The profit of wet and dry form of porang farming in Madiun Regency, East Java, Indonesia

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Abstract. This study aims to describe the profile of farmers, and the profit of porang farming. A proportional random sampling was used which involved 30 chip-selling farmers and 70 farmers selling wet tubers during a 3-year growing season in 2016-2019. Data analysis was conducted descriptively in tabular form. The results showed that all farmers were male, with the majority classified into the productive age, and a dominant educational level of elementary school. Furthermore, farming experience was below 13 years, with the Indonesian rosewood as the most widely used stand plant specie. Most farmers utilized less than 1.3 ha of Perhutani’s land. Sixty farmers sold the crops in form of wet tubers, 26 sold in form of chips (dry tubers), 6 sold wet tubers and chips (dry tubers), 4 sold bulbil/frogs and wet tubers, and 4 farmers sold the bulbil/frog and chips (dried tubers). The largest expenditure was the cost of seeds, amounting to 45.67% of the total expenditure, although included in the implicit costs. Therefore, farmers’ profit from porang farming reached 14,649,032 IDR for three years.

Keywords: Cost, Profit, Farming, Porang

1. Introduction

In Indonesia, there are lots of land not used for productive activities. Such land has not been processed for productive activities, but have the potential for economic value when managed well. Several models of land use have been widely reviewed and published including: a) Management of sleeping land in the area of ex-Forest Business Rights with alternative utilization into people's plantations, people's forests, community forests, a mix of forests and agriculture, and the development of ecotourism areas [1]. Data obtained from BPS in 2018 showed 9.53 million hectares of unused agricultural land spread across Indonesia. One way of utilizing this idle land is through the intercropping system [2]. Plants often used as intercrops are food plants, and many food plants (e.g. tubers) are a source of food ingredients in Indonesia. Tuber plants have a relatively large diversity of species including cassava, sweet potatoes, porang and others, as well as numerous benefits [3].

One type of tubers with promising economic value is porang (Amorphophallus oncophyllus), an under-utilized plant and source of glucomanan [4]. The prospect of this commodity is indeed very promising due to its economic value, especially for industry and health [5]. The glucomanan makes porang plants not only useful as food stuffs but also as an environmentally friendly glue material [6]. The bulbil/frog is a particular characteristic of porang not found in other iles plant types [7]. This tuber is round, symmetrical and forms a basin in the middle which is usually dull yellow or brownish-yellow [8].

One of the producing areas for porang in Indonesia is East Java Province, precisely in Madiun Regency. The following table shows the area and production of porang in Madiun Regency from 2017-2019.
Saradan District had the largest area of porang farming and produced the most wet tubers and chips in Madiun Regency, as shown in Table 1.

| Sub District | Area (Ha) | Production (Ton) | Area (Ha) | Production (Ton) | Area (Ha) | Production (Ton) |
|--------------|-----------|------------------|-----------|------------------|-----------|------------------|
|              | Wet Tuber | Chip             | Wet Tuber | Chip             | Wet Tuber | Chip             |
| Saradan      | 1097      | 6307.75          | 1072.32   | 1108             | 6371      | 1083.07          |
| Dagangan     | 149       | 778.4            | 132.33    | 151              | 778.4     | 132.33           |
| Kare         | 103       | 576.8            | 98.06     | 112              | 627.2     | 106.62           |
| Pilang Kenceng | 80     | 448              | 76.16     | 80               | 448       | 76.16            |
| Gemarang     | 55        | 308              | 52.36     | 61               | 341.6     | 58.07            |
| Delopo       | 32        | 174              | 29.58     | 32               | 174       | 29.58            |
| Wungu        | 11        | 61.6             | 10.47     | 11               | 61.4      | 10.47            |
| Wonoasri     | 5         | 28               | 4.76      | 5                | 28        | 4.76             |
| Madiun       | 4         | 22.4             | 3.81      | 8                | 44.8      | 7.62             |

Source: Agriculture Office of Madiun Regency 2017

In Saradan District, Porang is harvested once a year from June to August, with a great harvest is carried out in July. The crops are sold to collectors in the village in form of wet tubers or chips. In 2019, the price of wet tubers was 11,000 IDR per kg, while chips were 58,000 IDR per kg and continued to increase. Collectors determine the price of wet tubers and chips following the development of market prices. Therefore, farmers should know the minimum price in order not to suffer losses. Production costs incurred affect the income and profit of porang farmers. Furthermore, Indonesia imports porang flour (glucomannan) for industry, an average of 20 tons/year, equivalent to a visa of more than 3 million USD [4]. This condition signifies that an increase in productivity of porang has significant potential. To provide more comprehensive information to the public on increasing porang production in Indonesia, this study aims to describe the profile of farmers, costs and profit of porang farming in Madiun Regency, East Java, Indonesia.

