

**DYNAMICS OF PORANG COMMODITY DEVELOPMENT: AN ANALYSIS OF PRODUCER AND CONSUMER****Rizma Aldillah<sup>1</sup>, Harianto<sup>2</sup>, Suprehatin<sup>3</sup>, I Gede Mahatma Yudha Bakti<sup>4</sup>**<sup>1</sup> Student of the Agribusiness Science Doctoral Program, Study Program of Agribusiness, Faculty of Management Economics, Bogor Agricultural University, Indonesia, rizmaaldillah@gmail.com<sup>2</sup> Professor of the Agribusiness Department, Faculty of Management Economics, Bogor Agricultural Institute, Indonesia, harianto.ipb@gmail.com<sup>3</sup> Lecturer in the Agribusiness Department, Faculty of Management Economics, Bogor Agricultural Institute, Indonesia, suprehatin@gmail.com<sup>4</sup> Researcher at the Research Center for Circular Economics and Behaviour, Governance Research Organization and Public Welfare Economics, National Research and Innovation Agency, Indonesia, gede\_tok@yahoo.co.id

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**ABSTRACT**

**Background.** *Porang tubers have the potential to have high economic value, because they contain glucomannan which is good for health and can be easily processed into food ingredients to meet daily needs (Sholiha et al, 2020). For example, the production of porang in East Java in 2009 only reached 600-1000 tons of dry chips while the industry needed around 3,400 tons of dry chips (Wijanarko 2012 & Maharani 2022). This need cannot be met because in Indonesia porang has not been cultivated intensively and is still very dependent on natural potential, the planting area is still limited and there are no complete cultivation guidelines (Hidayat, 2021). In addition, it is also because not many people know about it, the age of the plant is relatively longer than other types of tubers and crops (Sumarwoto, 2004). However, in Indonesia, the dominant porang-derived products are rice, shirataki noodles and flour (Suroso, 2016). However, there are still many farmers who are hesitant to plant porang in large quantities (Kurniati et al, 2021). This is because farmers do not know the real economic benefits of porang cultivation in their farming business (Iqbal et al, 2020). Especially when the Covid-19 pandemic hit plus experiencing unfavorable weather, many local community garden products that should have been harvested became crop failures (Fadhil et al, 2021). Meanwhile, the dynamics in the consumer aspect lies in the problem of promoting Porang derivative products which have not been intensively carried out by the Porang industry (Andika, 2022). In addition, porang-derived products still have little variation compared to other tuber-derived products, such as cassava, sweet potatoes, taro, etc. (Mahirdini & Afifah, 2016). As said by David (2011) that in business it is not only concerned with the producer aspect, but it is necessary to pay attention to the consumer aspect, so that production results have a definite market, so that the strategy made in developing a product is complete.*

**Objectives.** *Beginning with analyzing how the level of profit from farming at the level of porang farmers. Many studies related to porang state that the profits of porang farmers are far greater than the profits from other tuber commodities, as stated by Hamdan (2020) that porang production can reach 6-10 tons per hectare with tuber prices in the range of 10-13 thousand per kg and bulbil prices can reach 200-300 thousand per kg, with production costs ranging from 80-90 million per hectare. However, the porang product itself has not been widely*

circulated at the consumer level, in line with the results of research by Subagiana et al (2022) and Supriyadi (2021) that porang-derived products are still relatively rare at the end-consumer level. For this reason, it is necessary to study the dynamics of porang farming at the farmer level. From a consumer perspective, it is necessary to examine consumer preferences for derivative products produced from the porang plant itself, which then determines the strategy for developing porang commodities.

**Methods.** Quantitative descriptive analysis in this study is an analysis of porang farming conducted in Ponorogo Regency, East Java Province, and Sinjai Regency, North Sumatra Province in 2021. Porang farmers are determined by snowballing at least 5 farmers with criteria when conducting the study, farmers are still doing porang farming. While the analysis of consumer preferences was carried out through online interviews with a questionnaire guide on respondents with the criteria of women and men who are already working, age range above 25 years and income above the Regional Minimum Wage (UMR) in their respective regions or in rupiah above Rp. 2.5 million per month, as many as 64 respondents. Then, several alternative strategies were determined in developing the porang commodity. The internal and external factors of the development of the porang commodity were obtained from key respondents consisting of: porang farmers, the porang industry, namely Small and Medium Enterprises (SMEs) at the household industry level, and consumers of porang derivative products who regularly buy porang rice.

