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Controlling Quinine: Trade Monopoly and Colonial Power in Kediri, c. 1800–1942

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Abstract

This study examines the development of cinchona cultivation and the monopoly of cinchona trade in Kediri, East Java, from 1830 to 1942, focusing on colonial economic policies, private investment, and plantation labour. Using the historical method of heuristics, source criticism, interpretation, and historiography, the study draws on primary and secondary sources from archives, libraries, historical newspapers, and digital repositories. The findings show that Kediri's geographical and environmental conditions supported cinchona cultivation to meet growing European demand for quinine as a malaria treatment. During the *Cultuurstelsel*, the Nederlandsche Handel Maatschappij (NHM) controlled cinchona exports. The Agrarian Law and Sugar Law of 1870 subsequently encouraged private investment, expanding plantations and attracting European and Chinese investors. This expansion increased labour demand, initially met through coercive arrangements and later through wage-based employment. Nevertheless, plantation workers, known as *koeli*, remained vulnerable within the colonial economic structure. Women also contributed to cinchona processing, performing demanding tasks comparable to those undertaken by men. By examining the relationship between colonial trade policies, private enterprise, and plantation labour, this study contributes to the historiography of colonial economic and social history in East Java.

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Introduction

Spices from the Indonesian archipelago have been important commodities in global trade since the classical period. The region's strategic geographical location and tropical climate have supported the fertility of various areas throughout the archipelago. Suitable soil conditions and humidity have also favored the growth of a wide range of commercial crops. The diversity of agricultural products, including nutmeg, pepper, and coriander, attracted foreign traders to the archipelago (Leirissa, Manilet-Ohorella, & Tangkilisan, 1996, p. 1). Over time, trade in these commodities became one of the factors that encouraged the arrival of Europeans and the expansion of Dutch colonial rule. Indonesian history in the nineteenth and twentieth centuries was marked by the increasingly intensive penetration of Dutch colonial power into various aspects of society. One of the areas affected by these developments was the economy, particularly through the cultivation of export commodities such as cinchona, pepper, nutmeg, coffee, tea, and cloves (Kartodirdjo & Suryo., 1991, p. 3). Several export crops that had previously been cultivated on government plantations were subsequently developed by private plantations as well (Boeke, 1917, p. 23). By the late nineteenth and early twentieth centuries, these developments had encouraged the diversification of plantation-based export commodities in the Dutch East Indies.

Cinchona was one of the plantation crops of considerable economic importance in Java. Plants belonging to the genus *Cinchona* originated in South America and grew in the Andes Mountains, including areas of present-day Peru, Bolivia, Ecuador, Colombia, and Venezuela. Cinchona was subsequently cultivated on plantations in Java to supply raw materials for pharmaceutical products. Unlike spices, which were generally used to flavor food, cinchona was primarily valued for its medicinal properties. Its bark was processed because it contained alkaloids, including quinine, which was used to treat malaria and certain febrile illnesses (Groothoff, 1915, p. 10). Cinchona cultivation in Java began to expand in the mid-nineteenth century. During this period, Kediri emerged as one of the regions contributing to cinchona cultivation in eastern Java (Bartels, 1903, p. 93). The area's geographical characteristics, shaped in part by its proximity to volcanoes such as Mount Kelud, Mount Klotok, and Mount Wilis, influenced its soil and agricultural environment. Volcanic materials contributed to soil fertility, while the mountainous terrain and rainfall affected local temperatures and humidity. These environmental conditions were relevant to the development of cinchona cultivation in Kediri (Groothoff, 1915, p. 70).

Within the colonial economic system, the Dutch government played an important role in regulating the production and trade of export commodities. Following the introduction of the *Cultuurstelsel* (Cultivation System) in 1830, the *Nederlandsche Handel Maatschappij* (NHM) played a role in managing the export of various government-produced commodities from the Dutch East Indies to the Netherlands and European markets (Wasino, 2013, p. 93). The gradual abolition of the forced cultivation system, which reached a major turning point in 1870, was accompanied by changes in colonial economic policy. The Dutch East Indies government enacted the Agrarian Law (*Agrarische Wet*) on April 9, 1870, under *Staatsblad* No. 55/1870, and the Sugar Law (*Suiker Wet*) on July 21, 1870, under *Staatsblad* No. 136/1870 (Simbolon, 2006, pp. 159–160). These policies created broader opportunities for private capital to enter the plantation sector in the Dutch East Indies.

