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FARM INVESTMENT ANALYSIS SUGARCANE IN GONDANGLEGI SUB-DISTRICT, MALANG DISTRICT (EAST JAVA) AND JAKEN SUB-DISTRICT, PATI DISTRICT (CENTRAL JAVA)

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ABSTRACT

This study aims to determine the financial feasibility of sugarcane farming in East Java and Central Java. The research was conducted using the literature method. The research locations were Gondanglegi District, Malang Regency (East Java) and Jaken District, Pati Regency (Central Java). The analytical tools used were farmer income, R/C Ratio, profitability, trend analysis and Mann-Whitney t- test. The results showed that the NPV value in Gondanglegi and Jaken sub- districts amounted to Rp.6,827,042,420 and Rp. respectively. IRR is 579.208% and 427.800% respectively and B/C Ratio value is 1.025 and 1.565 respectively, there is a difference in income received by farmers.

Keywords: farm feasibility, NPV, IRR, B/C Ratio.

INTRODUCTION

The sugar industry in Indonesia made from sugar cane has existed since the Dutch colonial era. The sugar industry is classified as an industry whose existence is old in the world. This can be seen from the history of the sugar industry in Thailand which has been established since the 13th century, in Brazil since the 15th century, and in Indonesia it is estimated to have existed since the 16th century. Indonesia experienced the glory era of the sugar industry in the 1930s with 179 operating sugar factories (PG), productivity of around 14.80%, and yields of 11%-13.80%. Peak production reached up to 3 million tons and sugar exports amounted to 2.40 million tons. This success was supported by the ease of obtaining fertile land, cheap labor, priority irrigation, and discipline in the application of technology (Susila et al., 2005).

The increase in sugar consumption in Indonesia from year to year provides ample opportunities for increasing the production capacity of sugar factories. In addition, the amount of sugar production in the country is currently felt to be unable to meet the needs of sugar in Indonesia. In the future, the government strives for Indonesia to achieve sugar self-sufficiency as one of the steps towards National Food Security. In order to support the improvement of sugarcane plantation development and the Indonesian sugar industry, information on the potential of sugarcane in Indonesia is needed. Sugarcane plantations in Indonesia according to their exploitation can be divided into Large Plantations (PB) and People's Plantations (PR). Large plantations consist of Large State Plantations (PBN) and Large Private Plantations (PBS).

In 2021 and 2022, the sugarcane area of both PBN and PBS decreased. The sugarcane area for PBN in 2021 was 76.98 thousand hectares, a decrease of 3.67 thousand hectares (4.55 percent) compared to 2020. Likewise, for 2022 against 2021 there was a decrease of 8.43 thousand hectares (10.95 percent) so that the area of sugarcane in 2022 became 68.55 thousand hectares. Sugarcane area for PBS in 2021 amounted to 131.19 thousand hectares, a decrease of 5.49 thousand hectares (4.02 percent) compared to 2020. In 2022, it decreased again by 7.44 thousand hectares (5.67 percent) compared to 2020.

2021 to 123.75 thousand hectares. Meanwhile, the PR sugarcane area in 2021 amounted to 239.18 thousand hectares, an increase of 690 hectares (0.29 percent) compared to 2020 and in 2022 decreased by 11.34 thousand (4.74 percent) to an area of 227.85 thousand hectares (BPS, 2022).

Large plantations (PB) and smallholder plantations (PR) of sugarcane are spread across ten provinces in Indonesia, namely North Sumatra, South Sumatra, Lampung, West Java, Central Java, DI Yogyakarta, East Java, West Nusa Tenggara, South Sulawesi, and Gorontalo. In terms of area, the five provinces with the largest sugarcane area in 2022 were East Java Province with 201,980 ha, Lampung 111,791 ha, Central Java 32,659 ha, South Sumatra 19,122 ha, and West Java 18,641 ha.

East Java Province has the largest sugarcane area in Indonesia. Sugarcane producers in East Java are spread across various districts or cities. One of the largest producers of sugarcane production in East Java is Malang district. Based on data from the East Java Provincial Plantation Office, in 2022 Malang district was the largest contributor to sugarcane crop production in East Java, amounting to 221,205 tons. And Gondanglegi sub-district is the sub-district that has the largest sugarcane land area in Malang Regency, which is 327.5 ha. While in Central Java as the province that has the third largest sugarcane area in Indonesia is in Pati Regency, precisely in Jaken District, which is 286 ha. This proves that there are still many people in Malang District, especially Gondanglegi District, Pati District, especially Jaken District who still survive to plant sugar cane and make sugar cane a commodity to earn income. From this background, the author wants to elaborate on **"Investment Analysis of Sugarcane Farming in Gondanglegi District, Malang Regency (East Java) and Jaken District, Pati Regency (Central Java)".**

The more land owned by farmers, the greater the amount of production produced so

that the welfare of farmers will increase. Productivity has a positive effect on farm income and profitability.

