

## Strengthening the Porang Creative Economy through Value-Added Production and a Communal Integration Business Model

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**Abstract.** Local food is a viable alternative to traditional food sources for meeting people's food needs. Central Java Province is a fairly high producer of porang. This is proven. One location with many farmers growing porang is in the buffer district of Surakarta City, namely Sukoharjo Regency. The production of food crops, especially porang in Sukoharjo, is what actually provides supplies to urban areas. Porang plants are sold in processed form, such as flour. The added value of this product increases economic value. The purpose of this study is to reveal the strengthening of the porang creative economy in Central Java Province through the creation of value-added products and the introduction of a communal business system that could potentially encourage porang production to become one of the iconic products in Central Java. This study uses a descriptive analytical method. This study utilizes primary data collected through direct interviews with farmers. The respondents of this study were 50 porang farmers in Sukoharjo Regency who are members of the Sukoharjo Porang Farmers' Friends (SPPS) in Kamal Village, Bulu District, Sukoharjo Regency. Data analysis used the Hayami method of value-added analysis and a literature review of the communal introduction system. The value-added analysis results show that glucomannan flour production generates an added value of IDR 199,641 per kg of porang tuber raw material with a ratio of 72.25%. The profit obtained by the trading business is IDR. 186,483 per kilogram of porang tuber raw material with a profit ratio of 68.68%. The communal introduction system enables the porang business to be well-managed, as there are still porang farmers outside Sukoharjo Regency who continue to plant. Communal integration can stabilize production supplies, thereby strengthening existing institutions and necessitating testing in the three districts involved.

**Keywords:** glucomannan flour; farmer institutions; supply chain stability; profitability analysis; agro-industry competitiveness

### INTRODUCTION

Individuals prioritize meeting their basic food demands. It is also an essential right for survival ([Abdoellah et al., 2023](#)). Most Indonesians continue to rely largely on rice for their food needs. As a result, the government's food diversification initiative uses locally available foods ([Budijanto & Yuliana, 2015](#)). Porang is a native food commodity that is currently growing in the community. This plant is currently an alternate crop with possibilities for export (porang tubers). Porang is a woodland plant that has evolved into a commonly farmed crop grown by farmers in open areas. Porang tubers provide numerous benefits due to their

high glucomannan content ([Yanuarti et al., 2017](#)).

Indonesia has only been able to supply 1,000 tons of the market demand, despite the market demand for porang reaching 3,400 tons. Export destinations for porang include Japan, Thailand, China, Vietnam, Pakistan, and Hong Kong. Demand for porang remains high, but supply is limited. Therefore, farmers are encouraged to cultivate porang, which will help improve their welfare and income ([Riptanti et al., 2022](#)). Considering its economic value and ease of cultivation, porang is suitable for Indonesia's climate and soil, making it a viable crop ([Irianto et al., 2023](#)). The high and stable market demand trend also suggests that porang plants should



be developed on a large scale ([Bidarti et al., 2021](#)).

Porang is a plant that can adapt to many environmental conditions. Porang is an agricultural commodity with significant economic potential. A hectare of porang plants can produce up to 6,000 plants. Growing porang on a single hectare yields more than 20 tons. Porang is a valuable crop in terms of both productivity and economics ([Putu et al., 2025](#)).

Product diversification is crucial to ensure that porang is not sold solely as a fresh food ([Dermoredjo et al., 2021](#)). In addition to preparing processed products, it is also crucial to maintain the ecosystem to ensure that porang cultivation thrives ([Wahidah et al., 2021](#)). Various efforts are essential, such as improving water quality and adapting to climate change by modifying the microclimate ([Winarto et al., 2017](#)). This is done to encourage farmers to continue growing porang. Maximizing income can be done by adding value to porang products. Furthermore, porang has a high added value, offering a variety of processed products. Noodles, rice, glucomannan flour, and even capsule packaging are all products that can be produced from porang. Furthermore, porang is also used in the cosmetics industry. This added value allows porang to penetrate the export market.

