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THE PRODUCTIVITY AND INCOME ANALYSIS OF CORN FARMING IN LALODATI SUB-DISTRICT PUUWATU DISTRICT KENDARI CITY

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ABSTRACT

This study aims to determine the productivity of corn farming, the influence of land area, the amount of use of seeds, fertilizers, herbicides, and labor on the productivity of corn farming, as well as the income of corn farming in Lalodati Sub-District, Puuwatu District, Kendari City. This research was conducted from June to August 2022. Determining the number of samples in this study used the Census Method, so the respondents were 25 farmers. The data analysis used is the method of productivity analysis and income analysis. The results showed that the average productivity of corn farming was 1,867 kg/ha/planting season. In contrast, the average income earned by farmers is IDR 5,184,283/per planting season.

Keywords: corn farming; factor productivity; income; productivity

INTRODUCTION

Corn is the second main commodity after rice based on Indonesia's food economic nomenclature. In some areas, corn is used as the staple food of the community. However, along with the rapid development of the livestock industry, corn has become the main component in the feed ration. It is estimated that only about 30% is for food consumption needs. The rest is for feed, seeds, and other industries (Kasryno et al., 2011). Various efforts have been made to meet the demand for corn, including using superior-quality varieties, applying Integrated Crop Management (PTT), and extending support to increase production Ditjen Tanaman Pangan, 2018). Based on data from Badan Pusat Statistik Sulawesi Tenggara (2021), corn production in Southeast Sulawesi in 2020 will reach around 165,146.37 tonnes of dry shells. This production has decreased compared to 2019, reaching 279,170 tons of dry shelled. According to the Head of the Southeast Sulawesi Food Crops and Livestock Service, the decline in production occurred due to a decrease in the corn planting area. In 2019 the corn planting area reached 66,868 hectares, while in 2020 it was only 49,632.7 hectares (Suparman, 2020).

One of the districts that produce corn in Kendari City is Puuwatu District. Based on data from the Kendari City Agriculture Service in 2021, in the 2017-2020 range, corn production and harvested area in Puuwatu District experienced fluctuations, in 2017 the harvested area was 95 ha, and output of 589 tons, the highest occurred in 2019 with a harvested area of 124, 5 ha produces corn production of 771.9. Meanwhile, the lowest occurred in 2020, which could have 180 tons of corn with a harvest area of 30 ha.

Lalodati Sub-District is one of those who run corn farming in Puuwatu District, Kendari City. Based on data from the Kendari City Agricultural Service, in 2020, the corn planted in the Lalodati Sub-District will be 52 hectares with a production of 252 tons. Maize productivity in Lalodati Sub-District is 4.85 tons/hectare, higher than the average corn productivity in Kendari City and the average corn productivity in Southeast Sulawesi Province. The increased production and productivity of maize in the Lalodati Sub-District is one of the contributions from the Mula Menre'e, Soliwu, and Lalojaya Farmers' Groups, which the Puuwatu Agricultural Extension Center assists. These three groups produce hybrid types of maize with a total land area of 60 hectares. The selling price of corn is IDR

4,000–4,500/kg, depending on the corn production in Lalodati. The price will decrease if there is a simultaneous harvest with other farmer groups. Otherwise, the price will increase if there are not many farmers harvesting. Based on the potential of this Sub-District, it shows that corn farming can provide economic benefits for farmers, even though the cultivation is carried out on land that is not large. Because based on the results of the research conducted, the income earned by farmers is IDR 6,070,791.41.

Corn farming has provided farmers with increased income, productivity, and other economic benefits in Indonesia. Based on research conducted by Suharno & Rusdin (2017) and Fyka & Rahmawati (2022) that hybrid corn farming in Muna Regency is more profitable, the income earned is more significant, provides benefits for the welfare of farmers with monthly payment exceeding the UMP of Southeast Sulawesi. Besides that, Syamsuri & Alang (2022) obtained that corn cultivation in North Kolaka has economic potential because it can afford all production needs. Meanwhile, Abidin (2015) stated that the prospects for developing corn in Muna, Buton, Kolaka, and Kendari Regencies are very potential. Rosegrant et al. (1987) state that corn has a comparative advantage with other commodities traded between regions. Research conducted by Setyastiawan et al. (2010) showed that the cultivation of corn commodities influences increasing regional income, obtaining an income multiplier number which shows the effect on total revenue, and becoming the primary sector for the economy in the Karo Regency area. Corn farming also significantly contributes to the income of farming families in Jember and Gorontalo Regencies in one growing season of the total farmer household income, based on research conducted by Triana et al. (2022) and Yusuf et al. (2019) . The results of the analysis conducted by Anshar (2012) in Jeneponto Regency show that in addition to having an impact on increasing income, the corn sector can expand employment opportunities, besides that, supporting businesses can grow, such as distribution of production facilities, home industry, transportation services and the blacksmith industry. who made agricultural implements.

