

Research Article

Analysis Of The Added Value Of Cassava Agroindustry Into Yam Crackers (Case Study Ud. Eki In Jorong Batu, Balang, Nagari, Limo Koto, Koto Vii District, Sijunjung Regency)Refangga¹, Roni Jarlis^{2*}, Fildza Arief Syuhada³, Andi Alatas⁴^{1,2,3,4} Faculty of Mathematics and Natural Science, Padang State University, Indonesia* Correspondence: ronijarlis@fmipa.unp.ac.id**ABSTRACT**

Cassava is one of the food crops that has many advantages. The purpose of processing cassava into sweet potato crackers is to increase the durability of cassava so that it is suitable for consumption and gets high added value in the market. The purpose of this study is to determine the amount of added value from processing cassava into UD yam crackers. EKI in Jorong Batu Balang. Revenue 1 time production produces 60 bunches/3000 pieces/78 kg of sweet potato crackers, 1 bunch is priced at Rp. 20,000 and the income earned by entrepreneurs is Rp. 1,200,000.00 per production time. Based on the results of research that has been conducted on Cassava Agroindustry into Sweet Potato Crackers (UD Case Study. EKI) in Jorong Batu Balang. The average value added for processing cassava into sweet potato crackers is IDR 4,298.00 per kg and the ratio of added value to output value is on average 64.47% per production process, which is high because the ratio is greater > 50%, As well as the total production cost used in 1 time the production of sweet potato crackers amounted to Rp.670,627.40.

Key words : Added value, Agroindustry, cassava, cassava crackers**ABSTRAK**

Singkong merupakan salah satu tanaman pangan yang memiliki banyak keunggulan. Tujuan dari pengolahan ubi kayu menjadi kerupuk ubi adalah untuk meningkatkan daya tahan ubi kayu sehingga layak untuk dikonsumsi dan mendapatkan nilai tambah yang tinggi di pasaran. Tujuan dari penelitian ini adalah untuk mengetahui besarnya nilai tambah dari pengolahan ubi kayu menjadi kerupuk ubi UD. EKI di Jorong Batu Balang. Pendapatan 1 kali produksi menghasilkan 60 ikat/3000 buah/78 kg kerupuk ubi, 1 ikat dihargai Rp. 20.000,00 dan pendapatan yang diperoleh pengusaha sebesar Rp. 1.200.000,00 per sekali produksi. Berdasarkan hasil penelitian yang telah dilakukan tentang Agroindustri Ubi Kayu Menjadi Kerupuk Ubi Jalar (Studi Kasus UD. EKI) di Jorong Batu Balang. Rata-rata nilai tambah pengolahan ubi kayu menjadi kerupuk ubi jalar adalah sebesar Rp 4.298,00 per kg dan rasio nilai tambah terhadap nilai output rata-rata 64,47% per proses produksi termasuk tinggi karena rasionya lebih besar >50%, serta total biaya produksi yang digunakan dalam 1 kali produksi kerupuk ubi jalar sebesar Rp 670.627,40

Kata kunci: Nilai tambah, Agroindustri, singkong, kerupuk singkong**HISTORY ARTICLE**

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1. Introduction

Sectors agriculture have roles Which very big in especially the country's economic growth country those with an agricultural style such as Indonesia. One of the agricultural subsectors is the food crops and horticulture sector. Secondary secondary crops also have high economic value and have promising prospects for development, such as cassava (Rahmi, 2014). Cassava is a plant that is resistant to water shortages so it can still be produced even on critical land and the method of planting cassava is very easy. The aim of processing cassava into cassava crackers is to increase the durability of the cassava so that it is suitable for consumption and obtaining high added value on the market.