Institutions play a crucial role in regulating interpersonal relationships and allocating scarce production factors. Institutions play a strategic role, but they can also be a barrier in developing nations, such as Indonesia, where many remain inadequate ([Fadhil et al., 2017](#)). The farmer's economic organization system comprises numerous key components, including institutions and their involvement. Institutions can be characterized as both game rules and organizational structures. Institutions are significantly impacted by their members' interactions in achieving common goals ([Harjanto et al., 2022](#)).

Institutions rooted in the community must be purposefully constructed to meet

specific needs. Farming households' financial circumstances can be improved by fortifying community-based organizations. Farming community institutions are characterized by the presence of leadership attitudes, adherence to rules and social norms, and their integration within the local social order ([Wesley et al., 2025](#)). A community-based land management system (community-based and management) that is carried out collectively will strengthen social ecosystem resilience. Agricultural land management on communal land is often equitable because it can be carried out by all community members using the resources available. Climate change, pest and disease infestations, and other possible barriers can all be managed with the proper deployment of a community system ([Mulyani et al., 2024](#)). The community system also encourages farmers to collaborate and utilize modern technology, which can serve as an alternative solution for Indonesian farmers who prefer traditional methods ([Saputro & Dewati, 2025](#)).

Central Java Province is a significant producer of sappanwood, also known as porang. This is evident. One location with a large number of farmers growing porang is in the buffer district of Surakarta City, Sukoharjo Regency. Food crop production, particularly porang in Sukoharjo, is what supplies the urban area. Porang plants are sold as processed flour. This added value to the product increases its economic value.

Optimizing the value of these agricultural products is undoubtedly necessary to maximize the development of agro-industry-based agricultural products. The economic significance of each stage and the institutions involved in product development, particularly porang as a local food commodity, is not examined in field practice or much research, which still concentrates on fundamental production issues. Because of this, the economic impact of each stage and the added value produced by the Hayami approach have not been precisely and clearly measured, and the distribution of economic gains is still

unequal. To quantitatively determine the contribution of processing to raising product value and, consequently, the degree of efficiency and profitability for each business actor, the Hayami value-added calculation method is required. However, measuring value-added alone is insufficient without understanding the institutional aspects, such as the role of farmer groups, cooperatives, financial institutions, and marketing parties, in influencing access to inputs, information, and markets, which allows for the identification of communal systems to develop. As a result, there is a disparity between the demand for an efficient and fair agribusiness system and the availability of a complete analysis that integrates value-added measurement (Hayami) and institutional analysis. Research or studies that incorporate these two factors are required to give a solid foundation for developing strategies to improve business actor welfare and strengthen the value chain in the long run.

This conceptual framework describes how increasing value-added through activities such as post-harvest processing and quality standardization enables better farm prices, which in turn directly increase farmer incomes. Conversely, communal integration in production and marketing yields long-term supply stability and consistent output volumes, thereby enhancing the market power of farmer groups in determining prices and negotiating contracts with large customers. Thus, individual value-added and communal integration work together to create an efficient, competitive, and equitable agriculture system. The research problem will explore how to strengthen the porang creative economy in Central Java Province through value-added practices and the introduction of a communal business system that could potentially encourage porang production to become an iconic product in Central Java.

## METHODS

The research objectives were achieved through a series of stages. The initial stage

was conducted by the research team, which included a literature review to strengthen the research idea. This research was conducted in several porang cultivation areas in several Penyangga Districts near Surakarta City, where it was observed that porang farmers were quite skilled at cultivating it. This study used primary data through direct interviews with farmers. The respondent population for the study, comprising the total number of farmers registered with the SPPS, consisted of 130 farmers. The respondents for this study were 50 porang farmers in Sukoharjo Regency who were still actively harvesting in July 2024. The 50 porang farmer respondents were obtained through a census method from the entire sample, the same as the farmer population available at Sahabat Petani Porang Sukoharjo (SPPS) in Kamal Village, Bulu District, Sukoharjo Regency. However, after this survey was conducted, 20 farmers stated that they were unwilling to start replanting in November. They would take a break from involvement in SPPS, resulting in a total of only 30 farmers remaining active by the end of 2024. Data collection utilizes tools, including questionnaires with several key questions, such as production results, selling prices of porang, labor costs, and additional input costs.

