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Factors Affecting Coffee Seed Farming Production (Coffea arabica L.) and Its Implications for Income

Riyan Febriyanto[1], Dety Sukmawati[2], Tuti Gantini[3]
Program Magister Agribisnis Fakultas Pertanian Universitas Winaya Mukti
*Corresponding author : riyannoah33@gmail.com

ABSTRACT

Coffee seed is one of the forest products with a lengthy marketing chain, in which numerous marketing agencies are involved; therefore, there is a need to improve efficiency in order to increase the value of existing coffee seed cultivation. It is regarded necessary to conduct research with the title "Factors Affecting Production of Arabica Coffee Seed Farming and Their Financial Implications." Farmers always anticipate high profits from their agricultural productions. To maximize profits, farmers and breeders must increase production and decrease production costs. Therefore, producers must be able to efficiently provide agricultural inputs on agricultural land. Not necessarily does the availability of agricultural inputs result in high productivity. Large income does not always indicate high efficiency, so efficiency measurements should follow the analysis of income. This study's target population consisted of Arabica coffee cultivators in Cianjur Regency. There are 30 individuals who propagate or sell Arabica coffee seeds. On the basis of the outcomes of field data analysis and hypothesis testing, as well as the discussion, the following research conclusions can be drawn: The performance of Arabica coffee seed cultivation in the Cianjur Regency is characterized by the use of leased land and an average business size of 7,700 stems. The required investment ranges between 2 and 8 million IDR. The seed mortality rate is approximately 22%, and the resulting products are separated into three grades: grade 1, 39.17%, grade 2, 35.87%, and grade three, 25%. The nature of the farmer's primary commercial enterprise is a source of support for the farmer's domestic economy. Seed inputs are acquired independently, and occasionally in collaboration with seed entrepreneurs from outside the city. Arabica coffee seed cultivation generates an average seasonal income of IDR 12,928,150 with a business efficiency rating of R/C 2.

Keywords : Efficiency_Analysis, Arabica_Coffee, Cobb_Douglas, Production_Factors, Farming_Performance

INTRODUCTION

Coffee plants are one of the most widespread agricultural and plantation products in Indonesia. In addition to palm oil, rubber, and other commodities, coffee is one of the most exported commodities in Indonesia. It plays an important role in the country's economy. India is therefore one of the largest coffee producers in Asia, along with India and the Philippines. Coffee is one of the country's largest contributors to foreign exchange, and coffee farming can also generate other benefits, such as increased employment opportunities and income for coffee farmers and all aspects of society involved in processing, cultivation, and marketing.

The increase in the number of coffee production every year is one of the proofs, that coffee farming is currently one of the attractions as a business field for the actors, both farmers and third parties as processors. According to data taken by the Central Statistics Agency of West Java, the number of coffee plant production in Cianjur Regency during the period 2019 to 2021 has always increased, in 2019 the amount of coffee that can be produced is 384.20 tons, in 2020 it is 384 tons and in 2021 it is 541 tons. From the data above, it can be seen that the number of coffee plant production from 2019 to 2021 increased by almost 50%, although in 2020 the number of coffee plant production decreased slightly, which is experienced by all regions in Indonesia. When compared to other cities or districts, Cianjur still has a coffee crop production value that is not too large or too small in scale, this may be influenced by several factors, such as land area, number of commodities, number of existing coffee farmers, consumption level in the area or other factors.

Coffee also plays a role in the development of the industry from coffee processing farming, both from the small or lower middle class (family industry), from the middle class and the upper middle class so that it has the potential to increase income. The Directorate of PPHP of the Ministry (2012) explained that Indonesia's coffee bean sector and processed products have a greater direct and indirect relationship value than each other. This means that for every increase in demand in the coffee bean and processed coffee products sector, it can increase output in all sectors including the coffee sales

industry and the impact is relatively large, which is 1.5 times. If we consider the effects of public consumption, that is. H. if domestic expenditure of the coffee industry increases, then the increase in production can be up to three times. The coffee bean industry and its processing also has the potential to increase workers' incomes in all industries. The impact of labor income from coffee beans and coffee processing in other sectors is around 1.6 times. However, the coffee bean industry and its processed products have limitations, namely the backward dispersion is greater than the forward dispersion, so that national economic growth is influenced by the growth of this industry.

The increase and development of both the coffee industry and the level of consumption in the Indonesian people affect welfare with a new lifestyle where the nature will encourage an increase in coffee consumption. The level of coffee consumption will be estimated by coffee entrepreneurs for a period of 20 years and always increases to reach 300 grams per capita from the initial consumption level of 800 grams per capita. The balance of coffee consumption and the fulfillment of its needs nationally needs to be maintained so that it does not affect market aspects both domestically and internationally by increasing its production.

