

# Analysis of Income and Transaction Costs of Purchasing Farmer's Sugarcane at Wonolangan Sugar Factory, Probolinggo Regency, East Java

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## ABSTRACT

Sugarcane is the main raw material for making sugar in Indonesia. Wonolangan Sugar Factory is one of the sugar processing factories located in Probolinggo Regency. PG (Pabrik Gula) Wonolangan Sugar Factory as buys sugarcane using Weight Sugarcane Buying System (SPT-ST) and a Potential system (SPT-SP). The difference in the sugarcane purchasing system is expected to provide different income to farmers, therefore the purpose of this study is to determine the income level of farmers in the SPT-ST and SPT-SP system; fine out the cost of economic transactions in the SPT-ST and SPT-SP system. This research method uses analytical methods with transaction cost analysis and independent t-test analysis, as well as quantitative methods with income analysis. The results showed: (1) Average income of farmers in the SPT-ST is Rp. 32,810,020.87/Ha, and Rp. 30,625,224.50/Ha for farmers with the SPT-SP sales system; (2) The transaction costs for farmers in the sugarcane buying system (SPT-ST) are Rp. 271,310/season and Rp. 679,583/season for SPT-SP farmers. The proportion of transaction costs to the income of SPT-SP farmers is 2.3%, while for SPT-ST farmers it is 0.8%. The proportion of transaction costs to the total costs incurred by SPT-ST farmers was 0.7%, for SPT- SP farmers it was 1.7%; (3) There is no significant difference between the average income of farmers with the SPT-ST and SPT-SP sales system in the PG Wonolangan. The difference in the average income is Rp. 2,157,776.06/Ha.

**Keywords :** Sugarcane buying system; Income; Transaction cost..

## 1. INTRODUCTION

Plantation is one of the agricultural sub-sectors that has great potential to be developed. According to the Directorate General of Plantations (2015), the plantation sub-sector contributed IDR 546.42 trillion to the national economy. Sugarcane is one of the most widely cultivated plantation commodities in Indonesia because it is the main raw material for making sugar. According to Pusdatin (2020), Indonesia experienced a golden age for the sugar industry in the 1930s with 179 sugar factories operating. Based on data from the Directorate General of Plantations (2020), the center of sugar production in Indonesia is East Java Province with a production of 1.09 tons per year and contributes 48.22% to national sugar production. The amount of sugar cane production is supported by the area of sugar cane in East Java which is higher than other provinces. However, the area of sugarcane in East Java is predicted to continue to decline due to various complex problems, one of which is the shift of farming to other commodities for farmers with a relatively small area of sugarcane. This is in line with Permadhi and Trikuntari's research (2021), which states that farmers with limited land ownership affect farmers' motivation to cultivate sugarcane.

One of the sugar mills in Probolinggo district that plays a strategic role is PG Wonolangan which has also experienced a decrease in the area of milled sugarcane by 17.9% in 2020 covering an area of 2,502.46 Ha. In an effort to overcome the decline in the area, PG Wonolangan continues to improve performance and relations with smallholder sugarcane farmers. Fulfilling the needs of PG Wonolangan sugarcane, is carried out through the purchase of people's sugarcane with the Sugarcane Purchasing System (SPT). In accordance with a circular issued by the Ministry of Agriculture No.593/TL.050/E/7/2019 which contains the establishment of regulations on the Sugar Cane Purchase System (SPT). This SPT is expected to replace the existing production sharing system (SBH), due to the low satisfaction of farmers in the aspect of determining the yield in the SBH system. This is in accordance with the research of Rondhi et al., (2020) at PG Wonolangan, which states that farmers have a low level of satisfaction with the aspect of determining yields. SPT is considered to provide a higher bargaining position for farmers. Behind these

advantages, SPT has consequences where sugar factories have to prepare more funds to purchase sugarcane. therefore, PG Wonolangan divides SPT into two types, namely SPT-ST and SPT-SP.