Value-added analysis is a method used to measure the extent to which a product's value is enhanced or increased as a result of specific treatments. Cultivating porang into various processed foods, such as flour and chips, adds value to the product. The analysis method used is the Hayami method. The assessment criteria are: a) If the value added is  $>0$ , then organic rice provides added value (positive); b) If the value added is  $<0$ , then the brown sugar cane agro-industry does not provide added value (negative). The Hayami method is presented in the following [Table 1](#) ([Soemantri et al., 2021](#)).

[Table 1](#) states that Output is the total production of glucomannan flour produced by porang farmers in one production process (in kilograms). Meanwhile, input or raw materials in the form of porang tubers are

used in the production process (in IDR.Kg<sup>-1</sup>). The number of workers used in production is calculated in one production process (in Man-Days). The conversion factor is the amount of output produced for every 1kg of raw material input used. The number of direct workers in the production process (in HOK.Kg<sup>-1</sup>).

The output price is the selling value of the product (in IDR). Labor wages are the average wages received by workers in each production period (in IDR.HOK<sup>-1</sup>). The

price of raw material input is stated in IDR.HOK<sup>-1</sup>. The contribution of other inputs is the average amount of costs, consisting of the cost of auxiliary raw materials and depreciation costs, divided by the amount of production produced (in IDR/kg). The output value is the value received from converting output to raw materials at the output price (in IDR/kg). Value added is the difference between the output value of porang tubers and supporting materials (in IDR/Kg).

**Table 1.** Calculation Procedure for Hayami Value Added Method

| No                                         | Variable                              | Notation                 |
|--------------------------------------------|---------------------------------------|--------------------------|
| <b>Output, Input, and Price</b>            |                                       |                          |
| 1                                          | Output (kg/week)                      | A                        |
| 2                                          | Raw materials (kg/week)               | B                        |
| 3                                          | Labor (HOK/week)                      | C                        |
| 4                                          | Conversion factor                     | $D = A/B$                |
| 5                                          | Labor coefficient (HOK/kg)            | $E = C/B$                |
| 6                                          | Output price (IDR/kg)                 | F                        |
| 7                                          | Average labor wage (IDR/HOK)          | G                        |
| <b>Income and value added</b>              |                                       |                          |
| 1                                          | Raw material price (IDR/kg)           | H                        |
| 2                                          | Contribution of other inputs (IDR/kg) | I                        |
| 3                                          | Output value (IDR/kg)                 | $J = D \times F$         |
| 4                                          | Value added (IDR/kg)                  | $K = J - I - H$          |
| 5                                          | Value added ratio (%)                 | $L = (K/J) \times 100\%$ |
| 6                                          | Labor compensation (IDR/kg)           | $M = E \times G$         |
| 7                                          | Labor share (%)                       | $N = (M/K) \times 100\%$ |
| 8                                          | Profit (IDR/kg)                       | $O = K - M$              |
| 9                                          | Profit share (%)                      | $P = (O/K) \times 100\%$ |
| <b>Remuneration for Production Factors</b> |                                       |                          |
| 1                                          | Profit margin (IDR/kg)                | $Q = J - H$              |
| 2                                          | Profit (%)                            | $R = O/Q \times 100\%$   |
| 3                                          | Labor (%)                             | $S = M/Q \times 100\%$   |
| 4                                          | Other inputs (%)                      | $T = I/Q \times 100\%$   |

Source: Handayani et al. (2024)