**Results.** The results show that porang farming can provide profits of up to 3-5 times the cost of production, with a range of up to IDR 100-200 million per hectare. This makes people increasingly have the opportunity for high market demand at the community level. From the results of consumer preferences, when choosing rice, people have taken into account the health content in it, both in terms of color, taste, uniformity, cleanliness, aroma/fragrance, brand/bran, packaging, storability to price.

**Conclusion.** So, from both perspectives it is concluded that in developing the porang commodity strategy a partnership between farmers and the private sector and the government is needed by utilizing available resources, besides that, socialization and promotion need to be carried out more intensely among the general public, because porang products have added health value and are friendly environment, the opportunity to sell in the market is greater.

**Keywords:** cultivation, farming, perspective, preference, strategy

## 1. Introduction

Porang (*Amorphophallus Muelleri* Blume) is a type of iles-iles plant that grows in forests. Porang is a shrub (herb) plant that has bulbs in the ground (Al-Hamdan 2020, Wardani 2022). Porang tubers have the potential to have high economic value, because they contain glucomannan which is good for health and can be easily processed into food ingredients to meet daily needs (Andika 2022, Sholiha et al 2020) In recent years the porang plant (*Amorphophallus muelleri*) has become popular because the demand for porang on the world market continues to increase so that many parties are interested in cultivating it (Maharani et al, 2022).

The prospect of this commodity can be said to be very potential because it has economic value, especially for industry and health (Utami, 2021). Porang plants have economic value that needs to be developed because they offer considerable export opportunities (Sulistiyo et al, 2015). Data from the Agricultural Quarantine Agency for 2021 in the Ministry of Trade (2021) stated that there was a 160% increase in the value of porang exports, namely porang exports in the first semester of 2019 were recorded at 5.7 thousand tons and in the 2021 semester, namely 14.8 thousand tons (Ridhanto et al, 2023). For the benefit of porang exports, Indonesia through the Ministry of Agriculture is encouraging the development of porang cultivation so that export volumes continue to

increase because so far, one of the biggest obstacles to porang exports in Indonesia lies in the limited supply of raw materials (Asriadi *et al* 2020, Dermorrdjo *et al* 2021).

Porang is exported to these countries in the form of flour and other preparations which are expected to have a higher added value later (Ghaniyah *et al* 2021, Rahayuningsih and Isminingsih, 2021). Therefore, porang is a potential plant to be developed as an export commodity because several countries need this plant as a food ingredient or industrial raw material (Kurniawan *et al* 2022, Priyanto *et al* 2016). Indonesia exports porang in the form of cassava/chips or flour to Japan, Australia, Sri Lanka, Malaysia, Korea, New Zealand, Pakistan, England and Italy (Riptanti *et al* 2022, Yudha 2022).

The demand for porang in the form of dry chips continues to increase. For example, the production of porang in East Java in 2009 only reached 600-1000 tons of dry chips while the industry needed around 3,400 tons of dry chips (Wijanarko, 2012). This need cannot be met because in Indonesia porang has not been cultivated intensively and is still very dependent on natural potential, the planting area is still limited and there are no complete cultivation guidelines (Hidayat, 2021). In addition, it is also because not many people know about it, the age of the plant is relatively longer than other types of tubers and crops (Sumarwoto, 2004). However, in Indonesia, the dominant porang-derived products are rice, shirataki noodles and flour (Suroso, 2016).

This commodity is one of the new export commodities that Indonesia wants to explore for international trade (Yuniarsih, 2022). However, the need for this commodity cannot be fulfilled optimally because porang plants have not been cultivated intensively (Yasin *et al*, 2021). This is because currently the cultivated plants are still very dependent on natural conditions, land is still limited and good and correct cultivation guidelines are not yet available (Saputra, 2021). Apart from that, it is also due to the mindset of the people who think that the planting age of this plant requires a longer time than other plants that have been widely planted by the community (Patiro *et al*, 2022).

In the dynamics of the producer aspect, in recent years, many farmers have cultivated porang, both on their own land, fields and forests (Nurcahya *et al*, 2022). However, there are still many farmers who are hesitant to plant porang in large quantities (Kurniati *et al*, 2021). This is because farmers do not yet know the real economic benefits of porang cultivation in their farming business (Iqbal *et al*, 2020). Especially when the Covid-19 pandemic hit plus experiencing unfavorable weather, many local community garden products that should have been harvested became crop failures (Fadhil *et al* 2021, Wardani 2022). Meanwhile, the dynamics in the consumer aspect lies in the problem of promoting porang-derived products which have not been intensively carried out by the porang industry (Rizki *et al* 2021, Susanawati *et al*, 2021). In addition, porang-derived products still have little variation compared to other tuber-derived products, such as cassava, sweet potatoes, taro, etc. (Mahirdini and Afifah, 2016). As said by David (2011) that in business it is not only concerned with the producer aspect, but it is necessary to pay attention to the consumer aspect, so that production results have a definite market, so that the strategy made in developing a product is complete, these reasons form the basis for consideration in analyzing the producer aspect. and consumers in the development of porang commodities. For this reason, it is necessary to study the dynamics of porang farming at the farmer level. From a consumer perspective, it is necessary to study consumer preferences for derivative products produced from the porang plant itself, so that in determining alternative strategies for developing porang commodities, producer and consumer aspects can be considered.

