# Price Analysis of Dendrobium Orchid Flowers: Study on Orchid Entrepreneurs in Surabaya

*by* Suci Turnitin2

---

# Price Analysis of Dendrobium Orchid Flowers: Study on Orchid Entrepreneurs in Surabaya

**Hary Sastrya Wanto[1*]**

[1] *Faculty of Agriculture, Wijaya Kusuma University Surabaya, Surabaya, Indonesia*

\* Corresponding author:

*Email: sas_hary@yahoo.co.id*

**Abstract**

The economic crisis that caused many companies to close, but on the other hand that the agricultural sector is able to survive when the crisis occurs, the factor from within the orchid is the genetic factor or type of orchid, including natural or cruciferous orchids. If the type of natural orchid then the growth and flowering will be relatively very long if without special treatment, but if the type of orchid cruciferous like Dendrobium then the growth and flowering is relatively faster. To know the production elasticity of Dendrobium orchids of various age ranges in Kayoon Market, Surabaya City is technically efficient. To know the production and price of Dendrobium Orchid Flower in various age range in Kayoon Market, Surabaya City. As information for Orchid Flower entrepreneurs in overcoming problems in problems in orchid business. Orchids belong to the orchid tribe or family "Orchidaceae" which in Greek, the word "orchid" comes from orchis which means testicle or testicles. In ancient times orchids were identical to men, both in color, shape and even structure. This research uses independent variables that the research location will be determined at Orchid Flower entrepreneurs in Kayoon Surabaya City, with the consideration that Kayoon Flower Market is the center of ornamental plant entrepreneurs including Orchid Flowers in Surabaya City. The method used in determining the research location is purposive method. Multiple Linear Regression Method To test the hypothesis, first statistical analysis was conducted by using exponential method. the analysis result shows that orchid entrepreneurs in Surabaya have achieved technical efficiency in their business. However, some factors such as land area seem to have a significant influence on production, while other factors such as fertilizer may require further handling. In addition, the break-even point cost analysis identifies the production point at which entrepreneurs can break even, which is

important for the sustainability and success of the orchid business in the local market.

**Keywords**

Price, Flower, Surabaya, Market

## 1. Introduction

The economic crisis caused many companies to close, but on the other hand, the agricultural sector was able to survive during the crisis. This shows that doing business in agriculture has a good opportunity. One of the agricultural commodities that has long been cultivated by some people but has not been maximized is Orchid Flower. Orchid Flower has relatively high economic value, because besides being able to increase income, it also absorbs a lot of labor and even as a source of foreign exchange (Kaldor, 1981). Therefore, it is expected that the attention from the government, private sector and community to develop the commodity. Based on the cut flower ornamental plant development program of the Directorate of Horticultural Production, cut flowers that are a priority to be developed are orchids, roses, chrysanthemums garbera, gladiolus, anturium and heliconia. Likewise, East Java, especially the city of Surabaya, cut flowers that have high economic value are still dominated by hybrid orchids (Setiawan, 2012).

Orchid flower has an opportunity to be developed because besides being favored by many people in the country, it is also favored by the people in the country and also favored by the international community, and if this gets attention by the government and becomes an export commodity, it will clearly increase the foreign exchange of the State. Orchid is one of the flowering ornamental plants that is not less beautiful than other flowering ornamental plants. Orchid has various flower shapes and patterns that are beautiful to the eyes. The beauty of its shape and flower has made this plant from the "Orchidaceae" family to be collected by many people either just for hobby or even for sale. Orchid plants are a type of plant that has a relatively slow growth speed. The speed of growth of each type of orchid is different because it really depends on the maintenance of the orchid itself. The growth of orchid plants is strongly influenced by several factors, both factors from within the orchid itself and external factors.

Factors from within the orchid are genetic factors or the type of orchid, including natural or cruciferous orchids. If the type of orchid is natural then the growth and flowering will be relatively very long if without special treatment, but if the type of orchid is cruciferous such as Dendrobium then the growth and flowering is relatively faster. External factors that influence are the intensity of morning sunlight, temperature, air humidity, water requirements, fertilizers, as well as the suitability of the place and growing media, air circulation, repotting and pest and plant disease attacks. Therefore, orchid cultivation techniques, especially in terms of plant care, need to be considered very carefully so that the growth process can be spurred to improve the quality and quantity of orchid plants.