The value added ratio is the percentage of added value of the product (%). Labor compensation is the wages received by workers in processing 1 kg of raw materials (in IDR). Labor share is the percentage of labor income from the added value obtained (%). Profit is the portion of income received

by the trading business (in IDR). The profit rate is the percentage of profit from the product value (%) ([Hamidi & Elida, 2018](#)). Margin is the contribution of the owner of production factors other than raw materials used in the production process (%). Direct labor income is the percentage of labor

income to the margin (%). Other input contributions are the percentage of other input contributions to the margin (%). The company owner's profit is the percentage of profit obtained by the trading business to the margin (%) (Nur Arifani & Mahfudz, 2024). Based on the amount of added value that has been obtained, the assessment criteria can be determined if the added value > 0, then the porang tuber processing process can provide added value, while if the added value  $\leq 0$ , then the porang tuber processing process cannot provide added value (Mardesci et al., 2021). Possible biases relate to several components. First, the quantity of output, raw materials, and labor were addressed by using the values obtained from glucomannan production at Sukoharjo Porang Farmers' Friends (SPPS). Second, the price of products, labor, and additional input costs were compared using price information from Sukoharjo Porang Farmers' Friends (SPPS).

To address the objective of introducing a communal integration system, potential locations for porang cultivation in Penyangga Regency, which borders Surakarta City, were mapped. These potential locations for farmers will serve as a meeting point for business development efforts, which can be implemented to penetrate the market by strengthening the supply side of porang farmers. Farmers will then be grouped to collaborate on meeting market demand, including processing porang tubers into other products with higher market value.

## RESULTS AND DISCUSSION

Porang is an agricultural commodity that is susceptible to price fluctuations. Porang prices pose a challenge for farmers and

policymakers in maintaining stable selling prices. Porang has export potential, particularly to several countries, including Hong Kong, Malaysia, the Maldives, Australia, Canada, Qatar, Singapore, Taiwan, and Vietnam (Rohmaya et al., 2022). However, the current price trend for porang is experiencing a drastic decline due to various factors, such as climate change and issues with porang export demand. One such issue is China's decision to stop importing porang from Indonesia. China is one of the largest recipients of porang products from Indonesia. This occurred in June 2020, when the shutdown occurred suddenly and unilaterally, with the reason later revealed to be China's efforts to reorganize its food security, including that of imports. This suspension is due to many Indonesian producers failing to complete necessary documentation, including risk management. This document is a crucial part of meeting export requirements in certain countries. Additionally, opposition to porang cultivation in Indonesia, which is not in line with the Food Safety Law of the People's Republic of China, makes it challenging for Indonesian porang products to re-enter the Chinese market. Therefore, strengthening the competitiveness of Indonesian products is necessary. Information on competitiveness is needed to determine whether a product can enter foreign markets and maintain its position in the global market (Santoso, 2015). This could also impact the porang harvests of farmers in Central Java, particularly in the Surakarta City buffer districts, which produce a significant amount of porang. The current selling price of porang received by farmers is presented in Table 2.

**Table 2.** Information on Selling Prices of Porang Owned by Farmers at the Research Location

| Information                                    | Number (Farmer) | Percentage (%) |
|------------------------------------------------|-----------------|----------------|
| Farmers Whose Selling Prices Are Above Average | 16              | 68             |
| Farmers Whose Selling Prices Are Below Average | 34              | 32             |
| Average Selling Price of Porang Farmers        | IDR 4,800/Kg    |                |

Source: Primary Data, processed 2025



**Table 2** shows that the average selling price of porang per kilogram for farmers reached IDR 4,800. This is a significant difference compared to 2019, when it reached IDR 10,000 per kilogram. This decline is acknowledged to be a demotivator for porang farmers, leading many farmers, all members of the Sukoharjo SPPS, to stop planting over the last two years, as they wait for prices to improve. Porang farmers who received below-average selling prices admitted that their harvest experienced a drastic price drop, reaching IDR 3,500 per kilogram. Porang farmers who received prices above the highest average reached IDR 6,300 per kilogram. All harvest prices obtained by farmers have indeed decreased compared to