SPT-ST is a sugarcane buying system with a weighted system where the funds used to buy farmers' cane come from the sugar factory's own funds, while SPT-SP is a sugarcane purchasing system where the funds used to buy farmers' cane come from investors. In addition to differences in funding sources, the SPT-ST and SPT-SP systems also have differences in the ownership of milled sugar and the types of sugarcane farmers' income. In the SPT-ST system, 100% of the sugar belongs to the sugar factory, while in the SPT-SP the yield of sugar and molasses will be divided according to the potential of the cane produced. The type of income received by SPT-ST farmers comes from the weight of sugar cane produced by farmers, while farmers' receipts in the SPT-SP system come from sugar and molasses, the farmer's share, each of which is multiplied by the prevailing price of sugar and molasses. Several differences in the purchase mechanism are expected to cause differences in income for farmers.

Farmer's income is the difference from the total revenue minus the total cost incurred by the farmer. Income is crucial in sugarcane farming. The higher the level of income earned by farmers, the smaller the tendency of farmers to switch to other commodities, and vice versa. According to Khudori (2022), the marketing margins obtained by farmers are decreasing and reduced margins will be followed by farmers leaving the sugarcane farming business. Marketing margin is the difference between the price received by farmers and the price received by consumers (Jumiati et al, 2013). Marketing margin is very influential on farmers' income. The greater the margin earned by farmers, the income earned by farmers will also increase.

In addition to marketing margins, farmers' income is also affected by production costs and transaction costs. Production costs are costs incurred to meet production factors such as land rent, seeds, fertilizer, and labor costs. Meanwhile, transaction costs are costs incurred by farmers apart from production costs. According to Williamson (1985), transaction costs are costs in traveling the economic system and costs for adapting to environmental changes. It is assumed that transaction costs in farming cannot be identified by farmers so that they have a significant impact on farming profits. The more transaction costs incurred, the farmers' profits will also decrease. Therefore, it is important to know how transaction costs can affect farmers' income.

## 2. RESEARCH METHODS

The method of determining the location is purposive, in which the researcher deliberately chose Probolinggo Regency with the consideration that this area is the main area of PG Wonolangan. Research using analytical and quantitative methods. The sampling method was carried out by 10-15% or 20-25 of the total population. Researchers took 22% of the total population of farmers, amounting to 163 people, so that the sample became 35 people. Determining the number of samples is based on Baley's opinion in Mahmud (2011), that research using statistical data analysis has a minimum sample size of 30 people. Determination of the sample using the simple random sampling method, where the sample is selected randomly without regard to the existing strata in the population (Sugiyono, 2013). For data collection methods used are interviews, observation, and literature study. Data analysis uses income analysis to answer the first problem formulation regarding farmers' income in the SPT-ST and SPT-SP systems. Farmer income can be obtained using the following formula:

### a. Production Cost Analysis

$$TC = TFC + TVC$$

Information :

TC = Total costs of sugarcane farming (Rp/one growing season)  
TFC = Total fixed costs of sugarcane farming (Rp/one planting season)  
TVC = Total variable costs of sugarcane farming (Rp/one planting season)

### b. SPT-ST Acceptance Analysis

$$TR = R/7\% \times 51000/kw \times TP$$

Information :

TR = Total Income (Rp/one growing season)  
R = Yield of sugarcane produced (%)  
7% = Yield of sugar cane at 7% level  
51000/kw = the stipulated purchase price for sugarcane plantations (HPP).  
TP = Total sugarcane production (Kw)

### c. SPT-SP Acceptance Analysis

$$\begin{aligned} \text{Sugar Receipt} &= \text{Sugar farmers share} \times \text{Auction price} \\ \text{Receipt of Drops} &= \text{Drops share of farmer} \times \text{Auction price} \\ \text{TR} &= \text{Acceptance of sugar} + \text{acceptance of drops} \end{aligned}$$

Profit Sharing Provisions:

- ❖ Yield up to 6%. 66% share of sugar belongs to farmers, 34% belongs to PG
- ❖ Yield above 6% to 8%. then for the excess yield of farmers, 70% share of sugar belongs to farmers 30% belongs to PG
- ❖ Yield above 8%. then for the excess difference in the yield of the farmer the share belongs to the farmer, share of sugar 75% owned by farmers 25% owned by PG.