The definition of agro -industry can be described as agro-industrial activities that utilize agricultural products as raw materials, design and provide equipment and services for these activities (Hidup Marsudi, 2013). Processing can be simple processing such as cleaning, selecting (*grading*), packing or can also be in the form of more sophisticated processing, such as milling, flouring (*powdering*), extraction and distillation (*extraction*), frying (*roasting*), demand (*spinning*), canning (*canning*) and other manufacturing processes (Life Marsudi, 2013). Cassava is one of the food crop commodities which is important and very strategic because it can be used for various products including food, feed, energy, pharmaceuticals and cosmetics (Firdaus *et. al*, 2019). Cassava is a commodity that has easy and easy cultivation techniques planted anywhere because cassava is able to survive on critical land and lack of water (Widiastuti *et. al*, 2020). The purpose of processing cassava itself is to increase the durability of cassava so that it is suitable for consumption and Utilize cassava to meet high selling value on the market (Sipayung , 2020).

The formulation of the problem in this research is how much added value, the ratio of added value and production costs from processing cassava into UD cassava crackers. EKI in Jorong Batu Balang Nagari Limo Koto Koto VII District, Sijunjung Regency?

The aim of this research is to determine the amount of added value, the ratio of added value and production costs from processing cassava into UD cassava crackers. EKI in Jorong Batu Balang Nagari Limo Koto, Koto VII District, Sijunjung Regency.

Several kinds of processed products Cassava includes cassava flour, cassava chips, sponge cake, sponge cake rainbows, cake pretty and so on (Djaafar and Siti, 20 1 3). Every company carries out production activities with the aim of maximizing profits (Tanjung and Ruslan 2019). The relationship between the factors of production and the level of production created is called production factors (Hanafi, 2017).

2. Method

This research was conducted from November 2023 to January 2024, located at the UD sweet potato cracker agro -industry business. EKI in Jorong Batu Balang Nagari Limo Koto, Koto VII District, Sijunjung Regency. This location was chosen purposively with the consideration that this sweet potato cracker agro-industry business is one of the sweet potato cracker processing businesses whose production *is* quite large compared to others in Jorong Batu Balang, this sweet potato cracker agro-industry business has been running for quite a long time, namely 12 years and also has 5 workers and 1 owner.

3. Results And Discussion

A. General Description of Research Locations

Jorong Nagari Limo Koto government area Koto VII District in Batu Balang is part of the Regency Sijunjung area . By administrative limit Jorong Batu Balang is: The northern boundary is South Padang Laweh , the southern boundary is Solok Badak , Limo Koto, western boundary Padang Laweh , eastern boundary Muaro Gambok .

B. Respondent Characteristics

Characteristics are the general condition of respondents in the UD sweet potato cracker business. EKI. The development of the business of processing cassava into cassava crackers is influenced by many parties such as owners, workers and consumers themselves. Workers are people who process cassava into cassava crackers which go through stages from peeling to becoming cassava crackers.

C. Respondent Identity

Respondent in this study is owner and staff working on business UD sweet potato crackers. EKI. Based on data from respondents who do activity in making product cassava processing become sweet potato crackers through method data collection with questionnaire obtained condition respondents about type gender , age , education , are as following :

1. Type sex

Tabel 1. Respondent Identity Based on Sex Type

No	Sex Type	Amount	Percentage %
1	Man	1	16.6 %
2	Woman	5	83.4 %
Amount		6	100

(Source : Primary Data After Processing, 2023)

Based on Table 4.5, in the UD sweet potato cracker business. EKI has only 1 male worker or 16.6% and 5 female workers or 83.4%, with a total of 6 workers.

2. Age

Tabel 2. Respondent Identity Based on Age

No	Age Respondents	Amount
1	15 - 25 Years	2
2	26 - 35 Years	3
3	36 - 45 Years	1
Amount		6

(Source : Primary data, 2023)

Based on this table, it shows that the average age of UD sweet potato cracker workers. partial EKI big on aged 26 to 35 years as many as 3 people. Based on the table above also provides information that majority respondents aged 36 to 45 years 1 person, while 2 people aged 15 to 25 years.

3. Education

Tabel 3. Respondent Identity Based on Education

No	Education	Respondent	Percentage %
1	elementary school	1	16.6 %
2	junior high school	3	50 %
3	high school	2	33.4 %
Amount		6	100

(Source : Primary Data After Processing, 2023)

Based on Table can be explained that large part of respondents or workers own elementary education only 1 person or amounting to 16.6%, meanwhile respondents who have 3 people with junior high school education or amounting to 50% and respondents who have 2 people having high school education or 33.4%.

