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Corn Using Efficiency Analysis in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, Lampung

ABSTRACT

One of the essential food crops worldwide is corn, which is also utilized in Indonesia as a feed for animals, a raw material for industry, and a source of basic requirements. This study intends to: (1) know the costs and income; and (2) know the efficiency of farming. In Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, the study's location was purposefully chosen. Cost and Revenue Analysis, Revenue Cost Ratio was utilized to analyze the study's data. (1) The average cost was 8.093.897,00 IDR, while the average income was 16.896.017,00 IDR, according to the findings. (1) Corn cultivation has been effective or profitable, as indicated by an R/C ratio of 2,09; (2) The average profit obtained is 8.802.119,00 IDR.

Keywords: Corn farming, Cost and income, Efficiency

INTRODUCTION

Corn (*Zea mays L.*) is one of the most important food crops in the world, besides wheat and rice. Indonesia is one of the corn producing countries that is used as an industrial raw material and as a staple food. In addition to being a source of carbohydrates for consumption, corn is also grown as animal feed, taken for oil (*from the ears*), artificial flour (*from the ears, known as cornstarch or cornstarch*), and industrial

raw materials (*from grain flour and cob flour*). Corn cobs are rich in pentose, which is used as a raw material for making furfural (Ari, 2010). One of the exploited and widely used secondary crops in Indonesia is corn (*Zea mays L.*), specifically as a source of raw materials for food and animal feed. One of the products in the food crop subsector that is strategically important to Indonesia's economy and agricultural development is corn. (Rukmana, 2010).

Labuhan Ratu IV Village is one of the corn farming centers in Labuhan Ratu district and East Lampung. According to the data, there are 25 farmer groups in Labuhan Ratu IV Village, and of those 25, 22 farmer groups (or 620 individuals) cultivate corn. The production of maize for the planting season of December–March 2021 will be 3.674.229 tons, with a productivity level of 58,1 (Kw/Ha), according to village data. The total land area used for corn growing is 632,25 (Ha). In Labuhan Ratu District, Labuhan Ratu IV Village produces 17,61% of the corn.

While there is a decent amount of production and productivity in the corn farming industry in Labuhan Ratu IV Village, Labuhan Ratu, East Lampung, it is impossible to ignore the numerous issues that farmers must deal with, from the production process to marketing corn agricultural products. Production issues are issues that frequently arise because of varying production conditions brought on by a number of issues, including pests and illnesses, weather and climate, rat assaults, and infections. The fluctuation of prices is another issue that Labuhan Ratu IV Village's corn farmers must deal with. Fluctuations in production and prices can make it expensive to run a farm and will reduce the amount of money that farmers make. Furthermore, the presence of these issues may reduce agricultural productivity.

The follow are the objectives of this study on corn production in Labuhan Ratu, East Lampung's Lauhan Ratu IV Village: (1) To determine the price and income of corn growing in Lauhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency; (2) To ascertain the effectiveness of corn farming in Lauhan Ratu IV village, Labuhan Ratu District, East Lampung Regency.

RESEARCH METHODS

Population and Sampling Methods

The research on corn farming was carried out in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency. The study was carried out between February and March of 2022. In this study, a simple random sample (simple random) technique was employed for sampling. Because sample population members are chosen at random from the entire population, regardless of demographic stratification, the simple random sampling technique is straightforward. The formula used is as follows: (Sugiyono, 2017).

$$n = \frac{N \,.\, z^2 \,.\, s^2}{N \,.\, d^2 + z^2 \,.\, s^2}$$

Note:
n = Total sample
N = Total population (620 corn farmers)
z2 = Confidence level

The level of confidence used is 95% or = 0,05. The z values are as follows:

Zα/2 = Z0.05/2 = Z0.025 = 1.96

s2 = Sample Variation
d2 = Degree of deviation (5% = 0.05)

$$n = \frac{620 \,.\, (1{,}96)^2 .\, (0{,}0583333)}{620 \,.\, (0{,}05^2) + (1{,}96)^2 . (0{,}0583333)}$$

$$n = \frac{138{,}937787}{1{,}77409321}$$

$$n = 78{,}3148181$$
$$n \approx 78 \text{ corn farmers}$$

Based on the sample calculation results, there were 78.31 respondents, rounded up.

Data collection Methods

The data used in this study are primary data and secondary data. The primary data used in this study were gathered through direct interviews with corn farmers in Labahan Ratu IV village, Labuhan Ratu, East Lampung, based on a questionnaire that had been produced with a list of questions. Secondary data are those gathered through indirect means, from records, documents, or literature that are relevant to the research and support it in Lauhan Ratu IV Village, Labuhan Ratu, East Lampung.