According to data obtained from the Indonesian Coffee Exporters Association (AEKI 2018), ministries together with farmers in Indonesia plan to expand coffee plantation land throughout Indonesia accompanied by replanting through intensification programs. With the hope, the coffee production target reaches between 900 tons to 1.2 tons per year, which can be achieved from now until the next 10 years as the process progresses.

As with most commodities, using quality seeds is one of the first steps that greatly determines the success of coffee cultivation in terms of quality. High-quality coffee beans have characteristics such as having constant growth, not having signs of pest and disease attacks, having many roots and can be produced in large quantities when seedlings are brought to the field. In general, kindergarten is a group of activities

Usually, the stages of the seedling process include seedling preparation, maintenance, and selection of ready-to-plant seedlings. High-quality nurseries have favorable physical characteristics, such as aggregates, clay/clay texture, water retention capacity, and total pore space. without a waterproof coating. Other environmental factors are estimated to have supporting chemical properties, such as high soil organic matter content, the absence of toxic soil elements, and the presence of acceptable macronutrients and micronutrients (Inawati 1989).

Cianjur Regency is one of the areas that has an agriculture-based economic growth (LPE) of 5.83%, which is very beneficial for the people of Ianjur Krang more than 60% of the workforce depends on the underprivileged sector. This is reflected in the results of the PRDB (Gross Domestic Product) in 2018 of 32,639,360,000 which mostly came from the agricultural sector, which amounted to 119.71% and the contribution of the industrial sector was 19.04%, including the agroindustry (BPS Cianjur Regency, 2019).

Coffee is a plantation crop with a long cultivation history and relatively high economic value. The coffee comes from the African continent, including the mountainous areas of Ethiopia. However, it is the country in the southern Arab region, Yemen, that has begun to popularize coffee rather than Africa, its home country (Rahardjo 2012).

Coffee plantations are mostly (94%) managed by locals, while the rest are owned by private or government plantations. Coffee produced by smallholders and large-scale plantations is not only consumed, but also supplied to factories such as Tugu Luwak, Nescaffe, Java Coffee, Torabika, and others. In general, coffee plantations in small plantations are not taken care of like large plantations, causing several problems, including a decrease in productivity. High productivity is achieved when all production factors are optimally and efficiently coordinated (Santoso, 1999). Based on initial data on coffee production from 2019 to 2021, almost all of the coffee produced comes from human-owned coffee plantations.

Similar to other business or sales industries, the process of selling coffee seeds or the level of production is definitely expected to run optimally and as well as possible because it will later affect farmers or coffee seed breeders. Farmers allocate inputs as efficiently as possible to maximize output by minimizing costs (cost minimization) and using limited capital to maximize profits (profit maximization).

The level of production affects the income level of artisans in the leather industry. If the output produced, then the income of artisans also falls, which means that there is a positive correlation between production volume and income.

Based on the problem of problem identification, the purpose of this research is the Prosperity of coffee seed farming in the Cianjur Regency area. Factors that affect the production of coffee seed farming. Implications or impacts of the amount of production and the price of coffee seeds on income.

MATERIALS AND METHODS (Arial 10)

The approach or technique used is the quantitative verification research method, which tries to show reality, explain the relationship between variables, and test theories and hypotheses based on empirical data verification. The method in question is a survey-based approach involving a number of coffee seed vendors who are the unit of analysis.

This research will be carried out in the Cianjur Regency area and the subject of the analysis is coffee seed breeders. Meanwhile, the factors that affect the production of coffee seed farming, the feasibility of coffee seed farming, and factors that affect the feasibility of coffee seed farming are the main variables in this study.

Variable Operations

Several variables are defined and measured in relation to the following concepts to facilitate data collection:

1. Efficiency is the maximum input condition. Technical efficiency maximizes output per input. Economic efficiency is technical and price efficiency. Allocation efficiency selects the best input rate for a given price.
2. Seed productivity is the yield or number of coffee seedlings in the area (ha) and time. Measured in abating/ha units).
3. Agricultural income, i. H. Difference between farmer income and farming costs.
4. Coffee seed production (Y) is H. The number of coffee seeds produced during one growing season is measured in stem units.
5. Cultivators plant coffee seeds on seed farming land (X1). Ha is the unit. Soil fertility can vary. The standard land rental price per hectare at the study site for one planting season, expressed in rupiah per hectare (Rp/ha), is used to calculate PX1.
6. Coffee plants produce X2 embryos per season. Kilogram size. The widely agreed seed price per kilogram (PX2) at the research site is Rp/child.
7. Coffee bean processors use X3 urea per season. Kilograms (kg) are used. The price of urea fertilizer is Rp/kg depending on the price of the study area.
8. In the growing season, SP36 (X4) fertilizer with P2O5 36% is used. To reflect the price level of the study area, the price of SP36 fertilizer is calculated in Rp/kg.
9. Organic fertilizer (X5) is made from rotting plant residues, manure, green manure, and compost (humus). Decree of the Minister of Agriculture No. 02 of 2006 stipulates the minimum technical standards for organic fertilizers (unless you provide them yourself). Breeders (X4) use sengon seeds for one season. Kilograms (kg) are used. At the study site, the price of X4 organic fertilizer is Rp/kg.
10. One kilogram of X6 pesticide is applied.
11. Production labor (X7). weekdays (HOK). Pungukur is obtained by modifying the unit to match the wages applicable to men's working days. The labor rate (X8) is estimated in rupiah per working day (Rp/HOK) like the wage rate at the study site.

