

## Analysis of the Structure, Conduct, and Market Performance of Gambier in West Sumatra, Indonesia

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**Abstract**— Gambier is a significant Indonesian export commodity contributing more than US\$ 55 million to the economy. Production of gambier is centered in the province of West Sumatra, specifically Lima Pulu Kota Regency. This research aims to analyze the structure, conduct, and market performance of gambier commodity in West Sumatra. Fifty-two gambier farmers and twelve gambier traders were interviewed with data that were analyzed descriptively to determine the market structure, market conduct, and market performance. Based on the number of end buyers (exporters) in West Sumatra, which are relatively small, only 16 companies compared to the number of sellers (farmers Gambier), this study concluded Gambier market structure tends to be monopsony. The majority of gambier exports from West Sumatra went to India. The market concentration analysis obtained a CR4 value of  $\geq 0.8$ , which means low competition in the gambier commodity market. The market entry barriers analysis obtained an average value of MES of 35%, indicating the existence of barriers to market entry for new competitors. Four institutions were involved in marketing; collecting traders I, collecting traders II, interregional traders, and exporters. Of the four marketing channels, farmers-traders II-interregional traders (PAD)-exporters, was the most widely used, amounting to 51.92% of gambier trade. The research shows how different marketing channels benefit different institutions and provides suggestions to move towards a marketing system that provides more benefits to producers. The highest total marketing margin is on channel 1; Farmers-Merchants Merchants Gatherer I-II- Traders Inter (PAD) - Exporters. It occurs because channel 1 provides more marketing agencies. The highest of sharing farmers is the channel 4, i.e. farmers- interregional traders -exporters by 63.15%, and the lowest is in channel 2 (farmers-collecting traders II - interregional traders (PAD)-exporters) of 57.2 %.

**Keywords**— market structure; market conduct; market performance; marketing margin.

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### I. INTRODUCTION

Gambier is a significant source of foreign exchange for Indonesia. In 2018, 18,000 tons of gambier were exported with a value of US \$55 million [1], meaning that Indonesia supplies a third of the global market share. However, 93% of Indonesian gambier exports went to one country, India. This dependence on one market weakens Indonesia's bargaining position in the global gambier market and creates vulnerability for producers, especially gambier farmers.

Gambier is a product derived from the sap of leaves and branches of the gambier plant (*Uncaria Gambier Roxb.*). Gambier is processed through several stages including, boiling, pressing, settling, draining, printing, and drying.

Most gambier production in Indonesia comes from smallholder plantations, and the province of West Sumatra is the leading producer, supplying 80-90 % national gambier production [2]. Two regencies of West Sumatra dominate

gambier production, Lima Pulu Kota (70 %) and Pesisir Selatan (30%) [3].

In 2003 the area of land used for gambier was 17,800 hectares with a production of 23,375 tons (Figure 1 and 2). Since 2014 there has been a significant increase in gambier production, and in 2018 29,342 hectares of land produced 7,574 tons (BPS 2019). The reduced production of gambier in 2017 was caused by a decrease in the purchase price at the farm level. The diverse nature of agriculture in West Sumatra means that when prices of one commodity, such as gambier, fall, farmers chose to leave gambier in the fields and focus on other commodities.

Previous research in Lima Pulu Kota Regency showed that the margins of the institutions involved in gambier marketing channels were relatively fair and balanced in their distribution, and the price ratio received by farmers was relatively high [4]. However, several other indicators show that marketing performance in inefficient. Gambier market structure in Lima Pulu Kota Regency is in an oligopsony

market (imperfect competition market). Farmers are spread across various regions with very diverse harvest times. Sales are spread out. The amount harvested by each farmer is relatively small, and the quality of the product varies. Because the final gambier market is far from production centers, the bargaining power of farmers is low. Further research demonstrated that there are four channels in gambier marketing, but these were inefficient due to the low bargaining position of farmers, making farmers price takers [5].