The data collection technique in this study used various methods, namely interviews with corn farmers, field observations, and literature reviews to examine previous research and complete the research data.

Data Analysis Method

Cost and Revenue Analysis

Analyzing the expenses and revenue associated with corn cultivation was the strategy employed for the first study's goal. Total costs are the total of all expenses, including both fixed and variable expenses, incurred to produce output. The following formula is used to determine the price of corn's agricultural production:

$$TC = FC + VC$$

Note:
TC = Total Cost (IDR)
FC = Fixed Cost (IDR)
VC = Variable Cost (IDR)

Corn production multiplied by corn's selling price is corn's agricultural revenue, with the following formula: (Pratama, Fajri, & Makmur, 2019).

$$TR = Y.Py$$

Note:
TR = Total Revenue (IDR)
Y = Total Corn Production (Kilogram)
Py = Selling Price of Corn (IDR/kilogram)

The difference between total costs incurred and corn farm income is corn farm income. The income formula is as follows: (Pratama, Fajri, & Makmur, 2019).

$$Pd = TR - TC$$

Note:
Pd = Income (IDR)
TR = Total Revenue (IDR)
TC = Total Cost (IDR)

Farming Efficiency

The R/C ratio approach is the technique employed in the second goal to assess the efficacy of corn farming. Comparing agricultural income and expenses is known as a revenue-cost ratio. Formula used:

$$R/C = \frac{\text{Receipt}}{\text{Total Cost}}$$

With the following concepts:
a = R/C
R = Py.Y
C = FC + VC
a = {(Py.Y) / (FC+VC)}
Note:
R = Revenue (IDR)
C = Total Cost (IDR)
Py = Selling Price of Corn (IDR/kilogram)
Y = Output (Kilogram)
FC = Fixed Cost (IDR)
VC = Variable Cost (IDR)

The business carried out is said to be efficient and profitable if:

(i) R/C Ratio > 1, the farm is considered to be efficiently run and lucrative or deserving of development and upkeep

(ii). If the R/C Ratio is less than 1, the farm is losing money or cannot be developed. (Pratama, Fajri, & Makmur, 2019).

RESULTS AND DISCUSSIONS

Characteristics of Corn Farmers

Farmers' characteristics are those of the corn farmers that participated in this survey as respondents. In this study, 78 maize growers from Labuhan Ratu IV Village participated as respondents. The age of the farmer, their most recent educational background, their farming experience, and the amount of land they farm for corn are all characteristics of corn farmers. Corn growers in Labuhan Ratu IV Village have the following traits:

Age of farmer

The Central Statistics Agency (2021) states that the age group (age) can be divided into two groups: the productive age group and the unproductive age group. Between the ages of 15 and 65, one can successfully develop a job. According to this justification, Table 1 shows the age range of farmers in Lauhan Ratu IV Village who participated in this study.

Table 1. Characteristics of Farmers by Age

No	Age (Years)	Number of Respondents	Percentage (%)
1	0-14	0	0
2	15-64	77	98,72
3	>65	1	1,28
	Total	78	100

Source: Primary data processed (2022)

According to Table 1, the majority of the maize farmers in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency are between the ages of 15 and 64, which is the productive age group. There are 77 farmers, or 98.72 percent, whose ages range from 15 to 64 and just 1 farmer, or 1.28 percent, whose ages range from 65 and older are considered to be tidal productive ages. Ashari (2020) explains that decision making on land management for corn growing is influenced by age in running agriculture. Farmers that are older have more wisdom and consideration when making choices.

Farmer's Education Level

According to Trahati (2015), education is an activity carried out by people knowingly and purposefully to reach specific life goals and objectives in order to develop each individual's capacities and talents as well as their excellent and strong character. Table 2 displays the education level of the farmers in this study.

Table 2. Characteristics of Farmers Based on Education Level.