In this study, farmers in the Lalodati Sub-District started their farming business with a government program, Special Efforts (UPSUS), to Increase the Production of Rice, Corn, and Soybean Commodities (*PAJALE*) in 2015. From the program, farmers received assistance from certified hybrid corn seeds, fertilizer subsidized prices, and tools for the production needs of each farmer group which causes farmers to be greatly assisted in terms of capital, besides that the majority of land managed by farmers is loaned land, so it is hoped that farmers can produce excellent and high corn productivity because they use quality seeds and fertilizers while reducing excess costs for products that can increase farmers' income. Lalodati sub-district has the potential to engage in corn farming which is supported by good soil and climate conditions. However, the problem farmers face is that the area lent to farmers is decreasing because it has been diverted to housing developments. In addition, the results of an initial interview with one of the farmers, if they do not receive seed assistance, their farming will not work due to the high cost of corn seeds. Not only that, all the corn farmers there have not calculated the production *input* and *output*. Based on the description above, this research was conducted to know the productivity of corn farming and income in Lalodati Sub-District, Puuwatu District, Kendari City.

MATERIALS AND METHODS

The research location was in the Lalodati Sub-District, Puuwatu District, Kendari City. The location selection was carried out purposively *based* on the consideration that in Lalodati Sub-District, there are 3 (three) farmer groups whose members are engaged in corn farming and have the largest land area in Puuwatu District, namely 60 hectares. The time of research was conducted in June-August 2022. The population in this study were all members of the farmer group working on corn farming in 2021, a total of 25 farmers. Sampling was carried out using the census method, so the total sample was taken as a whole of 25 farmers. Data analysis used is descriptive analysis method, productivity analysis, and income analysis. Based on (Soekartawi, 2016), the following is the productivity equation:

$$\text{Productivity (kg/ha)} = \frac{\text{Amount of production produced (kg)}}{\text{Land area (ha)}} \quad (1)$$

The income equation is based on (Soekartawi, 2016) :

$$I = TR - TC \quad (2)$$
$$TR = Y.Py \quad (3)$$
$$TC = TFC + TVC \quad (4)$$

Information: TC = Total cost (IDR/planting season), TFC = Total fixed cost (IDR/planting season), TVC = *Total variable cost* (IDR/planting season), TR = *Total revenue* (IDR/planting season), Y = Total production, Py = *Price*, I = Income.

RESULTS AND DISCUSSION

Characteristics of Respondents

The characteristics of the respondents described in this study include age, level of formal education, number of family dependents and corn farming experience, as seen in Table 1.

Table 1. Characteristics of respondents in Lalodati Sub-District in 2021

Characteristics of Respondents	Number of people)	Percentage (%)
Age (Years)		
34-64	21	84
>64	4	16
Level of Education		
No School	1	4
Elementary School/Equivalent	6	24
Middle School/Equivalent	10	40
High School/Equivalent	8	32
Family Dependents (Person)		
1-4	21	84
>4	4	16
Farming Experience (Year)		
1-4	19	76
5-10	6	24

Table 1 shows that most corn farmers in the study area are aged 34-64, averaging 21 farmers with a percentage of 84%. This situation illustrates that the respondent farmers in Lalodati Kelurahan generally belong to the productive age group. Based on Badan Pusat Statistik (2013), productive age ranges from 15-64 years. Thus, they have the potential and ability to work better and can accept technology and information to develop the corn farming they manage.

Generally, education influences the way of thinking of farmers. High education at a young age will make farmers more dynamic (Tuwo, 2011). The education level of the most respondent farmers is at the junior high school/equivalent level, amounting to 10 people with a percentage of 40%. From these data, it was concluded that the education level of farmers in the study area was relatively low. This is because the farmers who are the respondents are mostly poor farmers who cannot continue their education due to limited funds owned by the farmer's parents. With farmers' relatively low formal education level, the management of corn farming is only carried out simply by the custom that has been carried out by exchanging information obtained between farmers. In addition, farmers also receive informal education in the form of counseling conducted by Field Extension Officers (*PPL*) of Puuwatu District.

