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Analysis of Income and risk of Porang Farming

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Abstract---*This research data analyzed quantitatively to find the amount of income and risk of farming. The research was conducted in Mundeh Kauh Village, West Selemadeg District, Tabanan Regency and Depeha Village, Kubu Additional District, Buleleng Regency. The samples were taken from 19 Porang farmers from members of the Maju Bersama farmer group using the saturated sampling method and 11 Porang farmers from the Bali Porang Farmers Association (P3B) using the accidental sampling method. Farming income is the difference between the farming income obtained and the total farming expenditure. Farming risk is analyzed using the coefficient of variation. The research results reveal the following. The average income of Porang farming in Bali is IDR 2,130,493.46 per production cycle with an average plant population of 2,155 plants. The risk of Porang farming is classified as a large risk as indicated by the coefficient of variation (CV) value of Porang farming income of 1.96 (>0.5). The source of risk in Porang farming is the high variation in production due to exposure to tuber caterpillar attacks and falling prices due to the closure of Indonesian Porang exports due to non-fulfillment of food safety requirements in importing countries.*
Keywords---*farming, income, Porang, production, risk.*

Introduction

Indonesia is a fertile country with a tropical climate, which makes Indonesia have great potential to produce commodities in the agricultural sector. The agricultural sector has agricultural activities which include planting food crops and horticulture, fisheries, animal husbandry, plantations and forestry. The agricultural sector has contributed to supporting the national economy, both in providing food, health, cosmetics and trade products. The agricultural sector has commodities or products that have high selling value and have quite bright prospects, especially to meet market needs (Nicholson & Snyder, 2012; Pasolong, 2008; Pinem & Afifuddin, 2015).

Porang is a tuber plant from the species Amorphophallus muelleri. Porang is also known as iles-iles. One of the benefits of the Porang plant is as raw material for flour. The Porang plant is currently popular among people, because of the success stories of its farmers. Porang farmers in Kepel Village, East Java, have succeeded in becoming billionaires because of the Porang export business.

The benefits of Porang are widely used as raw materials for flour, cosmetics, water purifiers, as well as for making glue and "jelly" which in recent years has often been exported to Japan. Porang tubers contain a lot of glucomannan in powder form. Glucomannan is a water-soluble natural fiber commonly used as a food additive as an emulsifier and thickener, and can even be used as an ingredient in making environmentally friendly glue and making aircraft components, as reported on the official website of the Ministry of Agriculture. Porang is a plant that is tolerant of shade up to 60%. Porang can grow on any type of soil at an altitude of 0 to 700 meters above sea level. In

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fact, the nature of this plant can allow it to be cultivated in forest land under the shade of other plant stands. Seedlings are usually used from pieces of stem tubers or tubers that already have a growing point or frog tubers (bubils) which are planted directly. Agriculture.go.id wrote that the Porang plant has strategic value to be developed, because it has quite a big opportunity to be exported (Soekartawi et al., 1986; Prihatman, 2000; Simanjuntak, 2013). Agricultural Quarantine Agency records state that Porang exports in 2018 were recorded at 254 tons, with an export value reaching IDR 11.31 billion to Japan, China, Vietnam, Australia and so on. Currently, many Porang tubers still come from the forest and are not widely cultivated. There are several Porang flour processing centers currently, such as in the Pasuruan, Madiun, Wonogiri, Bandung and Maros areas.

Porang is increasingly becoming the favorite of farmers in Indonesia. Plants that were once considered wild plants have made many farmers millionaires. Now more and more farmers in a number of areas are cultivating Porang. Moreover, in the export market, Porang tubers which are processed into flour are much sought after. Porang is an agricultural commodity that greatly contributes to national economic growth and has the potential to improve the welfare of farmers. Where, Porang is an agricultural commodity that has high economic value and is in demand in the export market (Hernanto, 1993; Kadarsan, 1995).

