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PARTNERSHIP PATTERN AND CONTRIBUTION OF POISON CASSAVA FARMING INCOME TO FARMERS' HOUSEHOLD INCOME IN NIBUNG VILLAGE, BANGKA BELITUNG ISLANDS, INDONESIA

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ABSTRACT: Poisonous cassava plants have high adaptability to their agroecological conditions and contribute to the total income of farmer households. In the Bangka Belitung Islands Province, especially Nibung Village, poison cassava has developed as a farmer's household business. However, the position of poison cassava farmers in the agribusiness system still tends to be weak, especially in terms of market control and pricing. This condition encourages the formation of a partnership pattern between farmers and collectors or processing business actors. This study aims to analyze the partnership patterns applied in poisonous cassava farming and measure the contribution of income to the total household income of farmers. The research method used in this study is a survey. Meanwhile, the sample extraction method used in this study is a simple random method, which totals 33 samples. The data obtained from the field is presented in tabulation and continued with mathematical data processing and explained descriptively in the discussion, to answer the first goal. Then to answer the second goal, namely how much it contributes to the total household income of farmers using farming analysis and calculation of contribution to household income. The results of

this study can be found that the pattern of farmer partnerships in poisonous cassava is using the general trade partnership pattern. Its contribution to family income is 25%.

Keywords: *Partnership pattern, poison cassava, income, household*

1. INTRODUCTION

The agricultural sector has a very important role for the economy of rural communities, especially as a source of livelihood and a provider of employment for them (Buj et al., 2023; Kasus et al., 2022; Lasaksi et al., 2023). From an agribusiness perspective, not only the production aspect affects the sustainability of an agricultural commodity, but there must also be involvement between agribusiness actors through an effective marketing system and partnerships (Djazuli, n.d.; Ernita & Rahman, 2024; Suci et al., 2024). Thus, in the development of agricultural sector commodities, institutional strengthening is needed that can result in increased production efficiency and farmers' welfare (District et al., n.d.; Herawati, 2025; Province et al., n.d.).

One of the plants that has strategic value, especially in areas with limited choice of superior commodities, is poison cassava. These plants have high adaptability to their agroecological conditions and contribute to the total income of farmer households. Poison cassava is widely used as raw material for the processing industry and its market prospects are relatively stable (Ekonomi et al., 2024, 2025; Wung et al., 2025) . In the Bangka Belitung Islands Province, especially Nibung Village, poison cassava has developed as a farmer's household business.

However, the position of poison cassava farmers in the agribusiness system still tends to be weak, especially in terms of market dominance and price determination (Noort et al., 2022). This condition encourages the formation of a partnership pattern between farmers and collectors or processing business actors. Conceptually, agribusiness partnerships aim to create mutually beneficial relationships through a proportionate sharing of roles, risks, and benefits. However, in practice, not all partnership patterns are able to have a positive impact on increasing farmers' incomes.

A number of previous studies have focused more on the analysis of farm income or partnership studies in part, without directly linking it to the contribution to farmers'

household income as a whole. In fact, in the context of household economics, farmers' income is multistrata and comes from various sources, both agricultural and non-agricultural. Therefore, the analysis of the contribution of poisonous cassava farming income is important to assess the real role of the commodity in supporting the farmer's household economy.

Based on these conditions, there are still limitations in empirical studies that integrate partnership pattern analysis with the contribution of poisonous cassava farming income to farmers' household incomes, especially in the Bangka Belitung Islands area. This study aims to analyze the partnership patterns applied in poisonous cassava farming and measure the contribution of income to the total household income of farmers in Nibung Village. The results of the research are expected to make an academic contribution to the development of agribusiness studies and become the basis for the formulation of policies and strategies to strengthen equitable and sustainable partnerships.

2. RESEARCH METHODS

This research was carried out in Nibung Village, Puding Besar District, Bangka Regency, with the object of the research being poisonous cassava plasma farmers. The determination of this location was deliberately carried out with the consideration that Nibung Village is one of the villages that are members of the poison cassava processing company, and the village is the first to carry out poison cassava farming and Bangka Regency is the center of poison cassava plasma plantations in the Bangka Belitung Islands Province.