The policy changes after 1870 marked a new phase in the development of the plantation economy in the Dutch East Indies. Private capital played an increasingly important role in the production and trade of export commodities (Ricklefs, 1991, p. 190). Cinchona plantations in Kediri

also developed within this economic environment, attracting European and Chinese investors. The capital owners recorded in historical sources included the Han and Tan families. Han Liong Ing and Tan Kok Tong were among the Chinese entrepreneurs involved in the cinchona trade and several other commodities in Kediri through the 1930s (Salmon, 1991, p. 77). Their involvement is important for understanding changes in the groups engaged in, and the control exercised over, the cinchona trade following the expansion of opportunities for private investment.

In 1940, Java remained one of the principal cinchona-producing regions. Production figures recorded 16,371,000 kilograms of dried cinchona bark and 584 metric tons of quinine for export, excluding sales of seedlings and other processed products. Kediri also contributed to this production. However, the continuity of cinchona plantations faced major changes following the Japanese occupation in 1942. The Japanese military government redirected plantation land toward the production of food and raw materials needed to support the war effort, including castor plants. This shift in production priorities affected the continuity of cinchona cultivation in Kediri.

Several studies have examined the development of the cinchona industry and the plantation economy in the Dutch East Indies. In *Perkembangan Industri Kina di Jawa 1854–1940* [The Development of the Cinchona Industry in Java, 1854–1940], Ririn Darini examines the development of the cinchona industry in Java, particularly in West Java, where Bandung served as a major center, as well as the role of the colonial government in managing the industry and cinchona trade. This study provides an important reference for understanding the development of the cinchona industry. However, it gives limited attention to the role of private capital owners in the cinchona trade in Kediri following the enactment of the *Agrarische Wet* in 1870 (Darini, 2000).

A broader perspective on changes in the agricultural economy can be found in Pierre van der Eng's *Agricultural Growth in Indonesia: Productivity Change and Policy Impact since 1880*. This work examines changes in agricultural productivity and land-use policies, particularly those concerning food crops. General discussions of agricultural development need to be complemented by studies that account for the distinctive characteristics of individual commodities and regions. In this regard, research on cinchona in Kediri can provide a more specific account of the relationship between colonial policy, plantation crop production, and commercial interests (van der Eng, 1996). Meanwhile, Bisuk Siahaan's *Industrialisasi di Indonesia: Sejak Hutang Kehormatan sampai Banting Stir* [Industrialization in Indonesia: From the Debt of Honor to a Change of Course] provides an overview of industrialization and the development of private plantations in the Dutch East Indies, although it does not specifically examine the cinchona trade in Kediri (Siahaan, 1996).

Another relevant source is A. Groothoff's *Onze Koloniale Landbouw: De Kinacultuur*. This book discusses cinchona cultivation in Java and includes statistical data and documentation of production activities. Its account provides a foundation for understanding the technical aspects of cinchona cultivation, production, and processing. Nevertheless, it does not specifically examine the role of trading firms and private plantation owners in controlling the cinchona trade in Kediri (Groothoff, 1915).

Taken together, these previous studies indicate the need for further research linking the development of cinchona cultivation in Kediri to changes in control over the trade and the involvement of private capital owners. This study focuses on the development of cinchona production, the mechanisms through which a trade monopoly operated, and changes in the identities of business actors following the expansion of opportunities for private investment in the late nineteenth century. Accordingly, this study aims to explain the development of cinchona cultivation in Kediri and analyze how the cinchona trade monopoly operated and changed during the colonial

period. It is expected to contribute to the historiography of the economic and social history of East Java, particularly the history of plantation commodity trade, by examining the relationship between colonial policies, business interests, and plantation labor.