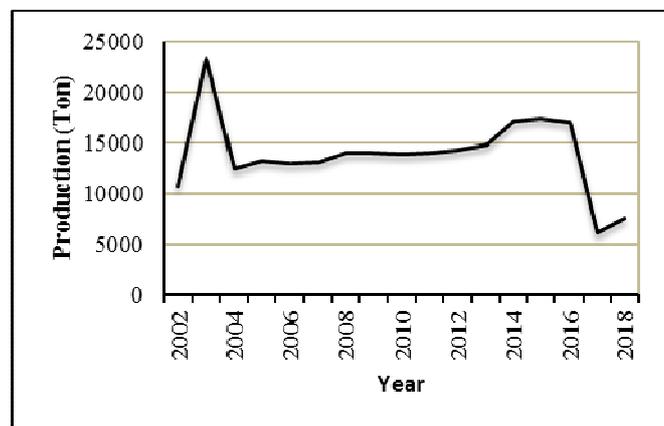


Fig. 1 Production of Gambier in West Sumatra Province (2012-2018)

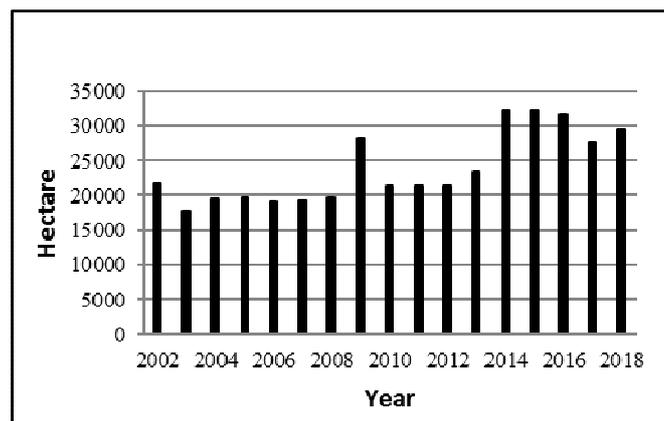


Fig. 2 Area of Gambier Production in West Sumatra Province (2012-2018)

Processed data from BPS 2019 [1] indicates that when the selling price of gambier exports rises, this increase is not accurately reflected in the price that farmers receive. While farmers may receive a slightly higher price, most of the price increase seems to be absorbed by middle-level buyers and exporters. It is a symptom of inefficient marketing. The previous research has highlighted. The main problem of facing the Gambier agro-industry is the inefficiency of marketing. This study was conducted to explore the structure, conduct, and market performance (SCP) performance of the gambier commodity in West Sumatra Province to capture the complexity of challenges in the gambier marketing system.

## II. MATERIAL AND METHODS

Two districts producing most gambier in West Sumatra were selected as research sites (Pangkalan Koto Baru and Kapur IX, in the regency of Lima Puluh Kota). In-depth interviews were conducted with 52 gambier farmers (26

from each district) and 12 gambier traders (6 from each district) between November 2019 and January 2020. Interviewees were selected using a snowball sampling technique. Further semi-structured interviews agencies and exporters. Data from interviews were analyzed in three ways.

### A. Analysis of Market Structure.

A descriptive analysis of gambier markets is used to identify whether they lean towards perfect or imperfect competition. Components of the market structure studied include market share, market concentration, and barriers to market entry [6].

### B. Analysis of Market Conduct.

A descriptive analysis of field phenomena is related to several dimensions of conduct, including buying and selling practices, pricing systems, and marketing agency collaboration [7].

### C. Analysis Market Performance.

Measures used in analyzing market performance included the marketing margins and the farmer's share. These were calculated as marketing margin and farmer share.

$$\text{Marketing Margin: } M = Pr - Pf \quad (1)$$

Where:

- M Margin gambier marketing
- Pr Gambier prices at the consumer level (IDR / kg)
- Pf Gambier prices at the farm level (IDR / kg)

$$\text{Farmer's Share: } FS = \frac{Pf}{Pr} \times 100\% \quad (2)$$

Where:

- FS Price section received by gambier farmers (IDR/kg)
- Pf Gambier prices at the farm level (IDR/kg)
- Pr Gambier prices at the exporter level (IDR/kg)

## III. RESULTS AND DISCUSSION

### A. General Conditions of Gambier Marketing in Lima Puluh Kota

Between 50 Kg and 150 Kg of gambier is sold per week by farmers. Several employees partially determine the output. Farmers with three workers can carry out five or six processing times per day, while a farmer with two workers is limited to four or five times per day. The highest quantities of Gambier obtained were most likely because of the sap gambier mixing with other ingredients such as flour of branches/leaves of gambier.

