Shallot Farmers Performance in Entrepreneurship Perspective with Linear Programming Approach Data Envelopment Analysis

Rosihan Asmara(✉), Fahriyah, Condro Puspo Mugroho, Mahfudlotul Ula, and Susanti Evie Sulistiowati

Departement of Agricultural Economics and Rural Development, Faculty of Agriculture, Brawijaya, Indonesia
rosihan@ub.ac.id

Abstract. The amount of production in shallot farming can be influenced by a variety of factors. Individual farmers' attitudes and behaviors have an impact on the decision-making process when choosing which inputs to utilize. Self-confidence, motivation, risk orientation, and knowledge are the factors that can be used to quantify this entrepreneurial attitude. Therefore, a component that will directly impact to production is the entrepreneurial attitude of farmers. The purpose of this study is to determine how farmers' entrepreneurial performance and income are related. There were 51 respondents in this study who provided primary data. Through the analytical technique known as Data Envelopment Analysis (DEA), it can be observed that farmers exhibit high levels of entrepreneurial performance, which has a favorable impact on the amount of money they make. Then, through tobit regression, it can be seen the factors that affect entrepreneurial performance are the latest education, farming experience, and the number of family problems. Our recommendation to policymakers is to establish a friendlier and more stable environment for entrepreneurship and reduce the risk of farmers' initial investment returns.

Keywords: shallot · entrepreneurial attitude · entrepreneurial performance · data envelopment analysis

1 Introduction

The entrepreneurial attitude that has by the farmer is considered as a part of the workforce which, when combined with other production factors in creates goods and services that will produce satisfactory output [1]. With an entrepreneurial attitude, they can assist farmers in recognizing and taking advantage of opportunities in the environment in creating high profits and production. Sujawo and Nuhfil [2] think that entrepreneurial attitude is a very important factor in influencing the amount of production and decision-making by farmers in allocating their inputs effectively and efficiently. Entrepreneurial attitude

Y. A. Yusran et al. (Eds.): BIC 2022, AEBMR 235, pp. 497–510, 2023.
https://doi.org/10.2991/978-94-6463-140-1_50

can affect income, the more positive entrepreneurial behavior, the more income earned [3]. Saghaian [4] also said that if the farmers have a high degree of entrepreneurship attitude, it can increase profitability and productivity. Entrepreneurship can be measured through several indicators, namely age, formal education, non-formal education, farming experiences, motivation (as internal factors), capital, marketing, and farming institutions (as external factors). Pradana [5] also stated that entrepreneurial characteristics include self-confidence, risk- taking, innovation, hard work, and growth-oriented are correlated with business success which includes business growth, turnover, and production. So, it can be interpreted that entrepreneurial performance can affect farmers' income, including shallot farmers. Nowadays, shallots are one of the leading horticultural commodities beside potatoes, big chili, cayenne pepper, garlic, and carrot. These production data for shallots are presented in Table 1.

Table 1. Percentage of Horticultural Crop Production Growth in Indonesia

Commodity	**Year**		**Growth (%)**
	2020 (Ton)	**2021 (Ton)**	
Shallot	1.815.440	2.004.590	10,41
Potato	1.282.770	1.361.060	6,10
Big Chilli	1.264.190	1.360.570	7,62
Cayenne Pepper	1.508.400	1.386.450	−8,09
Garlic	81.800	45.090	−44,88
Carrot	650.860	720.090	10,64

Source: Horticultural Statistic, 2021

The production of shallots in East Java according to [6] reached 2.004.590 tons in 2021. East Java has ten districts with the highest shallot production, including Nganjuk, Probolinggo, Malang, Sampang, Pamekasan, Keidiri, Bojonegoro, Ponorogo, Mojokerto, and Batu. District shallot production data in East Java Province [7] can be seen in Table 2.

The high rate of shallot production seen in Table 2 is influenced by both the input parameters and the farmers' entrepreneurial mindset. Entrepreneurial attitudes such as motivation, knowledge, risk-taking propensity, and self-assurance can be utilized as indicators of farmers' entrepreneurial performance. Farmers engage in farming because they are motivated to do so. Having enough information affects a farmer's capacity to do cultivation-related tasks. In order to progress their farming activities, farmers must also possess the bravery to accept risks and the skills to manage those risks. The farmers will then be able to share information thanks to their relationships with other parties and other farmers. When communicating, self-assurance is crucial.