## 2. Literature Review

Beginning with analyzing how the level of profit from farming at the level of porang farmers. Many studies related to porang state that the profits of porang farmers are far greater than the profits from other tuber commodities (Mundiyah *et al*, 2021), as stated by Hamdan (2020) that porang production can reach 6-10 tons per hectare with tuber prices in the range of 10-13 thousand per kg and bulbil prices. can reach 200-300 thousand per kg, with production costs ranging from 80-90 million per hectare, so that the total revenue per hectare from the production of porang produced can provide profits of up to 100-250 million per hectare (Megawati *et al*, 2022). However, the porang product itself has not been widely circulated at the consumer level, in line with the results of research by Subagiana *et al* (2022), Supriyadi J (2021) that porang-derived products are still relatively rare at the end consumer level. Furthermore, regarding the types of porang derivative products, as reported in a study by Wahyuni *et al* (2020) that the products of the majority of the porang processing industry. Several processed products made from porang, including: porang flour, glucomannan extract, shirataki noodles, konnyaku/shirataki rice, porang boba paste for drinks, it is necessary to conduct a descriptive study related to consumer preferences for porang-derived products (Novrizal *et al*, 2021).

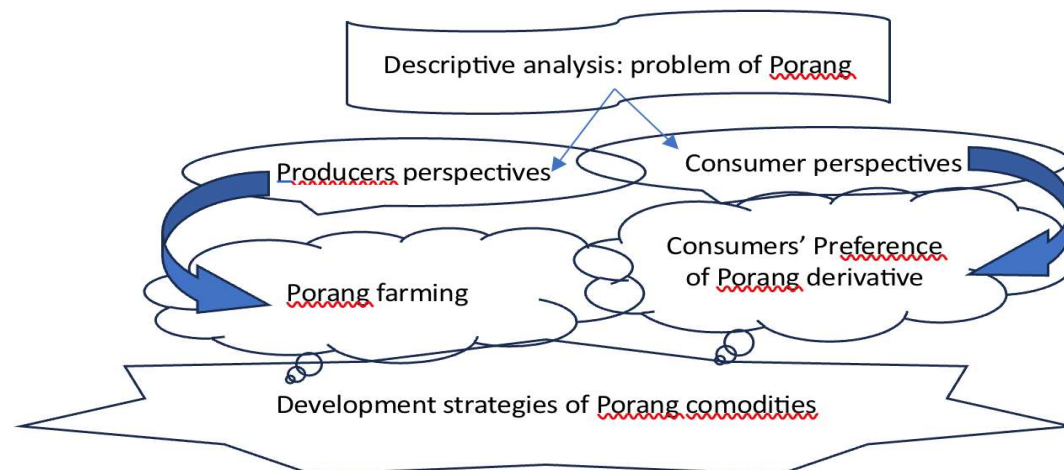


Figure 1. Study Operational Framework  
(Source: Penelitian Rizma Aldillah, 2021)

### 3. Research Method

*Quantitative descriptive analysis* in this study is an analysis of porang farming conducted in Ponorogo Regency, East Java Province, and Sinjai Regency, North Sumatra Province in 2021. Porang farmers were determined snowball at least 5 farmers with criteria when conducting the study, farmers were still doing porang farming. The results of the farm analysis presented are the averages of the several interviewed farmers. While the analysis of consumer preferences is carried out through online interviews with a questionnaire guide on respondents with the criteria of women and men who are already working, or if not working but already married with an age range above 25 years with income above the Regional Minimum Wage (UMR) in their respective regions - each or in rupiah above IDR 2.5 million per month, as many as 64 respondents.

Meanwhile, because there are several kinds of porang-derived products, in this study it was determined specifically for porang rice products, due to time and cost limitations in the study. As stated in research by Sholihq *et al* (2020) that the most popular porang derivative product is porang rice. After the quantitative descriptive studies that have been obtained from the perspective of producers and consumers, several alternative strategies are determined in the development of porang commodities. Where, the internal and external factors of the development of the porang commodity were obtained from intensive interviews with *key respondents* consisting of: porang farmers, the porang industry, namely Small and Medium Enterprises (SMEs) at the home industry level, and consumers of porang derivative products who routinely buy porang rice.