Certain farmers have an established relationship with a buyer. Some buyers provide loans for equipment to farmers, who, in return, commit to selling their gambier to that buyer. Gambier from Lima Puluh Kota regency is sent to exporters in Padang. The collector traders from Pesisir Selatan also send their gambier to exporters in Padang. A small proportion of gambier is traded among surrounded regions for domestic consumption.

The length of the marketing chain for gambier is one of the causes of inefficient marketing. Transportation for export occurs in several stages as follows:

- Transportation moves from the harvest fields to the house felts.
- Gambier is transported from home felts to markets or sales locations.
- Gambier is moved from the market location to the warehouse traders.
- Gambier is transported from the warehouse collector to the drying location.
- Gambier is transported between traders.
- Transportation of gambier to exporters.
- Transportation of Gambier from the exporter to the export location.

Traders set sales prices based on their purchase price and the cost of handling and transportation. In contrast, farmers only receive the price which has been determined by the merchant. According to one exporter in Padang, an importer from India regularly come to the Padang and determines the price for purchases in the future. Based on these prices, the purchase price from the merchant until the farmer is determined. The bargaining position of farmers may be further weakened because the collectors do not come on time so that farmers who need money are willing to sell their gambier at a lower price.

1) *Market Share*: There are considerably fewer end-buyers / exporters (16) in West Sumatra than producers meaning the gambier market structure tends to be a monopsony. The number of researchers has defined that the gambier market is an oligopsony [4]. India is the dominant buyer. Data support the conclusion, the gambier market leads to a monopsony market structure [10]. Imbalanced populations between sellers and buyers will impact the role of marketing agencies (traders), which are more powerful and dominant in determining the price of gambier. Sellers (farmers) will be inclined to be 'price takers' following the price set by the buyer (merchant).

Based on the number of end buyers (exporters) in West Sumatra, which are relatively small, only 16 companies compared to the number of sellers (farmers Gambier), this study concluded Gambier market structure tends to be monopsony. The oligopsony market structure is a structure consisting of several buyers [6]. The market structure Gambier likely to lead to an oligopsony market structure, but considering that the quantity delivered annually to India reaches 93%, it causes a tendency to lead to a monopsony market structure [4]. Gambier market share towards the Indian market is considerable and dominant compared to other destination countries. In line with this, [10] also mentioned that the Gambier market leads to a monopsony market structure. Imbalanced populations between sellers and buyers will impact the role of marketing agencies (traders), which are more powerful and dominant in determining the price of Gambier. Sellers (farmers) will be inclined as recipients' price (price taker) following the price set by the buyer (merchant).

2) *Market Concentration*: Market concentration can be calculated by measuring the output produced from the four largest companies in the industry [11]. In this study, the company was an exporter engaged in gambier trading in Lima Puluh Kota Regency. The analytical method used was

the Four Firm Concentration Ratio (CR4). A CR4 value of 0.8 showed very little Gambier market competition or highly concentrated following the theory [12], which states when  $CR4 \geq 0.8$  indicates that the industry is highly concentrated (highly concentrated).

3) *Barriers to Market Entry*: An MES value was obtained from the gambier purchase of the largest companies (exporters) to the total gambier from Lima Puluh Kota Regency. The analysis showed that during 2017 and 2018, firms that bought gambier in Lima Puluh Kota had an average value of 35% MES. This indicated the presence of barriers to entry in gambier trading at exporter levels.

