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INCOME ANALYSIS OF *ZEA MAYS L.* FARMING BUSINESS IN RUMPIN DISTRICT, BOGOR REGENCY

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ABSTRACT

Zea mays L. *is one of the productive commodities cultivated in Rumpin District, Bogor Regency. Although Rumpin Regency has potential, it is faced with several problems, namely the high price of fertilizers, the widespread use of similar pesticides, high labor costs, the high price of diesel fuel for the operational needs of agricultural machinery and equipment, and differences in the use of tools and machinery by each farmer in* Zea mays L. *cultivation activities. The purpose of this research is to analyze the production costs, income, and income efficiency of* Zea mays L. *farming in Rumpin District. The method used in this research is quantitative. Production cost expenditures were analyzed using cost analysis methods, and farming income efficiency was determined using R/C ratio analysis. The results showed that the total cost incurred was IDR 17,587,098/ha with a cash cost of IDR 7,486,439/ha and non-calculated costs of IDR 10,100,659/ha.* Zea mays L. *farming resulted in a positive average total income value. Income from cash costs was IDR 21.266.894/ha, and income from total costs was IDR 11.166.235/ha. The R/C ratio for cash costs was 5.17, and the R/C ratio for total costs was 2.42. This profitable* Zea mays L. *farming business can be continued by farmers in Rumpin District, Bogor Regency.*

INTRODUCTION

One of the mainstay agricultural commodities in Indonesia is *Zea mays L.* because *Zea mays L.* is the second food crop that is actively cultivated (Batoro, 2021). The number of farming households that produce the main agricultural commodities, with details: (1) rice, *Zea mays L.* and soybean commodities each around 14.99; 6.71; 1.16 million livestock business units; and (2) sugar cane commodities totaling around 195 thousand farming business units. Based on

data from the Department of Horticulture and Plantation Food Crops (Distanhorbun West Java, 2020) of West Java Province, the corn commodity widely cultivated in 27 districts/cities throughout West Java Province in 2020 was 1,176,476 tons. And specifically in Bogor Regency, the corn production figure in 2020 was 602 tons.

Rumpin District is one of the areas that cultivates a lot of *Zea mays L.* in a sustainable manner. Based on BPS data for 2020, *Zea mays L.* production in Rumpin District reached 115 tons. And the average planting area in 2016 – 2020 was 27.20 ha spread across Rumpin Village, Sukasari Village and Mekarsari Village (BPS, 2022). *Zea mays L.* farming in Rumpin District uses open rain-fed land around residential areas, former forests and former plantations which are classified as consistent and sustainable monocultures which are carried out within a year without any other crop rotation(Distanhorbun West Java, 2020)

The focus on management of *Zea mays L.* cultivation results is presented in the form of dry shells which are used for poultry feed and other post-harvest preparations. So, the harvest will be taken by poultry farming companies. Based on the results of the field survey, it was stated that the *Zea mays L.* planting pattern in Rumpin District, Bogor Regency is a monoculture pattern which consistently supplies the closest dry stock of *Zea mays L.* from Parung Market, South Tangerang City, Depok City, Bogor Regency, and Jakarta City so that *Zea mays L.* production is still ongoing. Based on the description relating to geographic location, land ownership, production input requirements, and the influence of market demand above, it is necessary to analyze the income efficiency of *Zea mays L.* farming in Rumpin District, Bogor Regency to determine the level of income. gain or loss in agricultural income. which is executed(xxxx, Year)

Zea mays L. is one of the productive commodities cultivated in Rumpin District, Bogor Regency. Based on observations in the field, *Zea mays L.* production is faced with several problems, including the high price of fertilizer, the large use of similar pesticides, high labor costs, and the high price of diesel fuel for operational needs of agricultural machinery. and tools, differences in the use of tools and machines respectively. Individual farmers in *Zea mays L.* cultivation activities, and there is uncertainty about land ownership because under certain conditions it is vulnerable to conversion. Thus, several of these problems have the potential to affect the efficiency of *Zea mays L.* farming income (Wahyuningsih et al., 2018)