High productivity will cause high farmer income with efficient production costs so that farmer income and farm profitability will increase. By calculating the feasibility level of sugarcane farming, farmers can find out whether the farm is feasible or not.

This study aims to determine the feasibility level and investment level of sugarcane farming in Gondanglegi District, Malang Regency (East Java) and Jaken District, Pati Regency (Central Java).

RESEARCH METHOD

The research method used is literature using data from the Indonesian Statistics Agency.

The amount of *Net Present Value* obtained by sugarcane farmers is calculated using a formula that refers to Kadariah (1999) as follows:

NPV = Total PV Proceeds - Total Outlay

The criteria are:

If NPV > 0, then the business is financially feasible to implement because the benefits obtained are greater than the costs. If NPV = 0 then the benefits of investment are equal to the level of *social opportunity cost of capital*, financially the business is difficult to implement because the benefits obtained are only enough to cover the costs incurred. If NPV < 0 then the business is not feasible to implement, this is because the benefits obtained are smaller than the costs incurred.

Internal Rate of Return analysis is the maximum interest rate (*discount rate*) to arrive at NPV equal to zero, in other words, the *Internal Rate of Return* is the average annual internal profit rate expressed in units of percent. calculated using a formula that refers to Kadariah (1999) as follows:

$IRR = i_1 + (NPV_1 / (NPV_1 - NPV_2)) \times (i_2 - i)_1$

Where:

NPV_1 = NPV is positive
NPV_2 = NPV is negative

i_1 = *discount rate* that produces positive NPV i_2 =

discount rate that produces negative NPV

The Net B/C *ratio* is the ratio of the present value of positive net benefits to the present value of negative net benefits. This figure shows the level of additional benefits for each additional cost of one unit of money. The criterion used for selecting the *Net* B/C *ratio of* project benefits is to select all projects whose B/C ratio value is one or more if the benefits are discounted at the *opportunistic capital* cost level (Gittinger, 1986), but if the *Net* B/C value is one or more if the benefits are discounted at the *opportunistic capital* cost level (Gittinger, 1986).

< 1, then the project is not feasible to implement. The formula used is (Kadariah, 1999):

$$\text{B/C Ratio} = \frac{\sum \text{PV Proceed}}{\sum \text{PV Outlay}}$$

Sensitivity analysis according to Gittinger (1986) on projects in the agricultural sector can change as a result of four main problems, namely changes in product selling prices, delays in project implementation, increases in input *costs* (*cost over run*) and errors in estimating production yields. Each possible change or error in the basis of calculation. Scenario I saw an increase in the selling price from Rp.16,000/kg to Rp.18,000/kg. Scenario II there is a 5%

decrease in production.
Mann Whitney difference test using spss 17, whether there is a difference in the average income per hectare of sugarcane in Gondanglegi District, Malang Regency (East Java) and Jaken District, Pati Regency (Central Java).

RESULTS

Farm Feasibility Analysis

Table 1. Financial Feasibility Results of Sugarcane Farming

No	Location	NPV Value	IRR Value	B/C Ratio Value
1	Godang Legi	Rp.6,827,042,420	579,208%	1,025
2	Jaken	Rp.20,149,118,785	472,800%	1,565

Table 1. Results of Sugarcane Farming Assumption Scenario

Location	Assumption	NPV	IRR	B/CRatio
Gondanglegi	Scenario I	Rp.4,296,092,901	601,00%	1,037
Jaken		Rp.17,218,841,340	347,800%	1,408
Gondanglegi	Scenario II	Rp.6,945,953,351	588,002%	1.014
Jaken		Rp.19,942,030,307	464,002%	1,549
Gondanglegi	Scenario III	Rp.2,580,060,550	90,077%	0,878
Jaken		Rp.12,823,425,173	168,005%	1.173

DISCUSSION

Investment Analysis

The amount of investment in Gondanglegi District is Rp.68,760,000 and in Jaken District it is Rp.61,670,000. The investment owned by each location is tools to support farming such as hoes, sickles, tractors, and hand sprayers. *Payback Period* in sugarcane farming in Gondanglegi District is 2 years 11 months 19 days, which means that business capital will return after the farm runs for Gondanglegi 2 years 11 months 19 days. Meanwhile, in Jaken District, it is 4 years 4 months 29 days, which means that the business capital will return after the farm runs for 4 years 4 months 29 days.