TABLE I  
MINIMUM EFFICIENCY SCALE (MES) LIMA PULUH KOTA GAMBIE MARKET  
IN 2017-2018

No.	Year	MES (%)	Information
1	2017	36.9	There are barriers to entry
2	2018	32.9	There are barriers to entry
	Average	35	

Each year, the value of MES tends to fluctuate (Table I). The MES value in 2017 reached 36.9%, and in 2018 32.9%. Fluctuations occur because of changes in the number of purchases made by the company. However, the value of MES was always higher than 10%. If a new competitor enters the market with a value below the average, then the competitor cannot compete with existing companies. However, if the new competitor would like to remain to trade, then the company must bear the higher costs to be competitive with other companies.

Based on the analysis of market share, the market concentration and barriers to a market entry indicates the high concentration of the market and the high market entry barriers (barrier to entry) at the level of exporters. Besides, the market structure formed at the producer level is oligopsony, with the number of collectors centralized as buyers. Thus, the role of exporters in determining the prices of gambier is more dominant compared to other marketing agencies. This is due to exporters directly dealing with consumers (importers) from India who determine the price.

#### B. Market Behavior Analysis (Market Conduct)

1) *Agencies and Marketing Functions*: Marketing agencies can act as individuals or organizations that enable gambier to move from producer to consumer. Four gambier marketing agencies are involved; traders I, traders II, inter-regional traders, and exporters. Associations of farmers and farmer groups have not been able to engage in gambier marketing actively.

- Farmer. Farmers perform some marketing functions such as exchange functions, physical and facilities. Exchange functions relate to the sale of gambier. Physical functions relate to transportation activities. The facility functions relate to underwriting risks, financial, and market information. The sales functions are related to the sales of gambier to a collector I, II, or merchant between regions. The transporting function is related to the transport of gambier from the processing location to the sale location (the market). The packaging function by the farmers relates to

facilitating the transport process. The storage function by farmer relates to the activities of the storage gambier when the gambier is ready for sale. The maximum storage time is for one week because more farmers bring their crops one day before the sale. Risk function occurs when farmers have processed the gambier and paid the workers, but the sales price is not sufficient to cover production costs. Other risks relate to the amount of sales volume, which is not as high as farmers' hope.

- Collector Trader I. Traders I are middlemen who collect gambier from farmers and distribute it directly to the collector traders II and interregional traders between regions without value-adding activities gambier (such as drying). Traders I are different from traders II in terms of the scale of sales and purchases, capital resources, and marketing functions (Table II). Traders I have smaller-scale purchases of about 2 tons/month or 60 kg/day, and the level of profit is smaller than traders II with the level of venture capital holdings are very small (with a capital of trust between local merchants).

TABLE II  
MARKETING FUNCTIONS PERFORMED AT THE DISTRIBUTOR LEVEL

Marketing Agencies	Marketing Functions	Information
Traders Gatherer I	Function Exchange	Purchase
		Sale
	Physical Function	Transport
	Function Facilities	Market Information

- Collectors Trader II. Collectors traders II are those who collect gambier from farmers and then distribute it to wholesalers and exporters. Traders II has a greater volume of sales and purchases > 2 tons/month to 14 tons/month, equivalent to sales of more than 60 kg/day up to 400 kg/day. Also, traders II have working capital and are not completely dependent on marketing agencies. The role of collecting traders is a very dominant Rizal [13]. In their functions, collectors perform processing operations such as gambier drying, and the expense is charged to marketing costs (Table III).
- Inter-Regional Trader. Inter-regional traders are traders who collect gambier from farmers and collectors then distribute gambier to wholesalers in Java or exporters. Farmers and traders are becoming a source of supply of gambier, and wholesalers can be the collectors and farmers who work in cooperation (unwritten agreement) or not. This unwritten agreement is related to the agreement of selling gambier from collector traders to the inter-regional traders who have provided capital. This unwritten agreement is only based on trust and the relationship that has existed for a long time or kinship. As for the dealer, they tend to be tied to large traders because traders directly provide the source of capital between regions (Table IV).