Orchids belong to the family "Orchidaceae", which is one of the largest families of flowers, having approximately 43,000 species from 750 different generations. According to various information, approximately 5,000 species of orchids are found in Indonesia with a spread almost

throughout the archipelago (Hiola et al., 2019). The orchid plant itself has various functions, among which the most important is as an ornamental plant that is enjoyed by the beauty of its flowers because each type of orchid flower has a distinctive shape, style, color and fragrance so that everyone is not bored to enjoy it. In addition, orchids are also taken for their flowers to be mixed in the manufacture of various beauty and health products for the wider community. The Law of Demand and Supply is very classic but until now it is still very relevant to the conditions and circumstances that when demand increases it is clear that the number of supplies or goods that must be supplied will also be greater. By seeing the opportunity for the demand for ornamental plants or Orchid Flowers that is promising will encourage farmers or entrepreneurs of ornamental plants or Orchid Flowers to also increase their production or supply, even many entrepreneurs who want to enter this industry.

Of the various types of cut flowers. The demand for Orchids is recognized as the most beautiful flower, has a long enough durability (*vase live*). As well as having the ability to hybridize between generations, so that modification of color, shape and size of the Flower is easier to do. Today's market demands the availability of quality Orchid Flowers and in sufficient quantities to meet the increasing needs. However, there are fluctuations in the demand for Orchid Flower so that there are fluctuations in the price of the commodity. Fluctuating demand will also have an impact on production fluctuations. Therefore, farmers or entrepreneurs of ornamental plants or Orchid Flower must also see the fluctuations that occur to do good planning in planning production volume, planning production volume, planning the use of technology or skills, planning the use of seeds, planning labor involvement, planning the determination of selling prices above the cost price. Very necessary as one of the tools in anticipating business failure and maximizing benefits.

Some problems faced by Orchid Flower entrepreneurs in Kayoon Surabaya City. Whether the factors of seedlings, fertilizer, and land area affect the production of Dendrobium Orchid flowers of various age ranges in Kayoon Market, Surabaya City. Whether Dendrobium Orchid Flower Entrepreneurs of various age ranges in Kayoon Market of Surabaya City are technically efficient. Whether the Dendrobium Orchid Flower Entrepreneurs of various age ranges in Kayoon Market of Surabaya City have reached Break Event Point. The purpose of this study is to determine the effect of seedlings, fertilizers, and land area on the production of Dendrobium Orchid Flowers of various age ranges in Kayoon Market, Surabaya City. To know the elastity of Dendrobium orchid production of various age ranges in Kayoon Market, Surabaya City is technically efficient. To know the production and price of Dendrobium Orchid Flower of various age range in Kayoon Market, Surabaya City. As information for Orchid Flower entrepreneurs in overcoming problems in problems in orchid business.

## 2. Literature Review

### 2.1 Orchid History and Origins

Orchids belong to the orchid tribe or family "Orchidaceae" which in Greek, the word "orchid" comes from orchis which means testicle or testicles. In ancient times orchids were identical to men, both in color, shape and even structure. Orchids also symbolize fertility and virility, in the past there was an assumption that if consuming young orchids, then someone could have a boy,

and if consuming old orchids would give birth to a girl, but in this myth there is no mention of the meaning of this consumption eaten as food or just enjoyed the beauty of the flowers. Orchids belong to a large family of groups (subdivisions) of closed flowering or seed plants (angiosperms), single seed plant class (monocotyledone), order orchidaceae (orchids). Orchid plants can grow in lowlands, dry deserts, hot jungles to highlands, including snowy mountain peaks. Most orchid species come from the tropics because the agroclimate in the tropics itself is very suitable for orchid growth (Wraith & Pickering, 2019).

Orchids in taxonomic classification belong to the Orchidaceae family. Phalaenopsis is derived from Greek, namely "plaenos" which means "butterfly" and "opsis" which means "to see". In plant taxonomy according to Meisel et al. (2015), the classification of orchids is as follows believes that orchids have more than 25,000 species spread throughout the world. But due to forest destruction, we have lost many species that have not been recognized and do not know exactly how many. Indonesia is known worldwide for its richness in orchids with more than 4,000 species spread across almost all islands. Kalimantan, Papua, Sumatra, Java are among the islands that are world famous for their orchid richness. The most famous orchids from Indonesia are the "moon orchid" (Phalaenopsis amabilis) which is designated as the "National Flower" and nicknamed the "Puspa Pesona", and the "Pouch Orchid" (Paphiopedilumjavanicum).