The research method used in this study is the survey research method. Meanwhile, the sample extraction method used in this study is a simple random *sampling method*. The determination of the number of samples in this study was carried out using the Slovin formula, as many as 33 samples from a population of 50 farmers.

The data obtained from the field is presented in tabulation and continued with mathematical data processing and explained descriptively in the discussion, to answer the first goal, which is to describe the implementation of the partnership pattern, namely by describing through 3 aspects, namely the first aspect *rule of*

representative namely in the form of determining rights and obligations between farmers and companies and determining the selling price of products. Second, The jurisdictional aspect is in the form of determining rules between farmers and companies, then the aspect of control over *right* in the form of mastery of production, mastery of technology and mastery of products for poisonous cassava plasma farmers in Nibung Village, Puding Besar District.

Then to answer the second goal of how much income poison cassava farming has an important role in its contribution to the total income of farmer households in Nibung Village, the analysis of farming used to look at income and income as well as the total income of poison cassava farming families uses the following formula:

(1) To calculate the total income of farmers using the formula:

$\sum PTK = PdU + PLU$

Where:

PTK = Total Family Income (Rp/Yr)

PdU = Income from poisonous cassava farming (Rp/Yr)

PLU = Income Outside Farming (Rp/Yr)

(2) To calculate income using the formula:

$PdU = PnU - BTP$

Where:

PdU = Income (Rp/Th)

PnU = Receipts (Rp/Th)

BTP = Total Production Cost (Rp/Yr)

(3) To calculate the receipts using the formula:

$PnU = \sum (Yu \times Hyu)$

Where:

PnU = Agricultural Revenue (Rp/Th)

Yu = Production Produced (kg)

Hyu = Selling Price of Products (Rp/Kg)

(4) To calculate the total cost of production using the formula:

$BTP = BT + BV$

Where:

BTP = Total Production Cost (Rp/Yr)

BT = Fixed Fee (Rp/Year)

BV = Variable Cost (Rp/Year)

Contribution is a contribution or in the study is intended as the amount of income contributed from poison cassava farming to household income.

$$\mathbf{K} = \frac{p}{\sum pd} \times \mathbf{100\%}$$

Description:

$\sum$pd = total revenue Family

p = Poison Cassava Income

k = Kontribusi

3. RESULTS AND DISCUSSION

3.1. General Conditions of Poison Cassava Farming

Poison cassava is one of the sweet potatoes that currently helps farmers a lot in increasing their additional income, before the arrival of poison cassava in Nibung Village, farmers had a great difficulty finding additional income apart from rubber plants, this made farmers very helped by the existence of this poisonous cassava.

Poison cassava grows on mainland, This plant cannot grow on waterlogged land so this plant must be planted on land that has loose and fertile soil, loose and fertile soil makes the results of poison cassava farming maximum because the characteristics of this poison cassava are in the form of tubers, the more fertile the soil, the maximum the results of the farming.

Poison cassava farming in Puding Besar District began in 2015 but the beginning of poison cassava farming in Nibung Village was carried out in early 2018. The process of planting poison cassava is not so complicated, starting from the preparation of seeds to harvesting, this makes farmers very helped by the existence of this poison cassava as a second income (*Second Income*) to meet their living needs.

Poisonous cassava seeds are obtained from companies that are responsible for giving to farmers. The company prepares seeds, fertilizers, tractors and other heavy

equipment to clear farmers' land, farmers only provide land that is ready to be cultivated. Poison cassava is planted with a minimum distance of 80 x 80 cm, this distance has been determined by the company, this distance aims to maximize yields in the farming if the planting distance is less than that, then there are a lot of obstacles experienced by farmers such as the tubers are not optimal, plants are easily attacked by fungi, the complexity of the land weeding process.

Poison cassava plants that are ready to be harvested from the age of 8-12 months, this already has a regulation from the company so that farmers are prohibited from harvesting this poison cassava for less than 8 months or more than 12 months, This makes the starch lacking in the poison cassava. After harvesting, the poisonous cassava is ready to be sold to the factory through the cooperative at a price that has been determined by the company.