Based on its geographical location, Rumpin District, Bogor Regency has a position close to the surrounding urban areas and still has a large expanse of land which is often cultivated for horticultural and food crops, so this area is one of the suppliers of *Zea mays L.* food products. for nearby urban areas, such as Parung Market, Tangsel City, Tanggerang City, Tanggerang Regency, Depok City, Bogor Regency, and Jakarta City(Distanhorbun West Java, 2020)

Zea mays L. is one of the food products supplied from Rumpin District every year. *Zea mays L.* cultivation is carried out in monoculture every year which is usually used for livestock and poultry feed. High market demand also influences the attractiveness of farmers to cultivate *Zea mays L.* every year and influences selling prices that vary at the farmer level. The selling price for *Zea mays L.* from January to June 2023 at the farmer level will be around IDR 4,500/kg to IDR 5,300/kg. The difference in the selling price of *Zea mays L.* certainly has the potential to influence cash receipts from *Zea mays L.* farming businesses in Rumpin District, Bogor Regency(Rahmadona & Rizka, 2021). Therefore, this research aims to analyze the efficiency of *Zea mays L.* farming income in Rumpin District, Bogor Regency in order to determine the level of profit received by farmers when cultivating *Zea mays L.*

RESEARCH METHODS

This research was conducted in Rumpin District, Bogor Regency. The location selection was carried out purposively with the consideration that the location is one of the consistent and sustainable producers of *Zea mays L.* every year in Bogor Regency. Research and data collection was carried out in March – June 2023.

Method of Collecting Data

This research uses quantitative methods to analyze Production cost expenditures were analyzed using cost analysis methods, the income and efficiency of *Zea mays L.* farming in Rumpin District, Bogor Regency. Income analysis is used to determine the amount of income received by farmers. Income efficiency analysis uses R/C ratio analysis to see income efficiency from *Zea mays L.* farming costs and the profits obtained.

Data Analysis Method

Sampling Method

The sample determination in this study was carried out using the census method (total sample), where the researcher took a sample of all hybrid corn farmers in Rumpin District, Bogor Regency. The sample criteria in this study were hybrid corn farmers with a planting period of February - May 2023. Based on data on the total population of hybrid corn farmers in Rumpin District, Bogor Regency, there were 19 respondents. A census or total sampling is a sample retrieval technique in which all members of the population are sampled. Research conducted on populations below 100 should be done by census, so that all members of the population are sampled as subjects to be studied or as respondents providing information (Sugiyono, 2018) .

Total sampling or census is a sampling technique if all members of the population are used as samples. This is often done if the population is relatively small, less than 30 people, or research that wants to make generalizations with very small errors. Another term for total sample is census, where all members of the population are sampled (Sugiyono, 2018).

Empirical Model

1. Revenue Analysis

Farming revenue is the result of multiplying the total product obtained by the selling price per unit of product. The total income formula is:

$$\boldsymbol{TR = Y \times Py}$$

Notes:
TR = Total Revenue (IDR);
Y = Production (Kg);
Py = Price Y (IDR/kg)

2. Cost Analysis

According to (Soekartawi, 2016) farming costs are all expenses used in farming. Farming costs can be divided into two, namely fixed costs and non-fixed (variable) costs. Fixed costs are costs whose amount does not depend on the size of the production to be produced, while non-fixed costs are costs whose size is influenced by the volume of production. Farming costs are also divided into 2 types, namely costs that are directly incurred (cash) and non-calculated costs (Rahmadona & Devitasari, 2022).

The following is the total cost formula:

$$\boldsymbol{TC = FC + VC}$$

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

The depreciation cost of agricultural equipment is calculated using the straight-line method, which divides the difference between the acquisition value and the estimated residual value by the useful economic life(Rizal et al., 2018). This method is used because the amount of equipment depreciation each year is considered the same and is assumed not to be sold.