### 2.2 Plant Cultivation Orchids

In general, cultivated orchids require a temperature of 280C with a minimum temperature of 150C (Pandey etal., 2018). Soil orchids are generally more heat resistant than potted orchids. However, high temperatures can cause dehydration which can inhibit plant growth.



**Figure 1.** Types of Orchid Flowers

Based on their growth pattern, orchid plants can be divided into two types, namely, sympodial and monopodial (Bhattacharjee & Hossain, 2015). Sympodial type orchids are orchids that do not have a main stem, flowers come out from the end of the stem and flower again from the growing plantlets. Except for Dendrobium sp. orchids that can produce new flower stalks on the sides of the stem. Examples of sympodial type orchids include: Dendrobium sp., Cattleya sp., Oncidium sp. and Cymbidium sp. Sympodial type orchids are generally epiphytic. Monopodial type orchid is characterized by the growing point located at the end of the stem, the growth is straight up on one stem. Flowering from the side of the stem between the two leaf axils of the orchid is generally done through conventional and in vitro culture methods.

Plant propagation carried out conventionally is as follows Vegetative propagation through breaking / separating clumps such as Dendrobium sp., Oncidium sp., Cattleya sp., and Cymbidium sp.; cutting plantlets that come out of the stem such as Dendrobium sp.; cutting plantlets that come out of the roots and flower stalks such as Phalaenopsis sp., which are then planted into the same medium such as ferns, coconut fiber moss, charcoal wood shavings, accompanied by a mixture of broken tiles or bricks. Generative propagation is by seed. Orchid seeds are very small and do not have endosperm (food reserves), so germination in nature is very difficult without the help of fungi that are symbiotic with the seeds. A good growing medium must meet several requirements, namely not weathering quickly, not being a source of disease, having good aeration, being able to bind water and nutrients well, easily available in the desired amount and relatively cheap in price (Mensah, 2015). For orchid plant growth, good media acidity (pH) ranges from 5-6 (Nanekar et al., 2014; Utami et al., 2017). Growing media is very important for optimal growth and flower production, so there needs to be an effort to find suitable growing media. Growth media that are often used in Indonesia include: moss, ferns, wood shavings, wood pieces, coconut fibers, charcoal and pine bark (De & Medhi, 2015).

The growth stadia (age) of potted plants of beautiful flowering orchids at the time of marketing is a major factor affecting the appearance of these plants indoors. It should be noted that the appropriate stadia for marketing depends on the time required to obtain the plants. Generally, plants with many blooms are more difficult to transport, more sensitive to ethylene and more easily damaged than plants transported in a stadia where the flowers are still in bud or the percentage of blooms is still low (Wojciechowska et al., 2018; Wouters et al., 2015). The quality and quantity of fertilizer can regulate the balance of vegetative and generative growth of plants. In the vegetative growth phase for small plants the ratio of NPK fertilizer is 30:10:10, in the vegetative growth phase for medium-sized plants the ratio of NPK fertilizer is 10:10:10. While in the generative growth phase, namely to stimulate flowering, the ratio of NPK fertilizer is 10:30:30.

The specialty of orchids lies in their appearance during consumption so efforts to maintain the quality of appearance for as long as possible is the main goal of post-harvest and post-production handling. To carry out these efforts, it is necessary to understand the various factors that can affect the post-harvest or post-production quality of orchids. Factors that affect the post-harvest quality of cut flower orchids are flower senescence, temperature, water and food supply, ethylene and mechanical damage and disease (Da Silva, 2015; De & Singh, 2016). While those that affect potted orchids include cultivars, growth stadia, light, medium, fertilization, temperature and length of transportation.

### 2.3 Orchid Cut Flower Marketing Prospects

The marketing aspect of cut flowers is an important aspect because it concerns the continuity of the business of cut flower farmers and entrepreneurs (Walsh, 2016). The cut flower market has its own characteristics in the market segment; The number of farmers / entrepreneurs involved in the cut flower business, requires a farmer / entrepreneur to be able to determine the market segment of his product which is considered the most profitable. The existence of several segments of the cut flower market, such as *florists,* decorators, hotels, restaurants, offices, *catering, supermarkets* and others, shows that the cut flower business is believed to still have a decent opportunity to be developed. The results of research by Soekartawi (1996) in Surabaya showed that the elasticity of demand for cut flowers reached 0.214. This indicates that the cut flower business still has a good business opportunity to be developed. Another indicator that shows optimism about the prospects of the cut flower business is that Indonesia, in addition to importing, also exports cut flowers, indicating that the cut flower commodity is elastic to demand. The production function is the physical relationship between production factors and output factors.