3.2. Description of the Implementation of the Poison Cassava Farmer Partnership Pattern

Partnership pattern analysis is an analysis used to measure partnership patterns between farmers and companies. There are several aspects used to measure the pattern of farmer partnerships, the aspects used are the *rule of representatif* (rules of play)*,* aspects of jurisdiction (rule of law) and aspects of control over *right*, here's the explanation:

3.2.1. Aspects *of the Rule of Representation*

Aspects of the Rule of Representative is the aspect that explains the rules of the game carried out by the company and the KSR (People's Cassava Plantation) farmers. As the Company and the government negotiate a suitable price to determine how much the purchase price of poisonous cassava, the price that has been mutually agreed is the price for farmers who join the cooperative is given a minimum price of IDR 850.00/kg. This price is given only to group farmers who join the cooperative, even though the price of sweet potatoes is falling, but for farmers who join the group are entitled to the price determined by the company and the government. The agreed price is the minimum price of the farmer is also entitled to a higher price than that, the price of cassava is always variable and follows the factory price at that time.

In addition, the company provides loans to every farmer who joins the cooperative, the company collaborates with regional banks as a source of loan funds, farmers are asked to complete the requirements set by the bank in the form of KTP, NPWP, Land Certificate, and Statement Letter. The bank gives a period of 1 year to farmers to pay off the borrowed debt. The agreement between banks, companies and the Bangka Regency government was agreed that the loan given to farmers was IDR 16,000,000.00 per hectare, with which the farmers have received seeds, land cultivation in the form of tractors and LCs, fertilizers, and pesticides.

In addition, the company is a guide for farmers such as providing technical personnel to assist farmers in guiding farmers about poison cassava cultivation, the company sends its employees who go directly to provide guidance to farmers, besides that PPL (Field Agricultural Counseling) also participates to help farmers, the existence of this technical guidance is because of the lack of knowledge of farmers about poisonous cassava because of this commodity new for farmers.

The company also provides information about the opening of non-technical job vacancies needed by the company to the cooperative. With the notification of the opening of vacancies so that the empowerment of the surrounding community, especially those who are members of cooperatives, is created.

The company provides a shortcut to farmers who are members of farmer groups, companies prioritize farmers who are members of cooperatives to sell their crops compared to those who are not members of cooperatives, things like this make it easier for farmers to sell their crops to companies, cooperatives can deliver as many as 2-3 trucks of crops in a day.

3.2.2. Jurisdictional Aspects

The jurisdictional aspect is an aspect that discusses the legal rules carried out between the company and the farmer. According to the Government of the Republic of Indonesia, the OSS management and organizing institution (*Online Single Submission*) based on the provisions of article 32 paragraph (2) of government regulation Number 24 of 2018 concerning electronically integrated business

licensing services. Grant location permissions. Cooperatives have the right to make a permit for the location of establishing the cooperative.

The requirement for poison cassava farming is that farmers are required to make a land certificate to plant poison cassava. The land used has been determined by the company, which is a maximum of two hectares per family, the land that has been registered is immediately surveyed directly by the company's survey team whether the land is suitable or not for poison cassava farming.

Based on the market 32 paragraph (1) of government regulation no. 24 of 2018 concerning licensing services, Cooperatives are required to make a business license. With this trade license, farmers can sell their crops to factories through this cooperative. Farmers who send their crops to the factory must get a letter of passage from the cooperative in the form of a DO (*Delivery Order*).

3.2.3. Aspects of Domination of *Right*

Aspects of mastery of *right* Namely explaining the assets of facilities and infrastructure, this aspect is divided into 3, namely mastery of production, mastery of technology and mastery of products.

3.2.3.1. Mastery of Production

Mastery of production is to explain how production activities are carried out by farmers when doing farming from seed preparation to post-harvest. Farmers provide land that will be cultivated to farm poisonous cassava and then the land is cultivated with heavy equipment (*Excavator*) then the land that has been cultivated will be reprocessed using a tractor that has been provided by the Company.

In addition, the company in terms of this partnership provides production facilities in the form of seeds and provides assistance in the form of equipment assistance such as tractors to cultivate the farmers' land. In addition, the partnership in this case acts as a guiding company for farmer groups that join the cooperative.