D. Processing Sweet Potato Crackers

In the processing of UD sweet potato crackers. The EKI that needs to be considered is that raw materials are raw materials that are processed and can be used as production facilities in a business. The availability of sufficient and usable raw materials is cassava, while other auxiliary raw materials used are salt, garlic, turmeric leaves, firewood, petrol, water and rubber binding.

Raw materials and supporting materials can be obtained easily due to availability and affordable prices so that they do not become an obstacle for sweet potato cracker entrepreneurs. Raw materials are materials that form a complete part of the finished product. Raw materials processed by entrepreneurs can be obtained from direct purchases from farmers/collectors.

E. Processing and production

Standard materials used in making Cassava crackers consist of cassava, salt, white onions, turmeric leaves as additional material or helper with comparison usage as the following: for example in one production process For every 180 kg of cassava, additional ingredients (5 packets of salt, onions white 3 cloves, leaves turmeric 1 bunch) and quantity Can adapt with many standard materials used.

Continuation will ensure something business For Can produce in relatively long time . In processing sweet potato crackers, the main raw material is used.

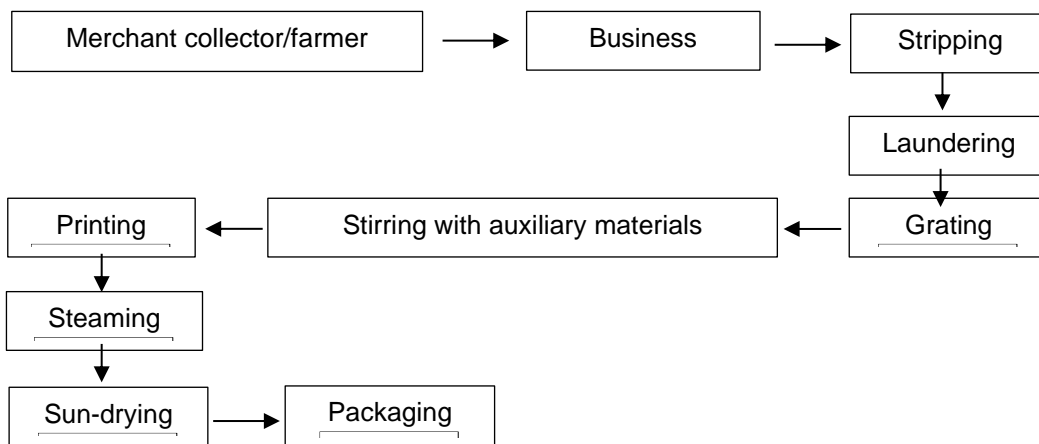


Figure 1. processing sweet potato crackers

Production of sweet potato crackers does not take that long. The cassava processing process basically has the same stages. The first is to provide raw materials purchased from collectors or cassava farmers themselves.

After that, we enter the peeling and washing process, where the cassava skin is scratched with the tip of a knife, then the skin begins to be peeled off until it is clean, and the washing process, where the peeled cassava is washed with water so that it is clean of all dirt, both of these processes take a long time. 30 minutes, grating and mixing process in which the cassava has been washed clean and then grated using a grater machine to form a dough and a kneading process in which the grated cassava is then mixed with supporting ingredients such as (salt, garlic and turmeric leaves) both processes take 1 hour.

After that, the molding process is where the finished dough is then molded , which takes 1.5 hours, the steaming process, where the molded cassava is put into a pot so that it is thoroughly cooked, this process takes 1.5 hours, the drying process in which the steamed crackers are placed on the plastic provided and then dried in the hot sun for 3 hours, the packaging process in which the dried sweet potato crackers are packaged by tying 50 pieces per bundle and stacking them into sacks, making it easier to transport to consumers. This process also takes 30 minutes, so the total time needed for the process of making sweet potato crackers, from peeling to packaging, is 8 hours.

Tabel 4. Variable Costs for Making Sweet Potato Crackers for One Time Production at UD.