Recently, the area where Porang is planted has become more and more widespread in the Bali region because it is increasingly in demand among farmers. Based on 2021 data, the planting area of Porang plants in Bali has reached 974 hectares spread throughout Bali. It is interesting to research how big the income and risks of Porang farming are in Bali Province (Suparmoko, 2000; Suratiyah, 2015; Suyamto et al., 2005).

Based on the background above, the research objectives can be formulated as follows, namely to find out how much income and risk the farmers obtain from Porang farming. Theoretically, the results of this research are expected to complete the body of theory regarding the risks of new commodity farming (Mosher, 1987; Mubyarto, 1973). Practically, this research can be used as consideration for farmers in making decisions to start and/or develop Porang farming and also for local governments, as consideration in determining policies related to the development of Porang farming.

Research Method

The research was carried out in Tabanan Regency, Bali Province. The research period is from March to October 2022. The types of data used in this research are quantitative data and qualitative data. Quantitative data is data in the form of numbers that can be calculated, namely the production of Porang farming, the selling price received by farmers, the costs incurred during the production process from planting to harvest, such as costs of production facilities and labor (Lovarelli et al., 2020; Nemecek et al., 2011). Fixed costs are not taken into account because Porang is an intercrop so fixed costs are charged to the main crop. In this research, the qualitative data used includes farmer identity, general description of the research location.

Based on the source, the data collected is primary data and secondary data. Primary data is data obtained directly from respondents or informants. Primary data in this research was obtained from direct observations and interviews with Porang farmers, including production and selling prices of Porang, costs incurred for Porang farming and activities or activities carried out in farming which were collected using a list of questions that had been prepared in accordance with the research objectives.

Meanwhile, secondary data is data obtained indirectly from the source. Secondary data was obtained from library sources and documents from the Bali Province Central Statistics Agency (BPS), supporting books and journals related to research on Porang farming activities. This secondary data was obtained to find out a general description of the research area.

The data collection method used in this research is as follows.

Interview, which is a data collection technique carried out face to face and direct and in-depth question and answer with Porang farmers to obtain the required Description and data using a structured in-depth interview instrument. Literature study, namely a data collection technique by reviewing and recording data from several literatures related to farming research and documents in government or private agencies.

Population is a collection of individuals consisting of objects/subjects with certain qualities and characteristics that have been determined by the researcher. Meanwhile, the sample is part of the number and characteristics of the population (Sugiyono, 2013). The population in this research are farmers who are members of P3B (Porang Bali Farmers Association) and members of the Maju Bersama farmer group. There are 200 people who plant Porang. The number of samples used by researchers in this study was determined by Tabanan Regency, 19 farmers and Buleleng Regency, 11 farmers.

The research variable used in this analysis is the farming income variable. The first indicator used is the total income from Porang farming, which uses the parameters of production quantity and selling price of Porang on the market. The second indicator used is the total cost of Porang farming, which includes all Porang farming production activities with the input cost parameters of Porang farming. The second indicator is farming risk with standard deviation and deviation coefficient indicators. Overall, the parameters above can be seen in the table as follows.

Table 1
Variables, indicators, parameters, and variable measurement in the analysis of income and risk of Porang farming in Bali province

Variable	Indicator	Parameter	Measurement
Farming Income	Farming Revenue	Production quantity	(kg)
		Price	(Rp/kg)
	Farming Costs:		
		Quantity of production facilities	Kg
		Price of production facilities	(Rp/kg)
		Use of labor	HOK
		Labor wages	(Rp/HOKg)
Risk Farming	Standard Deviation	Production expectations	Quantitative (kg/are)
		Average production	Quantitative (kg/are)
	Deviation Coefficient	Opportunity	Quantitative (ratio)
		Standard deviation	Quantitative (kg/are)
		Production expectations	Quantitative (kg/are)

