Competitive Advantage of Banana Stone

I Made Tamba¹, I Gusti Ngurah Alit Wiswasta, and Dian Tariningsih
¹Faculty of Agricultural, University of Maharaswasati Denpasar
Email: itamba17@unmas.ac.id

Abstract. Banana stone (Musa balbisiana), which was formerly known as wild banana, has now become a tame banana, because it is no longer only found growing on marginal land, but has expanded to become a versatile commercial plant. This study aims to analyze (1) the cost and return of banana stone farming, and (2) the competitive advantage of banana stone. This research was carried out with a survey research approach. Determination of respondents was carried out by stratified random sampling method. Strata is made based on the area of banana stone farming, with 81 people as respondents. The economic value of banana stone was analyzed quantitatively by the analysis of the return cost ratio, and the competitive advantage of banana stone was analysis by a policy analysis matrix (PAM). The result showed that (1) banana stone farming had R/C > 1, economically categorized cultivated, and (2) banana stone farming had a competitive advantage indicated by the PCR coefficient < 1. It was concluded banana stone farming was feasible because every one unit cost incurred result in revenues that are greater than one unit, and to save one foreign exchange unit at the level of private prices required a domestic resources cost that is smaller than one unit. It is recommended that farmers develop further banana stone farming as an instrument to maintain the sustainability of the agricultural sector.

I. Introduction

1.1 Background

Banana Stone is a plant that is able to grow in the environment of marginal lands. Historically, the banana stone plant is categorized as a marginal plant, because previously this plant did not take into account the economic value of the community, and some even labeled it as a ravine crop (many grow on the edge of cliffs and steep slopes). This is inseparable from the factual conditions, where banana stone plants are often found growing and developing on marginal land, or land that is often not used for commercial farming. It is not surprising then that [1] calls the banana stone a low-grade banana. Adaptation of the banana stone plant on marginal lands is very good, even this plant is able to compete with other plants with good growth rates.

The banana stone plant is able to grow despite inadequate water availability, even able to grow in the long dry season. This plant is also known to be resistant to pests and diseases [2]. In the midst of the many cases of wilting and other diseases that attack banana plants in general, but the banana stone escapes from diseases that attack many banana plants. Banana stone seem to not care and not be afraid of pests and diseases. The resistance of banana stone to pests and banana diseases has been tested through a long history, because there has not been a story about the banana stone that died in a clump due to wilting and or other diseases. Banana stones have resistance to diseases so they are made into breeders in the field of genetics [3].
The past story of the banana stone which is rather dim because it usually grows and develops only on marginal lands, has now turned bright with the changes in people’s consumption patterns that lead to organic food. The public is obsessed with respecting the body and soul more by moving from chemical synthetic food to more natural organic food. Widespread public awareness to extend his life expectancy, by turning to organic food is what gives fresh air to the banana stone. Now most of the banana stones no longer experience life languishing on marginal land but have instead grown and developed on more fertile land with relatively flatter topography and even spoiled with a few maintenance touches, which include fertilizing, eradicating weeds, eradication, thinning, and spacing.

Today, the banana stone has become a favorite plant as a versatile plant and beats the reputation of other banana plants. The economic value of banana stone even outperforms other banana plants and even other commercial plants such as rice and secondary crops. Imagine, this plant from saplings, young stems, old stems, leaves, young fruits, and ripe fruit, has become a commodity that has economic value and is reliable in dealing with market dynamics. It is not surprising then that this crop is very much cultivated by the farming community, because in addition to economic value and resistance to pests and diseases, the banana stone is very easily cultivated. However, there are a number of issues that need to be clarified from the development of banana stone farming, namely (1) how to balance revenue with the costs of banana stone farming, and (2) how to position the competitive advantage of banana stone.

1.2 Research Objectives
The aim of this study:
(1) Analyzing the cost and return of banana stone farming
(2) Analyzing the competitive advantage of banana stone.

2. Materials and Methods

2.1 Determination of Research Locations
This research was conducted in Payangan District, Gianyar Regency. The selection of research locations was done deliberately on the basis of the consideration that this area is a center of farming of banana stone in Gianyar Regency.