d. Revenue Analysis

$$\pi = \text{TR} - \text{TCP} - \text{Loan(if any)} - \text{Pph}$$

Information :

$\pi$	= Income (Rp/one growing season)
TR	= Total Revenue (Rp/one growing season)
TCP	= Total cost of production
Loans/ Liabilities	= credit used by farmers (Rp/one growing season)
Pph	= Income Tax (%)

The analysis used to solve the second problem formulation is transaction cost analysis. Transaction costs are all costs incurred other than production costs. transaction costs can be determined through the following formula:

- Transaction Cost Equation Formula:  $\text{TrC} = \sum Z_i$
- Formula for the Proportion of Each Transaction Fee to the Total Transaction Fees:  $rZ_i = \frac{Z_i}{\text{TrC}} ; \sum Z_i = 1$
- Formula for Proportion of Transaction Fees to Revenue :  $r_{\text{trc}} = \frac{\text{TrC}}{\pi} \times 100$
- Formula for Proportion of Transaction Fees to Total Fees ;  $r_{\text{tc}} = \frac{\pi}{\text{TC} + \text{Trc}} \times 100$

Information :

Trc	: Transaction Fee
$\sum Z_i$	: The sum of each transaction cost component (Information, negotiation, coordination, and monitoring)
$rZ_i$	: The ratio of the cost of each transaction fee to the total transaction fee
$r_{\text{trc}}$	: The ratio of transaction costs to revenue
$\pi$	: Income
$r_{\text{tc}}$	: Ratio of transaction fees to total fees
TC	: Total cost

The third analysis is the independent t-test analysis used to solve the third problem formulation, namely the level of difference in the average income on the SPT-ST and SPT-SP systems. Can be known by the following formula:

$$t = \frac{x_1 - x_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Information :

X1	= average income of sugarcane farmers SPT-ST
X2	= average income of sugarcane farmers SPT-SP
n1	= number of samples of sugarcane farmers SPT-ST
n2	= number of samples of SPT-SP sugarcane farmers
S1 <sup>2</sup>	= variance of sugarcane farmers' income SPT-ST
S2 <sup>2</sup>	= variance of sugarcane farmers' income SPT-SP

The hypothesis in this study are: There is a difference in income between sugarcane farmers with the SPT-ST and SPT-SP sales systems in the PG Wonolangan working area.

1. H0 = there is no difference in income between sugarcane farmers with the SPT-ST and SPT-SP sales system.
2. H1 = there is a difference in income between sugarcane farmers and the sales system SPT-ST and SPT-SP.

Decision making criteria:

1. If t-stat < t-table, then H0 is accepted, that is, there is no difference in income between sugarcane farmers with the SPT-ST and SPT-SP sales systems.
2. If t-stat > t-table, then H1 is accepted, that is, there is a difference in income between sugarcane farmers with the SPT-ST and SPT-SP sales systems.

### 3. RESULTS AND DISCUSSION

#### Income Level of Farmers in the Sugar Cane Purchasing System (SPT-ST) and (SPT-SP) in the Work Area of the Wonolangan Sugar Factory, Probolinggo Regency

Income in sugarcane farming is calculated after 12 months, that is after the sugarcane plants reach their harvest period. The Sugarcane Purchase System implemented in 2022 is the Sugarcane Purchase System with a weighted system (SPT-ST) and a potential system (SPT-SP). Revenue is obtained by reducing the total revenue earned by the total costs incurred. The components of costs incurred by farmers consist of land costs, seed costs, fertilizer costs, labor costs, and logging and transport costs (TMA).

