



The Impact Of Ladongi Dam Construction On The Productivity Of Wet-Rice Farming In East Kolaka District

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Abstract

The research aims to determine the differences in productivity of rice paddy farms that obtain irrigation water from Ladongi Dam and rice paddy farms that do not obtain irrigation from Ladongi Dam. And to determine the income of paddy rice farms that obtain irrigation from Ladongi Dam and paddy rice farms that obtain irrigation not from Ladongi Dam. Location selection was done purposively with sampling technique purposive random sampling. The population was divided into two, namely rice paddy farms using irrigation of Ladongi Dam and rice paddy farms that do not use irrigation of Ladongi Dam. The observed variables include, respondent characteristics, namely age, education level and number of family members and farming experience. While the characteristics of farming, namely the area of cultivated land, the use of seeds, the use of fertilizers, pesticides, labor, production costs, production revenue and income. Data analysis used to determine the impact is to use the t test analysis. The results showed that the average productivity of paddy rice farming with irrigation from Ladongi Dam is equal to and which is not using Ladongi Dam irrigation of quintals per hectare. Rice paddy farming income irrigation from Ladongi Dam amounted to Rp. 14,833,483 per hectare and which is not using Ladongi Dam irrigation amounted to Rp. 12,092,541 per hectare. The results of statistical analysis of the impact of the construction of Ladongi Dam by using the analysis of differences in productivity of paddy rice farming Ladongi Dam development significantly different at 95% confidence. The impact of development affects the productivity of paddy rice in East Kolaka. The average productivity of paddy rice farming productivity that obtained irrigation from Ladongi Dam was 5,075 kilograms per hectare and not from Ladongi Dam was 4,806 kilo grams per hectare. So there is a difference in the productivity of rice paddy farming of

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about 269 kilograms per hectare.

Keywords: Impact; Development; Dam; Farm Productivity; Paddy Rice.

INTRODUCTION

Agricultural development is an integral and inseparable part of national development. Agricultural development in the reform era places farmers as subjects in order to achieve national goals. The goal of agricultural development is to empower farmers towards an independent, advanced, prosperous and equitable farming community. Agricultural development can be achieved through sustainable agricultural development. Sustainable agricultural development is characterized by the continuity of production that provides profits, increased agricultural production and the freedom for farmers to make the best choices in farming (Kurniawan, 2004).

According to Erwin (2009), the role of the agricultural sector is as follows. 1) as a provider of foodstuffs needed by the community to meet food needs 2) provider of industrial raw materials 3) as a potential market for products produced by industry 4) as a source of labor and capital formation, 5) source of foreign exchange earnings, 6) reducing poverty and increasing food security and, 7) contributing to rural development and environmental preservation.

Food crops are one of the main commodities that must be available all the time, one of the commodities is rice. Rice is an agricultural commodity that has an important meaning for the Indonesian population who make rice as a staple food. Paddy rice commodity has the main function as a national food supplier and until now this function has not been replaced by other food crop commodities. Given that rice commodities are very supportive of national food security, the development of rice crops is very important to continue.

Rice is a strategic and key commodity in meeting national food needs. This is because 95 percent of Indonesian people still consume rice as a source of carbohydrate food (Directorate General of Food Crop Production Development, 2004). The need for rice as one of the main food sources for the Indonesian population continues to increase, because in addition to the growing population with an increase of around 2 percent per year, there is also a change in population consumption patterns from non-rice to rice (Andriani, 2008).

The increasing demand for rice due to the growing population demands higher rice production. National rice production is currently around 4-5 tons per hectare, but this production is still unable to meet the needs of rice. Efforts to increase rice production must continue through several breakthroughs in increasing production and productivity (Directorate





General of Food Crops, 2016). In line with that Irawan (2004). Increasing rice productivity and production continues to be carried out to increase farmers' income and welfare and ensure food security. The use of high-yielding rice varieties and the improvement of farming quality such as tillage, fertilization and planting methods have succeeded in increasing rice productivity.