### 4. Results and Discussion

#### *Porang Farming*

Porang farming which is usually carried out in Ponorogo produces bulbils and tubers. The variables that are taken

into account are inputs and means of production, as well as labor. While fixed costs are in the form of depreciation costs for tools used in porang farming and PBB. B fixed only 2% of variable costs. This means that almost 98% of variable costs dominate the expenses for porang farming. total income per person to total costs reached 300%. This means that there is a huge opportunity for porang commodities in increasing the income and welfare of farmers. Likewise with the net income of people, reaching Rp. 24 million per hectare, where the profit is up to 2 times the expenses. That is, porang is a promising commodity in improving the welfare of farmers and can be used as the main agribusiness product in selecting farmers' livelihoods. Porang can be propagated vegetatively and generatively (seeds, bulbils/frogs). The selected seeds are from healthy tubers and bulbils. Porang seeds are only planted once. After the seeds planted are 3 years old, they can be harvested and can be harvested every year without the need for replanting. In detail presented in Table 1 and Table 2.

Table 1. Analysis of farming costs and porang income per ha in ponorogo regency in 2021

Description	Unit	Amount	Price/Unit	Value (Rp)
Variable cost	xxxxx	xxxxx	xxxxx	xxxxx
seeds (frog/bulbil + tubers)	kg			4.774.142
Fertilizer				
Urea	kg	150	2.250	337.500
Sp 36	kg	200	2.400	480.000
Phonska	kg	200	2.300	460.000
Manure				1.147.288
Labor	xxxxx	xxxxx	xxxxx	xxxxx
Land processing	HOK	22,71	60.000	1.362.615
Planting	HOK	7,76	60.000	465.567
Maintenance	HOK	30,43	60.000	1.825.889
Harvesting	HOK	12,20	60.000	732.017
Total Variable Cost	xxxxx	xxxxx	xxxxx	11.585.018
Fix cost	xxxxx	xxxxx	xxxxx	xxxxx
hoe (shrinkage)				103.292
sickle (shrinkage)				29.015
Wangkil/hoe (Shrinkage)				21.790
Property taxes				80.000
Total fix cost				234.097
Total variable + fix cost				11.819.115
Production	xxxxx	xxxxx	xxxxx	xxxxx
Frog/bulbil	kg	46,81	157.800	7.386.618
Tubers	kg	2.464,78	11.870	29.256.939
Total Revenue				36.643.557
Nett income				24.824.442
Benefit/Cost				2,10

Source: Primary data survey, processed, 2021

Table 2. analysis of farming costs and income of porang commodities per hectare in sinjai regency. north sumatra in 2021

Description	Unit	Amount (per unit)	Price per unit (Rp)	Value (Rp)
Variable cost	xxxxx	xxxxx	xxxxx	xxxxx
Pesticide	lt			

a. Supremo		1,76	65.000	114.400
b. Supretox		0,22	70.640	15.541
Total Cost Pesticides				129.941
c. Labor				
• land clearing	HOK	2	50.000	100.000
• Beds	HOK	4	50.000	200.000
• Porang planting	HOK	4	50.000	200.000
• Weed claw Gulma	HOK	2	50.000	100.000
• Harvesting	HOK	4	50.000	200.000
Total fix cost	xxxxx	xxxxx	xxxxx	800.000
land clearing	land clearing	xxxxx	xxxxx	1.600.000
Fix cost	xxxxx	xxxxx	xxxxx	xxxxx
a. Tool depreciation				
Machete				46.552
Hoe				27.672
Ground fork				21.704
b. Property tax				68.152
Total fix cost	xxxxx	xxxxx	xxxxx	164.080
Total cost	xxxxx	xxxxx	xxxxx	1.764.080
Revenue	kg	955,68	7.060,60	6.747.674
Netto income				4.983.594
B/C ratio				3,8
R/C ratio				2,8

Source: Primary data survey, processed, 2021

### Consumer Preferences for Porang Derivative Products

Consumer preferences for porang-derived products, the first thing they want to know is how do respondents choose rice as a product to be consumed in their household? The results show that as much as 64% of respondents are very concerned with the level of fluffiness of rice when making rice, while for about 35% of respondents the level of fluffiness is not so important in buying rice. However, the white color of rice is the most important level in buying rice and only about 20% of respondents do not care about the cloudy white color of rice when buying rice (Figure 2 and Figure 3).