Production factors such as land, fertilizer, labor, capital, climate and so on all of which affect the size of the production produced (Lu et al., 2018). Because farmers or entrepreneurs know the amount of production that is used or used, farmers or entrepreneurs can estimate some of the production that must be produced. The production function describes all technically efficient production methods in ari using minimal factors. The relationship between production factors and production can be written in a function. Product Elasticity (EP) is the change in the product produced due to changes caused by the production factors used (Hetemäki & Hurmekoski, 2016). Quadrant I, shows that EP>1, which means that if the production factor is added to the use of 1%, it will add production greater than 1% Quadrant II, shows that 0 <EP <1, which means that if the production factor is added to the use of 1%, production increases by 1% Quadrant III. Shows that EP<0, which means that if the production factor is increased by 1%, the production will decrease.

The question of where is related to the location, whether the location is suitable for what will be done. When refers to certain seasons when there is high demand and when demand is sluggish, so that the time of business is also one of the determinants of cost differences. How much area, how much will be produced will also affect the amount of business costs. How production, concerning the methods and technology used, whether using new technology or new innovations. This will affect the cost of production, as well as the producer's income, the increase in productivity per unit area and time. The forms of technology can be : cultivation methods. The use of superior seeds, the use of agricultural equipment that can reduce labor. Thus technology can touch all aspects of production activities. The use of technology will basically increase the expenditure of fixed costs, maintenance costs, and additional labor. This means that it can change the composition of fixed costs and variable costs. Fixed costs are costs that are not consumed in one or two seasons (Li et al., 2015). Meanwhile, variable costs are costs whose size depends on the amount of production to be produced (Kirschen & Strbac, 2018). Costs whose size depends on the amount of production to be produced. The need to calculate the actual cost of goods arises as a result of the increasing magnitude and complexity of existing costs. The method of determining the cost of goods is by taking into account the elements of cost into the cost of

production (Friedman, 2017) . It is suspected that seed, fertilizer, and land area affect the production of orchid flower. It is suspected that the production elasticity is technically efficient. It is suspected that the selling price of orchids sold by the company is above the cost of production of orchids above the Break Event Point production.

## 3. Research Methods

This research method uses independent variables that the research location will be determined at Orchid Flower entrepreneurs in Kayoon Surabaya City, with the consideration that Kayoon Flower Market is the center of ornamental plant entrepreneurs including Orchid Flower in Surabaya City. The method used in determining the research location is purposive method. In addition, another consideration is that Kayoon Flower Market is a place that is easily accessible by researchers so that it is easier to communicate with respondents. Respondents in this research are all Orchid Flower entrepreneurs in Kayoon Flower Market, Surabaya City, namely 15 Orchid Flower entrepreneurs. The method used in the selection of respondents is the Census method. By taking all the population. Orchid flower entrepreneurs are producers as well as orchid flower farmers. The data used in this study consisted of secondary data and primary data. Secondary data was obtained from the Surabaya City Plant Agriculture Office, East Java Provincial Agriculture Office, by recording method. While primary data was obtained from Orchid Flower entrepreneurs in Kayoon Surabaya City, by using interview and recording method in accordance with the list of questions that have been provided in advance. Multiple Linear Regression Method To test the hypothesis, first statistical analysis was conducted using exponential method. The coefficient of determination was used to determine the accuracy of the model used by the independent variables used included in the model used by the independent variables used included in the coefficient of determination regression model (Peduzzi et al, 1995). to determine the closeness of the relationship jointly or simultaneously between the independent variables and the dependent variable.

## 4. Research Results And Discussion

Dendrobium orchid can grow well at an altitude of 0 - 700 meters above sea level. The required air temperature is minimun$21^O$ c - $23^o$ C and maximum $31^o$ C - $34^o$ C, the required air humidity is 60 - 65 %. Surabaya is one of the cities that meet the requirements for dendrobium orchids seen from the altitude, temperature, and humidity can be said to be suitable as a place to grow orchids. The average air temperature in Surabaya is $32^o$ C with a humidity level of 65%. If in a certain month the air temperature exceeds $34^o$ C, usually orchid entrepreneurs try to manipulate with fogging and watering in the surrounding environment, with the aim of maintaining the condition of orchid plants.

Age actually plays a role in the level of productivity that will be managed by orchid flower entrepreneurs. This is because the older the age of the entrepreneur, the physically weaker the work. However, on the other hand, the older the age of the entrepreneur, the relatively more experience he has so that he can achieve optimal productivity. In such a situation, entrepreneurs are faced with various circumstances. To cover up their physical weaknesses, entrepreneurs utilize labor in the family and hired labor. For more details on age groups, see Table 1.