Porang farming income can be calculated by the difference between total revenue and total Porang farming costs during one production cycle with the following formula:

$$\mathbf{\Pi = TR - TC}$$

Description:
Π : Farming income
TR : Farming revenue
TC : Total costs/farming
Meanwhile, revenue from Porang farming can be calculated by multiplying the production price of Porang by the amount of production obtained using the following formula:

$$\boldsymbol{TR = Pq \; x \; Q}$$

Description:
TR : Total Revenue
P : Production Price
Q : Production produced in one production cycle
Porang farming costs
The total cost (TC) in Porang farming is the total production costs incurred. Total costs consist of fixed costs and variable costs.

$$\boldsymbol{TC = TFC + TVC}$$

Description:
TC: Total Cost
TFC: Total Fixed Costs
TVC: Total Variable Costs
Farming Risk Analysis:
To answer the second research objective, coefficient of variation analysis was used with the formula:

$$CV = \frac{\sigma}{X_r}$$

Description:
CV = Coefficient of Variation
σ = Standard Deviation of Farming Income
X_r = Average Value of UT Income

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})}{n-1}}$$

Description:
σ = Standard Deviation of UT Income
X_i = UT income of sample to-i
$\bar{X}$ = Average UT Income
n = Number of Samples
Decision rule: CV ≤ 0.5 (small risk); CV>0.5 (major risk)

Results

Porang farmers who are members of farmer groups in Mundeh Village and Buleleng farmer groups have different distribution locations. The members of the farmer group in Mundeh Village all live in Mundeh Kauh Village, meanwhile the members of the P2B group live in various Villages in Buleleng including: Bondalem, Bengkala, Tamblang Depehe, Tajun, Sangsit, Silangjana, and Sambangan. Among these Villages, most Porang farmers in Buleleng live in Depehe Village. Therefore, the general description of the research location will be represented by Depehe and Mundeh Kauh Villages.

Depeha Village, which is within the scope of Kubutambahan District, Buleleng Regency. The distance between the Village Government center to the District Government center is approximately 22 minutes or approximately 11 Km, while the distance from the Village Government center to the Regency Government center is approximately 45 minutes or approximately 23 Km, and the distance from the center Village Government to the center of Provincial Government is approximately 2 hours 21 minutes or a distance of approximately 85 Km. Depeha Village consists of six Banjar Dinas, namely: Bingin, Dangin Pura, Dauh Pura, Pengubugan, Sanglung, and Seganti. In terms of government, Depeha Village is in Kubucepatn sub-district, Buleleng Regency with the following territorial boundaries:

North : Bukti Village
East : Tunjung Village
West : Tamblang Village and Bulian Village
South : Tajun Village

Depeha Village is known for its mango production. This Village is at an altitude of 525 - 675 m above sea level, with an area of 8.95 km2 or 895 ha consisting of:
Plantation land 251 ha
Public facility land 16 ha
Forest land 200 ha

To date, the population of Depeha Village is 5,960 people, with details of 3,046 men, and 2,914 women, and 1,628 families. Currently, the facilities owned and available in Depeha Village include 1 PAUD, 4 elementary schools and 1 junior high school. Agriculture in Depeha Village is dominated by annual crop farming, namely fruit crops and plantations. Fruit crops are dominated by manga, followed by rambutan, durian and banana, with production respectively: 987 tons, 98.5 tons, 30.5 tons and 19 tons. Meanwhile, plantation crops are dominated by cashews and chocolate with production of 334.80 tons and 104 tons.