They grouped the number of family dependents based on the classification from Badan Pusat Statistik (2000), namely minor family dependents of 1-3 people, medium-sized family dependents of 4-6 people, and significant family dependents of more than six people. The majority of the dependents of the respondent farmers, namely 21 people with a percentage of 84%, have small families, namely 1-3 people. Family members can be the capital of labor in the family. Still, in general, those involved in the corn farming process are the head of the family and his wife, so the availability of labor is not sufficient. Therefore, additional work from outside the family is needed during the harvest season.

The grouping of experience in farming is based on the category of inexperienced if working in the field of work for less than five years, quite experienced if working in a lot of work, quite experienced if 5-10 years, and experienced if more than ten years (Soehardjo & Patong, 1984). Most of the experience of farmers in farming corn fodder in the research area are less experienced, and previously the respondent farmers did vegetable farming. Farmers in the 5-10 year criteria, totaling six farmers, also do local corn farming. Since 2018, Lalodati Sub-District farmers have received assistance from certified superior variety seeds in the context of increasing production of corn commodities by at least 7% and a three-fold increase in exports in 2024 which will be channeled from the Directorate General of Food Crops. Since then, the respondent farmer in Lalodati has only started farming corn forage.

Characteristics of Corn Farming

Characteristics of corn farming in this study include land area, use of seeds, fertilizers, herbicides, labor, and the amount of production. The following details the characteristics of corn farming in Table 2.

Table 2. Characteristics of respondent farmers' corn farming in the Lalodati Sub-District in 2021

No.	Characteristics of Corn Farming	Range Per Farm		
		Highest	Lowest	Average
1	Land Area (ha)	1.5	0.5	0.96
2	Seed (kg)	27	10	18
3	Fertilizer (kg)	600	250	384
4	Herbicide (liter)	3	1	2
5	Labor (Labor Day)	47,25	13.125	27,195
6	Production (kg)	2,300	1,000	1,792

Table 2 shows that the area of corn farming cultivated by respondent farmers in the last planting season ranged from 0.5 to 1.5 ha with an average of 0.96 ha. Based on this, it can be concluded that the condition of the corn farming land for the average respondent is classified as medium arable land. This is by Hernanto's statement (1991) there are three groups of farmers based on the area of land they cultivate, namely the tiny area of arable land (<0.5 ha), the medium area of arable land (0.5 – 2 ha) and the large size of arable land (> 2 ha). Determining the ability of farmers to apply the technology disseminated is the area of land managed by farmers. The wider the land owned, the more farmers use recommended cultivation technology to increase their productivity and income Anwar & Prasetyowati (2021).

The use of seed by the respondent farmers during the last planting season ranged from 10 – 27 kg/ha/planting season with an average of 18 kg/ha planting season. The number of seeds used is still lacking, with the recommendation for hybrid corn seeds, namely 25 kg per hectare Irawan (2019). The amount of grain used by farmers indirectly affects the spacing they plant. Setting the spacing with a specific density aims to provide space for each plant to grow well. Spacing will affect the density and efficiency of light use, and competition between plants in water and nutrients affects crop production. At low densities, plants compete less with other plants, so the appearance of individual plants is better (Raja, 2019).

The fertilizer the respondent farmers use in cultivating corn farming ranges from 250 – 600 kg/ha planting season with an average of 384 kg/ha planting season. The amount needed by corn plants during the production process in one hectare depends on the fertility of the cropland. Therefore the actual dose of fertilization will differ from one place to another. However, as a general standard, the dosage of fertilizer for corn plants is 670 kg/ha (Murjoko, 2019). Based on these fertilization standards, the amount of fertilizer used in the study area is not the recommended dosage of fertilizer for corn plants. In addition, applying fertilizer to farmers' corn plants is only spread over the soil surface. In contrast, according to Akil (2009), recommendations for using fertilizer should be doubled because it is more effective than applying fertilizer spread over the soil surface. Because when the fertilizer is only spread when it rains, the fertilizer will be carried away by the water due to the uneven structure of the farmer's land.

The use of herbicides by respondent farmers in cultivating corn farming ranges from 1 – 3 liters/ha planting season with an average of 2 liters/ha planting season. The amount used is not following the recommendations, namely 3 liters/ha (Irawan, 2019). Eradicating weeds, apart from chemically, farmers also do it by pulling weeds manually. Herbicides are one of the agrochemicals besides fertilizers and pesticides whose use can be unfriendly to the environment. The negative impacts of the use of agrochemicals include contamination of water, soil, and agricultural products, health problems for farmers, decreased biodiversity, extinction of certain animal species such as worms that can fertilize the ground, and helplessness of farmers in procuring seeds (Yasmanidar 2019)

Respondent farmers tend to use labor outside the family compared to toil within the family. The lack of availability of labor in the family causes this. The use of delivery by farmers in working on the respondent's corn farming was only during harvesting activities. The average used was 27.195 Labor Day/planting season, consisting of workers within the family at 1.276 Labor Day/planting season and workers outside the family at 25.97 Labor Day/planting season. The use of this average is still low compared to the recommendations in the analysis of corn farming by the Editors of AgroMedia (2007) of 89 Labor Day/planting seasons. Generally, labor is used in every production activity, from land management, planting, fertilizing, maintenance, and harvesting to post-harvesting.