2019, when porang was valued quite highly. Anticipatory measures have been initiated by strengthening the competitiveness of porang products through the development of other processed food derivatives. The Sukoharjo SPPS has made efforts to process porang tubers into glucomannan flour, thereby maximizing the selling value given the low price of raw materials. Added value is essential because it can enhance product and service quality, create a more positive customer experience, and increase the competitiveness of a product or service. Furthermore, added value can also meet customer needs and foster sustainable customer loyalty. The results of the value-added analysis are presented in **Table 3**.

**Table 3.** Calculation of the Added Value of Glucomannan Flour at UD. Sahabat Petani Porang in One Production Period

| No.                                             | Variable                              | Value and Formula            | Production |
|-------------------------------------------------|---------------------------------------|------------------------------|------------|
| <b>I. Output, Input, and Price</b>              |                                       |                              |            |
| 1                                               | Output (kg/week)                      | (1)                          | 15         |
| 2                                               | Raw materials (kg/week)               | (2)                          | 19         |
| 3                                               | Labor (HOK/week)                      | (3)                          | 2          |
| 4                                               | Conversion factor                     | (4) = (1) / (2)              | 0.789      |
| 5                                               | Labor coefficient (HOK/kg)            | (5) = (3) / (2)              | 0.105      |
| 6                                               | Output price (IDR/kg)                 | (6)                          | 350,000    |
| 7                                               | Average labor wage (IDR/HOK)          | (7)                          | 125,000    |
| <b>II. Income and value added</b>               |                                       |                              |            |
| 8                                               | Raw material price (IDR/kg)           | (8)                          | 4,800      |
| 9                                               | Contribution of other inputs (IDR/kg) | (9)                          | 71,875     |
| 10                                              | Output value (IDR/kg)                 | (10) = (4) × (6)             | 276,316    |
| 11a                                             | Value added (IDR/kg)                  | (11a) = (10) – (9) – (8)     | 199,641    |
| 11b                                             | Value added ratio (%)                 | (11b) = (11a) / (10) × 100%  | 72.251     |
| 12a                                             | Labor compensation (IDR/kg)           | (12a) = (5) × (7)            | 13,158     |
| 12b                                             | Labor share (%)                       | (12b) = (12a) / (11a) × 100% | 6.591      |
| 13a                                             | Profit (IDR/kg)                       | (13a) = (11a) – (12a)        | 186,483    |
| 13b                                             | Profit share (%)                      | (13b) = (13a) / (11a) × 100  | 93.406     |
| <b>III. Remuneration for Production Factors</b> |                                       |                              |            |
| 14                                              | Profit margin (IDR/kg)                | (14) = (10) – (8)            | 271,516    |
| 14a                                             | Profit (%)                            | (14a) = (12a) / (14) × 100%  | 4.846      |
| 14b                                             | Labor (%)                             | (14b) = (9) / (14) × 100%    | 26.472     |
| 14c                                             | Other inputs (%)                      | (14c) = (13a) / (14) × 100%  | 68.682     |

Source: Primary Data, processed 2025

The economic value generated from production activities that drive various economic activities is called added value. Added value is defined as a commodity that has additional value due to treatment such as processing, storage, transportation, or other activities related to the production process. The process of calculating added value is obtained by subtracting the cost of a product from the cost of raw materials and other inputs. This cost excludes labor. The margin is obtained by subtracting the cost of the product from the raw materials involved in the manufacturing process. This calculated margin also determines the extent of the existing production factor components, such as other inputs, labor, and compensation for processing entrepreneurs.