Sample Withdrawal Method

Primary and secondary data were obtained. Interview data and questionnaires. Secondary data analysis from related institutions and cultural heritage research. The following table lists the categories and methodologies of the data.

Table 1. Types, Sources and Methods of Data Retrieval

It	Data Type	Data Source	Method
1	Data Primer a. Application of Coffee Seed Cultivation Technology b. Managerial Farmer Skills c. Success of Coffee Seed Farming	 Farmer Farmer Farmer	 Interview Interviews and Observation
2	Data Seconds a. Regency Profile b. Agribusiness Potential Data	SKDP	Literature and Documentation Studies

Data Collection Techniques

Questionnaires from around 30 coffee seed cultivators in Cianjur Regency were collected to collect data. The size of the population will determine the number of samples, the more samples the better; However, there is a minimum number of samples that must be collected by researchers, which is at least 30 samples (Cohen, 2007).

Hypothesis Testing Techniques

Coffee seeds, land area, urea fertilizer, organic fertilizer, SP36 fertilizer, pesticides and labor.

a. Hypothesis Testing 1

Hypothesis 1: Coffee seeds, land area, urea fertilizer, organic fertilizer, SP36 fertilizer, pesticides, and labor all have an impact on coffee seed cultivation yields. Utilize the production function of the exponential function model for evaluation.

The analysis method used is the Cobb-Douglass stochastic frontier. One of the simple methods is the reason why this method was chosen, because the form of this method can simulate the occurrence of multicollinearity. As Aigner explained. (1997) and Meeusen and Broeck (1997).

The similarity of its functions can be written as follows:

Y = bo X1b1X2b2 X3b3X4b4 X5b5X6b6 X7b7b7eu

Information:

Y = coffee bean production (kg)
X1 = land area (ha)
X2 = coffee beans
X3 = urea rifle
X4 = pupuk SP36
X5 = Organic fertilizer
X6 = pesticides
X7 = labor force (HOK/ha)
B1-b2 = variable regression coefficient X1 – X7
E = coeficin natural (2,718)

Cobb-Douglas must be linear because its original form is a power function, therefore the function is logarithmized so that it turns into a double linear form, as follows:

LogY = log bo + b1logX1 + b2logX2 + b3logX3 + b4logX4 + 51logX5 + b6logX6 + b7logX7 + U log e

Further testing steps are as follows:

a. Simultaneous Hypothesis Testing

At the same time, tests are carried out to determine how much production factor is used:

Land area, coffee seeds, urea fertilizer, organic fertilizer, SP36 fertilizer, pesticides and labor, which are considered to be at the rational limit affect the production of coffee seed cultivation, the research hypothesis is changed to a statistical hypothesis as follows:

H0 : bi = 0 → Production factors: land area, coffee seeds, organic fertilizers, organic fertilizers, SP36 fertilizers, pesticides and labor have a real effect on the production of coffee seeds.

H1 : bi ≠ 0 →Production factors: land area, coffee seeds, organic fertilizers, organic fertilizers, SP36 fertilizers, pesticides and labor have no real effect on the production of coffee seeds.

Testing of all coefficients as a whole through F test statistics with the formula:

$$Fhit = \frac{(\mathrm{n} - \mathrm{k} - 1)R_{yx}^2}{\mathrm{k}\left(1 - R_{yx}^2\right)}$$

Ftables with db1 = k and db2 = n-k-1 and error rates α = 5% are searched from f tables

1. Decision rules :

1. If Fhit ≥ Ftable, then the hypothesis (H0) is rejected, meaning that production factors such as land area, coffee seeds, organic fertilizers, SP36 fertilizers, pesticides and labor have a real effect on the production of coffee seeds.

2. If it matches < Ftable, then the hypothesis (H0) is accepted which means that production factors such as land, coffee seeds, organic fertilizers, SP36 fertilizers, pesticides and labor do not have a real effect on the production of coffee seeds.