TABLE III  
THE FUNCTIONS OF MARKETING IS DONE ON THE LEVEL OF TRADERS

Marketing Agencies	Marketing Functions	Information
Traders Gatherer II	Function Exchange	Purchase
		Sale
	Physical Function	Storage
		Transport
		Processing
		Packaging
	Function Facilities	Sorting
		Steps Risk
		Financing
Market Information		

TABLE IV  
MARKETING FUNCTIONS ARE PERFORMED AT THE LEVEL OF WHOLESALERS

Marketing Agencies	Marketing Functions	Information
Traders Among Regions	Function Exchange	Purchase
		Sale
	Physical Function	Storage
		Transport
		Processing
		Packaging
	Function Facilities	Sorting
		Steps Risk
		Financing
Market Information		

- Exporter. Exporters in this study were defined as the marketing agency that ships gambier abroad or to the world market. Based on data from [7], there are 16 corporate entities CV and PT businesses engaged in export of Gambier in West Sumatra (Table V).

TABLE V  
GAMBIER EXPORTER COMPANY IN WEST SUMATERA

No.	Company Name	Volume (Kg)	Value (US \$)
1	PT. AB Group	26,000	100 386
2	PT. Bina Earth Shankoro	27,000	87,897.42
3	PT. Emesos E. Indonesia	545,000	1,377,808.22
4	PT. Ganesha Eczema	795,000	2,724,547.88
5	PT Global Agro Eczema	1,010,000	2,575,132.06
6	PT. Global Impex Jhanindo	163,000	462,456.02
7	PT. Karya Mandiri Competindo	77,500	204,469.28
8	PT. Plantex Int. Sambeda	2,302,650	7,943,224.05
9	PT. Rajdular Brothers	656,450	1,879,696.73
10	CV. Rasdi & Co.	1,2500	42,750
11	PT. Roles Gambier	1,4000	42,000
12	PT. Interrogation Global Busines	2,5000	7,4092.50
13	PT. Sri Jaya Agro	2,936,970	10,455,471.05
14	PT. Sumatra Resources Int.	133,847	309,781.36
15	CV. Sutraco	15,000	6,0000
16	PT. Swati Commodities	166,845	640,861.50
	Amount	8,906,762	28,980,574.07

Source: Chamber of Commerce of West Sumatra Province [3]

In carrying out marketing activities, Gambier exporter purchases from traders and wholesalers through cooperation (unwritten contract) or not. Exporters also have a marketing

agency that served as a supplier of fixed Gambier, while at the level of exporters with importers (buyers) are based on the contract system.

The contract of purchase and sale is made based on the request of buyers. Delivery time intervals can usually 1-3 months after the contract agreement. The contract will be agreed upon quantity demanded importers (buyers) and the price to be received exporters based unit US \$ / ton. Any price and a predetermined amount in the contract will affect supply and demand conditions for farmers of gambier manufacturers, in this case, farmers. Table 6 shows the marketing function performed by exporters in marketing gambier.

TABLE VI  
MARKETING FUNCTIONS PERFORMED AT THE LEVEL OF EXPORTERS

Marketing Agencies	Marketing Functions	Information
Exporter	Function Exchange	Purchase
		Sale
	Physical Function	Storage
		Transport
		Processing
		Packaging
	Function Facilities	Sorting
		Steps Risk
		Financing
		Market Information

2) *Marketing Channels Analysis Gambier*: Marketing agencies such as farmers, distributors, traders, wholesalers, and exporters have a wide range of alternative options in the gambier channel.

TABLE VII  
MARKETING CHANNELS OF GAMBIE IN LIMAPULUH KOTA REGENCY

Channel Type	Information	Amount	Percentage (%)
Channel 1	Farmers-Merchants Merchants Gatherer Gatherer I-II- Traders Inter (PAD) - Exporters	20	38.46
Channel 2	Farmers-Merchants Merchants Gatherer I- Inter (PAD) -Exporters	2	3.85
Channel 3	Farmers-Merchants Merchants Gatherer II- Inter (PAD) - Exporters	27	51.92
Channel 4	Inter-regional farmers' Traders (PAD)- Exporters	3	5.77
	<b>Amount</b>	52	100

Table VII above shows the data of the farmers' samples (n = 52), traders I (n = 3), traders II (n = 6), traders among

regions (n = 3), and exporter (n = 1). The table also indicates the marketing channels through marketing Gambier in District Kapur IX. The District Pangkalan base consists of 4 types of marketing channels. The table also shows the balanced distribution and high price received by farmers. This shows that gambier marketing is quite fair in terms of the price distribution, where the portion received by farmers is significant. However, other research contradicts these findings.