Related to that Everson and Pray (1999) in Adhitya *et.al* (2013) suggested that infrastructure as one of the fixed factors that contribute positively to the growth of the agricultural sector and its productivity. According to Azdan and Samekto (2008) Dams are one of the important infrastructure buildings in the field of water resources and dams are also very useful for the agricultural sector and can affect crop productivity and cropping patterns of wet-rice farmers.

Based on one of the irrigation infrastructures built by the government in East Kolaka Regency is the Ladongi Dam in Ladongi District. With the construction of the Ladongi Dam, it is hoped that it will supply continuous water, with the hope that it will have an impact on the productivity of paddy rice. East Kolaka Regency rice paddy productivity in 2019 amounted to 42.39 quintals per hectare and in 2020 increased to 44.76 quintals per hectare.

The above illustrates that the construction of the Ladongi Dam will affect the productivity of paddy rice in East Kolaka Regency. However, so far no research has been conducted that examines in depth the impact of the construction of the Ladongi Dam on the productivity of paddy fields. Therefore, the researcher is interested in conducting a study entitled "The Impact of Ladongi Dam Development on the Productivity of Paddy Rice Farming in East Kolaka District".

METHOD

The population in this study was a number of wet-rice farmers in Atula Village, Ladongi Sub-district and Mekarjaya Village, Dangia Sub-district. The total population of wet-rice farmers in Atula Village Ladongi Subdistrict amounted to 356 farmers and Mekarjaya Village Dangia Subdistrict 139 farmers. Then the total population of farmers amounted to 495 people. The research sample was obtained by *simple random sampling* with a total of 136. Types and sources of data used in this study are primary data and secondary data. Data collection techniques are carried out by observation, interviews, and documentation.

Analysis of the productivity of wet-rice farming in East Kolaka Regency used the following calculations:

$$\text{Farmland Productivity} = \frac{\text{Total Revenue (Rp)}}{\text{-----}}$$



Land area (ha)

Differences in the productivity of rice paddy farms that obtain irrigation from Ladongi Dam and rice paddy farms that do not obtain irrigation from Ladongi Dam, used the method of analysis of *T-test (sample T-test)*, statistical tests with *T-test (sample T-test)* is used to explain whether there is a difference in the productivity of rice paddies with irrigation from Ladongi Dam and who do not obtain irrigation from the Dam Ladongi., the formula used as follows:

$$t_{hit} = \frac{\bar{X}_1 - \bar{X}_2}{sd \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$\bar{X}_1$ = Average productivity of non-irrigated paddy rice farms from Ladongi Dam (Rp/ha).

$\bar{X}_2$ = Average productivity of rice paddy farms that receive irrigation from Ladongi Dam (Rp/ha).

N_1 = Number of samples of rice paddy farms that do not obtain irrigation from Ladongi Dam.

N_2 = Number of samples of wet-rice farms that obtain irrigation from Ladongi Dam.

S_1^2 = Standard deviation/variation of productivity of rice paddy farms that do not receive irrigation from Ladongi Dam.

S_2^2 = Standard deviation/variation of productivity of rice paddy farms that obtain irrigation from Ladongi Dam.

The test criteria if $t_{hit} > t_{tabel}$ then there is a difference in the productivity of rice paddy farms that obtain irrigation from Ladongi Dam and rice paddy farms that do not obtain irrigation from Ladongi Dam, otherwise if $t_{hit} < t_{tabel}$ then there is no difference in rice paddy farms that obtain irrigation from Ladongi Dam and rice paddy farms that do not obtain irrigation from Ladongi Dam.

Income analysis used a formula according to Soekartawi (2006) To determine net income, the following formula can be used:

$$Pd = TR - TC$$

Where:

Pd = Income (Rp)

TR = total revenue / total revenue (Rp)

TC = total cost (Rp)

RESULTS AND DISCUSSION

Respondent Identity

Respondent identity is one of the measures to determine success in farming. Respondent identity is also a personal identity that characterizes a person who describes the

true state of a person. Psychologically personal identity can also be used as a reflection of how mature a person is. In connection with this study, the identity of respondents who will be seen are. Age of farmers, education level, farming experience and number of family members.