Farm Feasibility Analysis

Production costs are obtained from the sum of fixed costs and variable costs. The total production costs incurred by sugarcane farmers in Gondanglegi District for one year amounted to Rp.8,344,931,333. Fixed costs amounted to Rp.3,258,625,333 and variable costs amounted to Rp.5,086,306,000. Total production costs incurred by sugarcane farmers in Jaken District for one year amounted to Rp.5,116,540,000. Fixed costs amounted to Rp.1,625,333 and variable costs amounted to Rp.5,118,165,333 Fixed costs will not affect the level of activity carried out, although the activity is increased or decreased the amount of fixed costs will be the same. The thing that causes the difference in the amount of high or low fixed costs in farming is the amount of land area owned and depreciation costs incurred. A large land area will require large tax costs as well. This is in accordance with the opinion of Hansen and Mowen (2000) which states that fixed costs are costs that are constant or fixed even though the level of activity in the company increases. Warindrani (2006) added that the costs included in fixed costs are land tax and depreciation costs. Variable costs are costs

whose amount always changes following the volume of activities carried out. The costs included in this cost are the purchase of production facilities needed in farming such as the purchase of seeds, fertilizers, pesticides and labor costs. This is in accordance with the opinion of Sutrisno (2001) which states that variable costs are costs whose amount is not constant, meaning that the amount of these costs will change according to the level of production activities carried out. Faisal (2015) states that variable costs are costs paid to meet the needs of production facilities such as fertilizers, seeds and medicines. Warindrani (2006) added that examples of variable costs are raw material costs and direct labor costs.

The total revenue received for one year in Gondanglegi District amounted to Rp.8,549,625,000 with a selling price of Rp.350 / kg. Toal revenue received for one year in Jaken District amounted to Rp.8,008,000,000 with a selling price of Rp.400 / kg. high amount of production will affect the revenue received by farmers This is in accordance with the opinion of Zaini (2010) which states that the factors that affect the size of the amount of revenue on farmers is the amount of production. Farmers who get high production will get a large revenue and farmers who get a small revenue then the revenue received is also small.

The total income received by farmers in Gondanglegi Subdistrict amounted to Rp. 2,026,467,300, and in Jaken Subdistrict amounted to Rp.2,862,436,403 from the amount of income received is quite low for Gondanglegi Subdistrict income received for 325.7 ha so that per hectare of income received amounted to Rp.6,187,686, and for Jaken Subdistrict the income received per hectare amounted to Rp.10,003,273 this can be caused by the low selling price of sugar cane. The selling price of sugarcane in Gindanglegi District is Rp.350/kg while in Jaken District it is Rp.400/kg. The low selling price of sugar cane results in the income received by farmers will also be lower and can affect the level of prosperity for farmers. In the tabel 1 financial analysis of sugarcane farming in Gondanglegi District with a total land area of 325.7 hectares, an NPV value of Rp.6,827,042,420 was obtained and in Jaken District with a total land area of 286 hectares, an NPV value of Rp.6,827,042,420 was obtained. Rp.20,149,118,785, using a discount rate of 6.5%. The NPV value is the total sum of the *Present Value of* each year from year zero to year five, showing the difference between the present value of the investment and the present value of future net cash receipts. NPV in sugarcane farming in both Gondanglegi and Jaken sub-districts is greater than zero, meaning that sugarcane farming is feasible.

The Internal Rate of Return value illustrates the ability of a project's investment return on its investment expenditure. The use of the IRR value is especially intended for investors to estimate the return on investment they will receive for the project they invest in. The IRR value is always compared to the prevailing interest rate such as savings or deposits. An IRR value greater than the prevailing interest rate makes an investment project attractive to investors. This sugarcane farming was compared with an interest rate of 6.5%. The IRR value for sugarcane farming in Gondanglegi District is 579.208% and in Jaken District it is 472.800%, meaning that the interest rate that equates the present value of investment with the present value of future net cash receipts is an interest rate of 579.208% in Gondanglegi District, 472.800% in Jaken District the project is feasible to implement because the IRR is greater than the prevailing interest rate.

The calculation of gross B / C on sugarcane farming in Gondanglegi sub- district resulted in a gross B / C value of 1.025 and in Jaken sub-district of 1 . 565 where the value is greater than one which means that every expenditure of Rp. 1 will generate revenue of Rp. 1.025 in Gondanglegi sub-district and Rp. 1.565 in Jaken sub-district.

Sensitivity Analysis

The NPV, IRR, *Net* B/C values obtained from the calculations indicate that sugarcane farming is profitable or feasible to continue. Sugarcane farming contains uncertainties in several respects, such as changes in the sugarcane industry. Production and an increase in the selling price of production. Changes in production can occur when floodwaters recede, causing production to not be maximized.

