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# Profit Analysis of Garlic Seed Farming in Jangkat Subdistrict Merangin Regency

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***Abstract***— *Garlic is an important commodity controlling inflation besides chilies, shallots, and CPO or cooking oil. In the last ten years, the import condition of horticultural products, especially garlic, has tended to increase by up to 95 percent. This study aims to examine whether the development of a garlic farming within the framework of national garlic self-sufficiency in Jangkat Subdistrict, Merangin Regency, is feasible, especially from a financial and social aspect, so that it can become a recommendation material for the sustainability of garlic development in the research area. The research was conducted on 150 respondents. The results showed that from the short-term financial aspect, the R / C value is less than 1, as well as in the medium term, the NPV value is minus and the IRR is smaller than the social interest rate with B/C less than one so that the garlic seed breeding business in the research area is not feasible. From the physical condition, the appearance of onions is smaller and dirty causing marketing problems. most of the respondents did not understand the cultivation of garlic, the varieties of garlic planted in the study area were still less uniform and presumably not suitable with local agro-climatic conditions. So, Garlic self-sufficiency can only be realized if in a potential area such as this research area, a variety trial has been carried out to select the most suitable variety so that the maximum results.*

***Keywords***— ***Farming, Garlic Seed, Profit, Self-sufficiency.***

## I. INTRODUCTION

Jangkat District is a highland area with an altitude of 1035 m above sea level, almost the same as the average height of the Tawangmangu District area, which is 1000 m above sea level. Tawangmangu District is one of the main garlic producing areas in Indonesia with a productivity of between 12-20 tons per ha. By referring to the altitude, Jangkat District has the potential to become one of the centers of garlic (Allium sativum L.), as is the case with Tawangmangu District. Until 2019, Jangkat District was a producer of coffee, potatoes and other vegetable crops, except garlic. Garlic was only introduced through trials in 2019. Even though it has not yet seen its economic contribution, it is hoped that in the future garlic will become one of the icons of this region as the main producer in Indonesia. Garlic is a clumping seasonal plant that has a height of about 60 cm. Garlic planting is best done in areas with an altitude of 700 m asl - 1000 m asl with a pH of 5.5 - 7.5 (Direktorat Penyuluhan Tanaman Pangan, 1992). The things that need attention in the development of garlic are the seeds, cultivation and marketing aspects. Ulfa's research (2018) shows that the development of a garlic business in Nagari Salayo Tanang Bukit Sileh, although profitable, faces problems in terms of the condition of seeds, cultivation, marketing and selling prices. Meanwhile, from the aspect of cultivation, the results of research using lime on soils that have a pH of 4.05 and 5.02 (acid sulfate) produce good growth and yields on garlic plants. The addition of lime 3 tons ha-1 to soil with a pH of 5.02 gave the best growth and yields (Yenni, 2012).

In Indonesia, garlic was originally brought by Chinese traders, then cultivated by the community until now (Syamsiah and Tajudin, 2003) and can function as a medicinal ingredient (Majewski, 2014). In the last three decades Indonesia still has to import garlic and it tends to increase and control more than 95 percent of the domestic supply. This is a result of market openness, increased demand, and unfulfilled domestic production which will directly or indirectly affect the production and income of horticultural 2 farmers (Syahyuti et al., 2015). Based on data from the Central Statistics Agency (2018), it shows that the average national consumption of garlic tends to increase from year to year. On average, referring to 2017 data, the population's per capita consumption of garlic was 0.313 ounces / week or equivalent to 1.904 kg / year. Data from the Directorate General of Horticulture (2017) shows that in 2016, with a planted area of 2,117 ha, production of 18,200 tons, Indonesia had to import 448,000 tons to meet consumption needs. To reduce this dependence, the government has targeted a planting area of 72,249 ha with an estimated production of 603,000 tons in 2019. In fact, in 2019 Indonesia still imports garlic worth US $ 529.96 million with a total weight of 465.34 thousand tons. In fact, throughout 2019 garlic imports to Indonesia only came from China. The centers of garlic production in Indonesia are currently mainly in the provinces of West Nusa Tenggara, Central Java, West Sumatra, West Java and East Java (Directorate General of Horticulture, 2015). Garlic is a two-season herbaceous plant, but is grown as an annual except for seed production. Garlic in Indonesia is known by various names such as garlic (Malay), lasun (Aceh), dasun (Minang), onion (Javanese) and others.