##### a) Land costs, land costs are costs incurred by farmers to rent land.

This fee consists of land rental fees and taxes. The amount of tax paid is generally Rp. 250,000/Ha, while land rental fees range from Rp. 10,000,000 – Rp. 20,000,000/Ha. The average cost of renting land incurred by farmers is Rp. 15,547,333/Ha for SPT-ST farmers, and Rp. 15,346,061/Ha for SPT-SP farmers. The amount of land rental costs incurred by SPT-ST and SPT-SP farmers is not much different, because land prices are not affected by the sugarcane purchasing system. Differences in land prices are influenced by several factors such as soil fertility, land location, land access to main roads, and land type. The rent for paddy fields is higher than for upland land because it has easy access to irrigation and higher productivity. According to Khoir (2016), sugar cane cultivation carried out on paddy fields has better performance than on dry land. The percentage of farmers' paddy field ownership was 45.8%, while upland land was 54.2% of the total respondent's land area of 142 Ha.

##### b) Cost of seeds

The type of seed used by farmers in the PG Wonolangan Work Area is the Bulu Lawang (BL) variety. These seeds are used as new seeds in new sugarcane fields (plant cane), and embroidering in ratoon fields. The percentage of PC land is only 1.4%, while the ratoon land is 98.6% of the total respondents. Price BL seeds in 2022 is IDR 80,000/Kui, while the number of seeds needed for one hectare is 80 quintals.

##### c) Labor Costs

Labor costs vary greatly according to the cultivation techniques of sugar cane farmers. The stages of technical cultivation carried out by farmers are, planting new seeds (PC), clearing the remaining fellings (baking dumplings), kepras, pedot oyot, embroidery, irrigation, fertilizing, and klentek. According to Billi et al., (2016), sugarcane kepras aims to improve the growth of sugarcane so that the growing sugarcane shoots do not float above the soil surface. Meanwhile pedot oyot or cutting off roots is an activity that aims to improve air circulation in the soil and help increase nutrients in the soil. In addition, pedot oyot also functions to stimulate the growth of new shoot roots (Shodiq, 2018). The average cost incurred by PC land sugarcane farmers is Rp. 9,700,000/ha, while on RC land (Ratoon Cane) Rp. 8,000,000/Ha. Details of the costs of each stage of technical cultivation work can be seen in table 1 below.

Table 1. Sugarcane Cultivation Labor Costs in the Work Area of PG Wonolangan

Type of work	Average Cost	Percentage (%)
Planting seeds (For PC only)	Rp 1.700.000	17,5
Clean up the remaining cutting of sugarcane trees	Rp 200.000	2
Kepras	Rp 1.500.000	15,5
Oggy pedot	Rp 1.200.000	12,4
Embroidery	Rp 1.200.000	12,4
Irrigation	Rp 2.100.000	21,5
Fertilization	Rp 300.000	3,2
Klentek	Rp 1.500.000	15,5
<b>Total (PC Land)</b>	<b>Rp 9.700.000</b>	<b>100</b>

Source: Primary data processed (2022)

##### d) Fertilizer Cost

The types of fertilizers used by farmers in the PG Wonolangan Work Area are ZA, Phonska, and liquid fertilizers. In one hectare, the dose of fertilizer used by farmers is 6 kui/ha ZA, 4 kui/ha Phonska, and 2 tanks/ha of liquid fertilizer. The price of ZA fertilizer (subsidy) is Rp. 150,000/50 kg and Rp.300,000/50 kg (non-subsidized), for Phonska fertilizer prices of Rp.180,000/50 kg (subsidized) and Rp. 350,000/50 kg (non-subsidized). The price for one tank of liquid fertilizer is IDR 600,000. Liquid fertilizer is obtained by farmers through orders from PT. Sasa Inti, while solid fertilizers are obtained by farmers through local agricultural kiosks.

e) Cutting Loading and Transporting Fees (TMA)

The TMA process is the final process in sugarcane cultivation. Sugarcane that is 12 months old will be cut down and transported to the Wonolangan Sugar Factory. The sugarcane milling schedule in 2022 starts from May 27 to 8 November 2022. The TMA price that applies in the PG Wonolangan Work Area, namely Rp.7,500-8,000 per quintal of sugar cane for the cutting and loading process, and Rp.5,000-6,500 per quintal of cane for the transportation used.