The study covers the period from 1830 to 1942. The year 1830 serves as the starting point for situating the development of cinchona plantations within the broader transformation of colonial economic policy following the introduction of the *Cultuurstelsel*. However, the discussion of cinchona cultivation and trade directly follows the available historical evidence, particularly from the mid-nineteenth century, when cinchona cultivation in Java began to expand. The study ends in 1942, when the Japanese military government took power from the Dutch administration and changed the priorities governing the use of plantation land. This temporal delimitation establishes a clear scope and provides a framework for a focused historical analysis (Kuntowijoyo, 2001, p. 91).

Geographically, this study focuses on Kediri as its unit of analysis, taking into account the administrative boundaries of the Kediri Residency during the colonial period. Following the Sepreh Agreement of July 4, 1830, Commissioner-General Van Lawick van Pabst reorganized, divided, and assumed control over lands in the eastern Mancanegara region, including the territory that became the Kediri Residency (Arsip Nasional Republik Indonesia, 1830). By 1874, the residency comprised five afdeelingen (administrative divisions): Kediri, Ngrowo, Trenggalek, Blitar, and Berbek (*Staatsblad van Nederlandsch-Indië No. 73*, 1874). Defining these geographical boundaries is essential for identifying the areas involved in cinchona cultivation and trade while accounting for changes in the colonial administrative system throughout the study period.

Methods

This study employs the historical method with a descriptive-analytical approach. The historical account is organized chronologically, presenting the development of the issues under investigation while analyzing the relationships between events and the conditions underlying them. Historical research consists of four main stages: heuristics, source criticism, interpretation, and historiography. These stages are carried out systematically to produce a historical account grounded in sources whose reliability can be assessed and justified. The first stage is heuristics, which involves collecting sources relevant to the research problem, including both primary and secondary sources. Source collection was conducted through research at the Universitas Airlangga Library, the Jagir Archives Office, the Medayu Agung Library, and archival offices in Kediri. The primary sources collected included government gazettes (*Staatsblad*) and contemporary newspapers, such as *De Locomotief*, *Soerabaiasch-Handelsblad*, and *De Indische Courant*. These sources were used to trace colonial government policies, developments in trade, and cinchona plantation activities in Kediri.

Additional sources were collected from several digital archival platforms, namely Delpher, KITLV, and Gahetna. These platforms were used to locate documents, official government publications, contemporary books, photographs, and newspapers relevant to the study. The sources obtained included *Agrarische Regelingen voor het Gouvernementsgebied van Java en Madoera* and *Statistisch Jaaroverzicht van Nederlandsch-Indië*. The use of digital archives complemented research conducted at archival institutions and libraries while expanding the range of sources available for reconstructing the development of cinchona plantations and trade. The second stage is source criticism, which comprises external and internal criticism. External criticism is conducted to assess the authenticity of sources by examining their provenance, date of publication or creation, authorship, and documentary characteristics. Internal criticism, meanwhile, evaluates the credibility of the information contained in the sources by considering their content, context, purpose, and consistency

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with other sources. Both forms of criticism are applied to materials obtained from libraries, archival institutions, and digital platforms. Through this process, the researcher assesses the suitability of each source as a basis for establishing the historical facts used in the analysis.

The third stage is interpretation, which involves interpreting historical facts established through source criticism. At this stage, evidence from various sources is compared and synthesized to establish logical relationships among colonial policies, the development of cinchona cultivation, control over trade, and the involvement of private capital owners. Interpretation takes into account the economic and social context of the period under study to ensure that historical facts are not understood in isolation from the conditions that shaped them. Social science approaches are employed as analytical tools to explain relationships among the actors involved and changes in the economic structure of the plantation sector. The fourth stage is historiography, which involves presenting the research findings in the form of a historical account. At this stage, verified and interpreted historical facts are presented chronologically and analytically in accordance with the research problem. The narrative seeks to explain the development of cinchona cultivation in Kediri, the mechanisms through which trade was controlled, and changes in the roles of the colonial government and private capital owners. The historical narrative is constructed by connecting evidence from multiple sources to produce a coherent account supported by sufficient historical evidence.