EKI

No	Type Raw material	Number of units	Units	Price	Total cost
1	Inputs - Cassava	180	Kg	Rp. 2,000.00	IDR 360,000.00
	Amount				IDR 360,000.00
2	Other inputs - Salt	5	Wrap	Rp. 2,000.00	IDR 10,000.00
	- Onion white	3	Clove	Rp. 2,000.00	Rp. 6,000.00
	- Leaf turmeric	1	Tie	IDR 5,000.00	IDR 5,000.00
	- Firewood	3	Tie	IDR 10,000.00	IDR 30,000.00
	- Gas	1	Liter	Rp. 12,000.00	Rp. 12,000.00
	- Water	1	Day	Rp. 1,333.33	Rp. 1,333.33
	- Rubber binder	1	Ounce	Rp. 2,000.00	Rp. 2,000.00
	Amount				Rp. 66,333.33
3	additional costs - Work power costs	6	Hok	IDR 40,000.00	IDR 240,000.00
	Amount				IDR 240,000.00
	Total cost				Rp. 666,333.33

(Source : Primary Data After Processing, 2023)

Details of the use of each variable cost for main raw materials, auxiliary raw materials and labor costs in each production process in the UD sweet potato cracker agro -industry business. EKI. The main raw material for cassava is 180 kg, the total costs incurred are Rp. 360,000.00 per production, then the costs for purchasing supporting materials such as salt, garlic, turmeric leaves, then purchasing firewood, then purchasing petrol, paying for water per day and purchasing rubber binding. The total costs incurred for auxiliary materials are Rp. 66,333.33 per production and payment of labor costs. The total costs incurred for labor are Rp. 240,000.00 per production. Finally, we can see that the variable costs used in 1 production of sweet potato crackers are Rp. ,666,333.33.

F. Labor Wages

In the cassava agro -industry business becomes sweet potato crackers , wages power calculated work is Kindergarten fees / working hours namely Rp. 5,000/hour. The costs incurred in processing sweet potato crackers once in a while production can be seen in the table .

Table 5. The costs incurred in processing sweet potato crackers

No	Activity Type	Working hours (hours)	Worker Amount	Wage / Hour (Rp)	Production costs
1	Stripping sweet potato skin and washing	0.5	6	IDR 5,000	IDR 15,000
2	grating and mixing	1.0	6	IDR 5,000	IDR 30,000
3	Printing	1.5	6	IDR 5,000	IDR 45,000
4	Steaming	1.5	6	IDR 5,000	IDR 45,000
5	drying	3.0	6	IDR 5,000	IDR 90,000
6	Packaging	0.5	6	IDR 5,000	IDR 15,000
	Amount	8.00			IDR 240,000

(Source : Primary Data After Processing, 2023)

Time required worker in the manufacturing process sweet potato crackers started from stripping until packaging is 8 hours, then the longest time is drying and total wages power work used in one production processing cassava crackers amounting to IDR 240,000.00 per time production .

G. Equipment in the process of making sweet potato crackers

Tabel 6. Type Equipment And Depreciation Value Equipment Once in a while Production in the UD Sweet Potato Crackers Agroindustry. EKI.

No	Description	Units	Age economical	Unit price	Amount	Once in a while Production
1	Machine Grater	1	10 years	IDR 2,300,000.00	IDR 2,300,000.00	Rp. 737.18
2	Print Shrimp crispy	315	10 years	Rp. 11,500.00	IDR 3,622,500.00	Rp. 1,161.06
3	Pot	1	3 years	IDR 600,000.00	IDR 600,000.00	Rp. 641.03
4	A bucket of water	1	1 year	IDR 100,000.00	IDR 100,000.00	Rp. 320.51
5	Basins	2	1 year	IDR 70,000.00	IDR 140,000.00	Rp. 448.72
6	Knife peeler	1	2 years	Rp. 15,000.00	Rp. 15,000.00	Rp. 24.04
7	Plastic Clothesline	60	1 year	IDR 5,000.00	IDR 300,000.00	Rp. 961.54
	Total TC				IDR 7,077,500.00	Rp. 4,294.07
	Average				IDR 1,011,071.43	Rp. 613.44

(Source : Primary Data After Processing, 2023)

All types of equipment used have depreciation values per production process which vary from one piece of equipment to another, namely: types of grating machine equipment with depreciation values per production Rp. 737.18, cracker mold Rp. 1,161.06, pot Rp. 641.03, water bucket Rp. 320.51, basin Rp. 448.72, paring knife Rp. 24.04, plastic clothesline Rp. 961.54, so the total depreciation on equipment per production amount is IDR. 4,294.07.