2. Research Method

A descriptive method of analysis was used, which aimed to ascertain the circumstances that exist in research objects based on appropriate factors and and systematically compiled data [9]. This study attempts to provide an overview of porang farming such as the cost of seeds, fertilizers, labor, receipts, income, and profits [3]. It was conducted in 2019 in Klangon Village, Saradan District, Madiun Regency, East Java because porang is the leading export commodity in this village [10]. Furthermore, sampling was carried out based on field data from a population of porang farmers based on a predetermined population area. The farmers which were members of the Pandan Asri LMDH (Forest Village Community Institution) totaled 526. This number was then categorized into two, 158 porang farmers selling chips and 368 porang farmers selling wet tubers. The number of samples was proportionally calculated as follows:

Farmers selling chips: \( \frac{158}{526} \times 100 = 30.04 \approx 30 \)

Farmers selling wet tubers: \( \frac{368}{526} \times 100 = 69.96 \approx 70 \)
Based on the above calculations, the number of farmers selling porang chips was 30, while 70 farmers were selling wet tubers. Therefore, the total sample in this study was 100 people. Of the 100, they were further divided into five categories based on the form of porang sales, as shown in Table 2.

| Form of Sales                  | Total (people) |
|-------------------------------|----------------|
| Wet Tuber                     | 60             |
| Chips (Dry Tuber)             | 26             |
| Wet Tuber + Chips (Dry Tuber) | 6              |
| Bulbil/Frog + Wet Tuber       | 4              |
| Bulbil/Frog + Chip (Dried Tuber) | 4             |
| Total                         | 100            |

3. Results and Discussion

3.1 Profile of Porang Farmers

This farmer profile could measure the level of ability and success of farmers in running porang farming. Furthermore, the profile included six aspects: gender, age, level of education, farming experience, and types of stand plants.

| Farmer Profile               | Total (people) | Percentage (%) |
|------------------------------|----------------|----------------|
| Gender                       |                |                |
| a. Male                      | 100            | 100            |
| b. Female                    | 0              | 0              |
| Total                        | 100            | 100            |
| Age (year)                   |                |                |
| a. 27-37                     | 19             | 19             |
| b. 38-48                     | 36             | 36             |
| c. 49-59                     | 30             | 30             |
| d. 60-70                     | 15             | 15             |
| Total                        | 100            | 100            |
| Education                    |                |                |
| a. Elementary school         | 68             | 68             |
| b. Junior high school        | 23             | 23             |
| c. Senior high school        | 9              | 9              |
| Total                        | 100            | 100            |
| Farming Experience (year)    |                |                |
| a. 3-12                      | 51             | 51             |
| b. 13-22                     | 35             | 35             |
| c. 23-32                     | 11             | 11             |
| d. 33-42                     | 3              | 3              |
Table 3 showed that all farmers in Klangon Village are male, as all farming works are performed by men or the head of the family. Meanwhile, women provided less help in farming, and the youngest age of farmers was 27 years old, while the oldest productive age was 63 years. Furthermore, the age grade of porang farmers in Klangon Village fell mostly within the range of 16-64 years, which is classified as productive age. However, there were six farmers aged between 65-68 years which are classified as an unproductive age.

Farmers with 3 to 12 years of experience stated that it was easier to farm porang and produce more profits compared to other crops. Most of them were successors to their parents’ land. Meanwhile, porang farmers with farming experience ranging from 33 to 38 years may be pioneer farmers which realized that the market demand was very promising. Table 5 showed that the narrowest land area in Klangon Village was 0.2 ha, while the largest was 4 ha. Most farmers owned land in an area of 0.2 to 1.15 ha with a 66% percentage. Four people had control of 4% of a relatively large land area of 3.08 to 4.03 ha.