Based on the description above, the overall average production costs incurred by farmers can be seen in table 2 :

Table 2. Cost of Sugarcane Farming in the Work Area of PG Wonolangan

Cost type	Average cost (Rp/Ha)			
	SPT- ST		SPT- SP	
	Rp	%	Rp	%
Land Costs	Rp 15.547.333	37,6	Rp 15.346.061	38,1
Fertilizer Cost	Rp 4.834.500	11,7	Rp 3.951.613	9,7
Labor costs	Rp 5.670.583	13,8	Rp 5.447.171	13,5
TMA fees	Rp 15.246.790	36,9	Rp 15.600.922	38,7
<b>Total</b>	<b>Rp 41.519.399</b>	<b>100</b>	<b>Rp 40.121.966</b>	<b>100</b>

Source: Primary Data 2022 (processed)

Based on Table 2, it is known that the highest production costs incurred by farmers are land costs and logging and transport costs with a proportion reaching 36-38% of the total production costs incurred. The total cost is one component to determine the income earned by farmers. According to Kumalasari (2019), income is an indicator of farming success. The higher the level of income earned, the more efficient the farming is run. The value of farmers' income will be known through the subtraction of the total income of farmers by the total costs incurred.

The income of sugar cane farmers with the SPT-ST system comes from the weight of the cane produced in quintals then multiplied by the price of sugarcane per quintal. The price per quintal of sugarcane that applies in 2022 is IDR 51,000 – IDR 71,000/kui sugarcane. The price of sugar cane will be higher at the end of the milling process, this is due to competition from sugar mills towards the closing of the milling time to get sugarcane raw materials. The competition for sugar factories occurs as a result of the limited land for sugar cane owned by sugar factories, as well as the weakening of PG's power to bind farmers (Colosewoko, 2020). While the income of SPT-SP farmers comes from sharing sugar and molasses according to the potential produced by each individual farmer. The auction price for sugar in 2022 is IDR 11,500/kg, while the auction price for molasses is IDR. 2,250/kg. The average sugarcane production for SPT-ST farmers is 800 kui/Ha for ratoon plants, and 1200-1500 kui/Ha for PC plants. While the average yield of SPT-SP cane is 7.9, it is different from the profit sharing system (SBH), in the payment of molasses and sugar the farmer's share is paid in cash. The selling price of sugar cane in the PG Wonolangan Working Area in the 2022 milling season ranges from Rp. 51,000 – Rp. 72,000. The price that will be obtained by farmers will vary according to the cutting period and the quality of the cane. The calculation of the difference in farmer income using the two systems is described in table 3 below.

Table 3. Description of Farmers' Income Value of SPT-ST and SPT-SP in PG Wonolangan.

Description	Value of Farming (Rp/Ha)			
	SPT-ST		SPT-SP	
	Rp		Rp	
Acceptance (TR)	Rp 74.487.475,00		Rp 70.922.998,00	
cost (TC)	Rp 41.519.399,00		Rp 40.121.966,00	
Income tax	Rp 158.055,13		Rp 148.787,50	
<b>Total</b>	<b>Rp 32.810.020,87</b>		<b>Rp 30.652.244,50</b>	

Source: Primary Data 2022 (processed)

Based on the information in the table it is known that in the calculation of income there is also a component of income tax or PPH. The income tax value is based on the ownership of the Taxpayer Identification Number (NPWP) of each farmer. For farmers who do not have an NPWP, the pph value is only 0.5%, while for farmers who have an NPWP the pph value is 0.25%. Based on the description above, it can be seen that the income of sugarcane farmers on the SPT-ST and SPT-SP systems in the PG Wonolangan Working Area is at a profitable level.

### Farmer Economic Transaction Costs in the Sugar Cane Purchasing System (SPT-ST) and (SPT-SP) in the the Wonolangan Sugar Factory, Probolinggo Regency

Transaction costs are costs incurred by farmers apart from the price of production costs. Each component of transaction costs faced by farmers is certainly different, this is influenced by social conditions, property rights, and existing market conditions. The types of transaction costs contained in the system for purchasing SPT-ST and SPT-SP in the Work Area of PG Wonolangan are price information search fees, negotiation fees, coordination fees, monitoring fees, and other costs including Local Original Tax (PAD), APTR membership dues, contributions from the Partnership Gathering Forum (FTK), and the Road Smoothness Fund (DKJ).

