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USE OF TEA PRODUCTION FACTORS IN BEDAKAH PLANTATION UNIT PT PERKEBUNAN TAMBI WONOSOBO CENTRAL JAVA: ANALYSIS OF LOCAL EFFICIENCY

ABSTRACT

The research aims to 1) assess the impact of raw materials, wood pellets, fire woods, and electrical energy on black tea production at PT Perkebunan Tambi's Bedakah Plantation Unit tea factory, and 2) assess the level of allocative efficiency of the utility of black tea production factors at PT Perkebunan Tambi's Bedakah Plantation Unit tea factory. The descriptive technique is used with the case study implementation method in this study. Purposive sampling was used by the responders. Primary and secondary data were collected during a three-year period (2017-2019). For production factor analysis and allocative efficiency of production factors analysis, the analytical technique employs Cobb-Douglas, which calculates the ratio between the Marginal Value Product (MVP) and the input price (Px). The findings of this study revealed that 1) the number of raw materials and fire woods had an impact on the production of black tea at the Bedakah Plantation Unit tea factory, and 2) the utility of production factors in the form of raw materials and fire woods at the Bedakah Plantation Unit tea factory was ineffective. It is suggested that raw materials and firewood elements be added to the black tea processing at Bedakah Plantation Unit in order to attain aloocative efficiency.

Keywords : Tea, Production Factors, Cobb-Douglas, Allocative Efficiency.

INTRODUCTION

Indonesia has long been renowned as an agrarian country with enormous natural resources, particularly in the agricultural sector. Biodiversity in its many forms is a potential that must be cultivated in order to remain viable and sustainable. Tea plants are one example of potential biodiversity. Many people

today like drinking tea as a drink since it has a distinct taste and aroma and is said to provide a range of health benefits.

Several provinces in Indonesia have the potential to develop a tea plantation that will yield tea leaves that will be processed and consumed by the local people. According to the Ministry of Agriculture of the Republic of Indonesia, after West Java, Central Java produces the second biggest amount of tea plants in the country. However, from 2018 to 2019, In comparison to other regions, tea production in Central Java decreased from the previous year. This creates issues that can hinder productivity in a variety of businesses, particularly in the tea agro-industry in Central Java Province.

PT. Tambi Plantation is a private company involved in the tea agro-industry, with one board of directors (central) office and three Plantation Units (UP), namely UP Bedakah, UP Tambi, and UP Tanjungsari, all located in Wonosobo Regency. PT. Tambi Plantation is one of the enterprises that manufactures black and green tea powders. PT. Bedakah Plantation Unit is one of the company's plantation units. Tambi plantation is made up of a tea plantation, a black tea processing plant, and an agrotourism project that is still in the works. Bedakah Plantation Unit makes black tea using raw materials such as wet tea leaves sourced from the Bedakah Plantation Unit's own garden.

The production of black tea in the Bedakah Plantation Unit has fluctuated over the last three years (2017–2019), which is assumed to be owing to a scarcity of raw materials in the form of tea leaf shoots. With the current issues, the Bedakah Plantation Unit has been forced to expand production despite limited variables - production factors owned, one of which is the availability of raw materials, which reduces during the dry season. It necessitates that businesses employ their own production components in order to be effectively managed.

Because the production factor is "sacrificed" to achieve production, it is commonly referred to as "production sacrifice." This production component is known as "input" in English. As a result, knowing the relationship between production factors (input) and products (output) is required to make a product

(Soekartawi, 2003). Raw materials, supplementary materials, technology and manufacturing equipment, labor (human), and energy are among the production factors. The corporation must make a cost sacrifice in order to be able to manufacture employing this production factor (Noor, 2007).

Efficiency can be defined as a goal of using the fewest inputs to provide the most output. If the value of marginal products is equal to the price of the production factor in question, it is said to be price efficiency or local efficiency (Soekartawi, 2010). The link between input expenses and output generated is referred to as local efficiency. This locale efficiency will be achieved if the company is able to maximize profits by equating the marginal product value of each production factor with its price. By knowing the use of optimal or efficient production factors, maximum profit can be achieved with the smallest cost usage. Although efforts to increase production results are very important, but in this effort must still take into account the principle of profit-oriented business efficiency. This localized efficiency can be attained by understanding what factors influence production in the Bedakah Plantation Unit's tea facility. Based on this backdrop, the purpose of this study is to investigate the factors that influence black tea production as well as the local efficiency of the usage of production factors in the tea factory of Bedakah Plantation Unit.