Quoted from https://mundehkauh.wordpress.com, Mundeh Kauh Village is a Village resulting from the expansion of Mundeh Village into Mundeh Village and Mundeh Kauh Village, which is within the scope of West Selemadeg District, Tabanan Regency. The distance between the Village Government center to the District Government center is approximately 30 minutes or approximately 30 Km, while the distance from the Village Government center to the Regency Government center is approximately 60 minutes or approximately 50 Km, and the distance from the center Village Government to the center of Provincial Government is approximately 90 minutes or a distance of approximately 100 Km. Mundeh Kauh Village was approved as a definitive Village in 2004 with the Tabanan Regent's Decree Number: 15 of 2004 and consists of five Service Banjar, namely: Banjar Dinas Dayang, Penataran, Dukuh, Puncak Sari and Banjar Dinas Kedewatan, with an area of 743,548 Ha, with the following territorial boundaries:

To the north is Mundeh Village
East side with Tukad Yeh Bakung / Mundeh Village
South side with Forest / Lalang Linggah Village and Selabih Village
West side with Forest and Belatungan Village

To date, the population of Mundeh Kauh Village is 1,461 people, with details of 718 men, 743 women, and 464 families. Currently the facilities owned and available in Mundeh Kauh Village include 1 elementary school with 5 teaching staff and 1 principal, 1 kindergarten school with 1 teaching staff and 1 kindergarten principal, for facilities and the health infrastructure in Mundeh Kauh Village is 1 Assistant Community Health Center with 1 Medical Personnel, namely the Village Midwife (Ida Ayu Putu Eka Wiadnyani) with a practice time of 12 hours (Morning - Afternoon) who is based in Banjar Dinas Penatan.

Regarding its geographical location, Mundeh Kauh Village is an agricultural area, especially in the plantation sector, with farmer farmers making up the majority of the population's work/livelihood. The commodities developed are Coconut, Coffee, Cloves, Cocoa, Bananas, Mangosteen, Durian and others. To organize farmer activities in Mundeh Kauh Village, five Subak Abian Organizations have also been formed, and three Farmer Group organizations which are combined into one Farmer Group Association Organization. This is intended to make farmer group activities more effective as well as to increase farmers' income. In the Mundeh Kauh Village area there is no specifically agricultural area, this is due to its geographic location between 450 - 550 M above sea level, so the plants that are suitable for development are plantation/hardy plants. The superior product in Mundeh Kauh Village is the Cocoa Plant, apart from its stable price, the harvest period is quite long, namely 8 months each year (2002 – 2007), however starting in 2009 the Cocoa Plant began to be attacked by Cocoa Fruit Mover Pests (PBK) and also fruit rot (Heloveltis) which reduced production by up to 90% of the previous year's production (2008-2010), and in 2010 there was almost no cocoa harvest, this was due to too much rainy season so that many cocoa pods were rotten (amount There were more rainy months in 2010 than dry months). In terms of population, people's types of work are still dominated by the agricultural sector, especially the plantation sub-sector, in this case farmers and farm laborers with the following details:

Farmers	: 920 people
Farm Workers	: 41 People
Entrepreneurs	: 75 people
Civil servants / Polri	: 14 people
Retired	: 3 people
Not Yet Working	: 400 People +
Total	: 1,453 people

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The identity of the respondent describes the circumstances and conditions of the respondent's status in the farming business carried out. The identity of the respondent in question includes the respondent's name, age, education level, length of farming, number of family dependents and land area which can be seen in the attachments (Payraudeau & van der Werf, 2005; Sandhu et al., 2008). The identity of the respondent farmers will be discussed below.

Porang farming is an activity that depends on the farmer's ability to work and think to develop the Porang farming business, where this ability depends on the age of a farmer. Ability to accept Porang farming innovations. The age level of Porang farmers can be seen in Table 2.

Table 2
Percentage of Porang farmers based on age range in Bali provinces 2022

No	Age Range*) (Year)	Category	Number of people	Percentage
1	0 –5	in toddler	0	0%
2	5 – 11	child	0	0%
3	12 – 16	early teens	0	0%
4	17 – 25	late teens	0	0%
5	26 – 35	early adulthood	4	13%
6	36 – 45	late adulthood	7	23%
7	46 – 55	early elderly	7	23%
8	56 – 65	late elderly	12	40%
9	> 65	seniors	0	0%
	Total		30	100%

Note: *) According to the Indonesian Ministry of Health

Based on Table 2, it shows that Porang farmers in Bali Province have a diverse age range, but the majority are classified as late elderly farmers (40%) and early elderly farmers (23%). The remainder are late adults (23%) and early adults (13%). This age description confirms the conclusions of various studies which reveal that young people are reluctant to choose work as farmers as a livelihood for the population.