The company also provides several kinds of fertilizers in the form of microcyl (micro) and NPK (macro) fertilizers. This fertilizer is used 3 times a year in the

production of poisonous cassava. The company only produces fertilizer, then the farmer as the perpetrator, to sow the fertilizer to the poisonous cassava of each farmer. Fertilizer is already available in the cooperative, if the date has come for farmers to fertilize, they can take their fertilizer to the cooperative.

After harvesting, the poison cassava is transported by truck and taken to the poison cassava factory, the results of this production will later be sold in the company as a farmer's partner in accommodating the production results, the production of poison cassava itself is sold at a predetermined price according to the factory price on that day. After selling the produce to the farmer's factory, it is allowed to take the goose to be used as livestock feed. Of course, this is very helpful for farmers in providing their animal feed.

3.2.3.2. Mastery of Technology

The application of poisonous cassava farming technology uses several technologies to support farming, so that farming is carried out to the maximum, the cooperative has provided seeds for farmers who join the cooperative, these seeds are sold to farmers in a state that is ready to be planted and in a condition tied according to the needs of the farmers.

In addition, the company as a partner provides a tractor that will be used by farmers to cultivate land so that farmers will no longer find it difficult to cultivate land to grow poisonous cassava. In addition, farmers cultivate their land using *Excavator* thus accelerating the process of planting seedlings for planting.

In terms of harvesting, farmers use a variety of methods to harvest quickly and easily, usually farmers use a tool called harvest kit, this tool is made by the farmer himself to facilitate the harvesting process, and there are also farmers who harvest with the help of rope and wood, but many farmers prefer to use tools in the form of harvest levers which are used to dig poison cassava.

In addition, farmers transport their produce using trucks that have been provided by the cooperative. There are two types of means of transportation used when transporting farmers' products, namely using *Pick Up* and trucks. *Pick Up* It is used

to transport farmers' crops from farmland to temporary shelters and trucks are used to transport their crops to factories.

3.2.3.3. Mastery of the Product

Control of the product is that farmers are obliged to sell their production to Partner Companies that accommodate the farmers' production. In addition, the company sets deductions to farmers, the existence of this deduction is seen from the planting time of the farmer's poisonous cassava, the planting time of this poisonous cassava which is set by the company for one year, because with the condition of the poison cassava plant for one year the starch (starch) ranges from > 26%, so there are few pieces of poisonous cassava. Furthermore, the remains that stick to the poisonous cassava such as soil, gravel, wood and rainwater when transporting the produce from the farmer's land to the factory cause pieces of poisonous cassava. The following are the pieces of poisonous cassava from the company to farmers as follows:

Table 1. Poison cassava yield

NO	Rendemen (%)	Deduction (%)
1	19	24
2	20	21
3	21	18
4	22	15
5	23	12
6	24	9
7	25	6
8	>26	5

It can be seen in table 1., the larger the yield, the smaller the cut. Yield is the starch content present in poisonous cassava. The normal starch content in poison cassava ranges from 26-28%, if the yield is more than that, then the cut given to farmers is also large, usually a large yield is caused by the length of the poison cassava planting period.

The products produced by the company are in the form of tapioca flour, processed products from poisonous cassava are sold in various regions in Indonesia, besides

that cooperatives can sell tapioca flour in the region such as Puding Besar District and Bakam District and this is a tapioca flour marketing area for cooperatives.

In addition, the company provides its products for sale, the company also provides onggok and anir as animal feed for farmers who are members of the cooperative. These oats and groats are sold to farmers who raise livestock. This helps farmers to get cheap groceries and groceries.

So we can conclude by considering some of the above aspects of community partnership patterns in Nibung Village, Puding Besar District Using the general trade partnership pattern, this can be seen that farmers in Nibung Village are given loans in the form of money for the main capital of poison cassava farming, farmers also participate in determining the value of poison cassava to join the cooperative, Given the convenience of selling products from the company in the form of tapioca flour, it is easy to buy ongol and manir as animal feed at low prices.