To determine the sensitivity of sugarcane farming in the event of the above changes, it is necessary to make assumptions on several possibilities:

- There was a 10% decrease in production assuming that prices remained fixed and

costs incurred were also fixed.

- A 10% increase in fertilizer prices.
- There was a decrease in the original selling price of Rp.350 / kg (Gondanglegi District) Rp.400 / kg (Jaken District) to Rp.300 / kg with the assumption that the costs incurred were fixed.

From Table 2, it is found that any changes that occur in sugarcane farming in Gondanglegi District and Jaken District are declared feasible because all investment feasibility criteria are in accordance with economic theory. Scenario I, namely a 10% decrease in production with the assumption that prices remain and the costs incurred are also fixed, obtained an NPV in Gondanglegi District of Rp.4,296,092,901 which means that the net benefits obtained are Rp.4,296,092,901, an NPV value of Rp.17,218,841,340 which means that the net benefits obtained are Rp.17,218,841,340 in Jaken District. IRR in Gondanglegi and Jaken sub-districts is worth 601.002% and 347.800% respectively, indicating that investment in sugarcane farming at the level of 6.5% discount is feasible and not detrimental if run because the IRR is greater than the discount rate of 6.5%

Net B/C in Gondanglegi District is 1.037, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 1.037, and Jaken District is 1.408, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 1.408. In financial theory, sugarcane farming with these assumptions is declared feasible because the NPV value is greater than zero, *Net* B/C is greater than or equal to one, IRR is greater than or equal to Df.

Scenario II is a 10% increase in fertilizer prices. The NPV of Gondanglegi District was obtained at Rp.6,945,953,351, which means that the net benefit obtained was Rp.6,945,953,351, the NPV of Jaken District was Rp.19,942,030,307, which means that the net benefit obtained was Rp.19,942,030,307. IRR in Gondanglegi District and Jaken District are worth 588.002% and 464.002% respectively, indicating that investment in sugarcane farming at a discount rate of 6.5% is feasible and not detrimental if run because IRR is greater than the discount rate of 6.5%. The *Net* B/C of Gondanglegi Sub- district is 1.014, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 1.014 and Jaken Sub-district is 1.549, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 1.549. In financial theory, sugarcane farming with these assumptions is declared feasible because the NPV value is greater than zero, *Net* B/C is greater than or equal to one, IRR is greater than or equal to Df.

Scenario III decreases the original selling price of Rp.350 / kg (Gondanglegi District) Rp.400 / kg (Jaken District) to Rp.300 / kg with the assumption that the costs incurred remain The NPV of Gondanglegi District is Rp.2,580,060,550 which means that the net benefits obtained are Rp.2,580,060,550, the NPV of Jaken District is Rp.12,823,425,173 which means that the net benefits obtained are Rp.12,823,425,173. IRR in Gondanglegi and Jaken sub-districts is worth 90.077% and 168.005% respectively, indicating that investment in sugarcane farming in Gondanglegi and Jaken sub-districts is worth 90.077% and 168.005%, respectively. 6.5% discount rate is feasible and not detrimental if run because the IRR is greater than the discount rate of 6.5%. *Net* B/C of Gondanglegi District is 0.878, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 0.878 and Jaken District is 1.173, which means that every present value of expenditure of Rp 1.00 will provide benefits of Rp 1.173. In financial theory, sugarcane farming in Gondanglegi District with these assumptions is declared not feasible because the *Net* B / C is less than one so that if the price is reduced to Rp.300 / kg, farmers will experience losses, the break-even price that should not occur a loss of Rp.337 / kg. while for Jaken District is declared feasible because the NPV value is greater than zero, *Net* B / C is greater than or equal to one, IRR is greater than or equal to Df.

Mann Whitney Difference Test

Test the difference in the average income received by sugarcane farmers in Gondanglegi District and Jaken District per hectare using SPSS 17 known results Asymp sig (2-tailed) is 0.005 the value is smaller than the probability (0.05) there is a difference in the income received by farmers in Gondanglegi District and Jaken District, this can be caused because the land area in each district is different and the selling price in each difference is also different, so that the income received per hectare in each district will also be different.