Farmers' ability to understand technological advances depends on their level of education, which is a very important factor in developing Porang farming. Where the higher the level of education of a Porang farmer will certainly have an impact on the farmer's skills and abilities in carrying out Porang farming activities. The identity of Porang farmers is seen from the level of education in Bali, Payangan District, Gianyar Regency.

Table 3
Percentage of Porang farmer respondents based on education in Bali Province 2022

No	Education	Number of people	Percentage
1	No school	0	0%
2	Unfinished elementary school	8	27%
3	Finished elementary school	7	23%
4	Junior high school	1	3%
5	High school	5	17%
6	College/Academy	9	30%
	Total	30	100%

Source: Primary Data After Processing, 2022

Based on Table 3, it shows that the identity of Porang farmers is based on education level. It is surprising that the majority (30%) of Porang farmers' education has reached college/academy level, namely achieving. This shows that armed with Porang farming, it is attractive to highly educated people who, based on Description in various media, promise better profits than commodities that are commonly cultivated. Of the rest, the educational levels of Porang farmers are as follows: 27% have less than elementary school education, 23% have completed elementary school, 17% have completed secondary school, and only 3% have completed secondary school.

The main occupation of Porang farmers in general is farming, namely 93%, but there are 3% each of the 30 respondents whose main occupation is civil servants and private employees (Table 4). This shows that the Porang commodity is quite interesting to cultivate because of the promise of profit that this commodity promises, so people on a fixed income want to try it.

Table 4
Percentage of Porang farmer respondents based on main occupation in Bali Province 2022

No	Main job	Number of people	Percentage
1	Farmer	28	93%
2	Government employees	1	3%
3	Private sector employee	1	3%
	Total	30	100%

Source: Primary Data After Processing, 2022

The factor that influences the amount of Porang farming production is land area. The land area will have an impact on farmers in providing income to Porang farmers, where farmers who can cultivate, pay attention to land characteristics and utilize the land area they own will provide benefits to Porang farmers. The identity of Porang farmers based on land area is as follows.

Table 5
Control of Porang Farmer's Land in Bali Province 2022

No	Land Type	Owned (are)			Rent (are)		
		Average	Max	Min	Average	Max	Min
1	Garden/Moor	118 (94%)	375	0	14 (100%)	150	0
2	Yard	7 (6%)	30	1	0 (0%)	0	0
	Total	125 ^(100%)			14 ^(100%)		

Source: Primary Data After Processing, 2022

Table 5 can be seen that there are two types of land controlled by farmers in Bali, namely garden/moor land and yard land, which means land without irrigation. The average size of land owned by farmers is 125 acres, consisting of 118 acres (95%) of garden/moor land and 7 acres (6%) of homestead land. Apart from owned land, Porang farmers also control land by renting it to cultivate, namely an average of 14 acres of garden/moor land. Thus, the area of land cultivated by Porang farmers reaches 132 acres of garden/moorland, consisting of 118 acres of owned land and 14 acres of rented land. The amount of garden/moor land owned by farmers varies greatly from 0 - 375 acres. Farmers who do not own land are the ones who obtain land from other people by renting where the maximum area of garden/moor land from renting reaches 150 acres.