Table 1 Identity of Respondents in Rice Paddy Farming in East Kolaka. 2022

Characteristics	Category	Ladongi DPB (Th)	BPB Ladongi (Th)
Age	High	60	61
	Low	24	32
Farming Experience	High	35	36
	Low	5	9
Education	Elementary school equivalent	18	20
	SLTP equivalent	28	19
	Senior High School Equivalent	26	14
	Higher Education	6	4
Number of Family Members	Highest	7	7
	Lowest	2	2
<i>Description</i> <i>DPB: With Irrigation Dam</i> <i>BPB: Not Irrigation Dam</i>			

Table 1 shows that;

1. The age of farmers who use Ladongi Dam in paddy rice farming varies, with the highest age being 60 years, the lowest 24 years, and an average of 42 years. In contrast, farmers who do not use Ladongi Dam irrigation have the highest age of 61 years, the lowest of 32 years, and an average of 46 years.
2. Farming experience with Ladongi Dam irrigation ranges from 5 years to 35 years, with an average of 17 years, while farmers who do not use Ladongi Dam irrigation have farming experience ranging from 9 years to 36 years, with an average of 21 years.
3. The education level of farmers who use Ladongi Dam irrigation consists of 23% elementary school graduates, 39% junior high school graduates, 33% high school graduates, and 5% university graduates. Meanwhile, farmers who do not use Ladongi

Dam irrigation consist of 34% elementary school graduates, 33% junior high school graduates, 24% high school graduates, and 9% university graduates.

4. The number of family members in both farmers who use and do not use Ladongi Dam irrigation both have the highest family members of 7 people, the lowest of 2 people, and an average of 4 people, indicating that the provision of family labor in the two groups of farmers is not much different.

State of the Farm

The farming conditions in this study include land area, labor, production, and farmer productivity. For more details in Table 2 below;

Table 2 Farm Condition Data

Characteristics	Category	Ladongi DPB	BPB Ladongi
Land Area	Widest	4	4
	Narrow	1	1
Labor Usage	Most	110	134
	Smallest	20	25
Production Quantity	Highest	21.000	22.000
	Lowest	2.800	2.300
Productivity	Highest	6.500	6.500
	Lowest	3.900	3.900
<i>Description</i> <i>DPB: With Irrigation Dam</i> <i>BPB: Not Irrigation Dam</i>			

Source: Primary data processed, 2023

Table 2 above shows the farming conditions in this study including land area, labor, production, and farmer productivity with the following details

1. Respondent farmers both irrigation Ladongi Dam categorized medium, which is an average of 1.56 hectares while respondent farmers not irrigation Ladongi Dam in the category categorized the largest with an average of 4 hectares, with an average land area of 3 hectares. With such conditions, respondent farmers can maximize their productivity by maximizing the land use of their paddy rice farms.

2. The highest use of labor of respondent farmers with Ladongi Dam irrigation is 110 HKP, the lowest is 20 HKP with an average of 45.15 HKP while respondent farmers without Ladongi Dam irrigation have the highest use of labor, namely 134 HKP, the lowest is 25 HKP with an average of 132 HKP.
3. The highest production of respondent farmers' farms was 22,000 kg, the lowest was 2,300 kg with an average production of 7,478 kilo grams. The difference in the amount of production of respondent farmers is mainly due to the amount of land area. The higher the land area, the higher the amount of production.
4. Productivity varies with the value of productivity in paddy rice farming with irrigation of Ladongi Dam 6,500 kg/ha while in paddy rice farming not irrigation of Ladongi Dam the productivity is the same as well as the productivity of both farms the same value of 3,900 kg/hectare. However, on average in irrigation farmers Ladongi Dam average value of productivity is higher, which is 5,075 kg / hectare while on not irrigation Ladongi Dam only 4,806 kilo grams per hectare. There is a difference in productivity of approximately 269 kilograms per hectare.