The use of delivery only at harvest time is because the respondent farmers can still do other parts themselves and work together to do it with group members. Besides that, farmers can also not be paid when adding workers.

The result expected by farmers in farming is their success in obtaining production with optimal productivity and receiving high selling prices. Corn production obtained by the respondent farmers ranged from 1,000 – 2,300 kg/planting season with an average of 1,792 kg/ha/planting season. Hybrid seeds are superior seeds. Their production potential can reach 10,000 – 12,000 kg/ha. The low production is caused by the uncertain weather, pest attacks, one of which is pigs, and the reduction of farmers doing farming because the owner has sold most of the land lent to farmers to construct a housing estate.

Productivity of Corn Farming

Farming productivity is defined as the ability of the soil to produce crops. Productivity is a manifestation of all factors of production (soil and non-soil) that will affect crop yields based more on economic considerations. More details can be seen in Table 3:

Table 3. Total production and productivity of corn farming in the Lalodati Sub-District in 2021

No.	Description	Production (kg)	Productivity (kg/ha)
1	Highest	2,300	2,000
2	Lowest	1,000	1,333
3	Average	1,792	1,867

Table 3 shows that the highest production obtained by farmers in one growing season reached 2,300 kg with productivity of 2,000 kg/ha. In contrast, the lowest production yield obtained by farmers was 1,000 kg, with productivity of 1,333 kg/ha. Thus, on average, each respondent farmer achieved corn productivity of 1,867 kg/ha. These results are still less than corn productivity which can reach ±8,000 – 9,000 kg/ha (Galib & Sumanto, 2009).

Corn Farming Income

Corn farming income is analyzed by calculating production revenue with production costs incurred. The income analysis explains how the structure of production costs and income from farming is carried out. The amount of corn farming income can be seen in Table 5 below.

Table 5. Analysis of corn farming income in Lalodati Sub-District in 2021

Component Analysis	Unit	Amount
Fixed cost	IDR/planting season	272,357
Variable Cost	IDR/planting season	2,643,200
Total cost	IDR/planting season	2,915,557
Corn Production	kg/planting season	1,792
Corn Prices	IDR/kg/planting season	4,520
Reception	IDR/planting season	8,099,840
Income	IDR/planting season	5,184,283

Based on Table 5, it can be seen that variable costs have higher costs than fixed costs, namely IDR 2,643,200/planting season. This study's fixed costs are depreciation equipment, Land and Building Tax, and transportation costs. In contrast, the variable costs include seeds, fertilizers, herbicides, and labor. To get rid of pests, farmers only do it conventionally without pesticides. Research conducted by Hermawan et al. (2017) showed the use of fixed costs of IDR 562,466.39/ha, which is lower when compared to variable expenses of IDR 7,146,565.28/ha in one planting season.

The average corn production is 1,792 kg/planting season, with an average price of IDR 4,520/kg/planting season. Based on the production and selling price of the production unit, the average yield of corn farming per planting season is IDR 8,099,840. The farmers' income in the study area varies depending on the amount of corn produced and the prevailing price. Rachmadina et al. (2021), in their research, obtained an income of IDR 6,070,791.41/ha/planting season. The total production was 2,865 kg, and the selling price was IDR 3,385.94/kg, resulting in IDR 9,757,359.38/ha/planting season revenue.

The total revenue is greater than the total cost incurred, and this means that the farmer's income can cover all expenses incurred in the corn production process. This corn farming is profitable for the gain of corn farmers in the study area. The average yield of the respondent farmer's income is

large enough to meet the necessities of life and support the household finances of the farmer when the price of the leading agricultural commodity of the respondent farmer in the study area declines. This aligns with research conducted by Purwanto et al. (2015), which obtained a total revenue more excellent than the total costs incurred.

CONCLUSIONS AND RECOMMENDATIONS

Based on the research results, it can be concluded that the average productivity of corn obtained is 1,867 kg/ha/planting season. Meanwhile, the average income farmers earn IDR 5,184,283/per planting season. It is recommended that corn farming activities be maintained, and business volume increased because the farming carried out can benefit farmers.

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