Value added can also be defined as the difference between the value of a product and the cost of raw materials and other inputs, excluding labor costs (Matakena et al., 2021). Having good added value in a product will also strengthen the product's competitiveness in the market. (Arsyad et al., 2020). Meanwhile, margin is the difference between the value of a product and the price of raw materials alone. Value-added analysis is conducted using the Hayami method, which yields the value added and the ratio of value added to the resulting product, labor compensation, labor share, and the remuneration received by each factor of production.

Added value is applied to products, especially agricultural products, which are perishable and often in their raw form. The added value of farm products allows consumers to experience the product in a form other than consuming it directly after harvest. Added value, which is synonymous with reducing intermediate costs from the final value, is often used in agricultural commodities. The processing of these commodities is usually identified with added value. This is also commonly done by the agricultural processing industry to create added value, leveraging the increased utility of the commodity in line with the existing

flow of agricultural commodities. Added value is also related to changes in functional inputs that alter the form of production factors.

Glucomannan flour is one of the successful outputs, in addition to selling porang in its wet form. SPPS (Sahabat Petani Porang Sukoharjo) has a daily production capacity of 15 kg of glucomannan flour per production. On average, UD SPPS can produce flour at a daily production rate of 10-20 kg. The input used in producing glucomannan flour is 19 kg per production run, utilizing porang chips. Raw materials are obtained from harvests and from assisted farmers who are members. The workforce required to produce flour is 2 people with a working time of approximately 8 hours per day. Usually, the workers involved are UD managers or members of its production division. The selection of these workers is based on their competency, who are already accustomed to processing porang into flour. UD's production capacity is indeed limited, as it is still constrained by marketing and market demand. Additionally, UD aims to maintain the quality of the resulting product. The wages given to each worker in producing glucomannan flour are IDR. 125,000/HOK.

**Table 3** shows a conversion factor of 0.789, indicating that 789 grams of flour is produced from 1 kg of input. The input referred to in this table is raw porang tubers in units per kilogram, while the output, in kilograms of flour produced, is calculated each time it is produced. The efficiency of flour production is quite high. The labor coefficient of 0.105 indicates that ideally, 10 workers are needed to produce 100 kg of flour. The glucomannan flour production process is still semi-mechanized, so some stages are still carried out traditionally.

The output price of glucomannan flour is IDR 350,000/kg, and UD SPPS typically packages it in small packages (200 grams) or large packages of 1 kg. At room temperature, this flour has a shelf life of up to one year. UD SPPS prioritizes the implementation of good quality management, ensuring consistent

quality control to maintain the consistency of color, taste, and nutritional content. This glucomannan flour product has received BPOM and halal certification, making it safe for public consumption. Based on the research findings, it is crucial to maintain three main flows in maintaining a healthy porang value chain. This is supported by research by [Utami, R. A., Aji, J. M. M., & Ibanah \(2025\)](#), which states that product, financial, and information flows are crucial, so the supply of porang raw materials from farmers must also be maintained sustainably.

The raw materials used in processing the flour are usually obtained from the company's own harvest or purchased from assisted farmers. The price of raw materials purchased from farmers is around IDR 4,800/kg. Other inputs are also used in processing porang into flour at a cost of IDR 71,875. Other input contributions are the existence of fixed and variable costs in producing glucomannan flour. Reducing these costs can optimize the selling value of flour as a high-value trading business. UD SPPS obtained an output value of IDR 276,316. This indicates that the gross income when producing 1 kg of raw material input is IDR 276,316. Table 3 indicates that the added value generated by reducing the product value by the price of raw materials plus the contribution of other inputs is IDR 199,641/kg with a value-added ratio of 72.25%. This calculation does not include the sacrifice of labor wages. The resulting added value is greater than zero or positive, indicating that glucomannan flour is able to provide added value to the porang tuber production process. A ratio obtained more than 40% indicates high added value ([Padapi, Astrini R., Fitriani Wulandary, Ayu Haryono, 2023](#)).