Partial Hypothesis Testing

The influence of each factor of production:

Land area, coffee seeds, organic fertilizers, organic fertilizers, SP36 fertilizers, pesticides and coffee seed production work require further analysis. Therefore, subtest analysis is used. The purpose

of subanalysis is to determine the influence of a variable on the assumption that other variables remain unchanged or have no effect.
The description is as follows:
H0 : bi = 0, the regression coefficient of an independent variable is equal to zero.
H1 : bi ≠ 0, the regression coefficient of an independent variable is not equal to zero.
The statistical test used is the t-student test:

$$thit = \frac{bi - \beta i}{2a\sqrt{var(bi)}}$$

Error rate used in this analysis (α) = 5%

1. Decision Rules:

1. If Fhit ≥ Ftable, or if Pvalue ≤ α, then the hypothesis is accepted and the free variable (Xi) somewhat affects the variable (Y).
2. If Fhit < Ftable, or if Pvalue > α, Xi slightly affects Y if the hypothesis is adopted. Xi slightly affected Y, so the hypothesis was rejected, meaning that the production factor had no significant effect on increasing or decreasing the amount of coffee bean production.

Meanwhile, to test the accuracy of the model used, the magnitude of the determination coefficient (R2) is calculated, with the formula R2 = JKregression / JKtotal. The result is considered good if the value (R2) is close to 1 (one).

2. Hypothesis Testing 2

Hypothesis 2: The income of coffee seed farming is influenced by the production and price of coffee seeds. The test is still used using the Copp-Douglas method where the variables of price, revenue, and cost are added and will later be accumulated together with the value or amount of production (Y) whose value is known.
The equation of the function can be written as follows:
I = bo Yb1Xb1 Xb3 Xb3 Xb4 . eu
Information:
P = Revenue from the sale of coffee seeds
X1 = Production
X2 = Reception
X3 = Price
X4 = Fees
bi-b2 = Variable regression coefficients Y and X
A = Lagaritma Natorel (2,718)

Cobb-Douglas must be linear because its original form is a power function, therefore the function is logarithmized so that it turns into a double linear form, as follows:

LogY = log bo + b1logY1 + b2logP2 + U log e

Further testing steps are as follows:

Simultaneous hypothesis testing

The test was tested on how much the total production and selling price of coffee seeds had an effect on the income of coffee seed cultivation. Therefore, the research hypothesis is changed to a statistical hypothesis as follows:
H0 : bi = 0 → The amount of coffee seed farming production has a real effect on coffee seed farming income.
H1 : bi ≠ 0 → The amount of production and selling price of coffee seeds have no real effect on farming.
Testing of all coefficients as a whole through F test statistics with the formula:

$$Fhit = \frac{(\mathrm{n} - \mathrm{k} - 1)R_{yx}^2}{\mathrm{k}\left(1 - R_{yx}^2\right)}$$

Ftables with db1 = k and db2 = n-k-1 and error rates α = 5% are searched from f tables

1. Decision rules :

If Fhit ≥ Ftable, then the hypothesis (H0) is rejected, meaning that the amount of production, cost, receipt, and selling price of coffee seeds have no real effect on the income of coffee seed farming.

If Fhit < Ftable, then the hypothesis (H0) is accepted, meaning that the amount of production, cost, receipt, and selling price of coffee seeds have a real effect on the income of coffee seed farming.

RESULTS AND DISCUSSION (Arial 10)

Investment Capital, Fixed Costs and Variable Costs

The investment tools needed by respondents in coffee seed farming include water machines, hoses, buckets, paranets, hoes, machetes, media soil, polybags and others. These tools generally have an economic life of five years. The total investment value of these tools for a business scale of 7,700 rods is around Rp. 3,465,000 varies depending on the size of the business.

Human labor from inside and outside the family is utilized in the cultivation of coffee seeds. Nonetheless, in business calculations from any source, labor is accounted for as labor costs based on prevailing wages.

Fixed fees

Even though the land is owned by farmers, the fixed cost of planting Arabica coffee seedlings is still taken into account as land rent, maintenance of tools and machinery, capital interest, and depreciation of equipment. The average fixed fee for 0.26 acres, or 7,700 company tribes, is Rp. Appendix 1 provides complete information on fixed costs, while the table below provides a summary.

Table 2. Fixed Costs of Arabica Coffee Nursery Farming in 2023.

Fixed fees	The business scale is 7,700 stems equivalent to 0.26 ha	The business scale is 30,000 sticks equivalent to 1.00 ha
	Value (Rp)	Value (Rp)
1. Maintenance	134.667	120.000
2. Shrinkage of the tool	658.350	2.565.000
3. Capital Interest	866.250	3.375.000
4. Land Lease	231.000	900.00
Sum	1.890.267	6.960.000

Variable Costs

The variable costs associated with Arabica coffee cultivation consist of the following costs: Coffee seeds, organic fertilizers, NPK fertilizers, urea fertilizers and labor. The variable cost amounted to Rp 4,908,000 for an area of 0.26 hectares, equivalent to 7,700 permanent plantations.

Production, Productivity and Reception

The level of production costs, productivity, production equipment costs, and product selling prices greatly affect the income generated from the cultivation of Arabic coffee beans. The type, level, and application of technology have a major impact **on** production levels and productivity.