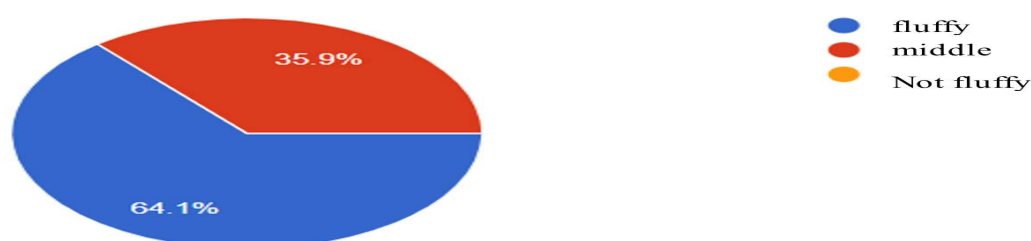


Figure 2. Consumer preferences for the level of rice fluffiness, primary data, processed, 2021

(Source: primary data survey, processed, 2021)

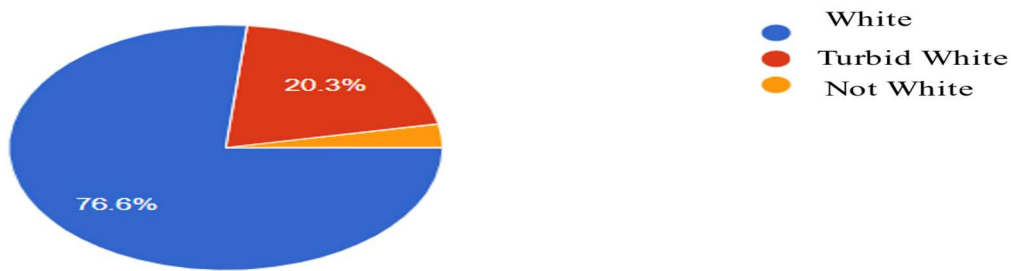


Figure 3. Consumer preference for rice color, primary data, processed, 2021

(Source: primary data survey, processed, 2021)

Furthermore, consumer preference for purchasing rice is also influenced by the large amount of broken rice in 1 sack (per 5 or 10 kg of rice per sack), where nearly 80% of respondents prioritize the amount of damaged/broken rice in 1 sack purchased. This means that the rice must be good and well packed, not just put it in a sack which has its own brand attached as is generally rice produced directly by small-medium rice producers. And only about 20% of the respondents did not care about the amount of broken rice in 1 sack they bought. Usually, rice with good/good and attractive packaging in accordance with ISO 9001 is a large-level rice producer or a factory that has been shuttled or a producer who already has a good brand image in the community. In detail presented in Figure 4.

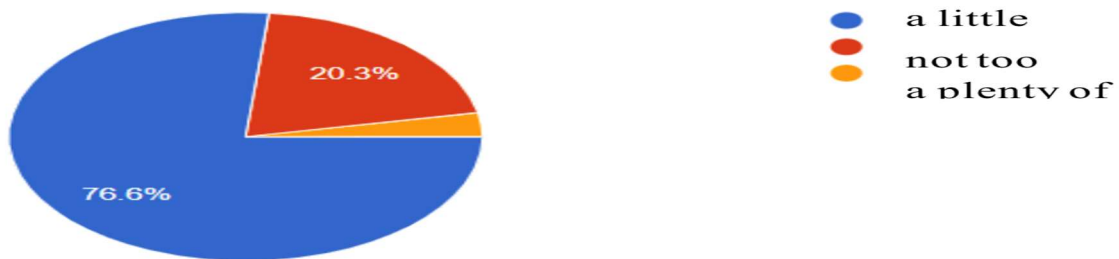


Figure 4. Consumer preferences for the amount of broken/damaged rice, primary data, processed, 2021

(Source: primary data survey, processed, 2021)

Meanwhile, the level of cleanliness of rice was also a further consideration for respondents, where as many as 82% of respondents stated that it was important to choose clean rice in buying rice on a daily basis, and about 10% did not care about this. Then in the aroma aspect, almost 80% of respondents also attach great importance to the sufficient fragrance of the rice they buy, while 14% of respondents choose non-flavored rice, and what is quite surprising is that only under 5% of respondents chose a very fragrant/sharp aroma from rice that he bought. This shows that the level of cleanliness is more important than the smell of rice. This means that respondents are more concerned with hygiene, such as health, than aesthetics, such as aroma and fragrance. In detail presented in Figure 5 and Figure 6.



