Journal of Agribusiness Management and Development, Vol 2 No 1, March 2021, Page 48-54
ISSN 2775-0248 (Print) ISSN 2775-0256 (Online)
Available at https://journal.ugm.ac.id/v3/JAMADEV

THE INCOME RISK OF SALAK NGLUMUT FARMING IN SRUMBUNG DISTRICT, MAGELANG REGENCY

Tri Eli Hariyani[1], Dwidjono Hadi Darwanto[2], & Hani Perwitasari[2]
[1,2]Department of Agricultural Socio-Economics, Faculty of Agriculture, Universitas Gadjah Mada
Corresponding author: dwidjonohd.sosek@ugm.ac.id

Received : 15 November 2020 Accepted : 15 January 2021 Published : 3 March 2021

ABSTRACT

Salak Nglumut is a potential snake fruit crop cultivated in district Srumbung, Magelang regency. The high potential is expected to increase the income of the snake fruit farmers. However, farmers' income is influenced by the level of income risks that arise. This study aims to determine the level of income risks and factors that affect the income risk of salak Nglumut farm in district Srumbung Magelang regency. The research location is determined by a purposive sampling method, while the research sample of 50 farmers was determined by a simple random sampling method. The analysis method used to determine the level of income risk is the coefficient of variation (CV), and methods to determine the factors that affect the risk of income is by using multiple regression analysis. The results showed that the risk of salak Nglumut farming income in district Srumbung Magelang regency is about 41.73% or categorized as medium risk. The factors that affect the income risk of salak Nglumut farm in Srumbung district Magelang regency include farming experience, labor cost, and farmer's age.

Keywords: coefficient of variation (CV), income, multiple regression analysis, risk, salak Nglumut

INTRODUCTION

One of the most cultivated plants in Indonesia is horticultural plants including salak or snake fruit. The area of agricultural land used for horticultural cultivation is 2,022,740 hectares or 25.99% of the total agricultural land area in Indonesia (Directorate General of Horticulture, 2015).

Salak fruit plants are included in horticultural crops (Directorate General of Horticulture, 2015). Based on data from the Directorate General of Horticulture (2015) regarding national fruit production contribution in 2014, the salak fruit commodity ranks fifth with a total production of 1,118,953 tons, contributing 5.65% of the total fruit production in Indonesia of 19,805,977 tons. Thus, it can be said that the salak fruit has the potential to be developed in Indonesia. According to data from the Directorate General of Horticulture (2015) regarding salak fruit production according to provinces in Indonesia, it is found that Central Java Province is the province that has the largest production of salak in Indonesia with a production percentage of 39.49% or 441,841 tonnes in 2014 of the total salak production in Indonesia. According to the Central Java Province Statistics Agency (2016), the region in Central Java Province that can produce salak is the Magelang Regency, with 10.03% of the total production in Central Java Province.

The area with the potential for farming in Magelang Regency is the Srumbung District, with the highest production level of all sub-districts in the Magelang Regency (Central Statistics Agency Magelang Regency, 2016). The type of salak plant cultivated in the Srumbung District is the Salak Nglumut. The high potential of salak production in the Srumbung Subdistrict makes it possible to continue to develop salak farming to improve the welfare of the community, the majority of whom earn a living as salak farmers. Welfare is usually measured based on a high-income value. The higher a person's income, the higher welfare, but horticultural plants have several characteristics that can increase farming risk. The Agricultural Research and Development Agency (2015) states that these characteristics include horticulturalcrops that are not durable and quickly decompose,require a large space for planting media, their planting area is specific to certain areas, the harvest period is seasonal, and the selling price fluctuates. These problems can create risks and uncertainties for farmers. Therefore, it is necessary to carry out an analysis to determine the level of risk of incomeand the factors that affect the risk of income so that farmers are expected to carry out risk management to reduce the level of risk in their farming.

Salak Nglumut or *salak pondoh* is native to Indonesia. The word "Nglumut" is a term for *salak pondoh*, cultivated by the salak farming community in Srumbung District, Magelang Regency. According to Santosa et al. (1996), salak (Salak edulis Reinw) belongs to the Pinang-pinangan or Palmae tribe. The morphology of the Pondoh salak plant can be described as a short trunked palm or Palma. Salak plant is a plant with two houses. Salak plants have that branch to form clumps at the base and have rhizomes in the ground. The tip of the salak plant's tip has pinnate compound leaves with the tip of the leaflets broader. Salak plant stems grow upright with an average height of 3-7 meters above the soil surface. The flowers are compound cob-shaped arising from the axillary of the leaves. Another characteristic of salak plants is that they can flower and bear fruit throughout the year with harvest periods, including the salak harvest season (November-January) and the medium season (May-June).