2.2 Determination of Respondents
The population of this research is the farmers who run the banana stone farming with land tenure status as the owner farmers. The area of ownership of the banana stone farms varies greatly among farmers, so the taking of respondents uses stratified random sampling based on the strata of land area banana stone farming, as presented in table 1.

| No | Strata of land area (acre) | Number population (person) | Number respondent (person) |
|----|---------------------------|----------------------------|----------------------------|
| 1  | <25                       | 82                         | 39                         |
| 2  | >25 – 50                  | 66                         | 31                         |
| 3  | >50                       | 23                         | 11                         |
| Total |                         | 171                        | 81                         |

2.3 Data Collection Methods
Data collected includes primary data and secondary data. Primary data were collected from respondents through direct interviews using a list of questions that had been prepared previously. Secondary data were collected from a number of online media.
2.4 Data Analysis Methods
The return cost ratio analysis is used to answer research objective 1, whereas to analyze the competitive advantage of banana stone is used the policy analysis matrix approach [4].

| Table 2. Policy analysis Matrix |
|---------------------------------|
| **Cost** | **Return** | **Input Tradable** | **Domestic Factor** | **Profit** |
| Private price | A | B | C | D |
| Social price | E | F | G | H |
| Divergence | I | J | K | L |

Competitive advantage is approached by Private Cost Ratio (PCR) with the formula:

\[
PCR = \frac{C}{(A - B)}
\]

3. Results and Discussion
3.1 Return Cost Ratio of banana stone farming
The banana stone farm is a simple farm that does not require complicated maintenance touches so it is often labeled as a farm that spoiled farmers. Imagine, this farm only requires minimal land management, minimal irrigation, and does not need to control pests and diseases. The more intensive maintenance treatment is given, the higher the rate of plant growth and development. This happens, because genetically these plants have been accustomed to grow and develop on marginal lands.

The banana stone farming which is the object of this research, is farming that is not carried out on marginal land, but on land that has good potential in terms of fertility, topography, irrigation, and accessibility. It is undeniable with such land conditions, the growth performance and development of banana stones for the better. Moreover, farmers provide a maintenance touch in the form of periodic fertilization so as to have a significant impact on the growth and development of the banana stones.

The main commodity that is the economic superiority of the banana stone is its leaf, because it is the banana leaf that has the best quality. Therefore, in this research the object of analysis of the return of the banana stone farming is the sale of its leaves. Harvesting banana leaves can be done regularly every month, where each tree is harvested by two leaf midribs. Every 20 midribs of leaves are turned into one fold, and then sold at an average price of IDR 10,500 per fold. Details of the cost and return of the banana stone farming in various strata of land area are presented in table 3.

| Table 3. Cost and return of banana stone farming in various strata of land area per year |
|---------------------------------|
| **Description** | **Strata of land area** |
| | <25 acres | 25 – 50 acres | >50 acres |
| Return (IDR) | 18,900,000 | 39,690,000 | 54,810,000 |
| Total cost (IDR) | 3,094,000 | 5,327,400 | 7,142,600 |
| Land lease | 1,250,000 | 2,625,000 | 3,625,000 |
| Seeds | 500,000 | 1,050,000 | 1,450,000 |
| Fertilizer | 144,000 | 302,400 | 417,600 |
| Labor | 1,200,000 | 1,350,000 | 1,650,000 |
| Profit (IDR) | 15,806,000 | 34,362,600 | 47,667,400 |
| Profit/Acre | 790.300 | 818.157,14 | 821.851,72 |
| R/C | 6,11 | 7,45 | 7,67 |
The results of the analysis show that in the broader strata, each IDR costs incurred generate greater revenues. An increase in farm area from an average of 20 acres to 42 acres gives a significant increase in R / C, from 6.11 to 7.45. However, an increase in farming area from an average of 42 acres to 58 acres only provided an increase in R / C of 0.22, from 7.45 to 7.67. Accumulatively, an increase in farm size tends to increase efficiency gains. Increased efficiency gains in wider farming come from labor cost savings. This is inseparable from the classification of stone bananas as mentioned by [5] as wild bananas. Genetically, banana stones are accustomed to grow and develop without the touch of maintenance, so that when cultivated these bananas do not require intensive maintenance.

The analysis showed that an increase in farm area from an average of 20 acres to 58 acres resulted in an increase in profit per acre from IDR 790,300 to IDR 821,851.72. This fact gives the meaning that the wider implementation of banana stone farming tends to provide a higher level of profit. In the case of banana stone farming which requires relatively less maintenance touch, it turns out to be able to save on the use of more labor on a wider farming area. This then leads to the level of profitability of banana stone farming which is obtained higher in the broader strata of land area.

3.2 Competitive Advantage

The results of the analysis of the banana stone competitive advantage with a policy analysis matrix approach are presented in table 4. There are only one type of costs that are tradable inputs, namely Urea fertilizer, while those classified as domestic factors are land rent, seedlings, and labor.

| Description   | Strata of land area |
|---------------|---------------------|
|               | <25 acres | 25 – 50 acres | >50 acres |
| Return        | 18,900.000 | 39,690.000    | 54,810.000 |
| Tradable input| 144.000   | 302.400       | 417.600    |
| Domestic factor| 2,950.000 | 5,025.000     | 6,725.000  |
| Profit        | 15,806.000 | 34,362.600    | 47,667.400 |
| PCR           | 0,1573    | 0,1276        | 0,1236     |