Figure 5. Consumer preferences for rice cleanliness, primary data, processed, 2021

(Source: primary data survey, processed, 2021)

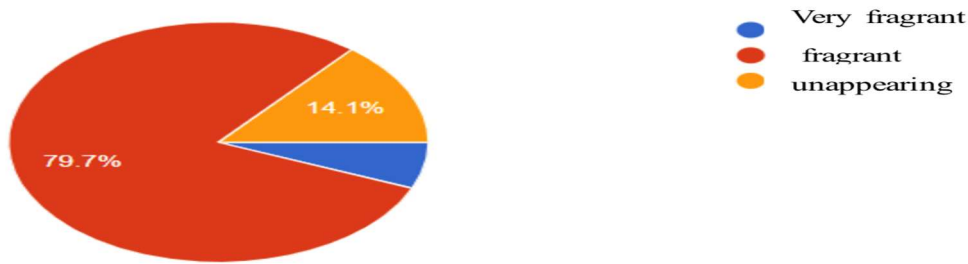


Figure 6. Consumer preference for the level of scent or fragrance of rice, primary data, processed, 2021  
(Source: primary data survey, processed, 2021)

The following is a discussion of consumer preference for the resilience of rice in storage as a household food reserve stock. The results in Figure 7 show that almost 45% of respondents indicated that they bought rice for rice that could be stored for more than 1 month, while 30% of respondents chose to buy rice which could only be stored for a maximum of 1 month, while around 25% of respondents actually bought rice. lasting only less than 1 month. This means that the respondent has considered the safety of the rice he bought. Because if the longer the rice is stored the better the condition or quality is, then it is certain that the rice contains a preservative that is quite strong, while rice that has a short shelf life is certain that the rice does not contain preservatives. However, the results obtained indicate that we are more satisfied with rice that has a long shelf life, because rice may no longer be the main food for daily consumption, because of that the rice purchased takes a long time to run out. This means that it can also be indicated that respondents are healthier in choosing carbohydrate foods, for example from vegetables such as potatoes and sweet potatoes.

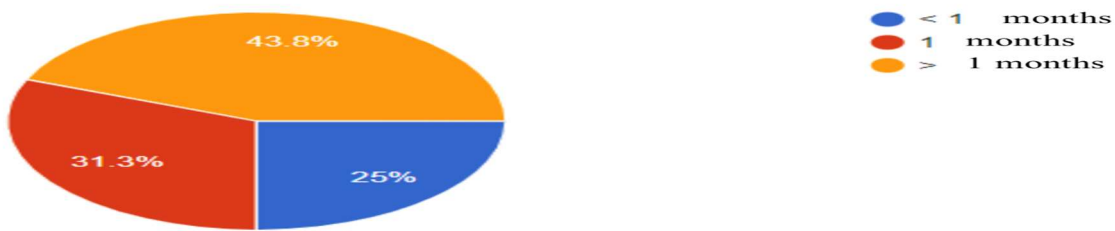


Figure 7. Consumer preferences for the storability of rice, primary data, processed, 2021  
(Source: primary data survey, processed, 2021)

The level of uniformity of rice grains is also one of the consumer preferences in buying rice. The results show that as much as 85% of respondents really consider the level of uniformity in the size of rice grains. However, the uniformity of the grains of rice is only about aesthetics/beauty, not really related to health, in which in fact many people are focused on the health aspect. Presented in detail in Figure 8.



Figure 8. Consumer preferences for rice grain uniformity, primary data, processed, 2021  
(Source: primary data survey, processed, 2021)



Sugar or carbohydrate content seems to be a pretty good consideration at the consumer level, where the results of the analysis show that as many as 50% of respondents care or pay attention to the sugar, carbohydrate and calorie content of the rice they buy, meaning that some don't care about it either. Then, the next indication is how producers introduce rice from a health aspect to the public massively, it needs more intense socialization, then it needs attractive promotions, it needs to hold trials in various adequate places, etc. In detail presented in Figure 9.



Figure 9. Consumer preferences for sugar, carbohydrates and calories in rice, primary data, processed, 2021 (Source: primary data survey, processed, 2021)

Finally, Figure 10 discusses how consumers consider the price of rice they buy. The results show that 55% of respondents prefer rice priced around Rp.10,000 to Rp.11,000 per kg, and 32% of respondents chose rice priced at more than Rp.12,000 per kg, and only about 12% of respondents chose rice priced at Rp.8,000 to Rp.9,000 per kg. This means that it is indicated that our society has been able to select how rice can be good food for health in terms of cleanliness, shelf life, color and aroma, etc. the consumer level is only at a price below IDR 10,000 per kg. In addition, other indications show that consumers who still make rice as their main food already have an income above the average minimum wage in each respondent's domicile area.

