

Analysis of Differences in Productivity and Income of Maize Farming Using Bisi-2 Seeds and Local Maize in Marobea Village, Sawerigadi District, West Muna Regency

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Abstract

This study aims to find out: (1) How the Productivity Level of Corn Farming Using Bisi-2 Seeds in Marobea Village, Sawerigadi District, West Muna Regency (2) How the Income of Corn Farming Using Bisi-2 Seeds in Marobea Village, Sawerigadi District, West Muna Regency. The determination of the location of this research was chosen deliberately (purposive). The data collected in this study is by using primary data obtained from the results of direct interviews with farmers using a list of questions/questionnaires and secondary data that have been processed and obtained from agencies related to various sources of literature, journals, books, and the Central Statistics Agency (BPS) or from related parties. The sampling method was carried out using a proportional stratified withdrawal method from each element of the population that was sampled and sampling was carried out randomly (Proportionate Stratified Random Sampling), with a total of 35 farmers. The data analysis used in this study is productivity and income analysis. Results of the study (1) The average productivity of bisi-2 corn in Marobea Village, Sawerigadi District, West Muna Regency is 2,610 kg/ha/planting season. Meanwhile, the average local corn productivity is 991 kg/ha/planting season (2) The average total income of corn farming using bisi-2 seeds in Marobea Village, Sawerigadi District, West Muna Regency is Rp6,503,082/planting season. Meanwhile, the average income of local corn farming obtained was Rp399,333/planting season (3) The productivity and income of bisi-2 corn and local corn farming in Marobea Village, Sawerigadi District, West Muna Regency showed a difference of $.000 < 0.05$ so that there was a difference between the productivity and income of bisi-2 and local corn.

Keywords: *climate change, productivity, cloves, adaptation strategies*

INTRODUCTION

Indonesia is an agrarian country where most of the population lives from farming, so agriculture is a sector that plays an important role in the welfare of the lives of the Indonesian people (Prabowo, 2013). The role of the agricultural sector is as a source of producing basic needs, clothing and shelter, providing employment for most of the population, contributing to high national income, providing foreign exchange for the country and having a high economic *multiplier* effect with low dependence on imports (*multiplier effect*), namely input-output linkages between industry, consumption and investment (Antara *et al.*, 2010).

Agriculture in Indonesia has always been developed by the community until now. This is due to the abundance of Indonesia's natural potential, one of the agricultural commodities is corn (Ratulangi *et al.*, 2019). Southeast Sulawesi is one of the provinces in Eastern Indonesia that has a large enough wetland, which part of the population relies on the needs of life in agriculture, so that agricultural development in the region is emphasized in this field. One of the commodities developed in Southeast Sulawesi is corn. Corn crop production in Southeast Sulawesi in 2020 reached 167,817 tons. The 2020 corn production in West Muna Regency was 13,681 tons Statistics Indonesia (2020). Corn production in Southeast Sulawesi in 2021 can be seen in table 1.

Table 1 Maize Production in Southeast Sulawesi in 2020

No.	District/City	Maize Production (Ton)
1	Buton	2.747
2	Muna	23.861
3	Konawe	11.550
4	Kolaka	9.945
5	South Konawe	36.493
6	Bombana	2.641
7	Wakatobi	163
8	North Kolaka	41.808
9	North Buton	811
10	North Konawe	3.539
11	East Kolaka	15.025
12	Konawe Islands	195
13	West Muna	13.681

14	Central Buton	2.867
15	South Buton	1.500
16	Kendari City	596
17	Baubau City	395
	Southeast Sulawesi	167.817

Source: Southeast Sulawesi Central Bureau of Statistics, (2021)

West Muna Regency is part of Southeast Sulawesi Province, West Muna Regency is an expansion of Muna Regency where the majority of people work as farmers. In general, this region has considerable agricultural potential, with most of the population depending on the agricultural sector. Sawerigadi sub-district in West Muna is a rural community with the majority of livelihoods as farmers. The main food crops cultivated in Sawerigadi sub-district are; paddy rice, corn, peanuts, cassava, and sweet potatoes. The variety of horticultural crops cultivated in the Sawerigadi Sub-district is quite varied. For vegetable crops there are cayenne pepper, long beans, water spinach, mustard greens, large chili peppers, spring onions, tomatoes, eggplants, cucumbers, and others. Of the 1,521 residents, the majority cultivate hybrid and local corn crops, while the concentration of corn farmers is in Marobea Village.