No	Education	Number of Respondent	Percentage (%)
1	SD	8	10,26
2	SMP	35	44,87
3	SMA	32	41,03
4	S1	3	3,85
	Jumlah	78	100

Source: Primary data processed (2022)

According to Table 2. This shows the wide range of educational attainment among corn farmers in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency, from Elementary School (SD) to Bachelor's degrees (S1). 8 people, or 10,26 percent, have completed elementary school (SD), 35 people, or 44,87 percent, 32 people or 41,03 percent, have completed junior high school (SMP), and 3 people or as much as 3,85 percent, have completed high school (SMA). This indicates that the education level of corn farmers in Labuhan Ratu IV Village is still quite moderate, with more over 50% of them merely having completed junior high school (SMP). Hokum, Leunard, & Raja (2019) claim that a person's low level of education can be impacted by a variety of internal and external circumstances. Self-perception, a desire to attend school, parental encouragement, and poor economic conditions are internal variables that contribute to low levels of schooling. Distance from home to school and insufficient access are examples of outside factors that have an impact on educational level.

Farming Experience

Experience can be divided into three categories, according to Yunismar & Nofialdi (2014), namely low experience (group 1), medium experience (groups 2), and high experience (groups 3), all of which are defined as having more than ten years of experience. Table 3 displays the study's farmers' past farming experiences.

Table 3. Characteristics of Farmers Based on Farming Experience

No	Farming Experience (Years)	Number of Respondent	Percentage (%)
1	<5	7	8,97
2	5-10	14	17,95
3	>10	57	73,08
	Total	78	100

Source: Primary data processed (2022)

According to Table 3, there are up to 7 corn farmers in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency who have less than five years of experience or 8,97 percent, 14 farmers who have five to ten years of experience or 17,95 percent, and 57 farmers who have more than ten years of experience, or 73,08 percent. This demonstrates that the Labuhan Ratu IV Village corn farmers have a substantial amount of expertise managing a farming operation.

Farmer's Land Area

Farmers are divided into three categories, according to Susilowati & Maulana (2012): small-scale farmers with fertile land areas of less than 0,5 ha, medium-scale farmers with fertile land areas between 0,5 and 1 ha, and large-scale farmers with fertile areas greater than 1 ha. Table 4 displays the land area of the respondents.

Table 4. Characteristics of Farmers Based on Land Area

No	Land area (Ha)	Number of Respondent	Percentage (%)
1	<0,5	13	37,18
2	0,5-1	50	64,10
3	>1	15	19,23
	Total	78	100

Source: Primary data processed (2022)

According to Table 4, there are corn farmers who have land areas of less than 0,5 ha with as many as 13 people or 37,18 percent who belong to the small fertile land scale, as many as 50 people or 64,10 percent who belong to a medium or medium arable land scale, and as many as 15 people or 19,23 percent who belong to the land scale area who have land areas of more than 1 ha. Based on the appropriate column, the typical land area utilized by corn farmers in Labuhan Ratu IV Village to cultivate maize is categorized as being of a medium or medium scale. In order to boost the productivity produced on big tracts of land and the income earned by farmers, Wahed (2015) claims that land area is one of the most important elements.

Corn Farming Cost and Income Analysis

Agricultural income is the end result of subtracting entire fixed and variable costs from income (the price received is multiplied by the result gained). To determine the farmer's income, an income analysis is conducted. Both fixed and variable costs are mentioned when computing revenue, together with the amount of money the farmer makes. Farm production revenue is calculated by multiplying the volume sold by the unit cost. Both fixed and variable agriculture costs are covered in this revenue analysis. The costs that the farmer bears outright are known as variable costs. All expenses that are not recurring but nevertheless count as costs are categorized as fixed expenses (Tahir, 2017).

Farmer corn production multiplied by the price of corn obtained by farmers generates the income for corn-based agricultural products in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency. Both fixed and variable expenses are involved in the operation of a corn farm. Variable costs include the price of seeds, fertilizer, medications, labor, and transportation, whereas fixed costs include things like land and building tax and equipment rental prices. Table 5 displays the variable cost of growing corn in Labuhan Ratu IV Village.

Table 5. Average Variable Costs in Corn Farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency.

No	Description	Unit	Value
1.	Variabel cost (VC)		
	Seeds cost	IDR	1.016.558,00
	Fertilizer cost	IDR	1.826.026,00
	Drug cost	IDR	370.064,00
	Labor cost	IDR	3.777.436,00
	Transport cost	IDR	398.718,00
	Total Variabel cost (VC)	IDR	7.388.801,00

Source: Primary data processed (2022)

According to table 5, variable costs are expenses that maize farmers incur and have a significant impact on agricultural yields. The variable costs increase with the amount of land being farmed. The price of seeds, fertilizer, medications, labor costs, and transportation charges are the variable costs associated with maize production in Labuhan Ratu IV Village. These variable costs are utilized:

(1). Costs associated with purchasing seeds for corn growing are known as seed costs. BISI-18 seeds are employed in the growth of corn in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency because of its high quality and ability to deliver the corn growers' desired yields. The typical amount that corn farmers spend on seeds to maintain their operations is 1.016.558,00 IDR.