This study adopts an economic history approach, focusing on the production, distribution, and export of cinchona. This approach is used to analyze the development of plantation enterprises, the processing of cinchona as a pharmaceutical raw material, and the distribution of its output to European markets. By examining the relationship between government policies and economic activities, the cinchona trade in Kediri is analyzed as a series of interconnected activities involving cultivation, processing, distribution, and export (Kartodirdjo, 2014, p. 155). A social history approach is also employed to understand the relationships among groups that developed alongside plantation activities. Particular attention is given to the relationships between the colonial government, capital owners, and plantation laborers, including workers known as *koeli kina* (cinchona laborers). This perspective helps explain the connections between plantation policies, business interests, and laborers' social conditions within the colonial economic structure (Sjamsuddin, 2007, p. 310).

To clarify the analysis, this study employs the concepts of monopoly and trade as its conceptual framework. A monopoly is understood as a market condition in which a single business entity or a small number of business entities control the sale of a commodity and restrict the entry of competitors into the market (Badan Pengembangan dan Pembinaan Bahasa, 2026) . Trade, meanwhile, is understood as the process of exchanging and distributing goods among actors or across regions in response to differences in needs and resource availability (Djoened, Poesponegoro, & Notosusanto, 2008, p. 70). These concepts are used to examine patterns of control over the cinchona trade, the relationship between production and distribution, and the roles of the colonial government and private entrepreneurs in export activities. Changes in agrarian policy, particularly following the enactment of the *Agrarische Wet* in 1870, are also considered to analyze the expansion of opportunities for land cultivation and the mobilization of plantation labor (Wiradi, 2000, p. 60).

Results and Discussions

1. Cinchona Cultivation in Kediri

Kediri is surrounded by several active volcanoes, namely Mount Kelud, Mount Kawi, and Mount Wilis. These three volcanoes contribute to the fertility of the surrounding land. During eruptions, they release volcanic ash that benefits the soil (Rivai & Sulistyo, 2000, p. 93). The presence

of these volcanoes and their contribution to soil fertility encouraged agricultural activities among the majority of Kediri's population. Nevertheless, other occupations also existed in the early twentieth century, including fishing in coastal areas and trading in traditional markets and urban centers.

In 1830, Van den Bosch designated Kediri as a *Kinacultuur* (cinchona cultivation) area. This meant that, as a consequence of the *Cultuurstelsel* (Cultivation System), land in Kediri was required to be planted with cinchona (Groothoff, 1915, p. 10). The soil and environmental conditions in Kediri were considered suitable for cinchona cultivation because cinchona species thrive in mountainous areas at elevations above 1,000 meters above sea level, with humus-rich soil, low temperatures, and sufficient rainfall (Paulus & Stibbe, 1918, p. 182). Cinchona plants were relatively common around the slopes of Mount Wilis. Cinchona belongs to the group of plants historically classified as spices and is characterized by opposite leaves with entire margins and an oblong shape. Its flowers are fragrant and brightly colored, ranging from white to pink, as illustrated in Figure 1. Cinchona seeds have a wing-like protective covering, while the fruit is ovoid. In Java, cinchona trees could reach approximately 30 feet in height at 14 years of age, with trunk diameters of around 8 inches (Morton, 1977, p. 341).



Figure 1. Cinchona plant. Reprinted from Onze koloniale landbouw: De kinacultuur (p. 10), by A. Groothoff, 1915, Haarlem: H. D. Tjeenk Willink & Zoon.

In Java, cinchona was primarily used for medicinal purposes through the processing of its bark. The quinine contained in cinchona bark could be used to treat malaria and other febrile illnesses. At the time, malaria was a pandemic that had spread across the world, and medical research indicated that cinchona was an effective remedy for the disease. In the Dutch East Indies, the first reported malaria cases date to 1760, when 384 cases and 12 deaths were recorded (Castellani & Chalmers, 1913, p. 859). Malaria spread rapidly due to tropical environmental conditions and relatively high rainfall, which favored the rapid proliferation of *Anopheles* mosquitoes, the vectors responsible for transmitting the disease. Another report recorded 107 deaths among Europeans from malaria in 1910 (*Kolonial Verslag*, 1920, p. 149).