Use of Production Facilities

The use of production facilities referred to in this study is the use of fertilizers, pesticides, and seeds. For more details, see Table 3 below;

Table 3 Use of Production Facilities

Characteristics	Category	Ladongi DPB	BPB Ladongi
Fertilizer Usage	Urea	189	181
	NPK	416	300
Pesticide Type	Insecticide (liter/ha)	0,94	0,97
	Fungicide (liter/ha)	0,57	0,27
	rodenticide(liter/ha)	0,60	0,49
	Herbicide (liters/ha)	0,58	0,50
	Molluscasides (kg/ha)	0,34	0,39
Seeds	Highest	220	200
	Lowest	25	60
<i>Description</i> <i>DPB: With Irrigation Dam</i> <i>BPB: Not Irrigation Dam</i>			

Table 3 above shows data on the use of production facilities in terms of the use of fertilizers, pesticides, and seeds. The following is the description:

1. The use of urea fertilizer respondent farmers rice farming in irrigation Ladongi Dam average 189 kg/hectare, while the use of NPK fertilizer with an average of 416 kg/hectare. In respondent farmers not irrigation Ladongi Dam with an average of 181 kg/hectare, with the use of NPK fertilizer an average of 300 kg/hectare. Under these conditions, in general, the use of fertilizer both urea and NPK fertilizer used by respondent farmers depends on the size of the farmers' cultivated land.
2. Respondent farmers in general, both Ladongi Dam irrigation farmers and non-irrigation Ladongi Dam farmers have used pesticides as a means of production. The use of pesticides by farmers will be able to increase their production or productivity if other means of production are sufficient.
3. Seeds per hectare of respondent farmers in Ladongi Dam irrigation respondent farmers with the highest use of seeds 220 kg, the lowest 25 kg with an average of 51.7 kilograms per hectare. Whereas in respondent farmers who did not use Ladongi Dam irrigation, the highest was 200 kg, the lowest was 60 and the average was 60 kilograms per hectare. The difference in the use of seeds by petnai is mainly influenced by the area of cultivated rice paddy farms that are managed.

Cost

The cost components in this study are the cost of purchasing fertilizer, the cost of purchasing seeds, the cost of purchasing medicines, the cost of tillage, labor wages and the operational cost of purchasing fuel for irrigation at the research site that uses supplementary irrigation.

Table 4 Production Costs Per Hectare of Repondent Farmers

Cost Type	DPB Ladongi (IDR/ha)	BPB Ladongi (RP/Ha)
Production Cost		
a. Seeds	362.049	428.122
b. Fertilizer	1122540	982.541
c. Pesticides	1236926	920.829
labor	4.363.537	4.363.537
Land Processing	1.800.000	1.800.000

el for Irrigation	0	554.420
x	100.000	100.000
tal	7.913.319	9.399.448
<i>Description</i> <i>DPB: With Irrigation Dam</i> <i>BPB: Not Irrigation Dam</i>		

The average cost incurred by respondent farmers for both Ladongi Dam irrigation and not Ladongi Dam irrigation is different. From the results of the analysis it is known that the respondent farmers who are not irrigation Ladongi Dam cost expenditure higher costs when compared with petanmi respondents with irrigation Ladongi Dam, the magnitude of the difference in costs incurred per farmer amounted to 1,486,128 rupiah per hectare. This is because in the non-irrigation of Ladongi Dam there are additional costs for fuel and additional labor.

Admission.

Revenue is the amount of money received by respondent farmers in one harvest season. Economically, farmers' income can be used to continue their business in the future. Acceptance of farmers on irrigation Ladongi Dam perusahatani gain acceptance of the average acceptance per hectare Rp. 22,510,737. While the respondent farmers are not irrigation Ladongi Dam earned revenue with an average revenue of Rp. 21,491,988 per hectare.