#### a). Information Search Fees

Information search costs are costs incurred by farmers to find price information and contact the Head of the PG Regional Garden to check the feasibility of sugarcane on their land. The type of outlay is a communication fee in the form of a data packet or credit. The amount of costs incurred by farmers depends on the frequency of communication carried out. The amount of costs incurred is around Rp. 25,000-Rp. 75,000. The average cost of information search incurred by farmers SPT-ST which is Rp. 41,000/season, while the SPT-SP farmers are Rp. 45,500/season.

#### b). Negotiation Fee

Negotiation Costs are costs incurred by farmers to reach a contract agreement with PG. the contract contains the initial purchase price of sugar cane, the determination of the initial planting time, the beginning of milling, closing of the mill, along with the rights and obligations of both parties. This negotiation activity is carried out in the Partnership Gathering Forum (FTK) which is held at PG Wonolangan 2 times in one season. The type of costs incurred by farmers is transportation costs to attend the forum. The costs incurred range from IDR 20,000 – 50,000 depending on the distance traveled to PG. The average negotiation cost incurred is Rp. 45,333/season for SPT-ST farmers, and Rp. 56,810/season for SPT-SP farmers.

#### c). Coordination Fee

Coordination costs are costs incurred by farmers to coordinate their sugarcane cutting schedule. This coordination activity is carried out through the Regional Partnership Gathering Forum (FTKW) led by the local KKW 2-3 times in one planting season. The types of costs incurred are communication costs to contact the KKW and transportation costs to attend the FTKW. The amount of costs incurred by each farmer will of course be different, this is adjusted to the frequency of communication and the distance traveled by each farmer to attend the FTKW. The average cost incurred by SPT-SP farmers is Rp. 40,000/season, while the SPT-ST farmers are Rp.37,500/season.

#### d). Monitoring Fee

Monitoring costs are costs incurred by farmers for supervision in the process of cutting sugarcane milling. According to Wicaksono (2015), monitoring is important to reduce the risk of contract failure. The types of costs incurred are communication costs used to contact logging officers in the field and cane receiving officers at PG, as well as transportation costs used to directly supervise the logging process on the land. The average monitoring cost incurred by SPT-ST farmers is Rp. 173,400/season, while the SPT-SP farmers are Rp. 131,500/season.

#### e). Other expenses (Membership of organizations and associations)

Other types of costs incurred by farmers consist of Local Original Tax (PAD) fees of 35 rupiah per quintal of sugarcane, APTR contribution fees of 15 rupiah per quintal of sugarcane, FTK contribution fees of 15 rupiah per quintal of sugarcane, and Road Smoothness Fund fees of 35 rupiah per quintal of sugarcane. if the accumulated costs incurred by farmers are Rp. 100 per quintal of sugarcane. This fee is only charged to SPT-SP farmers, and not charged to SPT-ST farmers. The amount of costs incurred by SPT-SP farmers is influenced by the weight of the sugar cane produced. The average cost incurred by SPT-SP farmers is Rp. 379,850/season. A description of the transaction costs incurred by SPT-ST and SPT-SP farmers in the PG Wonolangan Work Area can be seen in table 4 below.

Table 4. Description of SPT-ST and SPT-SP Farmer Transaction Fees in the PG Wonolangan, Probolinggo Regency.

Cost type	Average Cost (Rp/Season/Individual)			
	SPT-SP	Percentage	SPT-ST	Percentage
Pricing Information Search Fees	41.000	6,0	45.500	16,8
Negotiation Fee	45.333	6,8	56.810	20,9
Coordination Fee	40.000	5,8	37.500	13,9
Monitoring Fee	173.400	25,5	131.500	48,4
Other Expenses (Association)	379.850	55,9	-	-
<b>Total</b>	<b>679.583</b>	<b>100</b>	<b>271.310</b>	<b>100</b>

Source: Primary Data 2022 (processed)

Calculation of the proportion of total transaction costs to revenue and total costs is carried out to find out how important and influential transaction costs are to revenue. Sultan (2015), informed that transaction costs are costs that cannot be avoided and it is important to know their effect on the profits to be obtained. The production cost component is the biggest cost in production activities. However, transaction costs cannot be avoided by farmers and most farmers cannot identify these costs. Therefore, it is important to know the value of transaction costs, so that these costs can be minimized and increase farmers' profits. Details regarding the ratio of SPT-ST and SPT-SP transaction costs to income and the total costs incurred can be seen in table 5 below.