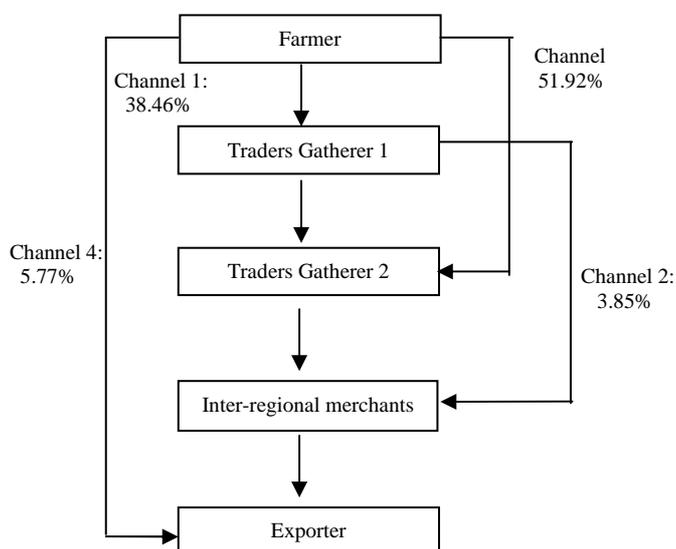


Fig. 3 Flow Chart of Lima Puluh Kota Gambier Marketing Channels

The percentage of farmers selling on channels 1, 2, and 3 was 94.23%, while the remaining 5.77% directly choose to sell to inter-regional traders. Of the four channels, channel three, farmers-traders II-interregional traders (PAD)-exporters, is the most widely used, amounting to 51.92%. The role of inter-regional traders looks very dominant as a liaison for farmers, distributors as well as traders to exporters. It is reinforced by the increasing volume of gambier received by a large merchant who accepts more than half Gambier that needs to be exported by the exporter. Gambier wholesalers can supply as much as 47.75 tons/month. While the average monthly export demand for the three exporters is 56 tons/month. This condition means the inter-regional trader in Kapur IX and Pangkalan is the largest supplier for the three exporters in West Sumatra, and other districts fill the rest.

### C. Performance Analysis Market (Market Performance)

The performance of the market (market performance) will reflect the interaction between market structure and market behavior [7]. The analysis used to measure market performance, including marketing margins, farmer share, as Table VIII. The table shows that the highest total marketing margin is on channel 1.

TABLE VIII  
ANALYSIS OF MARKETING MARGIN AND FARMER'S SHARE

Institution Trading System	Channel 1 (n = 20)		Channel 2 (n = 2)		Channel 3 (n = 27)		Channel 4 (n = 3)	
	IDR / Kg	% Share	IDR / Kg	% Share	IDR / Kg	% Share	IDR/ Kg	% Share
<b>1. Farmers</b>								
- Selling Price	19,550	57.87	19,500	57.72	20,000	59.20	21,333.33	63.15
<b>2. Collecting Traders 1</b>								
- Purchase Price	19,550	57.87	19,500	57.87				
- Marketing Costs	485	1.80	825	3.06				
- Gains	1,265	4.69	2,175	8.06				
- Margin Trading System	1,750	6.48	3,000	11.11				
- Selling Price	21,200	78.52	22,500	83.33				
<b>3. Collecting Traders 2</b>								
- Purchase Price	21,200	62.75			20,000	59.20		
- Marketing Costs	1,212.5	4.49			1,305.15	4.83		
- Gains	1,487.5	5.51			2,583.74	9.57		
-Margin Trading System	2,700	10.00			3,888.89	14.40		
- Selling Price	23,900	88.52			23,889	88.48		
<b>4. Traders Inter-Regional</b>								
- Purchase Price	23,900	70.74	22,500	66.60	23,889	70.71	21,333	63.15
- Marketing Costs	1,423	5.27	1,517	5.62	1,431	5.30	1,339	4.96
- Gains	1,677	6.21	2,983	11.05	1,680	6.22	4,327	16.03
- Margin Trading System	3,100	11.48	4,500	16.67	3,111	11.52	5,667	20.99
- Selling Price	27,000		27,000		27,000		27,000	
<b>5. Exporter</b>								
- Purchase Price	27,000	79.92	27,000	79.92	27,000	79.92	27,000	79.92
- Marketing Costs								
- Gains								
- Margin Trading System	6,784	20.08	6,784	20.08	6,784	20.08	6,784	20.08
- Selling Price	33,784	100.00	33,784	100.00	33,784	100.00	33,784	100.00