(2). Fertilizer costs are the fees farmers pay to purchase the fertilizer they use to grow maize. Urea and Phonska fertilizers were utilized in agriculture by all farmers who participated in the survey. The development of blossoms and fruits is enhanced by the application of urea and phonska fertilizers in corn crop growth. The average amount that farmers spend on fertilizer to operate their farms is 1.826.026,00 IDR.

(3). Drug costs are what corn growers pay to purchase medications like pesticides and herbicides. In Labuhan Ratu IV Village, corn farmers employ herbicides (drugs that kill weeds) such Kayabas, Mantapxone, Sidalaris, and Lindomin, while they use the insecticide Emacel to get rid of caterpillars and grasshoppers that damage corn

fields. The average cost of the drugs that maize farmers use to run their operations is 370.064,00 IDR.

(4). Labor costs are the costs incurred by corn farmers to pay labor wages when running a corn farm. In Labuhan Ratu IV Village, labor is required for plow-related land preparation, planting, caterpillar and weed spraying, fertilizer, harvesting, and post-harvest work. The average labor expense incurred by corn growers is 3.777.436,00 IDR.

(5). Transportation costs are costs incurred by farmers during the running of corn farming. Gasoline used in agriculture has a cost, as does moving the crop from the field to the farmer's house, who typically drives a car. The typical amount that farmers spend on transportation when operating a farm is 398.718,00 IDR.

Every growing season, corn producers in Labuhan Ratu IV Village spend an average of 7.388.801,00 IDR on variable costs. According to Ashari's research (2020), the variable expenses associated with growing corn in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province totaled 5.916.706,00 IDR and included the cost of seeds, fertilizer, insecticides, and labor. Due to fertilizer and labor expenses, corn cultivation in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province has lower average variable costs than corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency. greater labor costs, followed by additional transportation expenditures.

Table 6. Average Fixed Cost of Corn Farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency.

No	Description	Unit	Value
1	Fixed cost (FC)		
	Depreciation cost	IDR	191.603,00
	Land and Building Tax	IDR	20.994,00
	Rental Fee	IDR	492.500,00
	Total Fixed cost (FC)	IDR	705.096,00

Source: Primary data processed (2022)

According to table 6. Farmers incur fixed costs, which are expenses whose magnitude is not based on the size of the farm. In Labuhan Ratu IV Village, the fixed cost

of growing corn is made up of building land tax, equipment depreciation, and equipment rental charges. The fixed expenses corn producers must pay are as follows:

(1). Farmers must account for equipment depreciation since the quality of the machinery they employ to carry out agriculture has declined over time. Sickles, machetes, buckets, tarpaulins, corn planting tools, spray tanks, and jerry cans are among the tools used in corn farming. In one growing season, depreciating equipment costs 191.603,00 IDR.

(2). Farmers must pay taxes on the land they use to cultivate maize, which is known as the cost of land and building tax. The amount of taxes due is determined by the farmer's ownership of a specific parcel of land rather than his or her total land holdings. Farmers spend 20.994,00 IDR on average for land and building tax.

(3). Charges associated with renting the machinery needed to operate corn farms are referred to as rental costs. Plows are used by farmers to prepare the soil for planting, while corn planting equipment is rented by farmers to plant corn. Farmers rent equipment for a fee based on the amount of land they have farmed. Renting machinery for a maize farm typically costs 492.500,00 IDR per month.

The total fixed costs incurred by corn farmers in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency are 705.096,00 IDR per growing season. According to Ashari (2020) research, the average fixed expenditures associated with maize cultivation in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province are 228.279,00 IDR. These expenses include the cost of land leases and equipment depreciation. The average fixed costs for corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency are lower than the average fixed costs for corn farming in Patilanggio Regency, Pohuwato Regency, Gorontalo Province because corn farming in Labuhan Ratu Village has costs to rent equipment like plows and corn planting equipment, which results in higher fixed costs.

Table 7. Average Revenue on Corn Farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency.

No	Description	Unit	Value
1	Revenue (TR)		
	ProduCTION (Y)	Kilogram	5.088
	Selling Price (Py)	IDR/Kilogram	3.321,00
	Total Revenue (TR = Y.Py)	IDR	16.896.017,00

Source: Primary data processed (2022)

According to table 7. Farmers in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, produce 5.088 kg of corn on average per year, with a selling price of 3.321,00 IDR. Due to the production and sale of corn, corn farmers in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency typically earn 16.896.017,00 IDR each year.