Good land management or planting media, the use of superior coffee seeds, effective insect control at affordable prices, adequate irrigation, and adequate fertilization treatment, harvest and post-harvest handling are the cornerstones of farming activities. In addition, the scale of business controlled by Arabica coffee seed farmers is correlated with the products and productivity achieved.

With coffee seedlings reaching grade 3 (ideal at a height of 50 to 60 centimeters), the actual mortality rate reaches 39%, yielding a stem yield per season of 17%.

Farm Income and Farm Efficiency

Income from Arabica coffee nursery cultivation is influenced by production costs, production results, commodity prices, and other variables. The higher the cost of production, the lower the income, while the higher the output and commodity prices result in increased profits.

The income of coffee seed breeders for one season is Rp. 12,928,150 for a business scale of 7,700 stems or equivalent to land area = 0.26 ha and planting per hectare of Rp. 47,520,000.

Coffee Nursery Farming

Coffee nursery farming technology is basically farming that is usually carried out by farmers that is not too different from the application of other technologies. However, there is more emphasis on the use of organic fertilizers and for pest and disease control using organic materials and reducing the use of inorganic fertilizers and factory-made medicines. The application of the technology includes: land cultivation, seed treatment, seed seeding, weaning, irrigation, basic and additional fertilization, pest and disease control and weed control, water management, harvesting and post-harvest care.

Hypothesis Testing Analysis

As stated in the framework of thought, this research is a verifiable research so that a research hypothesis is proposed and testing is needed for the correctness of the hypothesis.

If F hit = 1892.597 is greater than F table = 2.46, then Ho is rejected or H1 is accepted. This means the parameters x1, x2,..... X7, really shows its influence in real life. This means that coffee seeds, organic fertilizers, urea fertilizers, SP36 fertilizers, pesticides and labor have a real effect on the production of arabica coffee seeds.

The diversity of factors that affect seed production is shown by the R square R2 = 0.998 or reaches 99.80% (presented in appendix 7), showing that the diversity of Arabica coffee seed production can be explained by these factors. The test switched to a partial analysis to find out the influence of each variable after confirming the real influence.

Table 3. Nature and Rationality of Factors Affecting the Production of Arabica Coffee Seed Farming

Variable	notasi	koefisien	t_{hit}	t_{tabel}	sifat	Keterangan
Luas lahan	X_1	0,051	2,952	2,074	Nyata	rasional
Bibit kopi	X_2	0,291	5,633	2,074	Nyata	rasional
Pupuk urea	X_3	0,361	6,083	2,074	Nyata	rasional
Pupuk organik	X_4	0,002	0,069	2,074	Tidak nyata	Tidak rasional
Pupuk SP36	X_5	0,027	0,910	2,074	Tidak nyata	Tidak rasional
Pestisida	X_6	0,391	9,465	2,074	Nyata	rasional
HOK	X_7	0,073	1,163	2,074	Tidak nyata	Tidak rasional

Of the seven input variables, it shows that they have been allocated rationally and the effect is real, except for the production inputs X4 (organic fertilizer), X5 (SP36 fertilizer), and X7 (HOK) indicate irrational, The influence of organic fertilizer on the production of Arabica coffee seed farming is not real, which means that the use of organic fertilizer and SP36 can be reduced or adjusted again even with the number of existing workers. The magnitude of the influence of each variable can be seen from the size of the production elasticity coefficient. The greater the value of elasticity, the greater the influence of the variable in question. Based on Table 3. The level of significance and magnitude of the influence of each variable is explained as follows:

1. Land Area (X1)

The production factor of land area (X1) has a real effect on the production of coffee seeds (Y), this can be seen from the value of t-count = 2.952 which is greater than t-table = 2.074. The magnitude of the influence of land area on coffee seed production is 0.051 which shows that every increase in planting area of one percent, it will be followed by an increase in coffee seed products by 5.1% assuming other factors remain. The number 0.051 directly shows that the elasticity coefficient of production inputs with a positive value greater than one indicates that the use of production inputs for land area is in a rational area.

2. Benih Kopi Arabica (x2)

Coffee seed production factor (X2) has a real effect on coffee seed production (Y), this can be seen from the value of t-count = 5.633 which is greater than t-table = 2.074. The magnitude of the influence of coffee seeds on the production of Arabica coffee seeds is 0.291 which shows that every additional coffee seed per unit, it will be followed by an increase in coffee seed products by 29.1%. The number 0.291 directly shows that the elasticity coefficient of production inputs with a positive value greater than one indicates that the use of coffee seed production inputs is in a rational area.

3. Urea Shooting (X3)

The production factor of urea fertilizer (X3) has a great influence on the yield of coffee seedlings (Y), as evidenced by the tcount = 6.083 greater than ttable = 2.074. The magnitude of the influence of urea fertilizer quantity on the production of arabica coffee seeds is 0.361, this shows that for each unit of urea fertilizer added, the production of coffee seeds will increase by 36.1%. The elasticity coefficient of production inputs has a positive value greater than one, which indicates that the use of urea fertilizer production inputs is in a rational area.