RESEARCH METHODS

This study used a descriptive technique and was conducted at Pt Perkebunan Tambi Bedakah Plantation Unit's tea factory. Because PT Perkebunan Tambi is the only private company operating in agro-industry with tea commodities in Wonosobo Regency, Central Java, the research technique used case studies. With 6 factory employees who understand tea production at the factory of Bedakah Plantation Unit, the method of identifying respondents is purposefully taking respondents deliberately (Nazir, 1983). Quantitative data was used, with main data gathered from interviews and secondary results obtained from factory administration documents as the data source. The data will be analyzed for the influence of production factors on the production of black tea using Cobb-Douglas function

analysis with analysis of coefficient of determination test (R2), F test, and T test, and then the influential production factors will be analyzed aloative efficiency using the calculation of the ratio between Marginal Value Product (MVP) with input price (Px) of each production factor.

RESULTS AND DISCUSSION

The Effects of Production Factors on Tea Production in UP Bedakah

Production is a process that improves the value of a product. Materials known as production factors are required to increase these benefits. Given the assumption that economic sources (production factors) are scarce, production elements must be combined effectively in order to produce the lowest cost combination (Damanik, et al., 2015). Raw Materials (BB), Wood Pellets (PK), FireWood (KB), and Electrical Energy are all regarded to have a meaningful impact on the manufacture of black tea (EL). The shoots of tea leaves collected from the garden itself, specifically the tea garden Bedakah Plantation Unit, are used as the raw material for the production of black tea, while wood pellets are used as fuel in the drying process of black tea. In the process of boiling and drying black tea, firewood is the primary fuel source.
In the Bedakah Plantation Unit, electrical energy is employed as the primary source of energy for running machines that prepare black tea. A function of production can be used to model the relationship between elements that impact production. The Cobb-Douglas production function was utilized in this investigation. The results of the Cobb-Douglas function analysis

Table 1.The Impact of Production Factors on Tea Production in UP Bedakah in 2019:

Model	B	t hit	Sig.
(Constant)	-0,038	-3,114	0,004
Raw Materials (BB)	0,946	10,935	0,000
Wood Pellets (PK)	0,018	0,576	0,569
Firewood (KB)	0,042	2,462	0,020
Electrical Energy (EL)	0,036	0,788	0,436
R^2	0,993		
Adjusted R^2	0,992		0,000
F Count	1145,266		

Source : Secondary Data processed (2021)

The results of this study can be turned into numerous linear regression equations based on the regression test results, as shown in equation 1.

LnPROD = Ln -0,038 + 0,946 LnBB + 0,018 LnPK + 0,042 LnKB + 0,036 LnEL + e^u..... (Equation 1)

To return to the equation of the Cobb-Douglas analysis paradigm, the equation is then converted to anti Ln (natural logarithm), yielding equation 2:

$PROD = 0{,}963\ BB^{0,946}\ PK^{0,018}\ KB^{0,042}\ EL^{0,036} + e^u$..... (Equation 2)

The overall value of production elasticity (EP) is 1.042 percent, as can be seen from the total value of the regression coefficient; if the ep value is more than 1, then enter the production area I. In this case, increasing input by 1% will result in an increase in output that is always larger than 1%. According to Sujarwo theory (2019), the reception will be better in this location if more inputs are employed. Manufacturers quit employing inputs in this region, despite the fact that profits can still be made by increasing the number of manufacturing inputs used. In this region, manufacturers should not halt manufacturing at current output levels. Coeffesien determination is used to calculate model determination (R2). The R2 coefficient is used to demonstrate how large dependent variables are defined by independent variables (Gunawan, 2018). The adjusted R2 value in this study was 0.992, or 99.2 percent. The figure indicates that the variable ability of production factors to influence black tea production is high, so it can be deduced that the variables of raw materials, wood pellets, firewood, and electrical energy have a 99.2 percent influence on the amount of black tea produced, with the remaining 0.8 percent influenced by factors outside the model. Simultaneous testing with the F test, which examines the impact of all independent variables on dependent variables at the same time (Sitinjak and Syahputra, 2019). The computed F value obtained is 1145,266 and the significance value is 0.000, according to Table 1. Ho was rejected while Ha was allowed because the sig value was less than 0.05, indicating that the variables of raw materials, wood pellets, firewood, and electrical energy all had a substantial impact on the amount of black tea produced.