Therefore, it is important to conduct entrepreneurial performance research using entrepreneurial attitudes as input and income as output and analyzed using the two-stage Data Envelopment Analysis (DEA) method. The results of entrepreneurial performance will show the achievements of each farmer. Then, the results of this analysis can also

Table 2. District Shallot Production in East Java Province

No	District	Production (Quintal)
1	Nganjuk	1.936.524
2	Probolinggo	663.708
3	Malang	232.134
4	Sampang	352.335
5	Pamekasan	191.866
6	Kediri	182.713
7	Bojonegoro	331.642
8	Ponorogo	37.941
9	Mojokerto	73.928
10	Batu	38.509

Source: Central Bureau of Statistics (BPS), 2022 (processed)

be used in analyzing peer farmers for farmers with suboptimal performance categories. Peer farmers are reference farmers who have optimal performance levels and are used as references for DMU. This research is different from previous research that has been there, namely in this study using production input factors as factors that influence production and using the two-stages data envelopment analysis (DEA) method.

2 Research and Analysis Methods

This research was conducted using a quantitative approach and the location selection was carried out purposively based on the highest production area. Meanwhile stratified random sampling is used for the sampling method, where each population unit is grouped with the same characteristics, then arranges in a sequence of levels from each group called strata [8]. Furthermore, for the analysis method, several methods are used, namely:

2.1 Analyzing the Entrepreneurial Attitude of Shallot Farmers

Research on the entrepreneurial attitude of shallot farmers uses a likert scale which is intended to measure the entrepreneurial attitude of farmers. The entrepreneurial attitude variables used are self- confidence, motivation, risk orientation, and knowledge. The data obtained with the likert scale is divided into three classes through calculations using a maximum score and a minimum score which will produce an interval class. The calculation is done by the formula below:

$$Interval\ \ Class = \frac{maximum\ \ score - minimum\ \ score}{n} \tag{1}$$

Description:

n : Number of categories (3: high, medium, low)

Maximum Score : The highest score produced by farmers and seen from each indicator

Minimum Score : The lowest score produced by farmers and seen from each indicator

The maximum and minimum score were obtained from the likert scale used in the questionnaire. The maximum score is the number obtained from the highest score produced by the farmer and is seen from each indicator. While, the minimum score is obtained from the lowest score produced by the farmer and is seen from each indicator. The number of categories is the number of desired categories, which in this paper are high, medium, and low. The interval class generated from the previous calculation is the range or distance in each class. Each farmer is then determined by his class on each indicator of entrepreneurial attitude. Each of these indicators is then summarized in the form of percentages by class and presented in tabular form.

2.2 Analyzing Entrepreneurial Performance on Shallot Farmer's Income with Two-Stage Data Envelopment Analysis Method

The entrepreneurial performance input used in the research is the entrepreneurial attitude which includes self-confidence, motivation, risk orientation, and knowledge. The use of these inputs is then compared with the income from the shallot farming of each DMU (Decision Making Unit). This study uses four indicators of entrepreneurial attitude, in each of which there are three categories (categories 1 to 3). The results of the entrepreneurial attitude category in each DMU will be analyzed as an observed input, while the output used is the farmer's income. The analysis is an analysis of entrepreneurial performance using the two-stage DEA method. The formula of the DEA method, namely:

$$hs = \frac{\sum_{r=1}^{m} \mu_{rj} \gamma_{rj}}{\sum_{r=1}^{n} v_{rj} x_{rj}} \tag{2}$$

Description:

hs : Entrepreneurial Performance of Each Farmer

m : Entrepreneurial Performance of Each Farmer Total Observed Farmer Output (income)

n : Number of Observed Inputs (Entrepreneurial Attitude)

γ_{rj} : The amount of output produced by each farmer

X_{ij} : The amount of input i used by each farmer

μ_{rj} : Weight of output produced by farmers

V_{rj} : Input weights used by farmers

Entrepreneurial performance was analyzed using the two-stage DEA method by entering data on income and entrepreneurship class for each indicator. After obtaining the results of the analysis, the farmers with optimal entrepreneurial performance are included in class one. Apart from farmers who are in class one, they are divided into four new classes, namely high, medium, low, and very low-performance categories. In addition, the results of the analysis will also show peer farmers in each DMU who have a performance result of less than one (not optimal).