**Table 1.** Age Composition of Orchid Flower Entrepreneurs in Surabaya

| No. | Age | Number of Entrepreneurs (people) | Percent (%) |
|---|---|---|---|
| 1 | 21-36 | 8 | 54% |
| 2 | 37-55 | 5 | 33% |
| 3 | 56-60 | 2 | 13% |
| **AMOUNT** | | **15** | **100%** |

The characteristics of orchid flower entrepreneurs show that their ages range from 21 years to 11 years. The largest group is between 21-36 years old, as many as 8 people (54%). Education plays an important role in the ability of entrepreneurs to increase their profitability. Therefore, adequate education will provide sufficient knowledge and experience in increasing the production and efficiency of entrepreneurs in running their business. For more details about the education level of respondent farmers can be seen in Table 2.

**Table 2.** Education Level of Orchid Flower Entrepreneurs in Surabaya

| No. | Education Level | Number of Entrepreneurs (people) | Percent (%) |
|---|---|---|---|
| 1 | Graduated elementary school / equivalent | 2 | 13% |
| 2 | Junior High School Graduation / Equivalent | 4 | 27% |
| 3 | Graduated high school / equivalent | 7 | 47% |
| 4 | Graduated S1 / Equivalent | 2 | 13% |
| **AMOUNT** | | **15** | **100%** |

The table above shows that the largest composition of the education level of orchid flower entrepreneurs is graduating from high school / equivalent at 47%. The table shows that the formal education level of orchid entrepreneurs is still relatively low. The number of family members of orchid flower entrepreneurs includes himself, wife, children and family members who come and become family dependents. The number of adult family dependents on the one hand is beneficial, namely as a source of labor in the family, because implicitly labor in the family is also an income of orchid flower entrepreneurs when paid for the labor itself and its family. But on the other hand, it adds to the expenses or costs for the family of the orchid flower entrepreneur itself. For more details can be seen in Table 3. below:

**Table 3.** Family Dependents of Orchid Flower Entrepreneurs in Surabaya.

| No. | Family Dependents (people) | Number of Entrepreneurs (people) | Percent (%) |
|---|---|---|---|
| 1 | 1-2 | 2 | 13% |
| 2 | 3-4 | 10 | 67% |
| 3 | 5-6 | 3 | 20% |
| **AMOUNT** | | **15** | **100%** |

The number of family dependents of orchid flower entrepreneurs in Surabaya ranges from 1-6 people. While the largest number of family dependents is 3-4 people by 67%, while the smallest number of family dependents is around 1-2 people by 13%. Orchid production in this study was

analyzed using Multiple Linear Regression analysis by looking at the influence of production factors that affect orchid production. From the regression model transformed to the Cobb Douglas type model, it can be seen the condition of orchid production at the farm level. Based on the results of the study, the production analysis is explained in accordance with the stages of maintenance of orchids cultivated by orchid entrepreneurs, namely Seeding Stage Orchids, namely orchids that have just been developed from nurseries until after the age of 4 months, then Adolescent Orchids, namely orchids aged 8-12 months and Adult Orchids aged 12 months until flowering, namely 16-18 months. Elasticity and Influence of Orchid Production at Seeding Stage Based on the result of Linear Regression analysis transformed to Cobb Douglas type model, the result is shown in Table 3 as follows.

**Table 4.** Effect of Production Factors on Orchid Production in Seeding Stage

| Production Factors | Regression Coefficient | $T_{count}$ | Significant |
|---|---|---|---|
| Constant | 3.416 | 15.200 | 0,0 |
| Seedlings | 0,039 | 0,735 | 0,47 |
| Fertilizer | 0,009 | 0,167 | 0,871 |
| Land Area | 0,107 | 2,852 | 0,16 |
| *R2* | *= 0,891* | | |
| *fcount* | *= 29,98* | *(Significant = 0.0)* | |

The table above shows that the model used in the study is theoretically acceptable because R2 is greater than 50%, which is 89.1%, while 10.9% is explained by other variables not included in this model. Fcount has an error rate of 0% so that this model fulfills the criteria for certainty of a very real model. The production elasticity of each production factor was : 0.639 for seedlings; 0.009 for fertilizer; and 0.017 for land area. These elasticity numbers based on production theory are in the rational area, meaning that orchid entrepreneurs in the seeding stage of orchid farming have met the criteria of technical efficiency, both elasticity values. Being in the range of elasticity 0 to 1.