According to (Rizal et al., 2018) to determine the depreciation cost of agricultural equipment can use the following formula:

$$\text{Tool depreciation costs} = \frac{(Nb - Ns)}{n}$$

Notes:
Nb = Tool purchase value (IDR)
Ns = Salvage value (IDR)
N = Economic life period (Year)

3. Income Analysis

Income is the difference between total income and total expenses (Soekartawi, 2016). The formula for income is :

$$\pi = TR - TC$$

Notes:
π = *Profit* (IDR)
TR = Total revenue (IDR)
TC = Total Costs (IDR)

4. Analisis Efisiensi Pendapatan

A business is said to be economically efficient from other businesses if its output to input ratio is more profitable than other businesses (Rahmadona & Rizka, 2021). Return and Cost Ratio (R/C ratio) is the ratio between the value of outputs and inputs or the ratio between revenues and farming costs(Soekartawi, 2016). The formula used is as follows:

$$R/C = \frac{TR}{TC}$$

Notes:
R/C = Revenue/Cost ratio;
TR = Total Revenue (IDR);
TC = Total Cost (IDR)

RESULTS AND DISCUSSION

Analysis of the Use of Means of Production in *Zea mays L.* Farming

Analysis of the use of production facilities is part of what is used in farming. Agricultural production will not get optimal results if it is not supported by good means of production (Rahmadona & Devitasari, 2022; Wahyuningsih et al., 2018) This analysis was conducted on *Zea mays L.* farms from February to May 2023.

a. Land

Land cultivated by farmers for *Zea mays L.* consists of self-owned land (52.63%) and rented land (47.37%) which is rain-fed. The rented land will be counted in the cash cost and the cultivated land is included in the farming cost. The cash cost of land rent for *Zea mays L.* farming in Rumpin sub-district is IDR 2,500,000/hectare/year. The area of land managed in farming affects production yields. The more land area used will certainly get an increase in yield (Folberth C, 2020), but if the more land area, the rental costs will also increase. Based on (Sajogyo, 1977) (Ahdiningtyas et al., 2023), the grouping of *Zea mays L.* farms in Rumpin Sub-district is mostly medium-scale farmers (73.684%) and large-scale farmers (26.316%). Of the land area, the average land value planted with *Zea mays L.* is 1,184 per farmer.

b. Seeds

Land cultivated by *Zea mays L.* farmers consists of owned land (52.63%) and rented land (47.37%). The *Zea mays L.* seed variety used is NK 212 because it is more resistant to weather and produces good, large-weight *Zea mays L.* Pods (Menteri Pertanian Republik Indonesia, 2013). Seeds are only purchased from a specialty shop in Kecamatan Rumpin at a price of IDR 100,000/kg. The *Zea mays L.* seeds used by farmers in Kecamatan Rumpin are included in the cash costs. The average cash cost calculated by *Zea mays L.* farmers for seed use is IDR 500,000 per planting period per hectare. Seed needs depend on the condition of the land area used and its growth. The average *Zea mays L.* seed use by farmers is 4,222 kg/ha^2.

c. Fertilization

In *Zea mays L.*, fertilization is done from the time the seeds are planted until the end of the planting period using urea, phonska, and chicken manure. The average use of urea fertilizer was 200 kg/ha^2, phonska fertilizer 200 kg/ha^2, chicken manure 2,622 kg/ha^2.

Purchased fertilizers have increased in price. During the previous planting period the price of urea fertilizer was IDR 2,250/kg, phonska fertilizer IDR 2,300/kg, chicken manure fertilizer IDR 75/kg, and during this research period IDR 2,700/kg, IDR 2,800/kg, and IDR 125/kg, respectively. These high fertilizer prices can cause the cost of agricultural inputs to increase, which results in a decrease in the profitability of *Zea mays L.* Farming (Wahyuningsih et al., 2018).

d. Pesticides

Pesticides are divided into two, namely insecticides and fungicides. The types of insecticides used are Curacron, Atraz, Aleron, Besmor, Furadan, Rat Poison, Calaris, and Marshal. The type of fungicide used is Bulaisida. Pesticides are needed in an effort to prevent and eradicate pests and diseases that attack. Control of plant pest organisms (OPT) must be done to minimize the use of synthetic pesticides. In addition, it also optimizes the use of alternative

pesticides that are environmentally friendly (Supriadi, 2013;Gajger & Dar, 2021). The need for pesticides can be seen in Table 1.