Revenue

Income is the main goal of every farm, as well as rice paddy farming. Opinion is the result of the calculation of the difference between revenue and total costs incurred or used in paddy rice farming. The amount of income of respondent farmers who obtain irrigation from Ladongi Dam and not from Ladongi Dam can be seen in the following table.

Table 5 Average Income Per Hectare of Farmers

Description	Ladongi DPB (IDR)	BPB Ladongi (IDR)
Reception	22.510.737	21.491.98
Cost	7.913.319	9.399.448
Revenue	14.597.418	12.092.541
<i>Description</i>		



DPB: With Irrigation Dam

BPB: Not Irrigation Dam

The income earned by respondent farmers in the study where farmers who cultivate on irrigation Ladongi Dam has a higher income compared with not irrigation Ladongi Dam. The amount of income of respondent farmers on irrigation Ladongi Dam per hectare of Rp. 14,597,418 while the respondent farmers are not irrigation Ladongi Dam Rp. 12,092,541 per hectare. With a difference in income of Rp. 504,877, the difference in income is mainly due to the cost of production facilities to buy fuel for diesel engine operation.

Productivity Difference Test

To determine the difference in productivity of paddy rice farms using Ladongi Dam irrigation and those that do not use Ladongi Dam irrigation in East Kolaka Regency, the formula $0.001 \leq 0.005$ is rejected or accepted.

From the results of the t-test analysis using the SPSS 16.0 analysis tool, it was obtained t count of 3.446 as can be seen in appendix 11, this shows that there is a difference in productivity between respondent farmers using Ladongi Dam irrigation and not using irrigation not from Ladongi Dam.

From the results of the calculation on t, it is known that t count is 3.44 with a significance level of 95% or 0.05% with a value of 0.001. This shows that the value of t count ≥ 0.005 . This means that there is a difference in the productivity of rice paddies between those who get irrigation from Ladongi Dam and not from Ladongi Dam at the 95% confidence level. Where the average productivity of paddy rice productivity that obtains irrigation from Ladongi Dam is 5,075 kilograms per hectare and not from Ladongi Dam is 4,806 kilo grams per hectare. So there is a difference in the productivity of rice paddy farming about 269 kilograms per hectare.

The impact of the construction of the Ladongi Dam in addition to differences in the productivity of rice paddy farming in East Kolaka. It also has an impact on the amount of revenue, costs and income. On the cost side, in particular, there are differences between rice paddy farms that receive irrigation from the Ladongi Dam, namely the rice paddy farming area in Atula Village there is no additional cost to irrigate their fields or the cost of irrigation is zero. While respondent farmers who are not and do not get irrigation from the Ladongi Dam on respondent farmers in Mekar Jaya Village require extra costs to irrigate their rice fields, namely by using alkon (diesel) to increase the water supply on their rice fields. The amount of costs incurred by respondent farmers averaged 554,420 rupiah per hectare. Water is an important



factor in determining the success of rice paddy farming. Seeing this fact, it is hoped that the government will continue to strive to continue to improve agricultural infrastructure, especially dams, which are very vital for the sustainability of wet-rice farming.

CONCLUSION

The impact of the construction of Ladongi Dam from the calculation using the difference test shows t count 3.446 greater than 95% significance. The difference in productivity between Ladongi Dam irrigation and not Ladongi Dam irrigation with a productivity level of 5,075 kg per hectare while farmers with irrigation not Ladongi Dam productivity is 4,806 kg per hectare. Or there is a difference in productivity of approximately 256 kg per hectare.

With the difference in productivity of paddy rice farming between using irrigation Ladongi Dam then berpenagruh also with the level of income of farmers. In the petuni who use Ladongi income Rp. 14,833,483 while on farmers who do not use not irrigation Ladongi Dam Rp. 12,092,541 per hectare.

Based on the above conclusions, it is recommended that the construction of dams be continued in order to increase the productivity of paddy rice, which in turn can strengthen regional food security and contribute to national food provision. In addition, the government is expected to provide equipment assistance to farmers in need, especially for those whose rice fields do not yet have access to adequate irrigation, so that irrigation needs can be met optimally.

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