**Table 5.** Effect of Production Factors on Adolescent Orchid Production

| Production Factors | Regression Coefficient | thitung | Significant |
|---|---|---|---|
| Constant | 1,480 | 3,533 | 0,005 |
| Seedlings | 0,306 | 3,888 | 0,003 |
| Fertilizer | 0,082 | 2,709 | 0,020 |
| Land Area | 0,18 | 0,519 | 0,614 |
| *R2* | *= 0,994* | | |
| *fcount* | *= 637,805* | *(Significant = 0.0)* | |

Statistically, of the three production factors, only one variable has a real effect, namely land area with a tcount of 2.852 with an error rate of 16%. The other variables, namely bbit and fertilizer, statistically do not have a real effect, but in theory it is correct because the coefficient is positive. Based on the results of multiple linear regression analysis with the Cobb Douglas type

model transformed so that the regression coefficient, as well as the elasticity of production, the results are obtained as in Table 5.

Table 5 shows that the model used in this study to see the effect of production factors on the production of adolescent orchids is statistically acceptable because $R^2$ reaches 0.944, this means that 99.4%. Variation juvenile orchid production can be explained by variation of seed, fertilizer and land area variables, while the remaining 0.6% is explained by other variables that are not included in this model. The results of the F test calculation showed an Fcount of 637.805 with an error rate of 0%. This shows that this model meets the criteria for certainty of a very real model.

Elasticity of production on each production factor, namely seedlings of 0.306, fertilizer 0.082, and land area coefficient of 0.18. These elasticity figures based on production theory are in the rational area, thus orchid entrepreneurs in adolescent orchid farms have met the criteria of technical efficiency, because the elasticity value is in the range of elasticity 0 to 1. Statistically, this study is only one variable that does not significantly affect the production of orchids. However, in theory it is correct because the regression coefficient of this variable is positive, meaning that the land area variable can increase orchid production, but the effect is not real because the error rate is 61.4%.

Seeds and fertilizer variables have a positive effect on juvenile orchid production meaning that if these two factors are added by 1% then production due to the influence of seeds will increase by 0.306%, this effect is statistically significant because the tcount is 3.888 with an error rate of 0.3%, as well as fertilizer has a positive effect meaning that if fertilizer is added 1% then production increases by 0.082 and the tcount is 2.709 with an error rate of 2%. Elasticity and Influence of Orchid Production Adult. Based on the analysis by using Cobb Douglass type model, the result is as shown in Table 6 below:

**Table 6.** Effect of Production Factors on the Production of Mature Orchids

| Production Factors | Regression Coefficient | thitung | Significant |
|---|---|---|---|
| Constant | 1,853 | 1,439 | 0,175 |
| Seedlings | 0,425 | 2,049 | 0,065 |
| Fertilizer | 0,002 | 0,030 | 0,0976 |
| Land area | 0,881 | 3,575 | 0,004 |
| R2 | = 0,983 | | |
| fcount | = 199,74 | (Significant = 0.0) | |

The table above shows that the model used in this study to see the effect of production factors on the production of mature orchids, is statistically acceptable because $R^2$ reaches 0.982, this means that 98.2%. The variation of mature orchid production can be explained by the variation of seed, fertilizer and land area variables, while the remaining 0.8% is explained by other variables that are not included in this model. The results of the F test calculation show that F count is 199.74 with an error rate of 0%. This shows that this model meets the criteria of certainty of a very real model. The production elasticity of each production factor, namely seedlings of 0.425, fertilizer of 0.02 and the elasticity coefficient for land area of 0.881. These elasticity numbers based on production theory are in the rational area, thus adult orchid entrepreneurs have

met the criteria of technical efficiency, because the elasticity value is in the range of elasticity 0 to 1.

Statistically of the three factors that do not significantly affect the production of adult orchids is fertilizer. However, in theory it is correct because the elasticity of fertilizer is positive, meaning that if fertilizer is increased by 1%, the production of mature orchids as measured by the flowering of orchids, can increase by 0.002%, but statistically it has no real effect. If the variables of seed and fertilizer are removed from the model, the effect of fertilizer on orchid production will be real. Seeds and land area variables have a positive effect on the production of adult orchids, meaning that if the seed production factor is added 1%, the production of orchids will increase by 0.425%, this effect is statistically significant because t count is 2.049 with an error rate of 6.5%, as well as land area has a positive effect on the production of adult orchids. This means that if land area is increased by 1% then orchid production will increase by 0.881% with t count of 3.357 with an error rate of 0.4%.