Table 1. Pesticide Needs of *Zea mays L.* Farms in Rumpin Sub-district, Bogor District per Hectare

Pesticide	Needs(liter)	Costs(IDR)
Insektisida		
a. Curacron	0,489	63.57,00
b. Atraz	1,000	112.000,00
c. Aleron	1,000	112.000,00
d. Besmor	0,250	28,00
e. Calaris	1,000	400.000,00
f. Marshal	0,489	19.56,00
g. Furadan	5,000	125.000,00
h. Racun Tikus	1,000	60.000,00
Jumlah	10,228	809.111,13
Fungisida		
a. Bulaisida	1,000	200.000,00
Jumlah	1,000	200.000,00
Total	11,228	1.009.111,13

Source: Primary Data, 2023

Table 1 shows that pesticide applications are made depending on pest and disease attacks. Pesticide use can be adjusted dynamically if there are pest and disease attacks that are at the economic threshold. Some pesticides are subsidized, namely the trademarks Atraz, Aleron, and Besmor, and other pesticides are not subsidized. The insecticide requirement per hectare is 10.228 liters/ha, while the fungicide is 1 liter/ha at IDR 809,111.13 and IDR 200,000.

e. Labor

According to (Soekartawi, 2016), labor is generally classified into two, namely labor outside the family (TKLK) and labor within the family (TKDK). The use of TKLK in *Zea mays L.* farming in Rumpin Subdistrict includes land cultivation, planting, fertilizing, weeding, spraying, harvesting, and post-harvesting. TKDK consists of family members such as husband, wife, children, and siblings who live together, while TKLK are relatives and people outside the family such as neighbors and local residents who are hired. The unit used in *Zea mays L.* farming is man-days (HOK). Working hours used by farmers ranged from 5 hours per day or adjusting the activities carried out. The labor of *Zea mays L.* farmers can be seen in Table 2.

Table 2. Labor of *Zea mays L.* Farmers in Kecamatan Rumpin, Bogor District per hectare.

No	Jenis Kegiatan	TKDK (IDR)	TKLK(IDR)
1	Land Preparation	740.278	433.333
2	Planting	483.333	48.611
3	Fertilizing and Watering	534.444	209.444
4	Weeding	210.000	-
5	Spraying	525.000	-
6	Harvesting	369.444	450.000
7	Post-Harvest	244.444	300.000
	Jumlah	3.106.943	1.441.389

Source: Primary Data, 2023

Based on Table 2, it can be seen that the largest cost in TKDK is IDR 3,106,943, meanwhile, the cost of hired labor (TKLK) amounted to Rp1,441,389. This shows that the cost of family labor (TKDK) was much larger than the cost of hired labor (TKLK). This is because farmers are still able to do all farm work. The working hours used by *Zea mays L.* farmers are uncertain, each job has different working hours depending on the size of the land and the type of activities carried out. The biggest activity cost is land management. The activity is carried out for 14 days. The expenditure value for labor costs in this study is similar to the research results conducted by Simanjuntak (2020), revealing that the expenditure for labor costs in one planting season was IDR 2.416.208 per hectare. Corn farming relatively absorbs quite a lot of labor. The high value of farmer expenditure for labor financing proves that corn farming absorbs quite a lot of labor.

Wages for each job also differ based on gender, with male labor costing IDR 100,000/day/person and female labor costing Rp50,000/day/person. This wage applies to all *Zea mays L.* cultivation activities from land management to post-harvest.

f. Agricultural tools

Agricultural tools used by *Zea mays L.* farmers in Rumpin Subdistrict are four-wheel tractors, hoes, sickles, maize planting tools, water pump/alkon machines, handspayers, corn shellers, and sack sewing machines. The four-wheeled tractors are government assistance given to the head of the Harapan maju farmer group (Sukasari Village) and the head of the Tunas Muda Tarogong farmer group (Mekarsari Village) and are also loaned to other farmers. Privately owned equipment used include hoes, sickles, corn shellers, corn planting tools, sack sewing machines, and water pump/alkon machines. These tools will not be replaced if they are still usable. The cost of depreciation of farm equipment will be included in the calculated costs, the depreciated value of the equipment is IDR 6,488,900 per hectare (xxxx, Year)

Farm Income of Zea mays L. Crops

The analysis of *Zea mays L.* farming income in Rumpin Subdistrict, Bogor Regency is divided into two components, namely revenue and costs. Revenue is the total amount received by farmers and partners. The amount of revenue received by *Zea mays L.* farmers depends on the production produced and the demand of partners. Farm receipts consist of cash and non-cash receipts. Cash receipts are receipts of *Zea mays L.* farmers paid by buying partners in the form of cash obtained from sales. Non-calculated costs receipts are obtained from the remaining *Zea mays L.* yields that are rejected or do not fit the criteria for sale, so the *Zea mays L.* is consumed and used by the farmers themselves or distributed to neighbors and the surrounding environment.