H. Income

Tabel 7. Income from sweet potato crackers per production at UD Agroindustry. EKI

No	Product type	Quantities/production	Unit price	Amount
1	sweet potato crackers	60 bunches/3000 lbr /78 Kg	IDR 20,000.00	IDR 1,200,000.00
Amount Reception				IDR 1,200,000.00

(Source : Primary Data After Processing, 2023)

In 1 production, 60 bunches/3000 pieces/78 kg of sweet potato crackers are priced at IDR 20,000.00 and the income earned by the entrepreneur is IDR 1,200,000.00 per production.

I. Value Added Analysis

The following is an analysis of the added value of UD's sweet potato cracker agroindustry. EKI, in this research is calculated to determine the added value of cassava into cassava crackers using the basic calculation of input per kilogram of raw material during one production process.

Tabel 8. Average Added Value of Sweet Potato Crackers Agroindustry Per Production Process

No	Variables			Units	Mark
I. Input, Output and Price					
1	Output (Kg/ Production Process)	OP		Tie	60
2	Input (Kg/ Production Process)	IP		Kg	180
3	Labor (HOK/ Production Process)	Kindergarten		HOK	6
4	Conversion Factors	FKO	OP/IP		0.33
5	Labor Coefficient	CEC	Kindergarten/IP	HOK/Kg	0.033
6	Output Price	HO		Rp/Kg	20,000
7	Average Labor Wages	UP		Rp/HOK	40,000
II. Revenue And Profits					
8	Raw material prices	HBB		Rp/Kg	2,000
9	Other Input Contributions	SIPL		Rp/Kg	368.52
10	Output Value	NO	FKO*HO	Rp/Kg	6,666.67
11	A. Added Value	NT	NO-HBB-SIPL	Rp/Kg	4,298
	B. Value Added Ratio	RNT	NT/NO*100%	%	64.47%

No	Variables			Units	Mark
12	A. Labor Income	PTK	KTK*UP	Rp/Kg	1,333.33
	Labor Department	BTK	PTK/NT*100%	%	31.02%
13	A. Profit	PFT	NT-PTK	Rp/Kg	2,965
	B. Rate of Profit	TPF	PFT/NT*100%	%	68.98%
III.	Percentage Factor Production Against Margins				
14	Margins	MR	NO-HBB	Rp/Kg	4,666.67
	A. Capital and Management	MDM	PFT/MR*100%	%	63.53%
	B. Labor	Kindergarten	PTK/MR*100%	%	28.57%
	C. Other Inputs	IPL	SIPL/MR*100%	%	7.90%

(Source : Primary Data After Processing, 2023)

Process sweet potato crackers one average production run is required raw cassava material as much as 180 kg per production process that produces as many sweet potato crackers (60 bunches/3000 pieces /78 kg) per production process. Lots of sweet potato crackers produced and raw input materials can be obtained factor conversion of 0.33 which shows that every one kilogram of processed cassava produces an average yield of 0.33 bunch of sweet potato crackers. Big small factor conversion influences quality material standard. The more big factor the conversion so the more productive processing (Hanafi, 2017).

Processing standard material in one production process 6 HOK are required per production process with wages amounting to IDR 40,000 per HOK with 8 hour start time from stripping to packaging . In the cassava agroindustry become entrepreneur sweet potato crackers Lots use power Work from outside family . Coefficient power Work obtained with share amount power Work with amount standard material used in one production process namely 0.033.

Processing cassava into cassava crackers requires donations of other inputs averaging IDR 368.52. Other input contributions are: cost supports and materials burn per kilogram of standard material . Average cost of material supports and materials burn is IDR 66,333.33 from 180 kg of cassava . So from one kilogram of sweet potato crackers is needed material supports and materials burn with average cost Rp. 368.52, so the average contribution of other inputs is IDR 368.52.