Entrepreneurial performance on income looks at the relationship between entrepreneurial performance on income. The analysis will see whether an increase in entrepreneurial performance can lead to an increase in farmers' income. Before conducting the analysis, the income of farmers is first divided into five classes, namely very low, low, medium, high, and very high income. The results of the analysis of entrepreneurial performance on income will show farmers at each level of entrepreneurial performance and income level and the relationship between entrepreneurial performance and farmer income.

2.3 Analyzing the Effect of Farmer Characteristics on Entrepreneurial Performance of Shallot Farmers

Analysis of the effect of farmer characteristics on entrepreneurial performance using farmer characteristics variables (age, last education, number of dependents in the family, land area, and farming experience) and the results of entrepreneurial performance analysis. The two types of variables were analyzed using the Tobit regression to see the effect and level of significance. According to Fair [9], Tobit regression can be expressed by the relationship:

$$\gamma_i = \begin{cases} \gamma_i^*, \gamma_i^* > 0 \\ 0, \gamma_i^* > 0 \end{cases} \tag{3}$$

With i = 1, 2,…, n and, γ^* is the response variable with the equation:

$$\gamma_i^* = X_i^{'} \beta + \mu_i \tag{4}$$

Description:

γ : Entrepreneurial performance (dependent variable)

x : Characteristics of farmers including age, last education, number of family dependents, land area, and farming experience (independent variables)

β : The value of the independent variable

μ_i : Residual (error) with independent normal distribution with mean 0 and variation σ^2.

3 Results and Discussion

3.1 Overview of Research Area

Banaran Wetan Village is located in Bagor District, Nganjuk Regency. The boundaries of Banaran Wetan Village are: in the north and west it is bordered by Banaran Kulon Village, in the south by Kendalrejo Village, and in the east by Nganjuk District. The area of Banaran Wetan Village is 250 hectares or 4.9% of the total area of Bagor District. Administratively, Banaran Wetan Village consists of 4 Hamlets.

3.2 Respondent Characteristic

The characteristics of the respondents in the study were age, last education, number of dependents in the family, farming experience, and land area.

3.2.1 Age

The age of the respondents is divided into five categories as shown in Table 3. The age category with a range of 48–55.6 years has the largest number of respondents, namely 23 people or 45%. The smallest number of respondents is in the age category with an age range of 64–72 years with a total of three people or 6%. The average age of respondent farmers in Banaran Wetan Village is 49 years and is included in the productive age. Humans are said to be productive if they are 15–64 years old. Table 12 shows that 48 out of 51 respondent farmers are of productive age.

Table 3. Distribution of Respondents by Age Category

Age Category (Years)	Total Respondent (People)	Percentage (%)
31–39,2	6	12
40–47,4	15	29
48–55,6	23	45
56–63,8	4	8
64–72	3	6
Total	**51**	**100**

Source: Primary Data, 2021 (processed)

3.2.2 Last Education

Characteristics of respondents in the last education category used in the study, namely not completed in primary school, primary school, junior high school, senior high school, diploma and bachelor.

The last education completed by the respondent was not graduated from primary school, primary school, junior high school, and senior high school. The highest number of respondents who completed the last education is senior high school level as many as 26 people or with a percentage of 51% and the least number of respondents is at the last education level not completing elementary school as many as three people or 6%. Based on Table 4, it can be seen that there are no respondent farmers with the last education level not attending school, Diploma, and Bachelor.

3.2.3 Number of Families

The number of farmer's dependent family member in this study was ranged from two to six people per family. As shown in Table 5, the number of farmer's dependent family members of four people has the highest number of respondents by 25 people or 49% and the least number of respondents, namely the category of dependents of a family of six people with as many as two people or 4%. The average number of farmer's dependent family members in Banaran Wetan Village is four dependents of the family.