The use of cinchona as a remedy for malaria was first attributed to the personal physician of King Charles II of England in 1678. However, cinchona bark had already been known in Europe as a treatment for fever since 1640. After King Charles II recovered from malaria using a cinchona-based remedy, demand for cinchona increased significantly in European markets and remained high over the following centuries (Groothoff, 1915, p. 5). For nearly 200 years, cinchona bark was used in its original form or processed into various products, including decoctions and cinchona wine. To obtain high-quality quinine, cinchona trees were commonly cut, and their upper portions were grafted onto

other branches. The bark was subsequently processed into powder, while some was traded in its raw form in European markets and as far away as Zanzibar (Groothoff, 1915, p. 10).

Van den Bosch viewed the high demand for cinchona in European markets as a promising economic opportunity. He subsequently introduced the *Kinacultuur* policy and imported cinchona seedlings from France in 1852 for distribution to several regions in Java, including Kediri (Groothoff, 1915, p. 12). During the 1830s, the colonial government established three cinchona plantations and initial nurseries in the Kediri Residency. These plantations are listed in Table 2.

Table 2. Cinchona Plantations in Kediri in 1830

Plantation	Location	Number of Seedlings
Penampean	Blitar (Kediri Residency)	150
Pidji Ombo	Blitar (Kediri Residency)	50
Sirah Kentjong	Blitar (Kediri Residency)	250

Note. Adapted from Onze koloniale landbouw: De kinacultuur (p. 112), by A. Groothoff, 1915, Haarlem, the Netherlands: H. D. Tjeenk Willink & Zon.

As shown in Table 2, the initial cinchona nurseries in Kediri were concentrated in the Blitar administrative division (*afdeeling*). This concentration was closely related to Blitar's location in the southern part of Java, where mountainous and highland environments were more prevalent than in other parts of the Kediri region. These geographical conditions facilitated plantation maintenance and irrigation. Government-owned cinchona plantations continued to expand and develop. By around 1870, export revenues from cinchona had begun to reach substantial levels (Allen & Donnithorne, 1954, p. 92). Cinchona cultivation was not exclusive to the Dutch. The British also promoted large-scale cinchona planting in their colonies, including Sri Lanka. The Dutch, who had initially emerged as suppliers of high-quality cinchona to European markets, consequently faced a new competitor. Beginning in 1884, cinchona prices fell sharply because of the abundant supply and harvests from Java and Sri Lanka. To address this situation, the colonial government of the Dutch East Indies reduced the area under cinchona cultivation to control output and prevent oversupply, thereby seeking to maintain high prices. In 1897, the area under cinchona cultivation was reduced from 1,037 hectares to 863 hectares. Land withdrawn from cinchona cultivation was subsequently used for agricultural experimental laboratories (Kerbosch, 1924, p. 428).

Another measure adopted by the colonial government was to purchase cinchona from smallholder plantations and resell it at substantially higher prices. The government paid three cents per kilogram for the highest-quality cinchona but resold it for 12.94 cents per kilogram (Groothoff, 1915, p. 106). The government justified the high selling price by citing the costs of insurance and transportation to Europe and destinations outside Java.

Table 3. Profits of the Government Cinchona Enterprise (in guilders)

Period	Expenditure	Revenue	Profit
1872–1881	712,603	1,310,062	597,559
1882–1891	1,565,870	2,951,870	1,386,000

1892–1901	1,294,732	3,020,901	1,726,169
1902–1911	2,873,345	5,216,577	2,343,232
1912–1915	1,347,339	3,291,609	1,944,720
Total	7,793,789	15,791,019	7,997,230

Note. Adapted from "'s Lands kina-onderneming," by M. Kerbosch, 1924, Koloniale Studien, 8(1), p. 435.

As shown in Table 3, the colonial government generated substantial profits from the cinchona enterprise. Kediri also contributed to the significant export revenues generated by the colonial government's cinchona trade. In 1925, cinchona plantations in Kediri produced 360,702 kilograms of raw cinchona bark (Dienst der Belastingen in Nederlandsch-Indië, 1925, p. 57). In subsequent years, both the government and private plantation owners continued to pursue the diversification of cinchona cultivation and production to maintain the crop's competitiveness amid the expansion of other agricultural commodities, including rice, sugar, tea, and coffee.