Maize (*Zea mays Linn*) is a food commodity that has long been cultivated by Indonesian farmers (Komala *et al.*, 2008). Maize is one of the food crops that has a great opportunity to support national food self-sufficiency. In some regions in Indonesia, maize can be used as an alternative food to rice, one of which is in Sawerigadi District, West Muna Regency. It is not surprising that corn is a crop that is often planted by farmers in Muna. Corn farmers plant corn twice a year, namely October-November (west season) and April-May (east season). This indicates that people in Sawerigadi Sub-district of West Muna are people who like to consume corn and most of the land is used to plant corn (Marhini *et al.*, 2021).

Maize seeds used by farmers in Sawerigadi Sub-district, West Muna Regency consist of several types including bisi-2 and local jagunhg. Bisi-2 corn variety is one of the superior varieties of Palawija, this variety is a hybrid that is tolerant to downy mildew and leaf rust, 50 percent of the hair comes out at the age of ± 56 days and ripens / harvests at the age of ± 103 days. Another characteristic of this variety is that it has a plant height of ± 232 cm, high and upright stems, long, wide, and drooping leaves with bright green leaf color. Bisi-2 corn plants have uniform diversity, good rooting and resistance to dwarfism. Bisi-2 maize is famous for its 2 cobs per plant. Bisi-2 cobs are medium-sized, cylindrical, uniform, and positioned in the center of the stem with the kelobot covering the cob well. Maize has an important role in the agricultural sector in



Sawerigadi Sub-district, West Muna. Maize grows well on lands that become one of the main commodities planted by local farmers. Maize is not only a staple food source for the local population but also an integral part of community life in this area. From an economic aspect, maize makes a significant contribution in strengthening the local economy, both as a selling commodity and for the consumption and feed needs of the community.

METHOD

The population of this study were all maize farmers who used Bisi-2 seeds and local maize in Marobea Village, Sawerigadi Sub-district, West Muna Regency, totaling 182 people. The method of determining the sample was carried out using the *Proportionate Stratified Random Sampling* method as many as 35 people from a total population of 182 people with 104 Bisi-2 corn farmers and 78 local corn farmers. The types of data used in this research are primary data and secondary data. Primary data collection is done by observation, and direct interviews using a list of questions (Quiseonere), while secondary data is obtained from various sources, namely various related agencies. The following is the data analysis used in this study:

1. Data analysis used to determine the level of productivity of Bisi-2 corn and local corn farming is quantitative analysis with the formula put forward by Sudarmo, (2016):

$$\text{Land Productivity} == \frac{\text{Output Production Quantity (Kg)}}{\text{Input Land Area (Ha)}}$$

Description:

Productivity = Productivity (Kg/Ha)

Output = Total Production (Kg)

Input = Land Area (Ha)

2. The income of Bisi-2 and local maize farmers can be calculated using the formula proposed by Soekartawi 2003:

$$\pi = TR - TC$$

Where:

π = Total Income (Rp / Planting Season)

TR = Total Revenue (Rp / Planting Season)

TC = Total Cost (Rp / Planting Season)

3. To determine the differences in productivity and farm income between Bisi-2 corn and local corn, we used statistical analysis of the *t-test (independent sample t-test)* with a one-way test used for research comparing two variables. The formula of the t-test is as



follows (Magdalena *et al.*, 2019):

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Description:

$\bar{x}_1$ = Mean of sample 1

$\bar{x}_2$ = Sample mean 2

n_1 = Number of samples 1

n_2 = Number of samples 2

s_1 = Standard deviation of sample 1

s_2 = Standard deviation of sample 2

RESULTS AND DISCUSSION

Productivity Levels of Maize Farming Using Bisi-2 and Local Maize Seeds

1. Land Area

The main component of land is soil, which is an important part of agricultural land (Puryantoro and Wardianto, 2022). The following is data from farmer respondents according to land area in maize farming in Marobea Village in Table 2:

Table 2 Land Area of Respondent Farmers of Bisi-2 Maize and Local Maize in Marobea Village, Sawerihgadi Sub-district, West Muna District.