4. Organic Fertilizer (X4)

Because t calculated organic fertilizer (X4) = 0.069 is smaller than t table (2.074), organic fertilizer has no real effect on coffee seed production. The elasticity coefficient for organic fertilizer production is 0.002, this shows that for each unit of urea fertilizer added, coffee bean production will increase by 0.2%. The number 0.002 directly represents the inelasticity coefficient of production inputs whose values are greater than zero and less than one, indicating that the use of organic fertilizer production inputs is in irrational territory, so its use can be adjusted or reduced.

5. Pupuk SP36 (X5)

The value of t calculation of SP36 fertilizer (X5) = 0.910 is smaller than t table = 2.074, so the use of SP36 fertilizer has no real effect on the production of coffee seeds. The elasticity coefficient for organic fertilizer production is 0.027, which shows that the addition of one unit of urea fertilizer will increase the yield of coffee beans by 2.7%. The number 0.027 indicates that the inelasticity coefficient of production inputs with a positive value is less than one, which indicates that the use of SP36 fertilizer production inputs is in an irrational area, so the amount used can be reduced.

6. Pesticides (X6)

The t-count value for pesticide production factor = 9.465 is greater than t-table = 2.074. The magnitude of the influence of the number of pesticide applications on the production of Arabica coffee seeds is 0.391 which shows that every addition of urea fertilizer per unit, it will be followed by an increase in coffee seed products by 39.1%. The number 0.391 directly shows that the elasticity coefficient of production inputs with a positive value greater than one indicates that the use of urea fertilizer production inputs is in a rational area.

7. Manpower (x7)

The t-calculated value for the labor production factor = 1.163 is smaller than the t-table = 2.074 shows an unreal effect on the product. The regression coefficient of 0.073 represents the elasticity of the labor production factor, which indicates that the addition of one unit of labor will increase output by 7.3% if all other factors remain constant. This shows that the amount of labor used can still be modified to boost the productivity of coffee seeds.

Economic Efficiency of Production Input Use

Use of production factors: Land area (X1); Coffee Beans (x2); Urea Fertilizer (X3); Organic Fertilizer (X4); Fertilizers SP36 (X5), Pesticides (X6) and Labor (X7) to the extent that they have been used to achieve economic efficiency are analyzed using the following formula:

1. NPMxi/Hxi = 1 ; Utilization of economic production determinants
2. NPMxi/Hxi > 1 ; The use of production factors is not economically effective.
3. NPMxi/Hxi < 1 ; The use of production factors is inefficient from an economic point of view.

Table 4. Results of the Calculation of Economic Efficiency Indicators of Arabica Coffee Seed Farming

Production Input	bi	And	Xi	Y/Xi	Hxi	HP	PMXi	NPMXi/Hxi
Land Area (X_1)	0.051	30,000	0.26	11,538.46	231,000	2,000	588.46	5.09
Seed (X_2)	0.291	30,000	3.21	934.57	180,000	200	271.95	3.02
Ureak (Xhh)	0.361	30,000	15.37	195.18	13,000	200	70.45	10.83
Org Pupu (Xh)	0.002	30,000	5.27	5,692.25	7,000	200	1.14	0.07
Pupu sP36 (Xh)	0.027	30,000	4.53	662.25	7,000	200	17.88	5.10
Pesticides (X_6)	0.391	30,000	20.67	145.13	35,000	200	56.74	3.24
HOK (X_7)	0.073	30,000	36.07	83.17	100,000	2,000	6.07	0.12

Based on the results of the calculation and analysis of the table above, it can be concluded that there is no use of production inputs that achieve economic efficiency. However, among the production inputs that have NPMxi/Hxi economic indicators that are close to 1.0 are for seed and pesticide production inputs, the values of 3.02 and 3.24 respectively are obtained. To achieve economic efficiency, for production inputs:

1. Land area must be added
2 Arabica Coffee Seeds should be added
3.Urea fertilizer should be added
4. Organic Fertilizers should be reduced
5. SP36 fertilizer must be reduced
6. Pesticides should be added

7. Labor should be reduced insignificantly.

Factors Affecting the Income of Arabica Coffee Seed Farming

Research Hypothesis 3: Coffee seed farming income is affected by: Production, profit, price, cost and productivity percent will be tested by multiple regression analysis with the following power function model:

P = bo Z1b1Z2b2.Z3b3Z4b4Z5b5. EU

If F hit = 37188.998 is significantly greater than table F = 2.62, then Ho is rejected and H1 is accepted. It shows the parameters b1,b2,..... b7, really shows its influence in real life. This means that the income of coffee seed farming is significantly affected by the amount of production, profit, price, cost and productivity.