CONCLUSION

Based on the results of the research conducted at the Al-Barokah association, it can be concluded that:

1. Sugarcane farming in Gondanglegi District with a land area of 327.5 hectares and Jaken District 286 hectares is feasible to run with NPV values of Rp.6,827,042,420 and Rp.20,149,118,785, respectively. The IRR is 579.208% and 427.800% respectively and the B/C Ratio values are 1.025 and 1.565 respectively.
2. Sensitivity conducted on sugarcane farming with 3 scenarios, namely a 10% decrease in production, a 10% increase in fertilizer prices, and changes in selling prices, shows that Gondanglegi District for scenarios I and II is feasible and profitable, while for scenario III it is not feasible to continue. Keamatan Jaken in all three scenarios agreed that sugarcane farming is feasible and profitable.
3. The Mann Whitney t-test showed differences in the average income received by farmers in Gondanglegi and Jaken sub-districts.

REFERENCES

Badan Pusat Statistika. 2021. Statistik Indonesia dalam Angka 2021.

Badan Pusat Statistika Jawa Timur, 2022. Statistik Indonesia dalam Angka 2022 https://jatim.bps.go.id/statictable/2023/03/21/2582/produksi-perkebunan-kakao-dan-tebu-menurut-kabupaten-kota-dan-jenis-tanaman-di-provinsi-jawa-timur-ton-2021-dan-2022.html. Diakses 26 Maret 2024 pukul 19.00 WIB.

Badan Pusat Statistika Subdirektorat Statistik Tanaman Tebu, 2023. *Statistik Tebu Indonesia.https://www.bps.go.id/id/publication/2023/11/30/3296e8514178dfdad17fc500/statistik-tebu-indonesia-2022.html*. Diakses 26 Maret 2024 pukul 19.00 WIB.

Faisal, H. N. 2015. Analisis pendapatan usahatani dan saluran pemasaran papaya (*Carica Papaya L*) di Kabupaten Tulunggagun (studi kasus di Desa Bangoan, Kecamatan Kedunwaru, Kabupaten Tulungagung). Jurnal Agribisnis Fakultas Pertanian Unita. **11** (13) : 12-28

Gittinger, J.P. 1986. Analisis Ekonomi Proyek-Proyek Pertanian. Ed ke-2. Slamet,S., dan Komet, M. Penerjemah; Jakarta; Universitas Indonesia Press. Terjemahan dari: Economic Analysis of Agriculture Project.

Hansen, D. R. dan M. M. Mowen. 2000. Manajemen Biaya: Akuntansi dan Pengendalian. Salemba Empat. Jakarta.

Kadariah. 1999. Evaluasi Proyek Analisis Ekonomi. Jakarta: Lembaga Penerbit Fakultas Ekonomi, Universitas Indonesia.

Margi, B dan S. Balkis. 2021. Analisis pendapatan dan efisisensi usahatani padi sawah di Desa Kota Bangun Kecamatan Kota Bangun. Jurnal Ziraa'ah. **41** (1) : 72-77

Mufrianti, F., dan Anton, F. 2014. Analisis faktor produksi dan efisiensi alokatif usahatani bayam (*Amarathus Sp*) di Kota Bengkulu. J Agrisep **15** (1): 31-37.

Nazili, A. 1982. Pendidikan dan Masyarakat. Yogyakarta; Bina Usaha.

Suardi, D. 2002. Perakaran padi dalam hubungannya dengan toleransi tanaman terhadap kekeringan hasil. J. Litbang Pertanian **21** (3): 56-68.

Supartama, M., M. Antara, dan R. A. Rauf. 2013. Analisis pendapatan dan kelayakan usahatani padi sawah di Subak Baturiti Desa Balinggi Kecamatan Balinggi Kabupaten Parigi Moutong. E-journal Agrotekbis. **1** (2) : 166-172.

Susila, W.R, Bonar M.S. 2005. *Situasi Pengembangan Industri Gula Yang Kompetitif Pada Situasi Persaingan yang Adil. Jurnal Penelitian dan Pengembangan Pertanian. http//pustaka.litbang.go.id.pdf*. Diakses 25 Maret 2019 pukul 17.00 WIB.

Sutrisno. 2001. Manajemen Keuangan. Teori, Konsep dan Aplikasi. Ekonisia. Yogyakarta.

Warindrani, A. K. 2006. Akuntansi Manajemen. Graha Ilmu. Yogyakarta.

Wijayanti, S., S. Candra, dan H. Sarjana. 2011. Analisis persediaan beras nasional dalam memenuhi kebutuhan beras nasional pada perusahaan umum bulog. Journal The Winners. **12** (1) : 82-96

Yuniasih, T., dan Suwatno. 2008. Manajemen Sumber Daya Manusia. Bandung; Alfabeta.

Zaini, A. 2010. Pengaruh biaya produksi dan penerimaan terhadap pendapatan petani padi sawah di Loa Gagak Kabupaten Kutai Kartanegara. Jurnal EPP.**7** (1) : 1-7.