No.	Land Area (ha)	Number (Soul)	Percentage (100%)
1	<0,5	12	34
2	0,5-1	20	57
3	>1	3	9
	Total	35	100

Source: Primary Data, 2024

Based on Table 2, it illustrates the land area in corn farming. Most respondents have a land area of <0.5 Ha with 12 respondents with a percentage of (34%). Farmers who have a land area between 0.5-1 Ha are 20 respondents with a percentage of (57%). While farmers who have a land area of more than < 1 ha there are 3 respondents with a percentage of (9%). Land area also affects production, therefore the more land owned by farmers, the greater the opportunity

for these farmers to obtain higher income.

2. Production and Productivity

One indicator of the success of farmers in managing their farms is the amount of production obtained and the productivity received.

Table 3 Production and Productivity of Bisi-2 and Local Maize Farmer Respondents in Marobebe Village, Sawerigadi Sub-district, West Muna District

No.	Variables	Description	Bisi-2 Maize	Local Corn
1	Production	Total Production (Kg/season)	52.200	5.300
		Average Production (kg/Ha)	2.610	353,333
2	Productivity	Total Production (kg/season)	52.200	5.300
		Total Land Area (ha)	22	5,733
		Total Productivity	48.200	14.862

Source: Primary Data, 2024

Table 3 above explains that farmers produce more Bisi-2 maize than local maize. The total production of Bisi-2 maize reaches 52,200 kg per season, with an average production per season of 5,300 kg. Meanwhile, local maize production is 5,300 kg per season, with a higher average production of 353,333 kg per season. Thus, Bisi-2 maize shows a larger overall production compared to local maize based on the data in the table. Meanwhile, the amount of maize production using Bisi-2 seeds is 52,200 kg/planting season, the harvested area of Bisi-2 maize is 22 ha, and the total productivity of Bisi-2 maize is 48,200 kg/ha/planting season. The average productivity of Bisi-2 maize is then calculated by dividing the total production of 52,200 kg by the total area of 22 ha to obtain an average productivity of Bisi-2 maize of 2,610 kg/ha/growing season. Meanwhile, the production of local maize is 5,300 kg/planting season, the harvested area of local maize is 5,733 ha, and the total productivity of local maize is 14,862 kg/ha/planting season. The average productivity of local maize is then calculated by dividing the total production of 5,300 kg by the total area of 5,733 ha, resulting in an average productivity of Bisi-2 maize of 991 kg/ha/growing season. This means that the productivity of Bisi-2 maize is higher than the productivity of local maize.

Income Level of Maize Farming Using Bisi-2 and Local Maize Seeds

1. Fixed costs, fixed costs are costs that are relatively fixed, and continue to be issued even though production is a lot or little (Abubakar *et al.*, 2022). Based on the results of the

study, the calculated cost is the cost of tools that are depreciated, this depreciation is the capital spent by farmers based on the use of these tools. The agricultural tools in question include tanks, lawn mowers, machetes, and numerators. Fixed costs incurred by Bisi-2 maize farmers in Marobea Village, Sawerigadi Subdistrict, West Muna Regency after depreciation reached IDR 11,270,693, with an average cost of IDR 1,073,399 for one harvest season. On the other hand, local maize farmers incur fixed costs after depreciation of IDR 6,508,000, with an average cost of IDR 433,867 for one growing season. From this data, it can be seen that the fixed costs of growing Bisi-2 maize are much higher than local maize in the study villages.

2. Variable costs are costs that change with the level of production, such as costs for seeds, non-family labor, and crop maintenance costs such as fertilizers and medicines. The total variable costs incurred by Bisi-2 maize farmers reached IDR 57,778,000 with an average cost per season of IDR 2,888,900. On the other hand, local maize farmers spent a total of IDR 5,602,000 with an average cost of IDR 700,250 per season. This difference shows that variable costs are highly dependent on the type and scale of production undertaken by farmers, as well as different maintenance strategies and use of production inputs.
3. Acceptance, farming activities carried out by a person will result in a revenue received, in this case respondents of corn farming at a time. It is also stated by Soeharjo and Patong *in* Asram (2020) that, acceptance is the result of selling production in the farm or outside the farm (company). Revenue obtained by producers can be in the form of cash and non-cash receipts. In each planting season, the revenue from Bisi-2 variety corn in Marobea Village, Sawerigadi Subdistrict, West Muna Regency reaches Rp199,110,000. On the other hand, local maize farmers in the same village receive a total of IDR 18,100,000 per planting season. The average revenue per season is around IDR 1,206,667.
4. Farm Income , is the difference between revenue and total costs incurred during one growing season (Abubakar *et al.*, 2022).