According to Ashari (2020) research, farmers in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province typically produce 5.875 kg of corn each year at a cost of 3.143,00 IDR, bringing in an average of 18.462.500,00 IDR per growing season. Due to the higher average production, corn growing in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province yields higher income than corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency.

Table 8. Average Income on Corn Farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency.

No	Description	Unit	Value
1	Revenue (TR)	IDR	16.896.017,00
2	Total Variabel Cost (VC)	IDR	7.388.801,00
3	Total Fixed Cost (FC)	IDR	705.096,00
	Income (Pd = TR-TC)	IDR	8.802.119,00

Source: Primary data processed (2022)

According to table 8. In Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, corn farmers typically receive a fixed payment of 705.096,00 IDR.

The difference between the income generated by the total variables and fixed costs and the income received by corn farmers was 8.802.119,00 IDR.

According to Ashari (2020) research, the total costs associated with growing corn in Patilanggio Regency, Pohuwato Regency, and Gorontalo Province are 6.144.985.985,00 IDR with an average income of 18.462.500,00 IDR. Therefore, the total income during the growing season is 12.317.515,00 IDR. Compared to Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, corn agricultural revenue is higher in Patilanggio Regency, Pohuwato Regency, Gorontalo Province. This occurred as a result of higher farming expenses and lower corn yield in Labuhan Ratu IV Village.

Discussions

Farmers with an advanced farming mindset constantly consider how to distribute inputs or production elements as efficiently as possible to get the most production. Farmers must attempt to raise profitability with restricted agricultural costs if they are operating on a limited budget. In other words, they must figure out how to increase agricultural production with the fewest input costs (Rahim & Diah, 2008). Efficiency is a technique used in the production process to create the maximum output while keeping production expenditures as low as possible, especially for raw materials, or by being able to produce the maximum production output with limited resources.

One method of calculating the farmer's profit is to use the R/C ratio. You can determine how much money is made and how much it will cost the farmer by calculating the R/C ratio. The ratio of all revenue to all expenses incurred during production is known as the R/C ratio. The benefits for farmers in performing their farming tasks increase with the R/C ratio (Soekartawi, 2011).

Table 9. R/C ratio of corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency.

No	Description	Unit	Value
1	Production (Y)	Kilogram	5.088
2	Selling Price (Py)	IDR/Kilogram	3.321,00
3	Variabel Cost (VC))	IDR	7.388.801,00
4	Fixed Cost (FC)	IDR	705.096,00
	R/C = (Y.Py)/(CV+FC)		2,09

Source: Primary data processed (2022)

According to table 9. In Labuhan Ratu IV Village, Labuhan Ratu District, East Lampung Regency, corn growers made 16.896.017,00 IDR. In the meantime, the overall expense was 8.093.897,00 IDR. The determination of R is then made. The R/C ratio used to compare total revenue to total expenses is 2,09.

The obtained R/C ratio is more than 1, indicating that corn growing is profitable and effectively managed in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency. According to Pratama, Fajri, & Makmur (2019) research, Feasibility Analysis of Hybrid Corn Farming in Trumon Tengah Regency, South Aceh Regency, the ratio of cost of income (R/C) is the value derived from the comparison between the entire value of income and total costs incurred.

The R/C calculation on corn growing in Trumon Tengah Regency, South Aceh Regency, produced a result of 2,13. The R/C value is greater than 1, which is the same as the R/C ratio for corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency. It can therefore be deduced that hybrid corn farming in Trumon Tengah District and Labuhan Ratu IV Village has been effective and profitable enough that it is worthwhile to continue.

CONCLUSION

Based on the study on corn farming in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency, the average cost of running a farm is 8.093.898,00 IDR every growing season, while the average income is 16.896.017,00 IDR. In Labuhan Ratu IV Village, corn farmers make an average of 8.802.119,00 IDR per growing season.

The R/C ratio analysis on corn farming in Labuhan Ratu IV Village yielded a result of 2,09, indicating that the village's corn farming is profitable and effective enough to allow for the continuation and expansion of agriculture.

Research on the factors that affect maize farmers' yields and income in Labuhan Ratu IV Village may be conducted in the future. So that you may later determine precisely what factors affect the output and revenue of maize farmers in Labuhan Ratu IV Village, Labuhan Ratu District, and East Lampung Regency.

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