2. The Cinchona Trade Monopoly in Kediri and Labor Mobilization

Following the implementation of the *Kinacultuur* policy by Van den Bosch, N.V. Nederlandsche Handel Maatschappij (N.V. NHM) exercised control over the cinchona trade in Java. N.V. NHM was an official trading company owned by the colonial government and responsible for exporting commercial commodities. Consequently, the government controlled trade policies, pricing practices, and profit margins. During the *Cultuurstelsel* (Cultivation System), N.V. NHM was authorized to manage the export of government-controlled commodities, including plantation products obtained through the forced cultivation system, for shipment to the Netherlands and European markets (Wasino, 2013, p. 93). The substantial profits generated by the *Cultuurstelsel*, including those from *Kinacultuur*, attracted public criticism from Dutch civil society. These large profits stood in stark contrast to the conditions of the Indigenous population, which was exploited under the forced cultivation policy. Meanwhile, private plantation enterprises in the Dutch East Indies expanded toward the end of the nineteenth century. Private investors considered the *Cultuurstelsel* detrimental to their interests because the government restricted their access to land ownership and labor. The government eventually abolished the forced cultivation system in 1870.

The dissolution of N.V. NHM's dominant role in the colonial trading system accompanied the abolition of the forced cultivation policy by the liberal faction in 1870. The Agrarian Law (*Agrarische Wet*) was subsequently enacted on April 9, 1870, under *Staatsblad* No. 55/1870. The Sugar Law (*Suiker Wet*) followed on July 21, 1870, under *Staatsblad* No. 136/1870 (Simbolon, 2006, p. 159). These policies opened the plantation sector in the Dutch East Indies to private capital. The Agrarian Law introduced several important provisions, including recognition of Indigenous landownership rights; a prohibition on the transfer of Indigenous land rights to foreigners, while permitting land leases for periods of five to ten years; permission for foreign investors to lease land and hire labor; and government control over all land not held under Indigenous ownership rights, which could be leased for periods of up to 75 years (Simbolon, 2006, p. 159).

These policies, which appeared to favor private investors, contributed to the expansion of cinchona plantations in Kediri. Investment opportunities also attracted European and Chinese investors to the region. Private enterprises played a substantial role in the development of the

cinchona industry in Kediri. They sold not only quinine extracted from cinchona bark but also seeds and seedlings. Although cinchona plantations were initially concentrated in the Blitar administrative division (*afdeeling*), their distribution expanded to other areas following the enactment of the Agrarian Law. These plantations included Mringin and Penampean in Tulungagung, as well as Petungsewu I, II, and III in Kediri, among others (*Soerabaiasch Handelsblad*, 1903). Some of these plantations were owned by Chinese families. Tan Kok Tong and Han Liong In were among the individuals recorded as cinchona plantation owners in Kediri (Salmon, 1991, p. 77).

Strong demand for cinchona and intense competition among investors encouraged the diversification of cinchona products. Entrepreneurs sold not only quinine but also seeds, whole trees, and processed products in powder and beverage forms. They also actively advertised their products in newspapers, as illustrated in Figure 2. The advertisement shows that the Petungsewu plantation sold cinchona seeds and trees that were up to 20 years old.



Figure 2. Cinchona plants. Reprinted from Soerabaiasch Handelsblad, October 9, 1903.

The advertisement above also specifies the characteristics of the cinchona products offered for sale. *Ledgeriana* refers to a type of cinchona whose bark was used as a raw material for industrial processing and medicinal products. *Ledgeriana* trees could be harvested once they were more than four years old. The quantity of bark obtained depended on the age of the trees, planting distance, and altitude. *Succirubra*, meanwhile, was a type of cinchona processed into powder. It was commonly used in pharmaceutical products, including medicines, shampoos, and cosmetics (Groothoff, 1915, pp. 66–72). *Ledgeriana* was the more sought-after variety. The establishment of privately owned cinchona companies in Kediri toward the end of the nineteenth century generated demand for labor. To facilitate plantation expansion, the government issued Decree No. 34 on August 30, 1858. Under this policy, workers on cinchona plantations were mobilized through forced labor. This meant that the workers, who were predominantly Indigenous people, had no right to refuse the work or challenge the wages set by the government. The wages were extremely low, and some accounts indicate that workers received no payment at all. They were also required to supply materials needed for plantation operations, including bamboo, timber, and other resources (Groothoff, 1915, p. 177).