3.3. Analysis of Farmers' Income in Nibung Village, Puding Besar District

3.3.1. Poison Cassava Farming

3.3.1.1. Fixed Cost of Poison Cassava

A fixed cost is the cost used over one harvest season. The fixed costs used by poison cassava farmers are in the form of hansprayers, machetes, hoes and harvest levers. These goods are used by farmers to carry out their farming, such as machetes used by farmers to cut down trees around poisonous cassava, besides that machetes are also used to cut the stems or tubers of poison cassava, hoes are used by farmers to dig holes when planting seedlings and to stir fertilizer, while hansprayer is used to spray pests, weeds and OPT (Plant Disturbing Organisms) in poisonous cassava plantations themselves. While harvest levers are used by farmers to extract poisonous cassava themselves during harvesting activities, the existence of harvest levers makes it easier for farmers to dig up the tubers so that it drains farmers a little. The average fixed cost of poison cassava in Nibung Village, Puding Besar District.

Table 2. Average Fixed Cost without *Joint Cost* of Poison Cassava in Nibung Village, Puding Besar District.

No	Tool Name	Depreciation Cost (IDR/lg/year)
1	Hansprayer	45.139,39
2	Harvest Leverage	17.454,55
Total Fixed Costs		62.593,94

Based on Table 2. above the average amount of fixed costs incurred in poisonous cassava farming worth IDR 62,593.94. It is known that the fixed costs incurred by farmers for hansprayer are IDR 45,139.39, and harvest leverage is Rp 17,454.55. Because in this study two commodities with different land are used, there are *join cost* at a fixed cost. *join cost* is a shared cost used in a farming to produce different products. In cassava farming, this poison is used *join cost* such as machetes and hoes, can be seen in table 3. The average obtained in Table 3. Explain the data above *join cost* in the form of poisonous cassava in the form of a machete of IDR 3,685.42, a hoe of IDR 2,520.00 with the total amount obtained in *join cost* amounting to IDR 6,204.42.

Table 3. Average fixed cost share cost in poisonous cassava farming

Yes	Tool Name	Depreciation Cost (IDR/lg/year)
1	Stuttgart	3.685,42
2	Hoe	2.520,00
Total Joint Cost Fixed Costs		6.204,42

Table 4. Average total fixed costs in poisonous cassava farming

No	Tool Name	Depreciation Costs (IDR/lg/year)
1.	Hansprayer	45.139,39
2.	Harvest Leverage	17.454,55
3.	Parang	3.685,42
4.	Hoe	2.520,00
Total Fixed Costs		68.798,36

Based on the table above, the fixed cost in poison cassava farming is IDR 68,798.36. Hansprayer amounted to IDR 45,139.39, harvest levers amounted to IDR 17,454.55, and machetes amounted to IDR 3,684.42 and hoes amounted to IDR 2,520.00.

3.3.1.2. Variable Cost of Poison Cassava

Variable costs are the costs used once in the harvest season in farming. The costs included in the variable costs in this study are in the form of seeds, fertilizers, pesticides and labor. The following is the average of variable costs in cassava farming in Nibung Village, Puding Besar District.

Judging from Table 5. above that the average amount of variable cost on seedlings is IDR 1,045,454.55 this is because farmers have just started to plant poisonous cassava, while for the average fertilizer used in the poison cassava business in one planting season is IDR 3,390,757.58, then the average cost of pesticides tends to be small because farmers rarely use pesticides to kill weeds, farmers believe that the higher the poisonous cassava trees, the slower the development of weeds and Over time, weeds die due to lack of sunlight, the average variable cost on pesticides is IDR 275,454.00. Furthermore, the average cost for the workforce itself is IDR 2,224,243.00. then the total variable cost in one harvest season of poisonous cassava is IDR 7,706,212.12

Table 5. Average variable cost of poison cassava in Nibung Village, Puding Besar District

NO	Tool Name	Quantity (IDR/lg/year)
1.	Seedlings	1.045.454,55
2 Fertilizer		
	a. Lime	1.240.909,09
	b. Organic	665.454,55
	c. Urea	770.303,03
	d. SP-36	902.121,21
	e. Microsil	582.272,73
3.	Pesticides	275.454,00
4..	Workforce	
	a. Planting	445.455,00
	b. Maintenance	645.455,00
	c. Harvesting	1.133.333,00
Total Variable Cost		7.706.212,12

3.3.1.3. Total Production Costs of Poisonous Cassava

Total Production costs are the total total costs incurred by farmers when farming poison cassava. The average cost of production of poisonous cassava in Nibung Village, Puding Besar District. Based on Table 6. The average production cost of poisonous cassava farming explains that the total fixed cost during poison cassava farming is IDR 62,593.94. Furthermore, Biya variables which include the cost of labor, seeds, fertilizers, and pesticides amounted to IDR 7,706,212.12. and with a total production cost of poisonous cassava of IDR 7,775,010.48.