Porang cultivation practiced by farmers in Bali is still considered non-intensive. This is in accordance with the conditions of Porang cultivation in general, which is cultivated as an intercrop between the main crops cultivated by farmers. Porang cultivation activities carried out by farmers are. Fertilization carried out by Porang farmers in Bali generally uses manure and does not use chemical fertilizers at all. The manure applied is fermented manure obtained from making it yourself or buying it. Manure is generally applied twice, namely at planting and when the plants are 3-4 months old. The amount of drum fertilizer given ranges from 1-3 tonnes, with an average of 2 tonnes. Farmers pay for manure at a price of 15,000-2,000 rupiah per bag with a weight of 20 kg per bag.

Most farmers plant Porang as an intercrop between main crops according to regional conditions. In the Tabanan area, Porang plants are planted among coffee, clove and cocoa plants. Meanwhile, in Depeha Village, Buleleng Regency, Porang is planted among mango plants. Porang cultivation carried out by farmers is classified as non-intensive. After planting, Porang are usually only given manure once after planting, namely at the age of 2-4 months. At the same time as the fertilizer is applied, weeding and hilling are carried out to control weeds before the Porang plant canopy covers the ground. After that, the plant is left to grow by itself until it is time to harvest, which is 2 years after planting (Moreira et al., 2021).

Analysis of Porang Farming Income

Farming is an activity carried out in processing natural resources by obtaining high production and income which can cover farming costs and ultimately increase profits, known as the concept of farming income (Miyata et al., 2009; Mertz et al., 2005). Porang farming income is obtained from the difference between receipts and costs incurred in the Porang farming production process which is calculated in one production cycle.

Revenue is the result of sales of Porang farming which is the product of the quantity of production and the selling price received by farmers. With an average plant population of 2,155 plants, the production produced in 1 production cycle is 1,430 kg. Meanwhile in 2021, the price of Porang fell from previously around IDR 10,000 per kg to IDR 4,326.98 per kg. According to Description from the chairman of the Buleleng Porang Association (P2B), the drop in Porang prices that year was caused by the drop in Porang prices because China closed its doors to imports of Porang products from Indonesia. This has caused Porang chip factories in the country to pile up and prices have fallen drastically. The reason for closing imports of Indonesian Porang is related to food safety. Simultaneously with the drop in Porang prices, Porang farmers only generated an average income of IDR 6,187,58621.

Porang farming costs incurred are the costs required to pay for all production facilities and labor used in the production process in Porang farming. In accordance with the Porang cultivation practiced in Bali, there are not many production facilities and labor required for Porang farming. The production facilities used are limited to seeds which generally come from tubers and manure. In Porang farming with an average population of 2,155 plants, the amount of seed required is 23.62 kg. The seeds that farmers get cost IDR 24,655.17 per kg, so the total cost of seeds reaches IDR 582,372.18 per kg. The type of fertilizer used is limited to 1.93 tons of manure at a price of IDR 896,551.72 per ton so the cost for fertilizer is IDR 1731,272.29.

Although not as much as crops such as vegetables, rice, corn and other food crops, another expenditure that has significant value is labor. Like small farms in general, the source of labor comes from within the family and outside the family. The total workforce used was 22 HOK, consisting of 10.48 HOK within the family and 11.31 HOK outside the family. With a rural labor wage rate of IDR 80,000 per day, the total labor expenditure required reaches IDR 1,743,448.28.

Table 6
Average Porang Farming Income with an average population of 2,155 plants in Bali 2021

Description	Unit		Value
Reception	IDR		6,187,586.21
Production	kg	1,430.00	
Price	IDR /kg	4,326.98	
Total Cost	IDR		4,057,092.75
a. Seed costs	IDR	582,372.18	
Seed	kg	23.62	
Price	IDR /kg	24,655.17	
b. Manure Costs		1,731,272.29	
Amount	ton	1.93	
Price	IDR /ton	896,551.72	
c. Labor costs	IDR	1,743,448.28	
Total Labor	HOK	21.79	
In family	HOK	10.48	
Outside the Family	HOK	11.31	
Wages	IDR /HOK	80,000.00	
Income	IDR		2,130,493.46

Furthermore, farming income is the net amount received by Porang farmers which is obtained from total income minus total production costs. The total costs, which consist of the costs of production facilities and labor wages, are IDR 4,057,092.75. With revenues obtained amounting to IDR 6,187,586.21 and total costs of IDR 4,057,092.75, the income of Porang farming with an average population of 2,155 plants in Bali is IDR 2,130,493.46 in one production cycle. The detailed calculation of Porang farming income can be seen in Table 6.