Table 5. Details of the Ratio of Transaction Fees to Revenue and Total Costs

Sugar Cane Purchase System	Transaction Fee (Rp/Ha)	Ratio to Income (%)	Ratio To Total Expenses (%)
SPT-SP	69.583	2,3	1,7
SPT-ST	271.310	0,8	0,7

Source: Primary Data 2022 (processed)

#### Differences in Farmer's Income in the Sugar Cane Purchasing System (SPT-ST) and (SPT-SP) in the Working Area of the Wonolangan Sugar Factory, Probolinggo Regency

The sugarcane purchasing system in the PG Wonolangan Work Area is the Balanced Sugarcane Purchase System (SPT-ST) and the Potential System (SPT-SP). Comparison of the two forms of the sugarcane purchasing system is used to determine differences in farming income. Based on the results of the analysis carried out using the independent t test, the results are shown in table 6 below.

Table 6 Results of the Independent t-test analysis of Sugarcane Farming Income in the Working Area of PG Wonolangan.

Description	Results
average income of SPT-ST (Rp/ha)	32.810.020,87
average income of SPT-SP (Rp/ha)	30.625.244,50
average difference (Rp/ha)	2.157.776,06
t-statistics/t-count	0,279
t-table	2,034
Significance of t-test (2-tailed)	0,782

Source: Primary Data 2022 (processed)

Based on the decision-making criteria, the t statistic/t-count value is 0.279 is less than the t-table value of 2.034 at df 33. So the researchers decided that H<sub>0</sub> was accepted, namely that there was no significant difference between farm income and the SPT-ST and SPT-SP sales systems in the Work Area of PG Wonolangan. Based on Table 3.5 it is known that the difference in farmer income is Rp. 2,157,776.06/Ha, the difference in the level of this difference does not cause a significant difference between farmers with the SPT-ST and SPT-SP selling systems in the PG Wonolangan Working Area. Farmers will get the price of sugarcane according to the quality of the sugarcane they have. Prices prevailing in the market have more influence on the supply of sugarcane prices for farmers.

The results of the identification of farming costs incurred by SPT-ST and SPT-SP farmers were not much different. Land prices, seed prices, fertilizer prices, cultivation costs, labor costs, and loading and transport costs are also not much different, so they do not have a large influence on differences in income. In terms of capital, both SPT-ST and SPT-SP farmers are not much different where farmers prefer to use People's Business Credit independently. This was due to the change from the role of sugar mills to no longer being credit guarantors. This is in accordance with the research of Rondhi et al., (2020), where since 2015 the role of PG Wonolangan has changed to only being an off taker and no longer providing credit and farming input for partner farmers. The choice of sugarcane purchase system, both SPT-ST and SPT-SP, is determined by PG based on PG's funding conditions.

#### 4. CONCLUSION

The average income of farmers in the people's sugarcane purchasing system (SPT-ST) in The working area of PG Wonolangan is Rp. 32,810,020.87/Ha, and Rp.30,625,244.50/Ha for SPT-SP farmers. Based on this level of income, SPT-ST and SPT-SP farmers are at a profitable level. The transaction fee for the SPTS-ST cane buying system is Rp. 271,310/season, while the average SPT-SP farmer transaction fee is Rp. 679,583/season. The proportion of transaction costs to income for SPT-SP farmers is 2.3%, while for SPT-ST farmers it is 0.8%. And the percentage of transaction costs to the total cost for SPT-SP farmers is 1.7%, while for SPT-ST farmers it is 0.7%. Based on the analysis conducted, there is no significant difference between the average income earned by farmers with the SPT-ST and SPT-SP sugarcane buying systems. The difference in the average farm income of SPT-ST and SPT-SP is only Rp. 2,157,776.06/Ha.