Imelda et al. (2008) conducted a study on income risks in monoculture and multicultural patterns of aloe vera farming in the North Pontianak District. The results showed that aloe vera farming's income risk was 5.37% in the monoculture pattern and 3.29% in the multicultural pattern. It shows that aloe vera farming's income risk with a monoculture pattern is higher than that of a multicultural pattern. Sukma et al. (2013), in their research on the analysis of partnership and independent tobacco farming in Lamuk Village, Tlogomulyo District, Temanggung Regency, an income risk analysis was carried out by comparing the level of risk of income from partnership patterns and independent patterns. Based on the risk analysis results, the income of partnership pattern farmers is 57% higher than the risk of independent pattern farmers' income by 55%. It is because there is a high variation in income among farmers in partnership patterns.

In contrast to previous studies, research by Rohmah et al. (2014) regarding the income risk of sugarcane farming in Bantul Regency in 2012, it was found that there were differences in the level of risk of three types of sugarcane farming, namely planted sugarcane farming, ratoon one sugarcane farming and ratoon two sugarcane farming. The lowest income risk belongs to the ratoon sugarcane farming, about 2,147.

Research related to farming risks was also carried out by Rifki (2014). His research showed that guava farming's average income was Rp. 22,537,837, with a coefficient of variation of 0.4266, which means that the risk of income in guava farming is high. Then, by implementing the Integrated Farming System (IFS), the coefficient of variation obtained is 0.0409 or lower than the risk that would arise without IFS's application.

Risks to farming can arise due to several factors. Imelda et al. (2008) show that several variables affect the risk of income, including the age of the farmer, the number of family dependents, farming experience, (dummy) cropping patterns, and (dummy) farmer's race.

In their study, Kumbhakar and Tsionas (2010) used parametric function analysis with several variables assumed to cause farming risk. The risk is strongly influenced by production inputs, including labor, fertilizer, land area, and other inputs. Based on the analysis, it is known that fertilizers, land area, and other inputs can increase the risk of farming, both production risk, cost risk, and income risk.

Saptana et al. (2010) mentioned several sources of risk in farming. It is stated that the sources of risk that cause farming risk comes from internal and external factors. Internal factors are factors that can be controlled by the farmer. Internal factors include the availability of capital, land tenure, and managerial ability, while farmers cannot control external factors because these factors are beyond the farmers' reach. These external factors include climate or weather changes, pests, diseases, prices for production facilities, and output prices.

1. Production Theory

The production function is a function or equation that shows the combination of the output level and the production activity's input level. The production function is mathematically formulated as follows (Boediono, 1982):

$$Y = f(X_1, X_2, X_3, \ldots, X_n) \quad (1)$$

in which :

Y : Production (dependent variable)

$X_1, \ldots X_n$: Inputs (independent variable)

2. Cost Theory

According to Suratiyah (2015), the cost function is a function that describes the relationship between the number of costs and the level of production. Costs can be divided into fixed costs and variable costs. Fixed costs are costs whose magnitude is not influenced by the production amount, while variable costs are costs whose amount is influenced by the production amount. According to Salvatore (2004), fixed costs are costs incurred in each planting period for fixed production inputs. Some examples of fixed costs include the cost of renting land, farming equipment, taxes, and borrowed capital. In addition, it also explains variable costs. Variable costs are costs incurred in each planting period for variable production inputs. Examples include fertilizers, seeds, and wages for labor outside the family.

3. Income Theory

According to Suratiyah (2015), three approaches can calculate costs and income in farming: the nominal approach, the future value approach, and the present value approach. The approach that is most widely used in farm analysis is the nominal approach. Robison and Barry (1987) formulate income as follows:

$I = P_Y . Y - P_X . X$ .... (2)

in which :

I	: Income
Py	: Output Price
Px	: Input Price
Y	: Total Output
X	: Total Input

The amount of input multiplied by the input price in mathematical equation (2) is defined as the number of input costs used but does not include fixed costs.