The price of *Zea mays L.* is IDR 4,500-5,300/kg. The selling price is determined through mutual agreement between farmers and partners, adjusted to certain conditions that cause price fluctuations. Furthermore, transportation costs, freight costs, and farming costs are borne by the farmers. The average production of *Zea mays L.* is 313.68 kg/ha with cash receipts of IDR 28,753.33/ha. The cash receipts of *Zea mays L.* farmers in Rumpin Subdistrict are greater than the research of (Kurniawati, et al. 2021)who analyzed the cost structure and income of *Zea mays L.* farming in Jerowaru Subdistrict, East Lombok Regency with an average receipt of Zea mays L. in Jerowaru Subdistrict of IDR 33,368,386.36/LLG or IDR 9,856,762.24/ha with costs incurred of IDR 13,624,957.09/LLG or IDR 8,107,899.81/ha so that the revenue received was IDR 19,743,417.91/LLG or IDR 11,748,855.67/ha. This means that *Zea mays L.* farming in Rumpin Sub-district has higher cash receipts compared to the selling price in (Kurniawati, et al. 2021). The revenue of *Zea mays L.* farming in Rumpin Sub-district can be seen in Table 3.

Table 3. Income from *Zea mays L.* Farming in Rumpin District, Bogor Regency per hectare.

No	Components	Volume (Kg)	Total (Rp)	Persentase (%)
1	Income on Cash Costs	313,68	28.753.333	100
	Total Revenue	313,68	28.753.333	100

Source: Primary Data, 2023

3. Farming Costs

Zea mays L. farming costs are the overall costs incurred by farmers during the production process in one planting period. Farming costs are divided into two, namely cash costs and Non-Calculated Costs (Rahmadona & Rizka, 2021).

a. Cash Costs

Cash costs are costs paid directly by farmers in the form of cash. Cash costs are influenced by the size of the production produced (Rahmadona & Rizka, 2021) .Cash costs in this study include out-of-family labor costs (TKLK), fertilizer purchase costs, pesticide purchase costs, seed purchase costs, land rental costs, vehicle operating costs, fuel costs (diesel), and electricity costs. The highest cash costs were incurred for the purchase of diesel fuel amounting to IDR 2,624,160 or 35.05 percent of the total farming costs. Meanwhile, the lowest cash costs were incurred for electricity amounting to IDR 29,259 or 0.39 percent of total farm costs. *Zea mays L.* farming costs in Rumpin Sub-district can be seen in Table 4.

Table 4. Cash Cost Structure per hectare

No	Components	Total (Rp)	Persentase (%)
	Fix Costs		
1	Land rent	2.500.000	3,50
	Variable Cost		
2	Seeds	500.000	6,68
3	Fertilizers	1.437.778	19,21
4	Pesticides	1.120.111	14,96
5	Packaging Costs	71.520	0,96
6	Fuel (Diesel)	2.624.160	35,05
7	Electricity	29.259	0,39
8	Hired Labor	1.441.389	19,25
	Total	7.486.439	100,00

Source: Primary Data, 2023

b. Non-Calculated Costs

Non-calculated Costs are costs that are not incurred in cash but are still taken into account to determine the value of the resources that have been expended. In this study, imputed costs include family labor (TKDK), tool depreciation costs, and land rent (for cultivated land that does not pay land rent). The highest calculated cost was equipment depreciation at IDR 6,488,900 per hectare or 64.24 percent of total farming costs. *Zea mays L.* farming costs in Rumpin Sub-district can be seen in Table 5(xxxx, Year)

Table 5. Non-Calculated Cost Structure per hectare

No	Components	Total (Rp)	Persentase (%)
	Fix Costs		
1	Land rent	504.815	5.00
2	Tools Depreciation	6.488.900	64.24
	Variable Costs		
3	TKDK	3,106,944	30.76
	Total	10.100.659	100,00

Source: Primary Data, 2023

C. Total Cost

Total costs are the sum of the cost components of *Zea mays L.* farming in Rumpin Sub-district, namely cash and imputed costs. Total costs have been summed up in values per hectare. The total cost of *Zea mays L.* farming in Kecamatan Rumpin can be seen in Table 6.