Table 4 Income of Bisi-2 and Local Maize Farmer Respondents in Marobea Village, Sawerigadi Sub-District, West Muna District

No.	Description	Maize Bisi-2 (IDR/season)	Local Corn (IDR/season)
1	Revenue (IDR/season)	9.955.500	1.206.667
2	Cost (Rp)	3.452.435	807.333
3	Revenue (IDR/season)	6.503.082	399.333

Source: Primary Data 2024

Based on Table 4, it can be seen that the average revenue from Bisi-2 corn farming reached Rp9,955,500 per growing season. The costs incurred for this farm reached Rp3,452,435 per season, while the income earned was Rp6,503,082 per growing season. On the other hand, local maize farmers receive an average income of Rp1,206,667 per growing season. The costs they incur to farm local maize reach IDR 807,333 per season, while the income earned is IDR 399,333 per growing season. The size of the income received each harvest season can be influenced by the area of land, the amount of production and the selling price. The income received by farmers has certainly been reduced by all the costs used during the production process. The costs referred to in this study are variable costs, namely costs incurred for the procurement of seeds, fertilizers, pesticides and labor. While fixed costs are costs used to procure tools in corn farming.

Testing Differences in Productivity & Income of Bisi-2 Maize with Local Maize

The results of the analysis of differences in productivity and farm income of Bisi-2 maize and local maize were conducted using the t-test. The difference in productivity and income of Bisi-2 corn and local corn, then the significance of the relationship using correlation t-test (independent sample t-tests), the results of the t-test can be seen in Table 5.

Table 5 Results of T-test Analysis of Farm Productivity of Bisi-2 Maize and Local Maize in Marobea Village, Sawerigadi Sub-district, West Muna District

	Local Corn	N	Mean	Std. Deviation	Std. Error Mean
Bisi-2 Maize	Bisi-2 Maize	15	10557333.3333	3295432.91469	850877.11981
	Local Corn	15	1206666.6667	1874534.86294	484002.82040

Table 6 Independent Samples Test

		F	Sig.	t	df	Sig. (2-tailed)
Bisi-2 Maize	Equal variances assumed	7.579	,010	9.552	28	,000
	Equal variances <u>not</u> assumed			9.552	22.20	,000

Table 6. shows the results of the Significant value of $0.000 < 0.05$ which means that H1 is accepted, namely that there is a significant difference between the productivity of Bisi-2 corn

and local corn, namely the average productivity of Bisi-2 corn is 10,557kg / growing season while the average productivity of local corn is 1,206 kg / growing season, with a difference of 9,351 kg / growing season.

Table 7 Results of T-test Analysis of Farm Income of Bisi-2 Maize and Local Maize in Marobea Village, Sawerigadi Sub-district, West Muna District

		N	Mean	Std. Deviation	Std. Error Mean
Bisi-2 Maize		20	6503065.3500	2915302.42336	651881.43936
Income					
Local Corn		9	1026314.8889	1657428.58022	552476.19341
Revenue					

Table 8 Independent Samples Test

		F	Sig.	t	df	Sig. (2- tailed)
Local Corn	Equal variances assumed	3.768	,063	5.234	27	,000
Revenue	Equal variances			6.409	25.209	,000

Table 8 shows the results of the Significant value of $0.000 < 0.05$, which means that H1 is accepted, namely that there is a significant difference between the income of Bisi-2 corn and local corn, namely the average total income of Bisi-2 corn is Rp6,503,065 farmers / growing season while the average income of local corn is Rp1,026,314 farmers / growing season, with a difference of Rp5,476,751 farmers / growing season.

CONCLUSION

Based on the results of the discussion in the research on the analysis of differences in productivity and income of corn farming using Bisi-2 seeds and local corn in Marobea Village, Sawerigadi Subdistrict, West Muna Regency, it can be concluded that the average productivity of Bisi-2 corn in Marobea Village, Sawerigadi Subdistrict, West Muna Regency is 2,610 kg/ha/planting season. While the average productivity of local corn is 991 kg/ha/planting season.

The average total income of maize farming using Bisi-2 seeds in Marobea Village, Sawerigadi Sub-district, West Muna District is Rp6,503,082/growing season. While the average income of local corn farming is Rp399,333/growing season.

Productivity and income of Bisi-2 maize and local maize in Marobea Village, Sawerigadi Sub-district, West Muna District show differences where the sig value is ,000 <0.05 so there is a significant difference between productivity and income of Bisi-2 maize and local maize.

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