The diversity of factors that affect seed production is shown by the R square R2 = 1,000 or reaching 100% (presented in appendix 9). This shows that the diversity of coffee seed farming profits that occur can be explained by these factors. Thus, a partial analysis will be carried out because the previous results are proven to have a real effect, this analysis is intended to see the influence of each factor (variable).

Table 5. Factors Affecting the Income of Arabica Coffee Seed Farming

Model		Unstandardized Coefficints		Unstandardized Coefficints	T	Sig	Collinearty Statistics	
		B	Std Error	Beta			Tolerance	VIF
1	(Constant)	1,515	0,353		4.29	0,000		
	Ln_Z1	0,157	0,060	0,156	2,607	0,015	0,001	668,471
	Ln_Z2	0,367	0,028	0,418	13,169	0,000	0,005	187,820
	Ln_Z3	0,036	0,020	0,006	1,815	0,082	0,564	1,774
	Ln_Z4	0,475	0,036	0,430	13,344	0,000	0,005	193,453
	Ln_Z5	0,001	0,001	0,001	0,393	0,698	0,794	1,260

The ttable is obtained for db = n-k =30- 5-1 = 24 and error rate = 5 %,: t (0.05: 24) = 1.713. The level of significance of each variable can be seen by comparing the tcal value with the table or it can also be seen from the sig number. Meanwhile, the magnitude of the influence or contribution of each variable is seen from the number of the elasticity coefficient of the profit function. The larger the value of the elasticity coefficient, the greater the influence of the variable in question. Based on Table 5. The following is an explanation of the significance and influence (contribution) of each variable:

1.Production (Z1)

It is shown that t-count = 2.607 which is greater than t-table = 1.707, then production (Z1) has a real effect on the income of coffee seed farming (K). This value shows that the influence of production on coffee seed farming income is 0.157, meaning that every increase in business scale of one percent will increase income by 0.157 percent.

2. Advantage (Z2)

It is shown that the calculated t-value of 13.167 is greater than the t-value of the table of 1.713, so the profit factor (Z2) has a real effect on the profitability of arabica coffee seed cultivation (P). The effect of profit is 0.367, which indicates that for every 1 percent increase in business size, there will be an increase in revenue by 0.367 percent, assuming other factors are not affected.

3. Price (Z3)

This is evidenced by t calculation = 1.815 greater than t table = 1.713, this shows that the price (Z3) has a significant effect on the income of Arabica coffee seeds (P). The magnitude of the influence of price on coffee seed farming income is 0.036 which means that for every one percent increase in productivity, there will be an increase in income by 0.036 percent assuming that all other factors are constant. This is the average price for the most widely distributed or produced coffee beans.

4. Fees (Z4)

(Z4) had a significant effect on the income of coffee seed farming (P), shown by the calculated t value = 13.344 greater than the table t value = 1.500. The effect of labor wages on the profit of sengon seed producers by 0.475%, shows a positive influence. This suggests that assuming all other assumptions remain constant, a one-percent pay increase would result in a 0.475% increase in earnings.

5. Productivity (Z5)

Shown by a t-count value of 0.393 which is smaller than the t-table value of 1.713, Production (%) (Z5) has no real effect on the agricultural income of coffee seedlings (P). The magnitude of the

influence of productivity on the income of coffee seed farming is 0.001. Although the effect is very small, the benefits are enormous. This explains that assuming other factors remain, any 1% increase in experience will be followed by a 0.001% increase in profits. This is due to the fact that the percentage of product grades between one and the other is not very different from the amount produced.

CONCLUSIONS AND SUGGESTION

1. The cultivation of Arabica coffee seedlings in Cianjur Regency is characterized by: cultivated on leased land and an average business scale of 7,700 stems. The investment needed is around Rp 2 to Rp 8 million. The seedling mortality rate is around 22% and the products obtained are divided into three grades: grade 1 39.17%; grade 2, 35.83% and grade 3, 25%. For farmer households, the nature of business as the main business activity is a source of support. Sometimes seed inputs obtained independently are obtained through cooperation with seed entrepreneurs from outside the city. Coffee farming earns a profit of IDR 12,928,150 per season with R/C 2 business efficiency.
2. The following factors affect the production of arabica coffee beans in its cantra, surface area, number of seeds, urea fertilizer and insecticide efficiency. Paying attention to the coefficient of the elasticity of the production input (Ɛprod), the use of the above production input shows that it is in an irrational area so it is necessary to adjust the amount again or add it again. Meanwhile, other production inputs have technically achieved efficiency. However, economically it indicates that it is still inefficient.
3. Coffee seed farming has reached its business feasibility, factual R/C reaches 2, meaning that for every one rupiah of costs incurred, it will get a revenue of Rp 2 or a profit of Rp 1 or a profitability of 100%. This indicates that Arabica coffee seed farming is not only worth trying but also worth developing.