Table 4. Distribution of Respondents Based on Formal Education

Formal Education	Total Respondent (People)	Percentage (%)
Not Completed In Primary School	3	6
Primary School	9	18
Junior High School	13	25
Senior High School	26	51
Total	**51**	**100**

Source: Primary Data, 2021 (processed)

Table 5. Distribution of Respondents Based on Number of Dependent Family Members

Number Of Family (People)	Total Respondent (People)	Percentage (%)
2	4	8
3	8	16
4	25	49
5	12	24
6	2	4
Total	**51**	**100**

Source: Primary Data, 2021 (processed)

3.2.4 Farming Experience

Farmers' farming experience is divided into five categories as shown in Table 6. The highest number of respondents are in the category of 24–32 years of farming experience with 19 respondents or 37%. Only three respondents have 5–14 years of experience, which this is the least years of experience category. This number is related to the average age of the respondents. Even though they have been accustomed to farming shallots since graduating from school or since they were young, farmers in Banaran Wetan Village have only started their independent farming with self-cultivated land at the age of over 20 years.

3.2.5 Land Area

The characteristics of the farmers' land area are divided into five categories. As shown in Table 7, the category of land area 0.484–0.656 Ha has the most number of respondents, namely 20 people or 39%. Category of land area 0.312–0.484 Ha adrift 1 respondent with a land area category of 0.656–0.828 Ha with the number of respondents respectively nine and ten people. The least number of respondents is in the 0.14–0.312 Ha category and 0.828–1 Ha category with the same number of respondents as many as six people or 12%.

Table 6. Distribution of Respondents Based on Farming Experience

Farming Experience (Years)	Total Respondent (People)	Percentage (%)
5–14	3	6
15–23	16	31
24–32	19	37
33–41	7	14
42–50	6	12
Total	**51**	**100**

Source: Primary Data, 2021 (processed)

Table 7. Distribution of Respondents by Land Area Category

Category Land Area (Ha)	Total Respondent (People)	Percentage (%)
0,14–0,312	6	12
0,312–0,484	9	18
0,484–0,656	20	39
0,656–0,828	10	20
0,828–1	6	12
Total	**51**	**100**

Source: Primary Data, 2021 (processed)

3.3 Entrepreneurial Attitude

The indicators of a farmer's entrepreneurial attitude are motivation, self-confidence, knowledge, and risk orientation. The analysis of entrepreneurial attitudes uses a likert scale whose data is obtained from interviews with farmers. The results of the analysis are divided into three categories based on the scores obtained by each farmer, namely low, medium, and high.

3.3.1 Motivation

The motivation of respondent farmers is seen from ten indicators which include the opportunity to increase income by working diligently, adequate facilities and infrastructure, responsibilities given, large profits, fulfillment of daily life from the agricultural sector, risk commensurate with the results, cooperative relationships between farmers and extension workers, awards from the government, and welfare from farming. The interview with entrepreneurial motivation's results were divided into low, medium, and high categories. The motivational attitude of farmers is high with a percentage of 49% as shown in Table 8. This motivation is influenced by the family and fellow farmers around.

Table 8. Distribution of Respondents Based on Motivational Attitudes

No	Class	Category	Total Respondent (People)	Percentage (%)
1	30–36	Low	8	16
2	37–43	Medium	18	35
3	44–50	High	25	49
	Total		51	100

Source: Primary Data, 2021 (processed)

Table 9. Distribution of Respondents Based on Confidence Score

No	Class	Category	Total Respondent (People)	Percentage (%)
1	29–35	Low	4	8
2	36–42	Medium	23	45
3	43–49	High	24	47
Total			**51**	**100**

Source: Primary Data, 2021 (processed)

3.3.2 Confidence

The attitude of self-confidence is divided into low, medium, and high categories. Ten indicators of self-confidence were proposed to respondents, namely: confidence in the business, confidence in answering questions from fellow farmers, good impact from fellow farmers, confidence in farming abilities, confident in the cultivation method used, continuing to work under the beliefs of others, confident in technology used, continue to work to achieve goals, dare to answer extension questions, and is ready to be a representative in events organized by the government. The attitude of farmers' self-confidence is high with a percentage of 47% as shown in Table 9. Farmers feel confident with the knowledge they have to do shallot farming. This is due to the experience that has been gained for years and direct activities in the field, thus making the farmers feel confident when they get questions from extension workers and fellow farmers.