Table 6. Total cost per hectare

No	Components	Total (Rp)	Persentas (%)
1	Cash Costs	7.486.439	42.57
2	Non-Calculated Costs	10.100.659	57.43
	Total	17.587.098	100,00

Source: Primary Data, 2023

4. Income and Efficiency of *Zea mays L.*

Income over cash costs is the difference between income and cash costs. Income over total costs is the difference between income and total costs. Farming is said to be efficient based on the calculation of the R/C ratio. R/C ratio is the ratio between the value of output and input or the ratio between revenue and farming costs. R/C ratio in this study includes R/C ratio of cash cost and R/C ratio of total cost. The cash cost R/C ratio is calculated by dividing cash receipts by cash costs. This analysis illustrates the profitability of farming without taking into account the calculation of costs that must be incurred by farmers. The farm income of *Zea mays L.* in Rumpin Subdistrict, Bogor District can be seen in Table 7.

Table 7. Income and Efficiency of *Zea mays L.* in Rumpin Subdistrict, Bogor District

	Components	Total (Rp/Ha)
A	Total Revenue	28.753.333
B	Cash Costs	7.486.439
C	Non-Calculated Costs	10.100.659
D	Total Costs (B+C)	17.587.098
Income on Cash Costs (A-B)		21.266.894
Income on total Costs (A-D)		11.166.235
R/C on cash costs		3,84
R/C on total costs		1,63

Source: Primary Data, 2023

Table 7 shows that the value of income with cash costs is IDR 21,266,894/ha. The R/C ratio on cash costs of *Zea mays L.* farmers is 3.84, which means that every rupiah spent by farmers on cash costs will yield IDR 3.84. The value of income on total costs is IDR 11,166,235/ha, with an R/C ratio on total costs of 1.63. This means that every rupiah spent by farmers will generate IDR 1.63.

The R/C ratio on cash costs and total costs has a value of more than one. Based on the R/C ratio value, it can be concluded that *Zea mays L.* farming in Rumpin Sub-district is efficient to develop because the revenue is greater than the expenditure. This is in line with previous research on *Zea mays L.* farming income analysis conducted by (Kurniawati, et al. 2021). Septiadi and Hidayati research showed that the R/C ratio of total costs was 2.01, which means that for every IDR 1 spent on *Zea mays L.* farming, farmers received IDR 2.01 in revenue. Therefore, *Zea mays L.* farming in Jerowaru Subdistrict is declared efficient (Septiadi & Hidayati, 2023).

CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the research results, it can be concluded that:

1. *Zea mays L.* farmers in Rumpin Sub-district, Bogor District are profit. The results showed that the total cost incurred was IDR 17,587,098/ha with a cash cost of IDR 7,486,439/ha and non-calculated costs of IDR 10,100,659/ha. *Zea mays L.* farming resulted in a positive average total income value. Income from cash costs was IDR 21.266.894/ha, and income from total costs was IDR 11.166.235/ha.
2. Zea mays L. farming income in Rumpin Sub-district with cash cost was IDR 21,666,894/ha and income with total cost was IDR 11,166,235/ha. The R/C ratio at cash cost is 3.84, while the R/C ratio at total cost is 1.63.

Suggestions

Suggestions for the sustainability of *Zea mays L.* farming in Rumpin Sub-district are for:

1. farmers to reduce the cost of purchasing similar pesticides that are effective in controlling pests and diseases so as to reduce the cost of production facilities.
2. Farmers should reduce the cost of purchasing diesel fuel for the operational fuel needs of agricultural machinery by buying directly from gas stations and assisted with permits and notifications from the Bogor District Food Crops, Horticulture, and Plantation Office or the Agricultural Extension Center for Region III Leuwiliang to facilitate the purchase. In terms of quantity, the use of diesel fuel also needs to be reduced as needed. Thus, the cost of purchasing diesel can be reduced more economically, while remaining effective and efficient in terms of price.