The highest PCR coefficient was achieved in the strata of planted area <25 acres which is equal to 0.1573 and the lowest PCR achieved in strata of acreage area> 50 acres is equal to 0.1236. Based on the magnitude of the PCR coefficient, it was revealed that the best competitive advantage was achieved at a planting area> 50 acres. This fact shows that the planting area strata> 50 acres is most suitable for the cultivation of banana stones, because it is the most efficient in utilizing domestic resources to produce a foreign exchange unit at the private price level. Cumulatively the banana stone has a competitive advantage, so that it actually provides real benefits for farmers. The banana stone competitive advantage is mainly supported by labor efficiency. This is in line with the opinion of [6] which states that the potential determinants of competitiveness are labor costs, interest rates, exchange rates, and economies of scale. Competitiveness in a particular industry results from centralizing management practices and supporting organizational modes within the country and sources of competitive advantage within the industry. To compete globally, a company needs strong domestic competition.

The ability of banana stone to use domestic resources to produce relatively high profits, supported by socio-cultural and economic systems that relatively many people use banana leaves so that the demand is relatively high continuously. This is in line with the opinion of [7] which states that competitive advantage is created and maintained through a highly localized process. Differences in terms of values, culture, economic structure, institutions, and national history all contribute to competitive success.

In addition to competitive advantage (quantitative analysis results), banana stone qualitatively also has a number of advantages compared to other plants. The advantages of the banana stone can be described as follows.
First, the harvesting of banana leaf can be arranged periodically, in the sense that the harvest of leaves can be advanced or set back in accordance with a more favorable market price, and also the availability of labor to harvest. This is because these commodities are relatively more durable (not easily damaged so the harvest can be delayed until a certain time limit). The observations showed that the tolerance limit for the delayed harvest of the banana leaf can reach 60 days. In such conditions, the oldest leaves can still be used for sale at reasonable prices, because the leaves of banana stone do not quickly age into dry leaves.

The flexibility of harvesting banana leaf has wide impact, both on economic and non-economic aspects. When the selling price rises, then the harvest can be advanced, which should have been harvested for two midribs into only one leaf midrib. A decrease in the quantity of products sold can be partially offset by an increase in selling prices. Farmers already have adequate literacy in managing harvest periods in the interest of responding to the dynamics of rising prices for the banana stone leaves. Conversely, if the price of a banana leaf falls significantly, then the harvest can be postponed so that it can obtain a more profitable selling price. In such a case, the decrease in selling price can be partially covered by an increase in the quantity of leaves sold.

Second, the harvest period of banana stone leaves all the time, because this commodity is not seasonal. This then has the implication that the supply of leaf banana stone does not experience high fluctuations, so it then has an impact on the selling price which is also relatively stable over time. The harvest period is all the time because the banana stone produces saplings in a sustainable manner that is ready to replace the parent of the banana stone whose productive period has ended. There is always a new generation of plants that grow and are ready to become productive plants so that the life cycle of these plants is not interrupted, which also leads to sustainable production. Banana stone trees whose productive period ends can be cut down as pig or cattle feed, and such conditions contribute positively to farmers' incomes.

Third, banana stone does not require intensive maintenance touch. Land that can be used for banana stone cultivation is very wide variability, in terms of topography, fertility, water availability, soil texture, temperature, humidity, and levels of organic matter. In terms of topography, the banana stone plant is able to grow on land ranging from relatively steep to flat topography. Likewise, in terms of land fertility, this plant is able to grow on relatively less fertile land with low levels of organic matter, and very limited water availability. Banana stone are tolerant of minimal maintenance touches, from planting to harvest. This plant does not require growing, weeding, eradicating pests and diseases, irrigation, and also periodic fertilization. This of course greatly saves labor and fertilizer production costs, which then has a positive impact on increasing farm profits.

Fourth, the use of the banana stone commodity is very broad, because the banana stone leaves can be used for various purposes, ranging from wrapping side dishes, fish and meat pepes, snacks pepes, bali snacks, packaging jinggo rice, uduk rice, mixed rice, canang sari ingredients, grilled rice wrappers, porridge wrappers, bean wrappers, and vegetable wrappers. The use of banana leaves does not know the season alias all the time, so the number of requests is stable. This stable demand condition is a competitive advantage over the banana stone commodity, which is rarely owned by other commodities. Besides the leaves, fruit from young to ripe has economic value. According to [8] banana stones can be used as a partial substitute for wheat flour in making brownie cakes, without changing the color, taste, aroma, texture, and overall acceptance of brownie cake products significantly. This then gives a positive impact on price stability and return of farm, which then leads to the benefits of farming and farmer income.