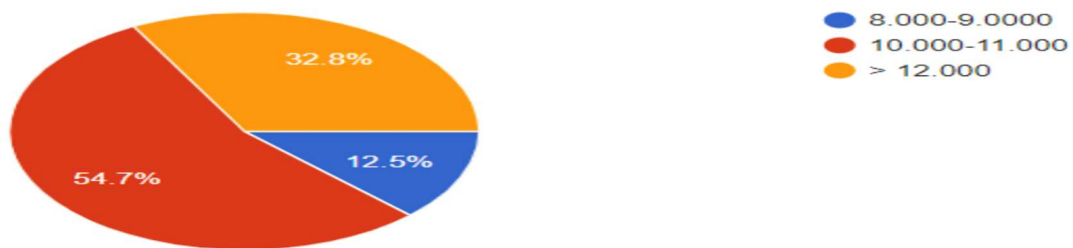


Figure 10. Consumer preferences for rice prices, primary data, processed, 2021 (Source: primary data survey, processed, 2021)

In general and as a whole, nearly 30% of respondents consider health aspects such as low sugar and gluten and calories in buying rice, followed by as many as 26% attach importance to taste, then around 10% consider the cleanliness of rice grains and cheap prices. This means, again, it is indicated that people in urban areas have shifted their thinking towards healthy food which is the main thing, no longer food that is just filling. Presented in detail in Figure 11.

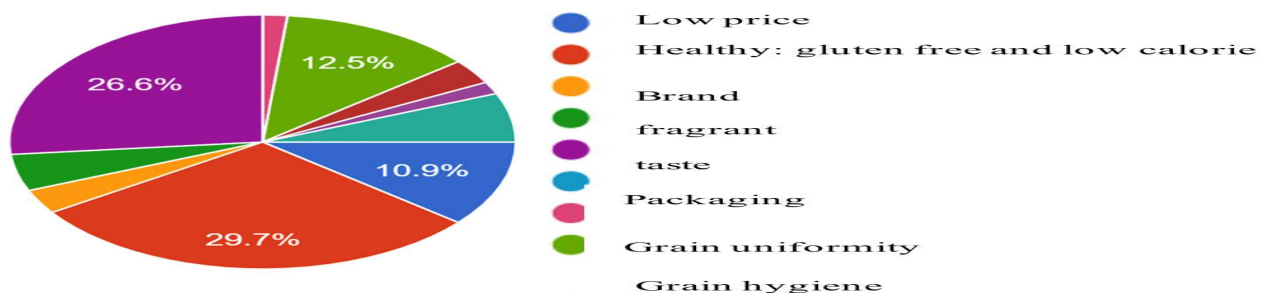


Figure 11. Consumer preferences for the attributes of purchasing rice (Source: primary data survey, processed, 2021)

Next is the discussion of how respondents consider the price of rice they want to buy or can afford to

buy with benefits such as porang rice. The results in Figure 26 show that almost 50% of respondents choose rice only at prices in the range of Rp.15,000 per kg, and only about 37% of respondents are willing/able to buy rice at prices of Rp.15,000 to Rp.20,000 per kg. and only about 10% of respondents dared to buy rice above Rp.30,000 per kg. This indicates that in fact our people are quite capable of buying rice which contains better health benefits which of course will be more expensive than rice which is generally consumed, namely rice from paddy. However, we are required to be able to produce rice ourselves with good benefits, so that porang rice producers can reduce the cost of making porang rice, so that porang rice can be sold at even more affordable prices in Indonesian society.

### ***Porang Commodity Development Strategy***

#### *Identification of Internal Factors for Porang Commodity Development:*

- a) Can grow under the shade of natural conditions and maintain green environmental conditions.
- b) Easy to cultivate and does not need intensive maintenance, so it can be said as an environmentally friendly commodity.
- c) Can be processed into various products.
- d) Porang-derived products, such as rice, flour and shirataki noodles have better quality than similar products made from non-porang, in terms of added health value.
- e) Many areas in Indonesia are suitable for porang cultivation, such as community forests or state forests.
- f) Growth at the beginning of planting takes a long time
- g) The cost of harvesting and marketing is higher.
- h) Public knowledge about porang tubers and their derivative products is still limited.
- i) Lack of promotional media for porang products.
- j) Porang derivative products in the modern or traditional markets are still few in terms of types and quantities.
- k) The price of porang derivative products, including porang rice, flour, and shirataki noodles, is still relatively expensive compared to similar products made from non-porang ingredients.