3.2 Porang Farming Cost and Profit

3.2.1 Production Cost

In this study, the production cost was divided into fixed and variable cost. Fixed costs for porang farming included costs of sharing for perhutani land, equipment depreciation, and production cost. Meanwhile, variable costs covered out of seeds, production cost and family labor costs, with all fixed costs included in explicit costs. However, the variable costs included in the explicit cost were outside of family labor and seeds, while the family labor costs were included in the implicit costs.

### Table 4. Porang Farming Costs in Madiun Regency, East Java, Indonesia

| Type of Cost          | Total (IDR) | Percentage (%) |
|-----------------------|-------------|----------------|
| **Fixed Cost**        |             |                |
| a. Explicit cost      |             |                |
| Land Sharing          | 2,547,255   | 9.01           |
| Depreciation of equipment | 1,217,390 | 4.31           |
| **Total Fixed Cost**  | 3,764,645   | 13.32          |
| **Variable Cost**     |             |                |
a. **Explicit cost**
   - Porang seeds: 12,998,750, 45.97%
   - Production cost: 3,632,665, 12.85%
   - Outside family labor: 5,572,162, 19.71%

b. **Implicit cost**
   - Family labor: 2,303,532, 8.15%

| Total Variable Cost | 24,507,109 | 86.68%
| Total Cost          | 28,271,754 | 100.00%

Table 4 showed that the total production cost incurred by porang farmers in Klangon Village was 28,271,754 IDR on average in one three-year planting period. Meanwhile, when viewed from the implicit cost component incurred by porang farmers, the proportion of porang seeds cost was the most massive at 45.97% of the total expenditure, while equipment depreciation cost was the lowest, at 4.31%.

3.2.2 **Income**

Income is the multiplication of the number of sales and the selling price obtained from the sale of wet tubers, chips (dry tubers), and bulbil/frogs.

**Table 5. Income of Porang Farmers in Madiun Regency in three years planting period**

| Type of Output   | Production (kg) | Price (IDR/kg) | Income (IDR) | Percentage (%) |
|------------------|-----------------|----------------|--------------|----------------|
| Wet Bulbs        | 2,573           | 6,967          | 26,144,000   | 60.65          |
| Chips (dried tubers) | 698          | 54,736         | 13,924,720   | 32.30          |
| Bulbil/frog      | 306             | 162,500        | 3,040,000    | 7.05           |
| **Total Income** |                 |                | **43,108,720** | **100**        |

From Table 5, it is proven that the land is favorable for planting bulbils/frogs, therefore selling them was an appropriate decision. The selling price of the output used in the calculation was the porang selling price, adjusted to each farmer’s selling time as the price changed every day.

3.2.3 **Profit of Porang Farmers**

Profit was determined by deducting the operating or production costs within a certain period. Net income is the result of the difference between income and total production costs. Therefore, the total production costs are the total of explicit and implicit costs.

**Table 6. Profit of Porang Farming in Madiun Regency During The Three-Year Planting Period**

| Description       | Total (IDR) |
|-------------------|-------------|
| Income            | 43,108,720  |
| Total Fixed Costs | 3,764,645   |
| Total Variable Costs | 24,507,109 |
| **Total Cost**    | **28,271,754** |
| **Profit**        | **14,836,966** |
Table 6 showed that farmers received much smaller profit than income due to the sizeable implicit costs for porang seeds of 45.97% and family labor with 8.15%, totaling 54.12%. This showed that the implicit cost of family labor and especially porang seeds, dramatically affected the profit of porang farming.

4. Conclusions

All respondents were male which mostly belonged to the productive age between 16-65 years. In terms of educational level, most were elementary school graduates. The majority had porang farming experience less than 13 years. Most of the respondents controlled Perhutani’s land as a place of farming for less than 1.3 ha. The total income of porang farming in Klangon Village for each planting period for three years was 43,108,720 IDR. The total production costs incurred by the average porang farmer were 28,271,754 IDR. In addition, the income that porang farmers obtained was 29,951,314 IDR, while the porang farming profit was 14,836,966 IDR.

There needs to be socialization or counseling from the government and related institutions regarding how to increase land productivity, porang nurseries, and sales systems. These can be achieved by providing information on effective land management methods, quality seed farming methods, and the latest market prices. Therefore, farmers can consider the sales system chosen.

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