As a cool season crop, its cultivation in Indonesia is carried out in the highlands which have low temperatures like the area of origin. The ideal temperature for shoot growth is between 20 - 250C. If the temperature is above 270C, the tubers will remain dormant and no shoots will appear. In sub-tropical areas, garlic requires a temperature of 200C to produce good tubers (Directorate of Food Crops Extension, 1992).

Research on the benefits of farming or farm income has been carried out, including corn farming by Herdawanto (2008) and Setiyanto (2008). Herdawanto (2008) examined corn farming in Bogor Regency, with an R / C ratio of 2.59, while Setiyanto examined corn plants in Kayen District, Central Java with an R / C value greater than one (profitable). Then Ummah (2011) and Fadila (2018) regarding red chili farming. Ummah's research (2011) in Ketep Village, Magelang Regency with an R / C value of 2.30, while Fadila (2018) looks at the effectiveness of the red chili farming group where farmers who cultivate red chilies with the group have run effectively with an average income of IDR 81,760,000 per hectare per growing season. Sunawirawan (2010) examined the efficiency of Sawi farming in Tanjung Karang Barat and Kemiling Lampung Districts with R / C values of 3.23 and 1.77, respectively. From this description, it can be concluded that all plant species studied showed favorable performance. Efforts to accelerate garlic self-sufficiency need to be carried out in stages and in a planned manner through government policy. Based on the Minister of Agriculture Regulation Number 38 of 2017, the government requires importers to produce local garlic covering 5 percent of the total volume of their import permits. Through this policy, Jangkat District, a potential highland area in Merangin Regency, Jambi Province, was chosen by business actors to become an alternative area for developing garlic centers.

In this context, garlic planting has been carried out in Jangkat District in 2019 covering an area of 20 ha with a potential production of 3 tonnes per ha. The aim of this development is to produce garlic seeds which will be distributed in the development area gradually. If the local community is involved and encouraged to cultivate garlic, then in the future Jambi, especially Jangkat District, will become one of the garlic producers that can contribute to reducing dependence on consumption of garlic from abroad. The success of a garlic business is determined by the accuracy in choosing a business location that meets the requirements technically, economically and socially. With the development of garlic in Jangkat District, an in-depth study regarding the economic benefits of cultivating garlic seeds needs to be carried out. So that these activities can be synergized with community activities, it is also necessary to explore the extent of the understanding of farmers in the research area and their response to garlic development. Therefore, knowledge or data is needed on matters related to the status of business profits that can be used to assess whether the garlic seedling is profitable if it is cultivated by farmers. Therefore, a study is needed to study whether the development of garlic business in Jangkat Subdistrict, Merangin Regency is feasible, especially from the financial or financial aspects as well as from the social aspects, so that it can become a recommendation material for the sustainability of garlic development in the research area.

## II. METHODOLOGY

This research was conducted to examine the benefits and feasibility of breeding garlic seeds from financial and social aspects. The research was conducted in Jangkat District, Merangin Regency. Research respondents were 150 farmers from 3 villages in Jangkat District who were randomly selected (simple random). Analysis of the

benefits / financial feasibility in this study using the short term and medium term (5 years).

Short term business feasibility. To find out whether the garlic seed breeding business in the research area is profitable or not in the short term, it is usually seen from the difference between the income and all costs sacrificed or also known as the net farm income (Soekartawi, 2002; Suratiyah, 2008; Soenaryo, 2009) For short-term analysis using R / C ratio analysis and k / C ratio. If R is farm revenue, Q is total production of garlic seeds, C is total production cost, Pq is the price of garlic seeds, pi is the price of input i, xi is the use of input i and k is the profit of farming, then:

R / C = (PqQ) / Σxipi and k / C = (R-C) / Σxipi.