#### REFERENCES

- Bili, A., Syafriandi., & Mustaqimah. 2016. Pengaruh Kedalaman Keprasan Tebu dengan Menggunakan Mesin Kepras Traktor Roda Dua Terhadap Kualitas Keprasan dan Pertumbuhan Tunas. *Jurnal Ilmiah Mahasiswa Pertanian Unsyiah*. 1(1): 995-1001.
- Colosewoko. 2020. Industri Gula Berbasis Tebu dalam Pusaran Masalah. *Asosiasi Gula Indonesia*. <https://asosiasigulaindonesia.org/industri-gula-berbasis-tebu-dalam-pusaran-masalah/> [ 7 Desember 2022].
- Jumiati, E., Dwidjono, H. D., Slamet, H., & Masyhuri. 2013. Analisis Saluran Pemasaran dan Marjin Pemasaran Kelapa Dalam di Daerah Perbatasan Kalimantan Timur. *AGRIFOR*. 7(1): 1-10.
- Kementrian Pertanian. 2016. Laporan Analisis Kebijakan Identifikasi Permasalahan dan Solusi untuk Pemenuhan Kebutuhan Gula Nasional. Bogor. Badan Penerbit Badan Penelitian dan Pengembangan Pertanian.
- Kementrian pertanian. 2020. Outlook Tebu. Jakarta. Badan Penerbit Pusat Data dan Sistem Informasi Pertanian.
- Khoir, A. S. 2016. Analisis Komparatif Kinerja Budidaya Tebu Petani pada Lahan Sawah dan Lahan Kering di Wilayah Kecamatan Tanggul Kabupaten Jember. Skripsi. Program Studi Agribisnis. Fakultas Pertanian Universitas Jember.
- Kumalasari, A. D., Kustopo, B., & Agus, S. 2019. Komparasi Produksi dan Pendapatan Petani Tebu Mitra dan Non Mitra Pabrik Gula Rendeng Di Kabupaten Kudus. *Agrisocionomics : Jurnal Sosial Ekonomi dan Kebijakan Pertanian*. 3(1):28-38.
- Mahmud. 2011. Metode Penelitian Pendidikan. Bandung. Pustaka setia.
- Permadhi, D., & Trikuntari, D. 2021. Analisis Faktor-Faktor yang Mempengaruhi Minat Petani Berusahatani Tebu (Studi Kasus: Wilayah Kerja Pabrik Gula Gempolkrep PT Perkebunan Nusantara X. *Indonesian Rugar Research Jurnal*. 1(2): 67-77.
- Rondhi, M., Devyana, D. R., Agus, S., Triana, D. H., Ebban, B. G., Titin, A., Anik, S., & Rokhani. 2020. Kepuasan Petani terhadap Pola dan Kinerja Kemitraan Usahatani Tebu Pabrik Gula Wonolangan Probolinggo Jawa Timur. *Industrial Crops Research Journal*. 26(2): 58-68.
- Sultan, H. 2015. Pengaruh Biaya Transaksi Terhadap Keuntungan dan Pembentukan Modal Usahatani Kedelai di Kabupaten Lamongan Jawa Timur. Skripsi. Sekolah Pasca Sarjana. Institut Pertanian Bogor.
- Sugiyono, 2016. Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta. Wicaksono, B. J. 2015. Analisis Perbandingan Biaya Transaksi Usahatani Tebu Kontrak dan Non Kontrak (Studi pada Petani Pabrik Gula Kebon Agung Kota Malang). 1-12.
- Shodiq, A. W. 2018. Pengelolaan Tebu (*Saccharum officinarum* L.) di PG Kebon Agung Malang dengan Aspek Khusus Produktivitas dan Rendemen Tebu pada Beberapa Varietas dan Kategori Tanaman. Bogor. Institut Pertanian Bogor.