The income of Arabica coffee seed farming is influenced by factors: production, profit, price and cost. The factors that contribute the most to income variables are; profit and cost factors. The elasticity coefficient of business-scale income is obtained by 0.367, meaning that for every increase in business scale of one percent, profits will increase by 36.7 percent. For the price, the profit elasticity coefficient is obtained 0.475, meaning that for every increase in costs of one percent, the revenue will increase by 47.5%.

REFERENCES

AEKI. 2018. "Indonesian Coffee Exporters and Industry Association." Aeki.org.od. accessed : January 14, 2023

Aigner, et all. 1977. Formulation and Estimation of Stochastic Frontier Production Function Model. Journal of Econometrics, 6(1), 21-37

Central Statistics Agency of West Java. West Java in numbers. 2021. West Java.

Boediono. 1993. "Macroeconomics." Introduction to Economics Synopsis Series No. 2 BPFE Yogya.

Cohen. 2007. Research Methods in Education. New York: Route.

Faadhilah, Salsabila, I Wayan Wiraatmaja, and I Nyoman Gede Astawa. 2021. "Growth Response of Arabica Coffee Seeds (Coffea Arabica L.) Against Various Types of Planting Media and Urea Fertilizer Dosages." Journal of Tropical Agroecotechnology 10(4): 578–95.

Gomes. 1995. Human Resource Management. Yogyakarta: CV. Offset Andi.

Hasan, Iqbal. 2005. Basics of Statistical Materials 2. Print to. Jakarta: PT. Earth Script.

Hendriksen, and Eldon S. 1997. Accounting Theory. Illinois: Richard D Irwin.

Hernanto. 1989. Agricultural Sciences. Jakarta: Independent Spreaders.

Inawati, K. 1989. Production of Micro Potato Tubers (Solanum Tuberosum L.) Through Manipulation.

Directorate General of Indonesian Plantations. 2021. "Coffee Production by Province in Indonesia, 2015-2019." Directorate General of Indonesian Plantations.

Jonathan. 2007. Path Analysis for Business Research with SPSS. Yogyakarta: Andi.

Ministry of Agriculture 2012. Ministry of Agriculture. p. 134. Jakarta.

Laoh, O. Esry H., Ronaldo esaya Amisan, and Gene H. M. Kapantow. 2017. "ANALYSIS OF COFFEE FARMING INCOME IN EAST PURWEREJO VILLAGE, MODAYAG DISTRICT, EAST BOLAANG MONGONDOW REGENCY Ronaldo Esayas Amisan Collection was carried out by taking primary data and secondary data. Primary Data Obtained from the ABSTRACT of This Study." Agri-Socioeconomics journal 13(2): 229–36.

Meeusen, W. and J. van den Broeck. 1977. Estimation of Efficiency of Cobb Douglas Production Function with Composed Error. International Economic Review, 18(2), 435-444.

Mubyarto. 1995. Introduction to Agricultural Economics. 3rd edition. Jakarta.

Najiyati, and Danarti. 2004. Coffee Plant Cultivation and Post-Harvest Handling. Jakarta: Independent Spreaders.

Norfahmi, Femmi, Nunung Kusnadi, Rita Nurmalina, and Ratna Winandi. 2017. "ANALYSIS OF LAND HOUSEHOLD WORK ON RICE FARMING AND ITS IMPACT ON FAMILY INCOME: Analysis of Rice Farming Time Allocation and Its Impact on Farmer Household Income." Agricultural Informatics 26(01): 13–22.

Pindyck, and Rubinfield. 2013. Microeconomics, Eighth Edition. United States: Pearson Education, Inc.

Rahardjo. 2012. "Guidelines for the Cultivation and Processing of Arabica and Robusta Coffee." : 9–35.

Saleh, and Samsubar. 2000. "Envelopment Data Analysis Method." PAE - FE UGM.

Samuelson. 1999. Microeconomics. Jakarta: Erlangga.

Santoso, B. 1999. Estimation of Profit Function and Business Scale in People's Coffee Farming in Lampung. Agro-Economics Research Center. Bogor.

Soekartawi. 1999. Theory and Application of Agribusiness. Jakarta: Raja Grafindo Persada.

Spillane. 1994. Indonesian Tourism, Economic Strategy and Cultural Engineering. Yogyakarta: Canisius.

Sukirno, and Sadono. 2002. Modern Macroeconomics. Jakarta: PT. Rajawali Grafindo Persada.

Trimono, Sungging, Ari Jumadi Kirnadi, and Inda Ilma Ifada. 2018. "PRODUCTION MANAGEMENT OF ORGANIC ARABICA COFFEE PLANTATION (Coffee Arabica) IN KAYUMAS VILLAGE, ARJASA DISTRICT, SITUBONDO REGENCY, EAST JAVA." Frontier Agribusiness 1(1): 1–7.