It occurs because channel 1 provides more marketing agency than channel 2,3 and 4. It also shows that the highest share farmer is on channel 4 with 63,15%, then consecutive channel 1 at 57,87, channel 2 at 57,72%, and channels 3 and amounted to 59,2%. From the analysis of market performance, the largest total marketing margin is in channel 1 (farmer- collecting traders I - collecting traders II-interregional trader (PAD)-exporter and the smallest is found in channel 4 (farmer- interregional traders -exporters). Then the highest share received by farmers is in channel 4 (farmers- interregional traders-exporters) by 63.15%, and the lowest is in channel 2 (farmers-collecting traders II - interregional traders (PAD)-exporters) of 57.2 %.

This is in line with research by Afrizal [4] which showed that Gambier marketing margins tend to be relatively fair and

balanced in their distribution, and the price ratio received by farmers is relatively high. This shows that Gambier marketing is quite fair in terms of the price distribution, where the portion received by farmers is significant. However, other research contradicts these findings. Research conducted by Hosen [14] demonstrated that the share price received by Gambier farmers was only 43.1%, i.e., the Gambier marketing system is inefficient, and in 2017 the price received by farmers was on average only IDR. 28,000 / kg when the export price received by exporters was IDR. 65 000 / kg. Several factors can influence this

discrepancy, but the most common cause is that price changes at the exporter level are not offset by price changes at the farmer level and vice versa, based on Husnaini [15] research.

#### IV. CONCLUSIONS

The market structure of Gambier marketing in Lima Puluh Kota is a monopsony. This is because India has such a dominant position as a buyer. There is very little competition in the Gambier market, and it is highly concentrated with a CR4 value of  $\geq 0.8$ . Gambier market also has barriers to entry for new competitors (exporters) with an average value of 35 percent MES. In marketing, there are four Gambier marketing agencies that traders I, traders II, inter-regional traders, and exporters. Gambier marketing channels are channel 1: Farmers-Merchants Traders collector I-II-inter-regional traders - Exporters of as much as 38.46%; Channel 2: Farmers-collectors trader, Merchants collector I – Inter-regional trader -Exporter as much as 3.85%; Channel 3: Farmers Merchants, Merchants collector II – inter-regional traders - Exporters of 51.92%; and Channel 4: Inter-regional farmers' Traders (PAD) -Exporter amounted to 5.77%. The total marketing margin is on channel 1; this occurs because the first line there are more than marketing agency channel 2,3 and 4. Moreover, the smallest is on channel 4. It also shows that the highest share 10 farmer is on channel 4,

namely 63.15%, and respectively channel 1 at 57.87%, amounting to 57.72% channel 2 and channel 3 and amounted to 59.20%.

#### ACKNOWLEDGMENT

The study of the Gambier commodity market structure showed that the barriers to becoming a trader and exporter of Gambier are relatively significant so that the market is dominated by exporters who have high capital. It is necessary to evaluate the regulations of the relevant agencies and supervise the implementation of these regulations. Based on the marketing margin and farmer share, farmers still get a relatively small profit from the low selling price of Gambier compared to traders. A further problem facing farmers is that the Gambier price keeps decreasing compared to previous years. It may through government interventions that would include Gambier as one of the commodities eligible for the warehouse receipts system.

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