4. Risk Theory

Debertin (1986) distinguishes the definition between risk (risk) and uncertainty (uncertainty). Risk can be defined as when the decision-maker knows the alternative outcomes and possibilities with each outcome. Bachus et al. (1997) also stated that farmers' natural conditions could be a risk if the possibility of occurrence can be identified. According to Ellis (1988), the risk is also limited by the possibilities associated with the occurrence of an event that affects a decision-making process.

5. Multiple Linear Regression Analysis

The multiple linear regression statistical model is shown as follows (Salvatore, 2004):

$Y = \alpha + b_1X_1 + b_2X_2 + ... + b_kX_k + e$................ (3)

in which:

Y	: dependent variable (income, risk income)
$X_1, X_2, ...X_k$	: independent variable (land area, farming experience, production, normalized fertilizer price by output price, normalized labor cost by output price, farmers age)
α	: constants
$b_1, b_2, ...b_k$	: coefficient

6. Coefficient of Variation

The variation coefficient is an analysis used to compare two or more standard deviations if all standard deviations are expressed in different measurement units. The coefficient of variation is defined as follows (Gujarati, 2006):

$CV = \frac{\alpha_x}{\mu_x}$..(4)

in which:

CV	= coefficient of variation
σ_x	= standard deviation of income
μ_x	= average income

METHOD

The basic method used in this research is the descriptive analysis method. Sugiyono (2013) explains that the descriptive analysis method is a method used to describe or give an overview of the object under study using data or samples that have been collected without analyzing and making a general conclusion.

The research was conducted in Srumbung District, Magelang Regency. The research location was determined purposively based on data from the Central Java Province Statistics Agency (2016)that Magelang Regency is a district as the third- largest salak production center in Central Java,which can potentially be developed. Sampling in the study was carried out by simple random sampling on several salak farmers obtained from 3villages in Srumbung District, Magelang Regency,including Kaliurang Village, Srumbung Village, and Jerukagung Village, with a total sample of 50 farmers from the total salak farmers in Srumbung District, Magelang Regency.

Data Analysis Method

1. Salak Farming Risk Income Analysis

The risk of farm income can be determined using the coefficient of variation (CV) analysis. The variation coefficient measures the relative risk obtained by dividing the standard deviation by the expected value. Income risk is determined based on the coefficient of variation (CV) obtained fromthe quotient of the standard deviation of income and average income. Steps to determine the coefficient of variation (CV) must be known in advance of the value of the standard deviation of income. According to Pappas and Hirschey (1995), the standard deviation value of income is formulated as follows:

$\sigma i = \sqrt{\frac{\sum(Xi-\gamma i}{n-1}}$.....................................(5)

in which:

σi	: standard deviation of income
γi	: average income
Xi	: income per sample
n	: total sample

After knowing the standard deviation value of income, it can be determined the value of the variation (CV) coefficient, which describes the amount of risk of income. Mathematically the coefficient of variation (CV) can be determined as follows:

$CVi = \frac{\sigma_i}{\gamma_i}$..(6)

in which:

CVi : coefficient of variation income
σi : standard deviation of income
γi : average income

Naftaliasari et al. (2015) stated that CV value is directly proportional to risk. The higher the CV value, the greater the risk accepted. It means that the higher the income received, the greater the level of risk received. Kadarsan (1995) stated that the CV value is directly proportional to the risks faced in farming. The level of risk can be categorized as follows (Hernanto, 1993):

$CV \geq 0,5$ = High risk
$0,2 \leq CV < 0,5$ = Medium risk
$CV < 0,2$ = Low risk

2. Analysis of the Factors that Influence Salak Farming Risk Income

Analysis of the factors that affect the risk of salak farming income is different from analyzing the factors that affect the salak farming income. The difference lies in the dependent variable and the independent variable used. It can be seen in the regression model between the two functions as follows:

$$\ln Y_i = \alpha_0 + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \alpha_3 \ln X_3 + \alpha_4 \ln X_4 + \alpha_5 \ln X_5 + \alpha_6 \ln X_6 + \mu_i \quad (7)$$

$$\ln \mu_i^2 = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \mu \quad (8)$$