Direct labor income is the multiplication of the labor coefficient by the average labor wage. Based on [Table 3](#), the calculation of direct labor income obtained is IDR 13,158/kg, indicating that the average labor income per 1 kg of raw material input for porang tuber processing into glucomannan flour is IDR 13,158. Based on the table, the calculation of the portion or share of labor

obtained is 6.59%. This calculation is obtained by comparing direct labor income with the added value generated. This labor calculation is less effective in representing labor acquisition because labor income is typically issued by the business owner ([Ramadan, 2023](#)).

The amount of profit is obtained by subtracting the added value and labor compensation. [Table 3](#) indicates that the profit obtained is IDR 186,483/kg with a profit rate of 93.41%. This illustrates the profit from the net added value because it has been reduced by labor compensation. The margin listed in [Table 3](#) is obtained by subtracting the output value from the raw materials, resulting in IDR 271,516/kg of raw materials, which constitutes 4.85% of the total value. Direct labor income, 26% contribution from other inputs, and 68.68% profit belonging to the company. Seeing the development of UD SPPS, which has quite good equipment and is capital-intensive, it is essential to be accompanied, especially in terms of creativity and innovation. The capital-intensive industrial sector is expected to provide increased productivity compared to labor-intensive industries. UD SPPS is actually trying to improve the creation of processed porang derivative products, such as rice and noodles.

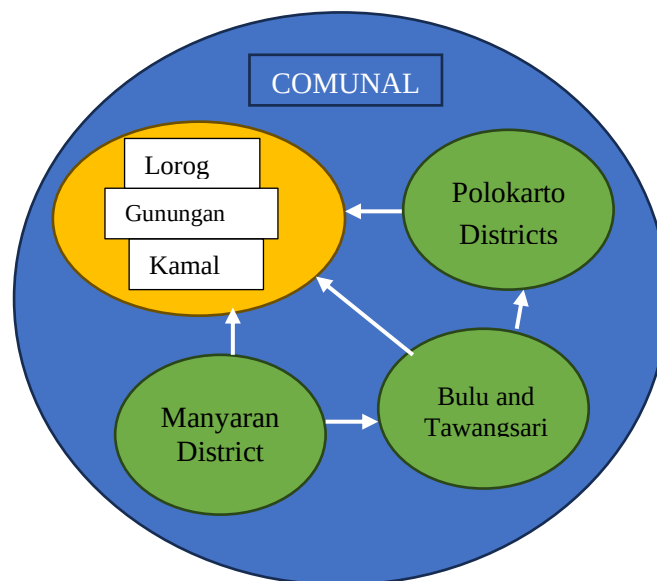
Systems of communal ownership are not meant for private use. A conceptual teaching that illustrates both individual and social ownership is the foundation of communal ownership. In reality, the way community organizations are set up is based on the idea that new members should benefit from their rights to collective ownership. To achieve the best combinations, farming integration systems are implemented. Combinations are used to provide maximum output with minimal inputs. By diversifying firms, this integration strategy reduces business risk. The sustainability of the land resources used by farmers is the primary focus of integration in this system.

A communal business system is crucial, considering that the number of porang



farmers joining the SPPS has declined over the years. Initially, there were 130 porang farmers registered with this business unit. This decline occurred over the following years, as only 80 percent of the total members were active. By 2024, only 30 porang farmers were still actively growing porang, joining the SPPS. This is the key to implementing a communal system. This system accommodates a single production point, namely the UD SPPS. Porang tubers can be stored and consolidated into a single point, allowing for a more stable selling price. In fact, there are still many porang farmers outside Sukoharjo Regency and the

SPPS who still grow porang but sell their harvest to intermediaries. It is not surprising that farmers who are not members of the UD SPPS usually receive a lower selling price of around IDR 3,500 per kilogram. Three regencies still have porang farmers: Sukoharjo, Wonogiri, and Karanganyar. Each of these three districts has a concentration of porang farmers, such as Manyaran, Bulu, Tawang Sari, and Polokarto. This communal introduction system conceptually facilitates porang farmers in selling tubers through UD SPPS, which are centered in three villages: Lorog, Gunungan, and Kamal.