Medium Term Farming Feasibility. Farming feasibility analysis is one approach to see whether a business is profitable or feasible to continue. This business feasibility analysis can be divided into two approaches, namely from the social or governmental aspects and from the private or individual / entrepreneur aspects (Gray et al. 1993). From the government aspect, the farm feasibility analysis is based on economic feasibility where the data used is based on the shadow price value. Meanwhile, from the private aspect, the analytical approach is directed at financial feasibility where the data used is based on the real market value. Several alternative methods of analysis that can be carried out to assess the feasibility of a business can be stated as follows. First, the analysis uses discounted criteria, which is based on the time value of money. Second, analysis that does not use a discount factor (undiscounted criteria).

For medium-term analysis, this study uses simulation figures and indicators of time value of money, namely IRR, NPV and B / C for 5 years with an annual inflation rate approach. Net Present Value Analysis is a method of appraising investment in order to determine the value of future returns that are currently valued. This method is an analysis method that considers the time value of money with the following formula (Gittinger, J.P, 1986):

$$\mathbf{NPV} = \sum_{t=1}^{n} \frac{B}{(1+i)^t} - \sum_{t=1}^{n} \frac{C}{(1+i)^t}$$

Where :

NPV is the net present value (Rp) of the benefits received in the future; B is the amount of benefits or benefits from various sources, both financial and non-financial, for the business felt by the executor in time t where t = 1,2 ... n years (months) is measured in Rp; C is the amount of costs incurred at time t; 'I is a social interest rate of around 10-15% per annum

〖1 / (1 + i)〗 ^ t = is the discount factor (disount factor);
Farming feasibility assessment from this aspect is, if

NPV is positive, so the farm is declared feasible

NPV is negative, so the farm is declared unfit.

Internal Rate of Return (IRR) analysis is an analytical tool that also looks at the time value of money as a basis for making investment decisions. Based on the simulated NPV values at two states of the social discount rate (loan interest), the NPV1 value will be obtained with the lowest possible interest i1 and NPV2 with the highest possible interest i2, so that:

$$\mathbf{IRR} = \mathbf{i_1} + \frac{\mathbf{NPV1}}{\mathbf{NPV1 - NPV2.}} (\mathbf{i_1 - i_2})$$

If the IRR value is equal to or greater than the prevailing social discount rate, then the business is said to be feasible, but if it is smaller, the business is declared unfit.

B / C ratio analysis if the analyst considers that all cost benefits are based on the assumption that all investment takes place in the long term, for example because of the large volume or scale of the business so that it requires large investments and takes into account the cost of capital so the analysis must consider the time value of money. If the analysis period is carried out for n years, the value of the B / C ratio becomes the B / C ratio analysis if the analyst considers that all cost benefits are based on the assumption that all investment takes place in the long term, for example due to the large volume or scale of the business so that it requires large investments and takes into account capital costs so the analysis must consider the time value of money. If the analysis period is carried out for n years, the B / C ratio will be

$$\mathbf{B/C} = \sum_{t=1}^{n} \frac{B}{(1+i)^t} \Big/ \sum_{t=1}^{n} \frac{C}{(1+i)^t}$$

B is the amount of benefits or benefits from various sources, both financial and non-financial, for the business felt by the executor in time t where t = 1,2 ... n years (months) is measured in Rp; C is the amount of costs incurred at time t; 'I is a social interest rate of around 10 to 15%; (1 + i) ^ n = is the discount factor (disount factor); The business is said to be feasible if during n years or n months of business operation the B / C value is at least

equal to one (B / C = 1), if the B / C value is less than one it is considered not feasible. Fially both short and medium term are not feasible or no Go.

## III. RESULT

An overview of garlic farming. The description of the state of garlic farming in the study area is based on the average data on land area, input use and production from respondent farmers who have cultivated garlic in 2019. Table 1 below describes the conditions of garlic nursery farming in the research area. From Table 1, it can be seen that the area of garlic farming is relatively small with an average of 0.67 ha per farmer.