Table 6. The average production cost of poisonous cassava farming in Nibung Village, Puding Besar District

Description	Quantity (IDR/lg/year)
Fixed Fees	68,798,36
Variable Costs	7.706.212,12
Total Production Cost	7.775.010,48

3.3.1.4. Acceptance and Income of Poisonous Cassava

Revenue is the result that poison cassava farmers receive from selling products. Revenue is obtained from the sale of products multiplied by the selling price. The average acceptance of poison cassava farmers in Nibung Village, Puding Besar District.

Table 7. Average Acceptance of Poisonous Cassava in Nibung Village, Puding Besar District.

Yes	Remarks	Quantity (IDR/kg/year)
1	Production	12.400,00
2	Pricing	1.200.00,00
Total Revenue		14.880.000,00

It can be seen from table 7. above that the average production of poisonous cassava farming in Nibung Village, Puding Besar District is 12,400 kg and a selling price of 1,200/kg is obtained. So the income in farming was obtained of IDR 14,880,000.

Income is the net profit obtained by farmers. The determination of income for poison cassava farmers is the total revenue minus the total cost of production. The average income received by poison cassava farmers in Nibung Village, Puding Besar District is as follows.

Table 8. The average income of poison cassava farmers in Nibung Village, Puding Besar District.

Yes	Remarks	Quantity (IDR/lg/year)
1	Reception	14.880.000,00
2	Total Production Cost	7.775.010,48
Total Revenue		7.104.989,52

Based on Table 8. Above, it can be seen that the average income of poison cassava farmers in Nibung Village, Puding Besar District is IDR 7,104,989.52 /yr.

3.4. Farmers' Income Contribution

Contribution is a contribution given to the family in achieving common goals with others. This means that the large share of income will be contributed to the income of poisonous cassava, rubber and non-farming. The amount of contribution of poisonous cassava, rubber and non-farming farming income to the total income of farmer households in Nibung Village, Puding Besar District can be seen in Table 9.

Based on table 9, it can be seen that the contribution of poison cassava farmers to the income of farmer families in Nibung Village is 25%, meaning the contribution of poisonous cassava income to the income of small families, and the contribution of rubber income to the income of farmer families is 51%, meaning the contribution of rubber income to the income of large families, and the contribution of non-farming income of 24% means the contribution of non-farm income to small farming exceeds the income of poisonous cassava.

Table 9. Contribution of income of poisonous cassava and rubber farmers in Nibung Village, Puding Besar District

NO	Income type	Average income (IDR/lg/year)	Kontribusi (%)
1	Poisonous cassava	7.104.988,52	25
2	Karet	14.707.139,97	51
3.	Outside of Farming	6.909.090,91	24
Total Revenue Contribution		28.721.219,40	100

4. CONCLUSION

The conclusion that can be drawn in this study is the pattern of farmer partnership in poisonous cassava, namely using the general trade partnership pattern. One of them is the aspect of *the rule of representativeness* (rules of the game) in the form of price rules that are determined jointly between farmers and companies and companies provide guarantees, jurisdictional aspects, namely farmers are obliged to provide land clearing requirements that have been regulated by the company, farmers sending goods to factories must go through cooperatives in the form of DO (*delivery orders),* and aspects of control over *rights* That is, farmers cultivate their land using tools in the form of excavators and tractors, and farmers transport poisonous cassava production using pickups and trucks to the factory. From the results of the study, it was found that the income of poisonous cassava farming was IDR 7,104,989.52 (Rp/lg/year) and its contribution to family income was 25%. Furthermore, rubber farming income amounted to IDR 14,707,139.03 (IDR / lg/year) and its contribution to farmer household income was 51%, as well as non-farming income of IDR 6,909,090.91 (IDR / lg/year) and contribution to farmer households by 24%.

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