3.3.3 Knowledge

The knowledge that is an indicator of a farmer's entrepreneurial attitude includes knowledge about cultivated varieties, how to cultivate shallots, doses of fertilizers and pesticides, plant spacing, selection of cultivation locations, knowledge of the entrepreneurial spirit, seed production, and influencing natural factors. The knowledge attitude of the respondents is divided into three categories, namely low, medium and high. The knowledge of farmers is moderate with a percentage of 49% as shown in Table 10. The respondent farmers admitted that their knowledge about shallot cultivation is quite good, considering their long experience of farming and success in achieving high amounts of

Table 10. Distribution of Respondents Based on Knowledge Score

No	Class	Category	Total Respondent (People)	Percentage (%)
1	29–34	Low	6	12
2	35–40	Medium	25	49
3	41–45	High	20	39
Total			**51**	**100**

Source: Primary Data, 2021 (processed)

Table 11. Distribution of Respondents Based on Risk Orientation Score

No	Class	Category	Total Respondent (People)	Percentage (%)
1	36–40	Low	16	31
2	41–45	Medium	26	51
3	46–49	High	9	18
Total			**51**	**100**

Source: Primary Data, 2021 (processed)

shallot production. Even though they are good enough, they feel that there are still many shortcomings in terms of knowledge and they still want to learn more so that the shallot cultivation is successful in terms of quantity and quality.

3.3.4 Risk Orientation

Farmers' risk orientation attitudes are divided into low, medium, and high categories. Indicators of risk orientation attitude include: not being hindered by increasing risks, acting directly on problematic crops, calculating profits and losses, choosing to lose several times rather than replacing commodities, continuing to cultivate shallots even though they suffer losses when prices are low, dare to take risks to be more advanced, diversify to avoid pest resistance, be prepared to take the risk of the decisions taken, take challenges for success, and calculate income and expenses due to the risk of passion (pieces of the scale). The risk orientation of farmers is moderate with a percentage of 51% as shown in Table 11.

Shallot farmers in Banaran Wetan Village do not diversify their crops to suppress pest resistance to pesticides. They still depend on pesticides to deal with pests that attack their crops. In addition to diversification, some farmers do and do not calculate profit and loss as well as revenues and expenses. Farmers who don't do the math feel that they will know whether they are making a profit or loss when the harvest comes. In addition, even though the prices are low, the farmers have never experienced a loss and can still return their capital with a small profit.

Table 12. Performance Distribution with DEA VRS

Performance Level	Range	Total Respondent (People)	Percentage (%)
Optimal Performance	1	22	43
High	0,824–0,701	2	4
Medium	0,702–0,578	3	6
Low	0,579–0,455	21	41
Very Low	0,456–0,333	3	6
Total		**51**	**100**
Average	**0,726**		

Source: Primary Data, 2021 (processed)

3.4 Entrepreneurial Performance Using Two-Stage Data Envelopment Analysis (DEA)

Entrepreneurial performance analysis was conducted using Data Envelopment Analysis (DEA) VRS. The results of the analysis of the entrepreneurial performance of farmers showed that there were 22 farmers in the optimal performance category, two in the high-performance category, three in the medium performance category, 21 in the low-performance category, and three people in the very low-performance category. This condition is presented in Table 12.

Based on Table 12, shows that as many as 43% or as many as 22 shallot farmers in Banaran Wetan Village are included in the optimal performance category. The average value of the entrepreneurial performance of farmers in Banaran Wetan Village is 0.726 which indicates that the entrepreneurial performance of shallot farmers in Banaran Wetan Village is in the high category. The entrepreneurial performance value of 0.726 means that farmers have the opportunity to increase their entrepreneurial performance by 0.274 or 27.4% and increase their income with their current entrepreneurial attitude.