Keterangan:
Yi : salak farming income (Rp)
μ_i^2 : salak farming risk income
μ : residual
β_0 : constants
β_i : regression coefficient of i-th parameter
X_1 : land area (m^2)
X_2 : farming experience (year)
X_3 : production (kg)
X_4 : normalized fertilizer price by output price (Rp)
X_5 : normalized labor price by output price (Rp)
X_6 : farmer age (year)

Analysis of the factors that affect the risk of salak farming income is different from analyzing the factors that affect the salak farming income. The difference lies in the dependent variable and the independent variable used. It can be seen in the regression model between the two functions as follows:

1. Classic Assumption Test

1.1. Normality Test

Using a classical linear regression model assumes that the confounding factors are normally distributed with a mean of 0 and a variance of σ2. The hypothesis in the normality test is as follows:

Ho : $\mu_1 = \mu_2 = \mu_3 = \mu_i = 0$
Ha : $\mu_1, \mu_2, \mu_3, \mu_i \neq 0$

Decision making for the normality test can be done by looking at the Jarque-Bera probability compared to alpha (10%). If the Jarque-Bera probability is higher than alpha, the regression residual follows the normal distribution (Gujarati, 2006).

1.2. Multicollinearity Test

Multicollinearity is the correlation between the independent variables in the model. The strength or the low of multicollinearity in an equation can be seen by testing the Variance Inflation Factor (VIF) and R^2. The hypothesis in the multicollinearity test is as follows:

Ho : there is no multicollinearity
Ha : there is multicollinearity

The model can be said to have multicollinearity disorder (Ho is rejected) if VIF > 10, whereas if R^2 shows a high value but only a few significant variables based on the t ratio, it means that the model has multicollinearity disorder (Gujarati, 2006).

1.3. Heteroscedasticity Test

Heteroscedasticity is an error term with a non-constant variant, while the error term with a constant variant is called homoscedasticity. Heteroscedasticity deviations are essential to know their existence. Testing for this deviation uses the White Test. The hypothesis used in the heteroscedasticity test is:

Ho : $\sigma_1 = \sigma_2 = \sigma_3 = \sigma_i$
Ha : $\sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_i$

If the Probability Obs*R^2 value> alpha (10%), then Ho is accepted, which means that the model is homoscedastic. Otherwise, if the value of Probability Obs*R^2 <alpha (10%), Ho is rejected, which means the model is heteroscedasticity.

2. Statistical Test

The statistical test of the regression model consists of three types of tests, namely the coefficient of determination (R^2), the F test (overall test), and the t-test (individual test). The explanation of each test is as follows:

2.1. The Coefficient of Determination (R^2)

The coefficient of determination is a tool for measuring the dependent variable's total variation, as explained by the independent variable's variation.

2.2. The F-test (Overall Test)

The F-test aims to test all the independent variables in the model so that it is known that the independent variables together significantly influence the dependent variable.

2.3. The T-test (individual test)

The t-test is a significance test carried out through a sample used to verify a null hypothesis's truth. The decision to reject Ho will be made based on statistical tests obtained from data tested for significance. The hypothesis of the t-test is as follows:

Ho : $\beta_I = 0$
Ha : $\beta_i \neq 0$

T-test decision making is based on comparing the t table with t count or comparing the probability value obtained with α (10%). If α < significance, then Ho is rejected. It means that there is an effect of the independent variable individually on the dependent variable.

RESULTS AND DISCUSSION

Risk of Salak Nglumut Farming Income

Farming risk can be in the form of production risk, income risk, and profit risk. Income risk is a type of risk that must be experienced by farmers. It is because farmers in managing their farms always expect income to be received from their products. Farmers will not take advantage of the products produced, but farmers only take advantage of the income that has been received from the sale of the product that has been generated. Farmers also will not take into account the profits unless they do farming on a company scale. The income risk of salak Nglumut farming in the Srumbung District can be seen in Table 1.

Table 1. The Average Income and Risk Income of Salak Nglumut Farming

Component	Value
Average Income (Rp/Ha)	74,344,962.09
Standard Deviation	31,024,359.12
Income Risk (%)	41.73

Source: Primary Data Analyzed in 2017

Based on Table 1, it can be seen that the risk of income received by Salak Nglumut farmers is 41.73%. This figure shows that the Salak Nglumut farm income has moderate risk. It is based on Hernanto's (1993) statement that the risk is said to be moderate if it has a CV value between 0.2-0.5 or 20-50%. Income risk is 41.73%, which means that the risk faced is 0.4173 rupiah for every rupiah received by farmers. It means that farmers can have two possibilities. First, farmers may not receive 41.73% of one rupiah, or farmers only receive 0.5827 rupiahs. Second, farmers may receive 41.73% more than one rupiah, or farmers receive 1.4173 rupiahs. The risk faced by farmers is due to the very volatile selling price of salak.