The use of seeds is related to the variety and number of seeds. Based on respondents' information, the varieties used were Lumbu Hijau and Sangga Sembalun. Of the 45 respondents who planted garlic, only 24 people (53.3%) knew the name of the plant variety, 21 people (46.7%) did not know the name of the plant variety due to its diverse and unsure appearance. It can be said that all farmer respondents doubted the authenticity of the garlic varieties they planted because the seedlings were not uniform in appearance and in fact resulted in low growth, and some did not grow. The number of seeds used is an average of 540 kg per ha. The use of these seeds depends on the size of the seeds and the spacing.

*Table 1. Condition of Average Land Area, Input Use and Garlic Production in The Study Area*

| No | Description | Unit | Average | Minimum | Maksimum | Number of Responden |
|---|---|---|---|---|---|---|
| 1 | Land | ha | 0,67 | 0,25 | 2 | 45 |
| 2 | Seed | kg/ha | 540 | 400 | 1200 | 45 |
| 3 | Use of Input | | | | | |
| | Urea | kg/ha | 115 | 50 | 200 | 36 |
| | SP36 (TSP) | kg/ha | 145 | 50 | 250 | 40 |
| | KCl | kg/ha | 82,38 | 25 | 200 | 35 |
| | Ponska (NPK) | kg/ha | 264 | 130 | 450 | 16 |
| | Kiserit | kg/ha | 111 | 50 | 400 | 27 |
| | Orgnic/cage | kg/ha | 554 | 100 | 1000 | 5 |
| | ZA | kg/ha | 62,5 | 50 | 100 | 4 |
| | Dolomite | kg/ha | 784 | 220 | 500 | 25 |
| | Pesticide | 1 | 5 | 2 | 6 | 45 |
| 4 | Production | kg/ha | 2.890 | 100 | 6000 | 45 |

Judging from the production, it is known that the amount of production produced on average is close to 2.9 tons per ha. This result is still very far from the expected amount, which is in the range of 6-8 tonnes. However, in the midst of low knowledge about garlic cultivation, there were 2 respondents whose production approached the expected results, namely 6 tons of wet garlic.

Farming Profit Analysis. Table 2 below presents data on revenue, costs and benefits of garlic captive farming. It can be seen that the garlic seed breeding business carried out by farmers in the study area with a limited level of technological innovation is not financially feasible or a loss in both the short and medium term.

*Table 2. Revenue, Costs And Benefits of Garlic Seed Farming in The Study Area in 2020*

| Description | | | Value |
|---|---|---|---|
| **A** | **Farming Revenue (2.9 tons x IDR 12,000** | **Rp.** | 34.800.000 |
| **B** | **Farming Costs** | | |
| | Seeds: 540 kg x Rp. 16,000, - | Rp. | 8.640.000 |
| | Fixed costs (depreciation) | Rp. | 3.642.083 |
| | Variable Cost (Pupuk dan obat2an) | Rp. | 21.732.840 |
| | Labour | Rp. | 875.500 |
| | Miscellaneous expense | Rp. | 280.000 |
| **Total production costs** | | **Rp.** | 35.170.423 |
| **C** | **Advantages** | Rp. | (-470.323) |
| **D** | **Business feasibility benefit parameters** | | |
| | **1. R / C = 0.99; k / C = -0.01** | | No go |
| | **2. B / C ratio<1; NPV <0; IRR < social discount rate** | | No go |

**Social Feasibility**. From the social aspect, it can be described about the respondent's knowledge of garlic cultivation, ever or never growing garlic, interest in growing garlic and the reasons, as well as the response to garlic development efforts. As for the reasons why they no longer plant garlic, from farmers who have planted garlic the following answers are obtained (Table 3:

*Table 3. Farmers' Responses to The Unsustainability of Cultivating Garlic in The Study Area*

| Group Reason | Reason | Number of Respondents | Percentage |
|---|---|---|---|
| a | The climate is not suitable | 3 | 7.6 |
| b | Loss | 8 | 20.5 |
| c | Expensive costs | 6 | 15.3 |
| d | Combination a and b | 14 | 36 |
| e | Combination of a and c | 0 | 0 |
| f | Combination of b and c | 1 | 2.6 |
| g | ombination of a, b and c | 7 | 18 |
| | Amount | 39 | 100 |