Production Break Event Point To calculate the Production Break Event Point of seedling stage orchids, adolescent orchids and adult orchids cultivated by farmers, it is based on the fact that Total Cost is a function of production, namely TC = f (Q), then mathematically the function is formulated in the form of a linear function, namely TC = a + bQ, then this function is adjusted to the cost theory, which is transformed into a quadratic model. Based on the model, then with mathematical steps can be determined Break Event Point Production at the current price level. Production Break Event Point of Orchid Seeding Stage The results of the quadratic model analysis used in this study obtained the following equation.

This model is statistically correct because $R^2 = 0.818$ with the understanding that the variation in total cost can be explained by the variation in seeding stage orchid production. The F test model certainty test is statistically acceptable because F count = 26.6 with an error rate of 0%, thus this model has very real accuracy. The effect of production on Total Cost is theoretically correct because the regression coefficient is positive. So that if production increases, it is certain that Total Cost will increase. To determine the Break Event Point production can be done by mathematical manipulation, assuming that in the long run there are no fixed costs, because fixed costs in the long run are variable costs. Based on this calculation, if orchid entrepreneurs sell seeding stage orchids at Rp 3,166 per pot, then the Break Event Point production is achieved at 3112 pots of seeding orchids, while the average production of seeding orchids is 8216 pots.

This model is statistically correct because R2 = 0.966 which means that the variation of Total Cost can be explained by the variation of production by 96.6%, while 3.4% is influenced by other variables included in this model. The model capacity test, namely the F test, is statistically acceptable because F count = 167.92 with a 0% error rate, thus this model has very real accuracy. The effect of production on Total Cost is theoretically correct because the regression coefficient is positive, so that if production increases, it is certain that the Total Cost will increase. To determine the Break Event Point production can be done by mathematical manipulation, assuming in the long run there are no fixed costs, because in the long run all costs become variable costs. Based on this calculation, if orchid entrepreneurs sell juvenile orchids at a price of Rp 38,620 per pot, then the Break Event Point production is achieved at 9,560 pots of juvenile orchids, while the average production of juvenile orchids is 28,800 pots. Based on this calculation, if orchid entrepreneurs sell adult orchids at a price of Rp 84,078 per pot, the

production Break Event Point is reached at 4,519 pots of adult orchids, while the average production of adult orchids at the current entrepreneur level is 14,625 pots of orchids.

## 5. Conclusion

The growth and production of Dendrobium orchids in Surabaya is influenced by geographical factors and environmental conditions, including altitude, air temperature and humidity. Surabaya was shown to fulfill these conditions, making it a suitable location for Dendrobium orchid growth. In addition, the study also revealed the characteristics of orchid entrepreneurs in Surabaya, including age distribution and education level. The age of entrepreneurs tends to vary, with the majority being in the range of 21-36 years, while the education level of the majority is high school or equivalent. Analysis of orchid production at the seeding, juvenile, and adult stages shows the influence of production variables such as seeds, fertilizers, and land area. In general, the analysis shows that orchid entrepreneurs in Surabaya have achieved technical efficiency in their business. However, some factors such as land area seem to have a significant influence on production, while other factors such as fertilizer may require further treatment. In addition, the break-even point cost analysis identified the production point at which entrepreneurs can break even, which is important for the sustainability and success of the orchid business in the local market. Overall, this study provides important insights for entrepreneurs and relevant stakeholders in improving the productivity and sustainability of orchid businesses in Surabaya.

## References

Bhattacharjee, D. K., & Hossain, M. M. (2015). Effect of plant growth regulators and explants on propagation on a monopodial and sympodial orchid: A study in vitro. *J. Orchid Soc. India*, 29, 91-102.

Da Silva, J. T. (2015). Ornamental cut flowers: physiology in practice. *Floriculture Ornamental Biotech*, 124-140.

De, L. C., & Medhi, R. P. (2015). Orchid-A diversified component of farming systems for profitability and livelihood security of small and marginal farmers. *Journal of global biosciences*, 4(2), 1393-1406.

De, L. C., & Singh, D. R. (2016). Post-Harvest management and value addition in Orchids. *International Journal of Biological Sciences*, 3(1), 14-35.

Friedman, M. (2017). *Price theory*. Routledge.

Hetemäki, L., & Hurmekoski, E. (2016). Forest products markets under change: review and research implications. *Current Forestry Reports*, 2, 177-188.

