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Gambir (*Uncaria gambier*) Processing and Marketing Techniques in Pesisir Selatan Regency, Indonesia

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A B S T R A C T

This study aims to determine the Gambir processing technique in Pesisir Selatan Regency and the market potential associated with Uncaria Gambir. This study uses a qualitative research methodology that focuses on the socio-economic impact of the Gambir processing system in Pesisir Selatan, which shows the importance of Gambir as a primary livelihood for local communities. This area is characterized by unique Gambir processing techniques that contribute to ecological sustainability and financial viability for farmers. The study results show that Gambir processing is still carried out in traditional ways: harvesting, boiling, pressing, filtering, drying, molding, and drying. Furthermore, for marketing Gambir, it is done by farmers selling to collectors and then selling it to local exporters in Padang City. This study provides information on the important role of Gambir in the economic landscape of Pesisir Selatan. It provides a comprehensive view of processing techniques, market dynamics, and cultivation systems that are important for the sustainable development of this valuable natural resource.

Contribution to Sustainable Development Goals (SDGs):
SDG 1 – No Poverty
SDG 8 – Decent Work and Economic Growth
SDG 12 – Responsible Consumption and Production**:**
SDG 15 – Life on Land

1. INTRODUCTION

1.1. Research Background

Gambier plant, scientifically known as *Uncaria gambir* Roxb, is one of Indonesia's leading non-timber forest products, particularly due to its economic significance and diverse applications. The plant has become an integral part of the local agricultural economy, especially in areas such as West Sumatra, where it thrives due to favorable climatic conditions and fertile soil types. Gambier production is a source of livelihood for rural communities and plays an important role in the global market, as Indonesia accounts for about 80% of the world's gambier exports [1], [2], [3]

Historically, gambier has been revered for its medicinal properties and applications in traditional medicine and its use in dyes and cosmetics [4]. Low production costs and high market demand underline its profitability; however, farmers often face price fluctuations and limited access to global markets, hamper their economic stability [5], [6]. This situation emphasizes the need for better marketing strategies and better integration of local farmers into larger supply chains, allowing them to benefit more from their production efforts [7], [8].

As attention is drawn to gambir due to its potential health benefits and versatile applications, there is an urgent need for innovative processing techniques and marketing strategies that can enhance its value and market reach [9]. This article analyses the economic value, current processing techniques, and marketing opportunities associated with gambir. It offers insights into how stakeholders can leverage this commodity to drive sustainable development in communities that depend on its production. Through a comprehensive literature review and case study, this study seeks to contribute to the understanding and

advancement of gambir as a valuable commodity in local and international markets.

Traditional methods of gambier processing include harvesting, steaming, pressing, and drying; however, these practices can be inefficient, potentially leading to low catechin yields and impacting the overall quality of the product [2]. Recent innovations such as eco-friendly extraction techniques using ultrasonic baths have shown promising results in producing higher-quality extracts while reducing environmental impact [10], [11]. Furthermore, advances in analytical methodologies, such as high-performance liquid chromatography (HPLC), have allowed for more precise measurement of catechin content, aiding in developing improved processing standards [12].

The gambier marketing landscape has evolved with technological advancements, notably by introducing digital platforms that facilitate better market linkages and enable farmers to reach a larger consumer base [13]. However, many farmers rely on traditional marketing channels, often leading to inefficiencies and increased costs. Studies have shown that improving marketing channels and shortening supply chains can substantially increase farmer incomes while ensuring consumers receive higher-quality products [14]. In this context, the role of cooperatives and farmer associations becomes more relevant, as they can support marketing efforts, increase bargaining power, and ensure a more equitable distribution of benefits in the supply chain [15], [16].

1.2. Research Objective

As the market for natural products and sustainable commodities expands globally, the potential of gambier as a profitable commodity becomes significant. By adopting innovative marketing approaches and leveraging modern technologies, stakeholders can maximize Gambier's economic benefits while ensuring its production's sustainability. Therefore, this article aims to review gambir processing techniques and the current state of gambir marketing, analyze producers' challenges, and explore potential strategies to improve market access and efficiency throughout the gambir supply chain.