Fifth, the exploitation of banana stones has very little risk and uncertainty. Imagine, the survey results show that the cultivation of banana stones has never experienced crop failure due to pests and diseases that interfere with production levels. Farmers who have a banana plantation, are not familiar with risk factors and uncertainty, because these plants are resistant to various banana plant diseases in general, so the risk of failure is very unlikely to occur. This provides a conducive climate for the development of the banana stone plantation, because farmers do not face or experience stress or thoughts caused by stable plant performance. Many farmers who are accustomed to living comfortably obsess about embracing banana stone farming, because they do not like being bothered by the demands of complex cultivation.
There is also a possibility that the banana stone farmers are risk averter farmers. They do not dare to face the risk of failure, whereas behind the risk there is always profit, the greater the risk the greater the profits that go with it. Such farmers always try to be in the comfort zone. A further implication of this condition is the conversion of land for certain uses into banana stone farming. For example, the conversion of land from cassava and rice land into banana stone land. When switching to banana stone farming, farmers no longer worry about crop failure, due to drought, pest and disease attacks, as well as other production failure factors. This has become the main driver for farmers in conducting banana stone farming.

According to respondents, the benefits of banana stone farming per hectare are greater than the benefits of farming cassava, pulses, and rice per hectare. This was revealed based on his experience organizing the cultivation of sweet potatoes, cassava, pulses, and rice. Taking into account the smaller risk and uncertainty factors as well as the greater profitability of the farm, then it is very rational then many farmers convert their paddy fields to bananas. Recorded the logical reasons of respondents who have diverted the use of rice fields into banana stone farming as follows.

Planting banana stones is much easier and cheaper than rice farming. The banana stone is once planted, the production flows continuously and never recedes with a relatively stable selling price. Unlike rice, which requires intensive maintenance, with a large inherent risk and high uncertainty, both in terms of production and selling prices. Moreover, there are demands for rice farming on fertilizer production factors whose availability often experiences scarcity. This clearly does not provide a sense of comfort for farmers in carrying out the production process.

Sixth, the commodity leaf of banana stone is far from the phenomenon of market failure, or it can be said that the form of commodity market for banana stone is a perfectly competitive market. The number of producers and consumers of banana stone leaves is large. There is freedom in and out of the market. In such conditions, neither consumers nor producers can influence market prices. Banana leaf commodity is relatively homogeneous, and is not differentiated by certain treatments or packaging so that it cannot affect market prices. Producer farmers are able to sell their additional production at the prevailing market price. Individual buyers cannot influence market prices, because they sell commodities that are homogeneous in shape. The price created (the market equilibrium price) of transactions on the ground is purely influenced by the strength of supply and demand. Banana stone commodity market (perfect competition market) is still working normally and has not been touched by the phenomenon of market failure, so that until now there is no need for government policies to protect producers and consumers of banana stone commodities due to market failures.

4. Conclusions
Based on the results of this study, it was concluded that (1) the return cost ratio of banana stone farming is higher with increasing planting area strata, which indicates higher efficiency gains in line with increasing land area, (2) banana stone has a competitive advantage in various strata of land area.

Acknowledgment
Thank you to:
1) Dear the Minister of Ristekdikti and its staff for permission, guidance, and research funding.
2) Dear the Head of LLDIKTI Region VIII for his assistance and direction in the implementation of research.
3) The Rector of Mahasaraswati Denpasar University (Unmas Denpasar) and its staff for permission, guidance, and direction in the implementation of applied research in higher education.
4) Respondents who have taken the time to provide information related to this research.
References

[1] Margono T 2000 Anggur Buah Pisang Klutuk (Jakarta: Grasindo) pp 20-32

[2] Borborah K., Borthakur S K., and Tanti B 2016 “Musa balbisiana Colla –Taxonomy, Traditional Knowledge and Economic Potentialities of The Plant in Assam, India”. Indian Journal of Traditional Knowledge. 15(1) pp 116-120.

[3] Fajarudin A 2013 Keragaman Genetik Pisang Musa balbisiana Colla di Indonesia menggunakan Penanda Amplified Fragment Length Polymorphism (AFLP). Tesisi Program Studi Biologi Tumbuhan. Institut Pertanian Bogor.

[4] Monke E A and Pearson S R 1989 The Policy Analysis Matrix for Agriculture Development (Ithaca and London: Cornell University Press) pp 54-79

[5] Sulistyaniingsih D L 2009 Pisang-Pisang Liar Sang Sumber Plasma Nutfah. http://blog.cgi.htm. Diakses pada 14 Juli 2017

[6] Porter M E 1990 The Competitive Advantage of Nations (New York: The Free Press A Division of Macmillan, Inc) pp 33-71

[7] Cho D S and Moon H C 2000 From Adam Smith to Michael Porter. Evolusi Teori Daya Saing. (Jakarta: Salemba Empat) pp 29-48

[8] Musita N 2008 Kajian dan Karakteristik Pati Resisten dari Berbagai Jenis Pisang. Tesis Universitas Lampung. Bandar Lampung.