Resulting output value from processing one kilogram of material standard sweet potato crackers which is IDR 6,666.67 which is the result of multiplication between factor conversion with output price . The price of perikat sweet potato crackers is IDR 20,000 per

person. Determination of price of sweet potato crackers from every businessman The same because there is an agreement between entrepreneurs, so there is no competition in determining price.

Average value plus what you get from processing one kilogram of standard material So amounting to IDR 4,298 per kilogram, meaning every one kilogram of input (cassava) will produce output (sweet potato crackers) of IDR 4,298 and ratio mark plus to The average output value is 64.47% per production process. So from calculation on can be interpreted that Value Added Ratio production business cassava processing become sweet potato crackers amounting to 64.47% are classified as tall Because the ratio is larger > 50% (Sudiyono , 2004 in Suprianto *et. al* , 2020).

Wages power average work for process material standard sweet potato crackers is IDR 1,333.33 per kilogram of standard ingredients. The average percentage share of labor wages in added value is 31.02%. Labor income is the wages received by direct workers for processing one kilogram of raw materials. The amount of income depends on the raw materials processed and the wage rate set by the entrepreneur. Judging from the average percentage share of labor income above, income is influenced by the labor coefficient, the greater the coefficient value, the greater the compensation received by workers.

Profit is obtained by subtracting labor income from value added. The average profit earned by entrepreneurs from processing one kilogram of cassava into cassava crackers is IDR 2,965 with a profit rate of 68.98%. Profit can be interpreted as the net added value received by entrepreneurs in one production process per kilogram of raw materials processed because it no longer contains compensation or labor income (Hayami *et. al*, 1987 in Widiastuti *et. al*, 2020)

Margin is the difference between the output value and the price of raw materials, which is the total remuneration to the owners of production factors. The average margin obtained is IDR 4,666.67 per kilogram of raw materials, which is then distributed to labor income of 28.57% or IDR 1,333.33 and supporting material donations of 7.90% or IDR 368.52 and business profits of 68.98% or IDR 2,965.

J. Production Costs

The following are the production costs of the UD Agroindustry business. EKI, in this research, was calculated to find out how much production costs in processing cassava into cassava crackers can be seen in the table.

Tabel 9. the production costs of the UD Agroindustry business

No	component costs	amount / once production
A.	Variable Costs	
	- Cassava	IDR 360,000.00
	- Salt	IDR 10,000.00
	- Onion white	Rp. 6,000.00
	- Leaf turmeric	IDR 5,000.00
	- Firewood	IDR 30,000.00
	- Gas	Rp. 12,000.00
	- Water	Rp. 1,333.33
	- Rubber binder	Rp. 2,000.00
	- Wages power Work	IDR 240,000.00
Total variables		Rp. 666,333.33
B.	Cost Still	
1	Machine Grater	Rp. 737.18
2	Print Shrimp crispy	Rp. 1,161.06
3	Pot	Rp. 641.03
4	A bucket of water	Rp. 320.51
5	Basins	Rp. 448.72
6	Knife peeler	Rp. 24.04
7	Plastic Clothesline	Rp. 961.54
Total cost still		Rp. 4,294.07
Total cost (a+b)		Rp. 670,627.40

(Source : Primary Data After Processing, 2023)

Usage from every amount cost variable as in the material standard main , material standard helper , wages power total work costs incurred amounting to IDR 666,333.33 as well cost still incurred in every time the production process in the UD sweet potato cracker agro - industry business . EKI of IDR 4,294.07. Finally we can know that the total production cost used in 1 production of sweet potato crackers amounts to IDR 670,627.40.

4. Conclusion

Based on the results of research conducted on the Agroindustry of Cassava into Cassava Crackers (Case Study of UD. EKI) in Jorong Batu Balang Nagari Limo Koto, Koto VII District, Sijunjung Regency. The size average mark plus For processing cassava into cassava crackers amounting to IDR 4,298 per kg and ratio mark plus to mark output average as big as 64.47% per process production is classified as high because the ratio is greater than > 50%. And the total production costs used in 1 production of sweet potato crackers are IDR 670,627.40.

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