2. MATERIALS AND METHODS

2.1. Research Procedure

1) Type and Approach of Research: This research uses a qualitative approach with a descriptive research type. The aim is to describe the gambir processing process and the marketing system carried out by farmers or gambir business actors.
2) Research Location and Time: The research was conducted in 3 sub-districts with the largest gambir producers gambir production centers in Pesisir Selatan Regency. The research was conducted in October 2024
3) Informants and Informant Determination Techniques. Informants were selected purposively (purposefully), namely Gambir farmers/processors, Collectors or local marketing actors, Related agencies (eg, Agriculture or Trade Office), and Local community leaders. The number of informants will be determined based on data saturation (saturated data).
4) Data Collection Techniques
   a. In-depth Interview, Using semi-structured interview guidelines to explore Gambir processing techniques and stages, Tools and materials used, Problems/techniques often encountered, Marketing channels and strategies, Price and distribution chain
   b. Observation was conducted at the Gambir processing location and marketing location. This observation aims to strengthen the interview results.
   c. Documentation, A collection of secondary data, such as photos of the processing process, production records, and data from related agencies.

2.2. Data Analysis

Data were analyzed using the Miles and Huberman qualitative analysis method, which includes Data reduction, Data presentation, drawing conclusions or verification, and Data validity. To ensure the validity of the data, source and technique triangulation techniques were used, namely comparing data from various sources and different data collection methods.

3. RESULT AND DISCUSSION

3.1. Gambir processing at the farmer level

a. Harvesting is done by cutting the twigs and leaves with a harvester, putting them in a basket made of rattan, and taking them to the processing place. The leaves and twigs are harvested in the morning and put into the basket. Usually, there are two types of tools for cutting gambir leaf twigs, such as a harvester and garden shears, which can be seen in (Fig. 1)

b. Boiling Preparation: The material is put into a knit (ajuik) and placed into a kapok or basket without a base of woven bamboo, clamped on the edges with rattan, and compacted. One boiling of the material used is an average of 42 kg, which, if sorted, consists of 30 kg of leaves and 12 kg of twigs. The dry weight of the raw material is 12.6 kg (30%).

c. Boiling is done for 1 hour; every 30 minutes, it is turned over and stabbed. stabbing the gambir bundles during the boiling process with a sharp stick aims to provide a path for hot water to enter the gambir bundles so that the boiling is even. can be seen in (Fig. 2)

d. Pressing: The boiled material is taken out, wrapped and tied with a rope until it is cylindrical and solid, then pressed until the liquid drops are gone and reboiled for 5 minutes for pressing once more. After the leaves are tied, they are beaten with a small wooden hammer so the sap can come out to the surface of the leaves. The pressing time is around 10-15 minutes, depending on the type of pressing tool used. Can be seen in (Fig.3).

Fig. 1. Harvesting and Boiling Preparation

Fig. 2. Boiling

Fig. 3. Pressing

e. Sedimentation: The pressing result of the liquid is transferred to a paraku (sedimentation container). The sedimentation time is 12 hours in the paraku. The extract from the pressing is filtered to separate dirt from the liquid. Sedimentation can be stimulated by rubbing the sap with a collection of jute/plastic sack fibers. The sedimentation time is one night. Furthermore, the sediment in the form of paste is separated from the liquid and transferred into a calico sack for draining. To speed up the draining, a load is added on top, and the draining is carried out for one night (12 hours). Can be seen in (Fig.4).

f.

Fig. 4: Sedimentation

g. Forming gambir is done using cylindrical bamboo pieces with a diameter of 2-5 cm and a height of 3-7 cm. The gambir molding tool is made of bamboo (cupak). There are several forms of gambir molds, such as biscuit-shaped gambir molds, coins, mortars, and bootch.

h. Drying aims to dry or reduce the water content of gambir, which is done by utilizing the sun's heat for 3 to 4 days. If it rains, the gambir boiling furnace is used to heat it. The drying process is imperfect, resulting in the color and smell of gambir and the water content not being in accordance with quality standards. Higher water content facilitates mold growth during storage. Drying on the ground, on the side of the road, will have a high chance of being contaminated by dust, dirt, and other foreign objects (Fig.5).

Fig. 5: Forming and Drying

Traditional gambir processing in Pesisir Selatan Regency encompasses a rich heritage and plays a significant role in the local economy. The primary product, gambir (Uncaria gambir), is derived from the leaves and branches of the plant, known for its medicinal and industrial applications. The quality of gambir produced is heavily influenced by the traditional methods used in its processing. Research indicates that traditional extraction methods significantly affect the quality of gambir, highlighting variances in catechin content based on these methods [17].