Partial testing uses the t test which is a test of the significant influence of independent variables on individual dependent variables (Sitinjak, W., and Syahputra, D. 2019). This can be seen from the significant value of t resulting from the calculation. If a significant value of t is less than a significant level (0.05), the independent variable affects its dependent variable individually; on the other hand, if a significant value of t is greater than the degree of significance (0.05), the independent variable has no effect on its dependent variables individually (Elvira and Sagala, 2017). Raw materials, wood pellets, firewood, and electrical energy are independent variables (BB, PK, KB, and EL), while black tea production is a dependent variable.

Based on the Cobb-Douglas equation of 0.946 with a significance level of 0.004 and the results of regression analysis between raw material factors (BB) and black tea output. With a significance value of 0.004 (0.004 0.05), it can be inferred that raw materials have a substantial impact on the manufacture of black tea. Both have a positive influence, with a value of +0.946. While other conditions remain constant, a 1% increase in raw material utilization will result in a 0.946 percent increase in production. If the average amount of raw materials used grew from 320,305.78 kg to 323,508.84 kg, the average amount of black tea produced climbed from 70,043.42 kg to 70,706.03 kg. The findings of the study revealed that raw materials have a beneficial impact on black tea production in the Bedakah Plantation Unit; the more raw materials used, the more black tea products produced, and vice versa. This is due to the fact that raw materials are the primary raw materials used in the production of black tea.

Based on the results of the Cobb-Douglas equation of 0.018, with a significance rate of 0.569, regression analysis between the wood pellet factor (PK) and the production of black tea. With a significance value of 0.569 (0.569 > 0.05), it can be inferred that wood pellets have no effect on black tea production. The use of wood pellet components had no influence on the production of black tea at the Bedakah Plantation Unit, according to the findings of the study. In the drying process, wood

pellets that are solely utilized as a supporting fuel are only used in one of two furnaces.

Based on the results of the Cobb-Douglas equation of 0.042, with a significance level of 0.020, regression analysis between the firewood factor (KB) and the output of black tea. With a significance value of 0.020 (0.020 > 0.05), it can be inferred that firewood has a considerable impact on black tea output. Both have a positive influence, with a value of +0.042. While other parameters remain constant, increasing the use of firewood by 1% will improve production by 0.042 percent. If the average amount of firewood used went from 22,579.86 m3 to 22,805.66 m3, the average amount of black tea produced grew from 70,043.42 kg to 70,072.83 kg. The findings of the study revealed that firewood had a favorable impact on the production of black tea at the Bedakah Plantation Unit; the more firewood utilized, the more black tea the unit produces. Firewood is utilized as the main fuel for the pelayuan process on 13 witehring trough (WT) engines in the production of black tea in UP Bedakah, as well as for the drying process. As a result, the corporation must pay close attention to the amount of firewood utilized in order to improve the process of processing and drying black tea and manufacture high-quality black tea goods.

The regression coefficient value in the Cobb-Douglas equation for the electrical energy factor (EL) and black tea production is 0.036, with a significance level of 0.436, according to the results of the regression study. With a significance value of 0.436 (0.436 > 0.05), it can be stated that electrical energy has no significant impact on the manufacturing of black tea. Electrical energy had no effect on the production of black tea in the Bedakah Plantation Unit, according to the findings of the study. This could be because the factory administration records do not reflect the actual figures of electricity usage each month, but rather the number of monthly invoices in which part of the extra electricity usage from the previous month is included.

Local Efficiency Analysis of Production Factors Usage

There are two factors that must be met in order to determine the level of production efficiency in farming: the requirement of necessity and the condition of adequacy. To determine whether or not manufacturing is efficient, the ratio of marginal product value (NPM) to marginal casualty costs (BKM / Pxi) is utilized to compute adequacy (Sinabariba, et.al., 2014). The value of regression coefficients produced from Cobb-Douglas production functions was used to examine the usage of localized efficiency utilization of production variables. Only aspects that affect production outputs, such as raw materials and firewood, are considered in this location efficiency study. Table 2 displays the findings of the efficiency analysis of the UP Bedakah black tea production factor.

Table 2. Analysis of Alokatif Efficiency of The Use of Black Tea Production Factors in Plantation Unit Factories In 2017 - 2019.