#### *Identification of External Factors for Porang Commodity Development:*

- a) The need for exports is very high (world markets are wide open).
- b) Availability of land in community forests or state forests is quite extensive.
- c) The government is starting to be concerned about people's businesses both at home and abroad.
- d) Porang farmers are qualified in carrying out porang cultivation which is fairly easy and does not need intensive care.
- e) The demand for porang tubers at the industrial level both locally and abroad is quite high.
- f) Porang farmers have begun to lack porang raw materials from nature.
- g) The number of porang farmers is still limited.
- h) Market information is still limited (tends to be closed).
- i) The selling price at the farm level is still very volatile.
- j) Lack of outreach, counseling and assistance regarding porang products.

From the identification of internal and external factors that have been carried out, several alternative strategies can be determined in developing the commodity of porang from the perspective of producers and consumers as follows:

- 1) Utilizing the availability of seeds and fertilizers to increase people's productivity because they have a fairly high selling price.
- 2) Utilizing the availability of land brushes, considering that porang plants are easy to cultivate and do not require intensive care.
- 3) Utilizing the marketing of porang tubers through social media and other socialization channels considering that the demand for porang both at home and abroad continues to increase.
- 4) Utilize suitable areas, such as community or state forests for sustainable porang cultivation, considering that farmers are quite experienced and qualified in cultivating porang tubers.
- 5) Provide outreach and education as well as promotions to the general public/community regarding porang through social media and other socialization channels considering the demand for porang tubers and their derivative products is increasingly widespread.
- 6) Increasing media promotion for Porang derivative products at the consumer level considering

that Porang has competitive prices with quite good added value.

- 7) Utilizing the availability of existing fertilizers and seeds, to prevent changes in price fluctuations which are quite dynamic.
- 8) Minimizing long initial growth, by utilizing the availability of fertilizers and preventing pests and plant diseases.
- 9) Building partnerships, forming cooperatives and providing capital assistance from both the government and the private sector for people's superior products.

## 5. Conclusion and Implications

### *Conclusion*

Conclusion from the perspective of porang producers, namely porang can be used as a superior livelihood for farmers besides other commodities which of course can have an impact on increasing income and welfare of farmers, because the income generated is like plantation/horticulture farmers, with a B/C ratio value of 2, 1 (Ponorogo district, East Java) and 3.8 (Sinjai district, North Sumatra). This shows that porang cultivation is feasible for farmers, especially in areas close to porang processing.

Conclusions from a consumer perspective on porang-derived products, namely, from the results of respondents' perceptions of porang-derived products with various attributes such as health, price, brand, cleanliness, content, place to buy, uniformity, it can be illustrated that some people see aspects of food not only as a filling, but healthy meal at an affordable price. So that porang can be a commodity as a main food raw material such as rice, it can be a food substitute commodity for rice made from rice. At present, it is difficult for people to immediately become a substitute commodity for rice made from paddy, but in its development it is possible that if there is a lot of cultivation and it is easy and inexpensive to reach all food farmers in Indonesia, it is possible that this will happen. Where porang is the main alternative in making rice with added health value.

Therefore, the results of the analysis of porang development strategies conclude that 1) increasing the availability of porang by utilizing the potential of land in forests and yards that are still wide and some of the advantages of porang include being able to grow under stands, only needing one planting, no need for intensive maintenance and resistance pests and diseases will increase the amount of production so that export needs and the domestic market are fulfilled; 2) encouraging partnerships between porang farmers and the porang processing industry because porang cannot be consumed directly; 3) Porang has many benefits if after processing it can be used as an alternative source of food, therefore it is necessary to educate consumers regarding the benefits of food made from porang, especially for health; 4) the development of processed porang products is directed at a niche market, namely products for health.

### *Implications*

a. For porang farmers (practically):

- Utilization of the potential of understorey land optimally both in yards and forests to increase production of porang plants.
- Improving the ability of human resources, in this case porang farmers, so that farmers can cultivate porang plants properly and correctly.
- Increasing the ability of farmers to master the post-harvest technology of the porang plant, so that processed products from the porang plant will be produced which have a high selling value.

b. For Central or Regional Government:

- Development of porang plant centers in the Provinces of Java (overall), Sumatra and Sulawesi, including by making demonstration plots in several groups that have suitable growing conditions.
- Increasing cooperation with investors both in terms of capital and in terms of marketing.
- Implementation of policies and legal regulations by the government that side with and support porang farmers in developing their businesses.

c. For future researchers: Future research should direct research on a wider object. With the development of porang plant centers, it is hoped that the research locations will be carried out by other centers in all provinces in Indonesia.

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