**Figure 1.** Introduction to the Porang Communal System

**Figure 1** shows that porang farmers in Central Java are spread across several locations. Porang farmers, who are members of the SPPS Sukoharjo community, are unable to meet market demand due to limited production volumes during certain periods. Therefore, expanding partnerships with other farmers in nearby locations is crucial. This can be achieved by establishing a communal system with farmers in nearby locations, such as in Manyaran, Bulu, Tawang Sari, and Polokarto Districts. If this communal integration system can be implemented, this group of farmers will have a stronger institutional structure. This is also consistent

with study undertaken by (Riptanti & Irianto, 2023), the consistent availability of porang tubers, along with restricted supply from other places, has inhibited the processing industry's capacity to achieve an economically viable production scale. This shared system will provide an ongoing supply of raw resources.

Strengthening the introduction of communal business models must also be balanced with strong institutional support. Farming development strategies cannot be effective without strong institutional support. Interaction between farmers, farmer groups, and farmer group associations is crucial for

sustaining porang farming activities. Institutions are also needed to advance the economic structure by determining which regions' potential can be maximized to meet the needs of porang. Institutional strengthening will also impact farmer welfare. Institutions can facilitate various aspects, from capitalization and preparation of production facilities to marketing of farmers' organic products. The contributions and benefits of institutional strengthening will certainly encourage this communal system to continue over time. Institutional aspects can also reduce conflicts between farmers through clear regulations and operational standards for organic rice production, ensuring the highest quality of porang produced by farmers across regions. Institutions can also encourage groups to progress together, fostering internal and external strengthening over time. Institutional development will also make farmers more efficient in carrying out their farming activities. Institutionally based social capital will also increase enthusiasm for interaction within the organization, contributing to the sustainability of the communal organization that is formed. This research could also be expanded by calculating several other components, such as comparing research on glucomannan flour production from porang with other commodities. Furthermore, future research could also examine cost-benefit analyses and break-even points for communal aggregation.

The internal validity of this study is strong, as the instruments have been tested for reliability and the data collection procedures were carried out consistently. Internal validity can be affected by potential selection bias because the respondents who were voluntarily selected in this study were the names who had received recommendations from SPPS Sukoharjo. Of course, in terms of external validity, this research is intended for porang farmers and the Sukoharjo SPPS, which serves as a platform for their development. The results also illustrate that alternative outputs besides selling porang in

its raw form can strengthen competitiveness and increase the selling price of porang.

## CONCLUSION

The results of the value-added study indicate that glucomannan flour production generates an added value of IDR 199,641 per kilogram of porang tuber raw material, with a profit-to-return ratio of 72.25%. The trading business generates a profit of IDR 186,483 per kilogram of porang tuber raw material, with a profit-to-return ratio of 68.68%. Based on this profit level, UD. Sahabat Petani Porang's glucomannan flour production is feasible to develop. The study also indicates that this year, 30 porang farmers are still actively growing porang out of a total of 130 registered members. The decline in porang farmers is due to various factors, including the relatively low selling price of porang harvests, averaging IDR 4,800 per kilogram. The communal introduction system enables well-managed porang farming, facilitating the centralization of porang production among farmers. The results of this study indicate that current output still requires further pilot evaluation.

Further processing of porang can be continued into other forms, such as rice and noodles. This will undoubtedly enhance product competitiveness and market value, thereby facilitating effective marketing. Furthermore, support from various parties, such as local governments, cooperatives, and NGOs, is needed to provide policies that support porang farmers, along with incentives in the form of production equipment. Furthermore, a wide-open export market must be facilitated in the long term. Optimizing the communal system must also be aligned with synergy among farmers to maintain high production volumes within the group, resulting in stronger and more stable sales and price negotiations. This implementation can be used as a medium-term effort, with regular aggregation and monitoring of the established communal system.

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