3.5 Entrepreneurial Performance Against Income

Analysis of entrepreneurial performance on income is carried out by looking at the distribution of respondents on entrepreneurial performance and income using crosstab analysis. The income of shallot farmers in Banaran Wetan Village is grouped into 5 classes, namely very low, low, medium, high, and very high. The distribution of respondents based on income can be seen in Table 13 and Fig. 1.

Based on Fig. 1, we can see that in the very low-income category, farmers with optimal performance and low performance have the same number of respondents, namely 8 respondents. In the low-income category, farmers with optimal performance have the highest number of 9 respondents. Low performance has the highest number in the medium income category, with as many as 8 respondents. There are as many as half of the respondents in the high-income category who fall into low performance. In the very high-income category, the number of respondents with optimal performance and moderate performance is the same, namely 2 respondents. This can explain that entrepreneurial

Table 13. Distribution of Respondents Based on Income

No	Class	Income (Rupiah)	Total Respondent (People)	Percentage (%)
1	Very Low	7.025.500–42.033.718	17	33
2	Low	42.033.718–77.041.937	14	25
3	Medium	77.041.937–112.050.155	12	24
4	High	112.050.155–147.058.374	4	8
5	Very High	147.058.374–182.066.592	5	10
Total			51	100

Source: Primary Data, 2021 (processed)

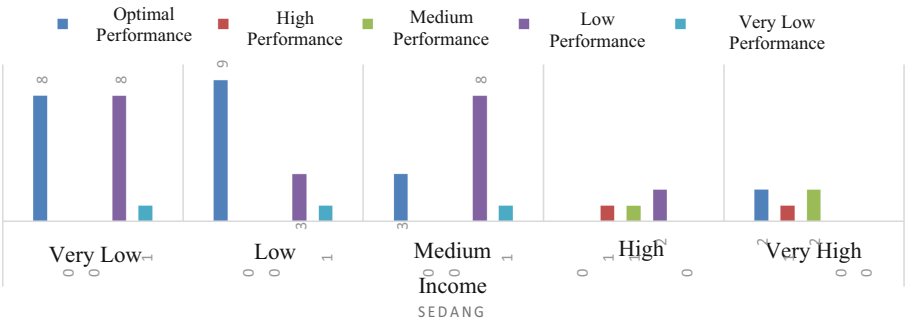

Fig. 1. Entrepreneurial Performance Against Income. Source: Primary Data, 2021 (processed)

performance with shallot farmers' income has a positive relationship, namely increasing entrepreneurial performance will increase farmer income. According to Yuliandi [3], the more positive the entrepreneurial behavior, the higher the income earned.

3.6 The Effect of Farmer Characteristics on Entrepreneurial Performance

Characteristics of farmers can be different from one another. These variables can affect entrepreneurial performance both positively and negatively. The results of the analysis of the effect of the characteristics used in this study on entrepreneurial performance are presented in Table 14.

Based on Table 14, the variables of age and land area have no significant effect on entrepreneurial performance. Increasing age can reduce entrepreneurial performance, one of which is related to the application of new technology in farming. According to Sukanata, et al. [10], age can affect the speed with which farmers apply agricultural crop cultivation technology. Older farmers no longer have the passion to develop their farms, while young and mature farmers are in ideal conditions to make changes in cultivating crops. Meanwhile, the last education variable, the number of family

Table 14. The Effect of Farmer Characteristics on Entrepreneurial Performance

Variable	Coefficient	Std. Error	Prob.
(X1) Age (yeras)	-0.003036	0.008158	0.7097
(X2) Last Education	0.189356	0.050267	0.0002
(X3) Family Member (People)	-0.093060	0.029372	0.0015
(X4) Farming Experience (years)	0.017567	0.006528	0.0071
(X5) Land Area	0.114092	0.132927	0.4344
Constant	0.104186	0.441327	0.8134