3.2. Gambir processing at Collector Trader

The drying process carried out by gambir traders is by drying in the sun. This drying is done on the Gambir drying floor. The dried gambir is covered with sacks, which aims to make it easier to lift the gambir into the warehouse when the weather is cloudy or rainy. This drying is carried out for 2-3 days until the gambir is no longer sticky and is dry. Some traders also use the smoking method to dry the gambir. This smoking is done by placing the

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gambir on shelves and burning wood on the stove under the smoking shelves.

Dried gambir is stored in a warehouse. The storage conditions in the warehouse are stored at room temperature. Storage carried out by gambir traders ranges from 6-7 days, because gambir shipments to exporters are carried out once a week, according to gambir demand. Gambir packaging uses 2 types of sacks, namely burlap and plastic. This packaging aims to facilitate the delivery of gambir to exporters. Gambir packaging is carried out if the quality or specifications of the gambir product follow the exporter's request.

3.3. Gambir processing at Exporters

The drying of gambir received from farmers and gambir traders aims to reduce the water content of gambir, and drying is carried out in a gambir drying place using solar heat, this is the same as drying carried out by farmers and traders, drying is carried out for 3-4 days before processing is carried out. Sampling of gambir that has been dried is carried out for testing. Gambir that meets the quality requirements is not processed, but gambir that does not pass the quality requirements is processed in the production room.

Gambir is cooked in a mixing tank for 4 hours, during the cooking process, chemicals are added so that pure gambir is separated from dirt, dirt that has been separated from the material is sucked, Gambir dirt that has been sucked is then dried, the dirt is used as boiler fuel. The clarification stage is carried out for 2 hours. This process is a stage to produce pure gambir, where the impurities contained in the raw materials have been minimized. Materials that have gone through the clarification process are removed from the tank, such as the method of sucking up dirt, the material storage uses a bucket, and the gambir that has been collected is cooled for 30 minutes and then molded.

The printing of processed materials is carried out in the Gambir warehouse. The printing of the materials uses a cylindrical pipe with a diameter of 2-5 cm and a height of 5-10 cm. The printing results are placed in the Gambir storage warehouse. The printing results are called Gambir catechin. Drying of gambier catechin is done in the gambier warehouse, drying using a fan placed on blocks of gambier expanse has been printed, and the gambier is dried for 2-3 days.

3.4. Gambir Marketing Channels

The gambier supply chain has various choices in distributing gambier. Therefore, in this study, it is necessary to identify marketing channels that aim to see the behavior of each marketing institution when choosing marketing channels to market gambier. The differences in marketing forms can be influenced by marketing characteristics in the region and based on the type and price of gambier. The selection of the gambir supply chain is determined by the uniformity of the gambir supply chain in each gambir production center region and the percentage of gambir marketing channel selection in each gambir supply chain. The gambir supply chain that is widely chosen is the channel that starts with farmers, collectors, local exporters, and foreign consumers. Channel 1 is the largest in Pesisir Selatan Regency. Based on the analysis of the Gambir marketing institution, the percentage of sales to collectors reached 58.54% and continued to local exporters 27.42%. Can be seen in Table 1.

Table 1. Gambir Marketing Channels

Channel	Marketing Step
Channel 1	Farmers-Collectors-Local Exporters-Foreign Consumers
Channel 2	Farmers-Distributors-Wholesalers-Local Exporters-Foreign Consumers
Channel 3	Farmers-Wholesalers-Local Exporters-Foreign Consumers
Channel 4	Farmers-Collectors-Wholesalers-Local Exporters-Foreign Consumers
Channel 5	Farmers-Wholesalers-Exporters Outside the Province/Wholesalers in Java-Distributors-Foreign/Domestic Consumers

The marketing chain for Gambir in Pesisir Selatan involves several key players, including farmers, processors, and traders. Farmers, often small-scale producers, harvest and initially process gambir before selling it to local middlemen or traders. This structure leads to challenges such as low bargaining power for the farmers and price fluctuations due to market dynamics. A study examining the efficiency of gambir production indicates that farmers face technical inefficiencies linked to inadequate capital and labor constraints affecting their output quality and quantity [18].

Furthermore, the socio-economic evaluation of gambir cultivation systems reveals variations across different farming practices employed in Pesisir Selatan. Certain crop combinations, such as durian and gambir, have been shown to yield better financial returns compared to mono-cropping systems [1]. This practice enables farmers to diversify their income streams and improve resilience against market fluctuations. The SWOT analysis indicates that increasing demand for gambir presents opportunities for business expansion; however, challenges remain, including improved processing techniques and better access to market information for farmers [19].