1. Factors that Influence Salak Farming Income Risk

Based on the results of the regression analysis, the income risk function regression equation obtained as follows:

$$Ln\mu_i^2 = -8{,}855583 - 0{,}192\ LnX_1 - 1{,}882191\ LnX_2 - 0{,}480\ LnX_3 - 0{,}009\ LnX_4 + 0{,}071814\ LnX_5 + 3{,}306296\ Ln\ X_6 \quad (9)$$

a. The Coefficient of Determination

The results of the regression analysis show that the income risk function has an adjusted R^2 value of 0.124, which means as much as 12.4% of the variation in the dependent variable in the form of residue or error $(\mu)^2$, income risk can be explained by the independent variable in the form of land area, farming experience, production, price, fertilizer, labor costs, and farmer age. At the same time, the remaining 87.6% is explained by other variables outside the model. The adjusted R^2 figure generated from the income risk function model can be said to be very low. The dependent variable used in this function is a residual or error resultingfrom the previous income function regression.

The residue or error used is the residual variation from the independent variable that is not included in explaining the dependent variable in the income function. The residue or error is the other independent variables that cannot be known. This ignorance makes residual or errors an uncertainty or risk. In the income risk function, the residue is used as the dependent variable, while the independent variable used is the same as the independent variable used in the income function. Thus, it can be said that between the dependent variable and the independent variable, it cannot be ascertained that the variation in the independent variable can explain the variation in the dependent variable in the income risk function.

b. The F-test

The regression analysis results on the income risk function have a probability F test of 0.066, which is smaller than α (10%), so that Ho isrejected. It means that land area, farming experience, production, fertilizer prices, labor costs, and farmer age together influence the risk of income significantly at the specified level ofsignificance.

Table 2. Factors that Influence the Risk of Salak Nglumut Farming Income

Variables	Coefficient	t-sig
Constanta	-8.855	0.3148
Ln land area (X_1)	-0.192	0.6084
Ln farming experience (X_2)	-1.882191**	0.0300
Ln production (X_3)	– 0.479726	0.4422
Ln fertilizer price divided by output price (X_4)	– 0.008669	0.7897
Ln labor price divided by output price (X_5)	0.071814**	0.0198
Ln farmer age (X_6)	3.306296*	0.0540
Adjusted R^2	0.124	
F-stat	2.153	
F-sig	0.066	

Source: Primary Data Analyzed in 2017

Description:

*** : level of significance 99% (α=1%)

** : level of significance 95% (α=5%)

* : level of significance 90% (α=10%)

c. T-test

Based on Table 2, it can be seen that the independent variables that individually have a significant effect on the dependent variable include farming experience, labor costs, and age of farmers. Simultaneously, land area, production,and individual fertilizer prices do not significantly influence the dependent variable, which means Ho rejected. It can be seen based on the probability of the t-test for each independent variable. Farming experience has a t-test probability of 0.030, which is smaller than α (10%), which means that individual farming experience significantly affects the dependent variable. Also, labor costs have a probability t-test of 0.019, which is smaller than α (10%), which means that individual labor costs significantly affect the dependent variable and the farmer age variable. The t-test probability is 0.054 smaller than α (10%) means that farmer age individually have a significant effect on the dependent variable.

CONCLUSIONS

This research concludes that the level of income risk of salak Nglumut farming in the Srumbung District, Magelang Regency is 41.73%, or it is categorized as moderate risk. Besides, the factors that affect the risk of farming income for salak Nglumut in Srumbung District, Magelang Regency include farming experience, labor costs, and farmers' age. These factors have an impact on the low-income risk figure.

Risk management that should be carried out includes improving the workforce's quality as farming actors, processing salak into various snacks, using insurance, and regenerating farmers so that the risk level of farm income is expected to be reduced.

REFERENCES

Bachus, G.B.C., V.R. Eidman, and A.A. Dijkhuizen. 1997. Farm Decision Making Under Risk and Uncertainty. Netherlands Journal of Agricultural Science 45: 307-328.