REFERENCES

Ahdiningtyas, M., Maidatatia, A., Fitri, S., Uyun, S., & Alwi, F. (2023). Efisiensi Teknis dan Ekonomis Pada Usahatani Padi di Desa Alang-alang Kecamatan Tragah Kabupaten Bangkalan. *Agricultural Socio-Economic Empowerment and Agribusiness Journal*, *1*(2), 59. https://doi.org/10.20961/agrisema.v1i2.62663

Batoro, J. (2021). Ethnobotany Of Local Corn (Zea Mays L.) In Ngawu Sub-Village, Tosari District, Pasuruan Regency, East Java, Indonesia. *Journal of Southwest Jiaotong University*. https://doi.org/10.35741/issn.0258-2724.56.6.53

BPS. (2022). *BOGOR REGENCY IN FIGURES BPS-Statistics Of Bogor Regency*. Badan Pusat Statistik. Jakarta.

Folberth C, N. K. J. B. R. S. P. V. P. C. I. A. J. J. P. & M. O. (2020). The global cropland-sparing potential of high-yield farming. *Journal Nature Sustainability*, *3*, 281–289.

Gajger, I. T., & Dar, S. A. (2021). *Plant Allelochemicals as Sources of Insecticides*. https://doi.org/10.3390/insects

Kurniawati, N., Suparmin, & Amiruddin. (n.d.). Analisis Struktur Biaya Dan Pendapatan Usahatani Jagung Hibrida Di Kecamatan Jerowaru Kabupaten Lombok Timur Analysis Of Cost Structure And Income Of Hybrid Corn Farming In Jerowaru Subdistrict East Lombok Regency. *Agroteksos*, *31*(2), 2021.

Menteri Pertanian Republik Indonesia. (2013). *Pelepasan Galur Jagung Hibrida NK 212 Sebagai Varietas Unggul dengan Nama NK212*.

Rahmadona, L., & Devitasari, F. (2022). Income Analysis Of Dewa Carambola Farming In Sawangan Subdistrict, Depok City, West Java. *Journal of Agri*

Socio Economics and Business, *4*(1), 57–68. https://doi.org/10.31186/JASEB.4.1.57-68

Rahmadona, L., & Rizka, A. E. (2021). Income Efficiency Of Cassava Farming In Ciseeng Sub-District Bogor Regency. *Journal of Agri Socio Economics and Business*, *3*(2), 81–90. https://doi.org/10.31186/jaseb.03.2.81-90

Rizal, A., Agus Handaka Suryana, A., DwiPutro, R., & Perikanan dan Ilmu Kelautan Universitas Padjadjaran Jl Raya Bandung-Sumedang Km, F. (2018). *Analisis Komparasi Keragaan Usaha Budidaya Ikan Lele Mutiara (Clarias Gariepinus) Dengan Dan Tanpa Sistem Bioflok Comparative Analysis Of Performance Growing Business Of Mutiara Catfish (Clarias Gariepinus) With And Without Biofloc System* (Vol. 8, Issue 1).

Sajogyo. (1977). *Golongan Miskin dan Partisipasinya Dalam Pembangunan Desa*. LP3ES. Jakarta.

Septiadi, D., & Hidayati, A. (2023). *Analisis Efisiensi Dan Faktor-Faktor Yang Mempengaruhi Produksi Jagung Di Daerah Penyangga Kawasan Ekonomi Khusus Mandalika Efficiency Analysis And Factors Affecting Corn Production In The Buffer Area Of The Mandalika Special Economic Zone*. *5*(2), 113–121.

Soekartawi. (2016). *Analisis Usaha tani*. UI Press. Jakarta.

Sugiyono. (2018). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.

Supriadi. (2013). Optimal Use of Various Kinds of Pesticides to Control Plant Pests and Diseases. In *J. Litbang Pert* (Vol. 32, Issue 1).

Wahyuningsih, A., Setiyawan, B. M., & Kristanto, B. A. (2018). Efisiensi Ekonomi Penggunaan Faktor-Faktor Produksi, Pendapatan Usahatani Jagung Hibrida Dan Jagung Lokal Di Kecamatan Kemusuk, Kabupaten Boyolali. *Jurnal Sosial Ekonomi Pertanian*, *2*(1), 1–13. https://doi.org/10.14710/agrisocionomics.v2i1.2672