3.5. Gambier Quality in Every Supply Chain

The results of the gambir quality test are gambir obtained from the West Sumatra gambir supply chain by purposive sampling, which was selected from the sub-districts as the Most Producers in Pesisir Selatan Regency, namely Koto IX Tarusan District, Sutera District, and Batang Kapas District. The next gambir sampling was at the local exporters of West Sumatra, namely CVR and PTSj.

Gambir obtained from Farmers is a type of Bootch gambir with an average height of 3.20 cm, a diameter of 3.68 cm, and a weight of 22.76 grams from 46 samples. Bootch gambir has different sizes from each region because it uses different molds; the shape of the gambir printed by farmers can be seen from the mold used by farmers. Several types of gambir found at the farmer level include biscuit gambir, egg halaban, coin, small yellow bootch, and mortar. Then, at the exporter level, the gambir produced is called catechin gambir.

Gambir obtained in the gambir supply chain is subjected to quality testing based on SNI 01-3391-2000. This quality testing is carried out to determine the quality of gambir in the gambir supply chain, starting from Farmers to Exporters. The quality of gambir in the gambir supply chain is seen in Table 2. The parameters observed consist of water content, ash content, catechin content, water-insoluble material content, and alcohol-insoluble material content.

The quality of gambir in the gambir trade in the gambir supply chain to exporters is seen from the water content of the gambir. The lower the water content of the gambir sold, the higher the price of the gambir. This is because the dirt in the gambir is related to the ash content of the gambir, where the more dirt in the gambir can reduce the price of the gambir. Ash content can be caused by minerals already present in plants and minerals that farmers deliberately add during processing.

The water content parameter is a critical point in the sale of local gambir in the gambir supply chain, this is because the drying process requires additional costs for traders (collectors) for sales to exporters. The water content produced by farmers determine the price of gambir. The lower the water content of the gambir (not sticky), the higher the value of the gambir received by farmers. Water content is related to the drying of gambir; farmers dry gambir with 2 methods, namely the smoking method and the drying method using solar heat. The smoking method is used by farmers when the weather is rainy and does not support sun drying. This method can affect the water content of the gambir produced.

The drying process with smoking is done by opening the extractor container (Kanca) so that the heat reaches the smoking racks. The smoking method (15.22%) can provide low water content compared to using sunlight (16.52%) from the same thickness of gambir (2.2 cm). The quality of gambir in the West Sumatra gambir supply chain can be seen in Table 2.

In summary, traditional gambir processing in Pesisir Selatan is deeply intertwined with local economic structures and agricultural practices. While artisanal processing techniques contribute to unique quality characteristics, the market potential for raw materials hinges on understanding and addressing inefficiencies throughout the supply chain.

Table 2. Gambier Quality in Every Supply Chain

Origin of Gambir		Water Content (%)	Ash Content (%)	Catechin Content (%)	Water Insoluble Material (%)	Alcohol Insoluble Material (%)
Koto XI Tarusan[1,2]		20.02	4.17	50.59	15.82	14.70
Sutera[1,2]		21.45	9.06	49.62	17. 97	25.21
Batang Kapas[1,2]		19.16	7.04	55.43	13.36	10.30
Laxmi[4]	1	19.48	2.62	72.79	2.75	7,68
	2	14.22	0.05	85.24	1.35	1,98
	3	16.38	0.13	84.42	1.30	3,22
	4	23.34	0.09	86.88	0.50	0,84
SJA[4]	1	16.39	4.24	59.30	8.41	19,29
	2	16.10	3.99	52.50	6.94	22,05
	3	15.54	9.06	53.12	4.40	24,51
	4	15.25	5.58	43.57	2.98	26,90
Quality I[5]		Max. 14	Max.5	Min. 60	Max. 10	Max. 7
Quality II[5]		Max. 16	Max. 5	Min. 50	Max. 16	Max. 10
Description: (1) Farmers, (2) Traders, (3) Exporters1(CVR), (4) Exporters2(PTSj) and (5) SNI 01-3391-2000						

Continuous education and technological integration remain pivotal for enhancing both the quality of gambir produced and the economic viability of its marketing chain.

4. CONCLUSION

Gambier processing is carried out by every actor in the gambir marketing chain, both from farmers, collectors, and exporters; this aims to obtain good quality so that they can get a decent price from consumers or every actor in the gambir supply chain; there are five gambir marketing channels in the Pesisir Selatan regency and the most is the channel carried out by farmers selling to collectors, then directly sent to local exporters in Padang city. The quality of gambir can be seen from the catechin content of gambir; the highest quality produced from exporter gambir reaches 86%.

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