Table 3, it can be seen that the farmers who feel the losses when cultivating garlic are quite a lot, namely 20 percent. There are those who think that the garlic business is expensive and requires a large amount of capital (15.3%). Meanwhile, there were 7.6 percent of petami who thought that garlic was not suitable. The most common assumption is that farmers claim the climate is not suitable and the garlic business is losing money. Better to grow coffee that is not as troublesome but the yield is adequate.From the research results, it was found that as many as 89 people (59.3%) of respondents said they did not know how to cultivate garlic and 61 people (40.7%) of respondents said they knew how to cultivate garlic. It can be interpreted that farmers who understand how to cultivate garlic in the research area are still very limited. In

other words, most respondents do not know how to cultivate garlic.

## IV. DISCUSSION

The use of input by respondents is relatively not in accordance with the recommendations. At least according to Wahyudi, et al (2014), fertilization with a dose of 30 tons of cage fertilizer (chicken), 80 kg N (equivalent to 170 kg of Urea), 20 kg of P2O5 (equivalent to 110 kg SP36), and 65 kg of K2O (equivalent to 110 kg KCl) will give a yield of around 15 tonnes per ha per growing season. Farmers in the study area have not found an appropriate dosage for local agricultural conditions, so a trial of garlic fertilization is needed. This needs to be done to reduce the distance between expected production and actual results, so that it can provide motivation for farmers to get a positive response.

Although respondents know how to cultivate garlic, it is not certain that the individual has ever practiced it. From the research results it is known that the number of respondents who have planted garlic as many as 45 people. Of the 45 people, only 6 (13%) are still planting garlic, 39 respondents have discontinued the cultivation of white bang. From Table 3, it is found that there are 24 respondents who stated that the climate is not suitable (reason a), or 61.5%, while those who stated that they lost if they cultivated garlic (reason b) were 30 people or 77%. Furthermore, the number of respondents who stated that the cost of cultivating garlic is expensive (reason c) was 28 people or 72%.

From the sustainability response data for garlic farming (Table 3) it can be explained that the response of farmers to the development of garlic commodity at the time of the study was relatively low. This is due to several factors, namely: 1) The seeds planted by farmers, namely Lumbu Hijau or Sangga Sembalun have not been classified as seeds according to the quality and location of the study. This can be seen from the high diversity and low production. There is still one more variety that needs to be tested in the research area besides Lumbu Hijau or Sangga Sembalun, namely the Tawangmangu Baru (TB) variety which comes from an area where the altitude is relatively the same as that of Jangkat District and its surroundings .; 2) The farmers' mastery of garlic cultivation technology is still relatively low so that the production obtained is low; 3) Cultivation technology that is still not well mastered, it can be seen from the variation in the use of inputs that are not in accordance with the recommendations. The gaps in the use of minimum and maximum inputs are so far away that it can be concluded that there is no standard knowledge for local farmers in using agricultural inputs; 4) Geographically, Jangkat District is very potential to develop garlic plants. As a result, financially, the cultivation of garlic seeds with low cultivation technology makes the business not financially feasible. Therefore, it is necessary to improve garlic cultivation techniques in the future, both for varieties that have been cultivated and for other varieties that have never been cultivated so that maximum production standards can be achieved.

## V. CONCLUSION

In the short term, garlic farming has not been profitable because 1) the farmers are not fully experienced technically, 2) the quality of the planted seeds is not well controlled; 3) the resulting product is less acceptable to the market because of its less attractive appearance. Same is the case with the short term, in the medium term, garlic farming that has been carried out by farmers is also not financially feasible. Socially, most farmers doubt the success of growing garlic because they are still not sure about the suitability of the climate and the investment is very expensive. For the sustainability of the garlic self-sufficiency program, a more in-depth study of the suitability of varieties and cultivation technology in the study area is required accompanied by a massive extension program.

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