Source: Primary Data, 2021 (processed)

dependents, and farming experience have a significant effect on entrepreneurial performance. The improvement in the farmer's education quality has an impact on increasing entrepreneurial performance. This is similar to Lubis [11] that formal education is very beneficial for everyone because formal education is one of the efforts that can be made by someone to be able to change behavior for the better with planned ways and processes. While the variable number of family dependents, the more the number of family members, the farmers improve their entrepreneurial performance. This needs to be done so that the production and income of individual farmers can increase. The last is the variable of farming experience that affects entrepreneurial performance. According to Yasa, et al. [12], the farming experience can generally affect farmers' knowledge of cultivation techniques in the farming activities they run. Thus, farmers who have longer farming experience have higher productivity compared to farmers who have less farming experience.

4 Conclusion

The entrepreneurial performance of farmers on average is in the high category and has a positive relationship with income. The higher the level of entrepreneurial performance of individual farmers, The farmer's income also will be higher, However, some farmers are still classified as medium and low categories, so they are advised to refer to peer farmers in doing their farming. Then, several variables have a significant effect on farming performance, namely the last education variable, farming experience, and the number of family dependents. In order to better understand farmers, it is felt that there is a need for more effective counseling activities, such as counseling with themes that are tailored to farmers' environmental circumstances and counseling that is in line with their needs. There are also efforts to increase the number of sugarcane seed producers who should keep working to develop sugarcane seeds that are preferred by farmers in each region. In order to create better and more acceptable new varieties that farmers will accept, sugar factories should consider farmers' preferences and satisfaction levels with existing sugarcane seed varieties in the research area. This will allow the farmer satisfaction index to rise once more to nearly 100%.

Acknowledgments. The authors would like to thank the editors and the reviewers for all their efforts. This paper acknowledges the support from the Departement of Agricultural Economics and Rural Development, Faculty of Agriculture, Brawijaya, Indonesia.

References

1. Dzansi, DY. 2014. Entrepreneurship-The Productive Ingenuity of the Human Factor In An Ambiguous Environment. Mediterranean Journal of Social Sciences 5(23): 11–19.
2. Sujarwo and Nuhfil Hanani. 2016. Incorporating Enterpreneurship in a Production Function. Agricultural Socio-Economics Journal 16(2): 79–86.
3. Yuliandi, Cindy Dwi. 2016. The Influence of Entrepreneurial Behavior on Income Through Business Capital Mediation. Bandung: Economic Education Study Program, Faculty of Economics and Business Education, Pendidikan Indonesia University.
4. Saghaian, sayed., Husein Muhammadi and Morteza mohammadi. 2022. Factors Affecting Success of Entrepreneurship in Agribusiness: Evidence from the City of Mashhad, Iran. Sustainability 14: 1–12
5. Pradana, Aditya Muhammad. 2017. The Relationship between Entrepreneurial Characteristics and Business Success of Pepper Farmers in Cisarua District, West bandung Regency. Bogor: Department of Agribusiness Faculty of Economics and Management, Bogor Agricultural University.
6. Hortikultural Statictiss. 2021. National Leading Hortikultural Statistic 2019–2021. Directorat General of Hortikultural, Ministry pf Agriculture of Republic Indonesia: Jakarta.
7. Central Bureau of Statistics. 2022. East Java Province in 2021. BPS: Jawa Timur Province.
8. Dwiastuti, Rini. 2017. Estimator Socio-Economic Research Methods. Malang: UB Press.
9. Fair, R.C. 1977. A Note on the Computation of the Tobit Estimator. Journal Econometrica, 45(7): 1723–1727.
10. Sukanata, I Ketut, Dukat, dan Angie Yuniati. 2015. Relationship between Farmer Characteristics and Motivation with Farmer Group Performance. Agrijati Journal 28(1): 17–34.
11. Lubis, Rafiqah Amanda. 2016. The Effect of Education Level and Age on the Performance of Agricultural Extension Officers in Mandailing Natal District. Agrohita Journal I (1): 64–71
12. Yasa, I Nyoman Artika dan Handayani. 2017. Analysis of Production and Income of Paddy Rice Farming In Bonemarawa Village, Riopakava Disrict, Donggala Regency. E-journal Agritekbis 5(1): 111–118.