Risks of Porang Farming Income

In this analysis, the risk referred to is uncertainty where the chance of occurrence is unknown, so in the analysis the size of the average deviation of the variable Porang farming income is used, which is measured by the average standard deviation (Komarek et al., 2020; Pannell et al., 2000). To obtain the average standard deviation, the unit of analysis for all farming samples was first standardized, namely a population of 2,155 plants. The risk of farming income is analyzed using the coefficient of variation. A small coefficient of variation value indicates low variability in the average value of the distribution. This illustrates that the risks faced are small. The risk analysis for Porang farming production in Bali can be seen in Table 7.

Table 7
Risk Analysis of Porang Farming Income in Bali 2022

Description	Value
Average Farming Income (IDR)	1.269.959
Standard Deviation of farming income (IDR)	2,918,568
Coefficient of Variation	2,30

Source: Primary Data After Processing, 2021

Based on Table 7, it can be explained that the average income from Porang farming in Bali is IDR 1,489,123. From the analysis, the standard deviation of Porang business income in Bali is IDR 2,918,568. The quotient between the standard deviation of Porang farming income and the average Porang farming income obtained a coefficient of variation of 1.96. The coefficient of variation value is smaller than 0.5, which indicates that the income risk of Porang farming in Bali is relatively high. Mutiara & Kholil (2022), state that if the coefficient of variation is > 0.5 then the risk of farming income is large, and vice versa.

Risk Sources in Porang Farming

Every farming business is exposed to various sources of risk, including: Production uncertainty, price fluctuations, technological developments, competitors' actions, government policies (Dewi, 2017). From the several sources of risk above, according to the Chairman of Porang Bali, production uncertainty and price fluctuations are the causes of risk to Porang farming income in Bali. Production uncertainty is mainly caused by pest and disease attacks, while price risk is caused by constraints on Porang exports as previously explained. The main pests and diseases of Porang plants are: Fungi (*Colletotrichum sp*, *Sclerotium roflsii*, *Fusarium oxysporum*), leaf caterpillars, nematodes, grasshoppers and tuber caterpillars. According to Description from the Chairman of Porang Bali, Porang production in Bali is very susceptible to tuber caterpillars (*Araechenes*). Tuber caterpillars attack the tubers and cause the quality of the Porang tubers to decrease and their weight to become lighter (Lien et al., 2007; Toma & Mathijs, 2007).

Conclusion

Based on the description of the research results, the following conclusions can be drawn:

1) The average income of Porang farming in Bali is 2,130,493.46 rupiah per production cycle with an average population of 2,155 plants.
2) The risk of Porang farming is classified as high risk as indicated by the coefficient of variation (CV) value of Porang farming income of 2.30 (>0.5)
3) The source of risk in Porang farming is the high variation in production due to exposure to tuber caterpillar attacks and falling prices due to the closure of Indonesian Porang exports due to non-fulfillment of food safety requirements in importing countries.

Suggestion

Efforts to mitigate the risks of Porang farming in Bali are by reducing the causes of production variations and falling Porang prices. Reducing production variations can be done by implementing good agricultural practices procedures. Meanwhile, looking for solutions to overcome the drop in Porang prices outside cultivation areas at the farmer level, improving the implementation of good handling of Porang products in order to meet food safety requirements in

importing countries should be carried out with a comprehensive and integrated approach involving various related institutions, both government and private.

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