Variabel	Rata-Rata Var (Xi)	Px	Y	PY	Bix	Apxi	MPP	MVP	MVP/ Px	Xi Optimal
Raw Materials	.305,78	1.200,00	70.043,42	20.000,00	0,95	0,22	0,21	4.137,36	3,45	1.104.351,26
Firewood	535,14	108.000,00	70.043,42	20.000,00	0,04	130,89	5,50	109.945,94	1,02	544,78

Source : Primary Data Analysis (2021)

The MVP (Marginal Value Product) value for raw material factors is 4,137.36, according to the results of the local efficiency study in Table 2. This means that each addition of raw materials of 0.95 kg will improve the receipt of Rp 4,137.36. When comparing the MVP value to the marginal casualty costs (Pxi) for raw materials worth Rp 1,200, the mvpxi to pxi ratio is 3.45. The MVP (Marginal Value Product) value for the firewood component is 109,945.94, according to the results of the local efficiency analysis in Table 2. This means that each addition of 0.04 kg of firewood will enhance the receipt by Rp 109,945.94. The mvpxi to pxi ratio of 1.02 yields the MVP value when compared to the Marginal Casualty Cost (Pxi) for firewood of Rp 108,000.

Because the allocation of production elements has been efficiently localized, the Marginal Product Value (NPMx) is the same as Px. It demonstrates that maximum profit or optimal use of production elements has already been achieved. The following are the efficiency criteria: 1. (NPMxi / Px) > 1 indicates that the

utilization of input X has been inefficient or insufficient, and that input X must be added to achieve efficiency. 2. (NPMxi/Px) 1; indicates that the use of input X is inefficient or has beyond the optimal limit, and that input X must be lowered to achieve efficiency (Nurul, et.al., 2018). The MVP/Px value in the raw material variable has a value of 3.45 (greater than 1), indicating that the usage of raw material factors is not yet efficient and has to be increased, according to the results of the production factor efficiency study. Due to a scarcity of raw materials to be processed into black tea at the UP Bedakah factory in 2019, raw material consumption is still relatively low. Due to a paucity of raw materials in the form of wet tea leaves, the processing facility in UP Bedakah was unable to meet the target of black tea output set at the time. This is due to harvesting limits in the supply of raw materials supplied by the UP Bedakah facility as a result of a long drought that prevents tea leaves from growing properly. Furthermore, UP Bedakah acquired raw materials from its own garden, where the crop from the UP Bedakah garden was partly allotted to meet the raw materials for green tea production in UP Tanjungsari at the time.

From 2017 to 2019, the average raw material utilized was 320,305.78 kg; however, to achieve local efficiency, the raw material must be increased to 1,104,351 kg. The corporation should make efforts, particularly in UP Bedakah, to improve the number of raw materials by focusing on the garden, which is an issue for tea leaf yield during the dry season. This can be solved by using technology or microclimate engineering to provide a climate ideal for tea plant growth, such as planting protecting trees like silver oak, albasia, kaliandra, dadap, lamtorogung, and acacia. Protective trees can be used to reduce wind speed, so reducing evaporation of water in the soil and plants. They can also be used to reduce air temperature in the surroundings, thereby preserving moisture and overcoming drought (Haq and Karyudi, 2013). However, water should be considered so that the entire tea plant receives sufficient moisture content and the drought problem can be resolved during the dry season.

The MVP/Px value in the firewood variable has a value of 1.02 (greater than 1), indicating that the usage of the firewood factor has not been efficient and that it has to be added, according to the results of the production factor efficiency study. In UP Bedakah, firewood, which is the primary fuel used in the processing of black tea, is still in short supply. This may be due to the fact that during the drying process and tea leaf pelayuan, personnel may utilize their intuition in temperature settings and firewood, resulting in the usage of firewood that is not appropriate for the needs. The average amount of firewood utilized from 2017 to 2019 was 535.14 kg; however, to attain aloative efficiency, 545 kg of firewood must be added. The company should make efforts, particularly in the production section of UP Bedakah, to control staff performance to work in accordance with the SOP that has been established, and in the use of firewood, a calculation with the number of raw materials processed to be efficient can be held.

CONCLUSION

The amount of raw materials and firewood used in the tea factory UP Bedakah affects the production of black tea, and the utilization of production factors in the form of raw materials and firewood has not been efficient.

The average amount of firewood utilized from 2017 to 2019 was 535.14 kg; however, to attain aloative efficiency, 545 kg of firewood must be added. The company should make efforts, particularly in the production section of UP Bedakah, to control staff performance to work in accordance with the SOP that has been established, and in the use of firewood, a calculation with the number of raw materials processed to be efficient can be held.

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