Agricultural Research and Development Agency. 2015. Inovasi Hortikultura Pengungkit Peningkatan Pendapatan Rakyat. <http://hortikultura.litbang.pertanian.go.id/Buku_Inovasi/Inovasi%20Hortikltura.pdf>. Diakses pada 9 Oktober 2017.

Central Statistics Agency of Magelang Regency, 2016. Hortikultura. <https://magelangkab.bps.go.id/linkTabelStatis/view/id/264>. Diakses pada 12 September 2017.

Central Statistics Agency of Magelang Regency. 2016. Statistik Pertanian Hortikultura Jawa Tengah 2012-2014. <http://jateng.bps.go.id/website/pdf_publikasi/Statistik-Pertanian-Hortikultura-Jawa-Tengah-2012-2014.pdf>. Diakses pada 12 September 2017.

Boediono. 1982. Ekonomi Mikro Edisi Kedua. BPFE, Yogyakarta.

Debertin, D.L. 1986. Agricultural Production Economics. Macmillan Publishing Company, New York.

Directorate General of Horticulture. 2015. Statistik Produksi Hortikultura 2014. <http://hortikultura.pertanian.go.id/wp-content/uploads/2016/02/Statistik-Produksi-2014.pdf>. Diakses pada 29 Agustus 2017.

Ellis, F. 1988. Peasant Economics: Farm Households and Agrarian Development. Cambridge University Press, Cambridge.

Gujarati, D.N. 2006. Dasar- Dasar Ekonometrika. Jilid 1 Edisi Ketiga. Penerbit Erlangga, Jakarta.

Hernanto, F. 1993. Ilmu Usahatani. Penebar Swadaya, Jakarta.

Imelda, J. H.Mulyo dan H. D. Dwidjono. 2008. Analisis perilaku petani terhadap risiko usahatani lidah buaya di Pontianak. Jurnal Agro Ekonomi 15(1):17-34.

Kadarsan, H.W. 1995. Keuangan Pertanian dan Pembiayaan Perusahaan Agribisnis. Gramedia, Jakarta.

Kumbhakar, S. C. dan E.G. Tsionas. 2010. Estimation of Production Risk and Risk Preference Function: A Nonparametric Approach. Ann Oper Res 176:369-378.

Naftaliasari, T., A. Zainal dan U. Kulsum. 2015. Analisis risiko usahatani kedelai di Kecamatan Raman Utara Kabupaten Lampung Timur. JIIA 3(2):148-156.

Pappas, J.L. dan M. Hirschey. 1995. Ekonomi Manajerial Edisi Keenam Jilid II. Binarupa Aksara, Jakarta.

Rifki, M. N. 2014. Analisis Risiko dan Ketidakpastian Pendapatan Usahatani Jambu Biji pada *Integrated Farming System* (IFS) dengan Metode Simulasi *Monte Carlo*. Magister Teknik Sistem, Universitas Gadjah Mada. Tesis.

Robison, L. J. and P.J. Barry. 1987. The Competitive Firm’s Response to Risk. Macmillan Publisher, London.

Rohmah,W., S. Any dan H. Slamet. 2014. Analisis pendapatan dan tingkat kesejahteraanrumah tangga petani tebu tanam dan keprasan di Kabupaten Bantul. Jurnal Agro ekonomi 24(1):54-65.

Salvatore, D. 2004. Managerial Economics in a Global Economy Fifth Edition. South Western Thomson Corporation, USA.

Santosa, T., Sujono dan P.N. Rohadi. 1996. Diskripsi Salak Pondoh dan Teknologi Penyerbukan Bantuan. Instalasi Penelitian dan Pengkajian Teknologi Pertanian, Yogyakarta.

Sugiyono. 2013. Metode Penelitian Kuantitatif, Kualitatif dan R&D. CV Alfabeta, Bandung.

Sukma,T., H. Slamet dan Djuwari. 2013. Analisis usahatani tembakau pola kemitraan dan mandiri di Desa Lamuk Kecamatan Tlogomulyo Kabupaten Temanggung. Jurnal Agro Ekonomi 24(1):24-36.

Suratiyah, K. 2015. Ilmu Usahatani Edisi Revisi. Penebar Swadaya, Jakarta.