Hiola, S. F., Dirawan, G. D., & Wiharto, M. (2019, August). Characteristics of Wild Orchids in Mallawa Resort at Bantimurung Bulusaraung National Park, South Sulawesi, Indonesia. In *IOP Conference Series: Materials Science and Engineering* (Vol. 551, No. 1, p. 012132). IOP Publishing.

Kaldor, N. (1981). The role of increasing returns, technical progress and cumulative causation in the theory of international trade and economic growth. *Economie appliquée*, 34(4), 593-617.

Kirschen, D. S., & Strbac, G. (2018). *Fundamentals of power system economics*. John Wiley & Sons.

Li, H., Sun, Q., Zhang, Q., & Wallin, F. (2015). A review of the pricing mechanisms for district heating systems. *Renewable and Sustainable Energy Reviews*, *42*, 56-65.

Lu, H., Xie, H., He, Y., Wu, Z., & Zhang, X. (2018). Assessing the impacts of land fragmentation and plot size on yields and costs: A translog production model and cost function approach. *Agricultural Systems*, *161*, 81-88.

Meisel, J. E., Kaufmann, R. S., & Pupulin, F. (2015). *Orchids of tropical America: an introduction and guide*. Cornell University Press.

Mensah, A. K. (2015). Role of revegetation in restoring fertility of degraded mined soils in Ghana: A review. *International journal of biodiversity and conservation*, *7*(2), 57-80.

Nanekar, V., Shriram, V., Kumar, V., & Kishor, P. K. (2014). Asymbiotic in vitro seed germination and seedling development of Eulophia nuda Lindl., an endangered medicinal orchid. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, *84*, 837-846.

Pandey, R., Singh, B. K., Singh, R., Baksh, H., Pandey, P., & Pandey, M. (2018). Impact of Climatic Conditions in Horticultural Crop Production. *Intl J Eng. Sci Adv Research*, *4*(2), 14-20.

Peduzzi, P., Concato, J., Feinstein, A. R., & Holford, T. R. (1995). Importance of events per independent variable in proportional hazards regression analysis II. Accuracy and precision of regression estimates. *Journal of clinical epidemiology*, *48*(12), 1503-1510.

Setiawan, I. (2012). *Agribisnis kreatif: pilar wirausaha masa depan, kekuatan dunia baru menuju kemakmuran hijau*. Penebar Swadaya Grup.

Utami, E. S. W., Hariyanto, S., & Manuhara, Y. S. W. (2017). In vitro propagation of the endangered medicinal orchid, Dendrobium lasianthera JJ Sm through mature seed culture. *Asian Pacific Journal of Tropical Biomedicine*, *7*(5), 406-410.

Walsh, J. (2016). From local gardens to the national market: the case of cut flowers in Kathmandu. *International Journal of Entrepreneurship and Innovation Management*, *20*(5-6), 320-329.

Wojciechowska, N., Sobieszczuk-Nowicka, E., & Bagniewska-Zadworna, A. (2018). Plant organ senescence–regulation by manifold pathways. *Plant Biology*, *20*(2), 167-181.

Wouters, N., De Ketelaere, B., Deckers, T., De Baerdemaeker, J., & Saeys, W. (2015). Multispectral detection of floral buds for automated thinning of pear. *Computers and Electronics in Agriculture*, *113*, 93-103.

Wraith, J., & Pickering, C. (2019). A continental scale analysis of threats to orchids. *Biological Conservation*, *234*, 7-17.

# Price Analysis of Dendrobium Orchid Flowers: Study on Orchid Entrepreneurs in Surabaya

**10** Anna Jasińska-Biliczak. "How to Ensure the Development of SMEs in Post-Pandemic Economy? A Start-ups Case Study", TalTech Journal of European Studies, 2023
Publication

1 %

**11** e-journal.unair.ac.id
Internet Source

1 %

**12** Saichol Ketsa, Ian J. Warrington. "The dendrobium orchid: Botany, horticulture, and utilization", Crop Science, 2023
Publication

1 %

**13** Ankita Lal, Manu Pant, Anil Kumar, Lok Man Singh Palni, Arundhati Singh, Masoom Raza Siddiqui, Azamal Husen. "Clonal propagation and hardening of epiphytic orchids (Aerides multiflora and Rhyncostylis retusa) for sustainable conservation and utilization", South African Journal of Botany, 2023
Publication

1 %

**14** www.ijabe.org
Internet Source

1 %