Labor policies governing plantation work under the *Cultuurstelsel* attracted widespread criticism. The colonial government subsequently issued Decree No. 27 on January 24, 1864. This regulation stipulated that cinchona cultivation would employ a free labor system. The policy represented a modest improvement in plantation workers' circumstances. In private plantations, wages

were determined through negotiations between workers and plantation owners (Kerbosch, 1924, p. 426). Large-scale demand for plantation labor in Kediri was documented following the establishment of *Cult. Mij. Gogoniti te Amsterdam* in Blitar on March 11, 1874 (Departement van Binnenlandsch Bestuur, 1915, p. 122). Other companies subsequently followed, taking advantage of the fertile land in the Kediri Residency. The establishment of numerous private enterprises created a demand for workers to support production and processing activities. These companies therefore required substantial labor forces for different tasks, prompting many residents to migrate to areas near available employment opportunities.

Plantation workers can be divided into two categories according to their duties. The first consisted of workers employed directly in the production process, primarily for manual labor in the fields, including planting, maintenance, and harvesting. The second comprised workers responsible for processing raw materials in factories. Although machinery had been introduced, considerable amounts of manual labor were still required. These two functions were connected through intermediate personnel, including assistants and supervisors known as *opzichters*. Plantation workers, commonly referred to at the time as *koeli*, were organized into teams, each supervised by a foreman. Several foremen reported to a chief foreman, while assistants and *opzichters* oversaw the broader workforce hierarchy (Kartodirdjo & Suryo., 1991, p. 145).



Figure 3. *Female workers stacking cinchona logs at the Petungsewu plantation. Reprinted from Onze koloniale landbouw: De kinacultuur (p. 70), by A. Groothoff, 1915, Haarlem, the Netherlands: H. D. Tjeenk Willink & Zon.*

The welfare of cinchona plantation laborers in Kediri remains unclear in the available accounts. The division of labor between men and women also differed according to the tasks performed. Women generally predominated in small-scale cinchona processing and were assisted by their children or other family members. These workers were typically unskilled. Their duties included extracting quinine and sorting bark according to quality. Men, by contrast, were more commonly engaged in fieldwork, including stripping bark directly from trees, sawing trunks and branches, and drying the harvested material. An illustration of cinchona plantation laborers is presented in Figure 3. The continued increase in cinchona bark supplies intensified competition among plantation entrepreneurs. This competition extended beyond plantations in Java to include producers in Britain, Germany, and the Netherlands. The introduction of a cinchona export ordinance further complicated

conditions for private entrepreneurs. The ordinance, which took effect on March 1 and remained in force until January 1, 1937, established annual maximum limits on the quantity of cinchona bark that could be exported. The colonial government also prohibited the export of cinchona seeds and plants and restricted their domestic use without authorization from the competent officials. From this period onward, cinchona plantations increasingly gave way to food-crop cultivation and the expanding sugar industry. The situation deteriorated further when Japan took control of Kediri in 1942. Cinchona was no longer treated as a major commercial crop.

Conclusion

Cinchona was a new crop cultivated by the colonial government in Kediri under the *Cultuurstelsel* (Cultivation System). Its medicinal properties in treating malaria made this plant highly sought after by Europeans. Van den Bosch recognized this demand as an economic opportunity and introduced the *Kinacultuur* policy to promote cinchona cultivation. Kediri's designation as a center of cinchona cultivation in East Java was based on its geographical and environmental conditions. The region is surrounded by volcanoes, including Mount Kelud, Mount Klotok, and Mount Wilis. Both active and extinct volcanoes can enrich the soil with nutrients that may be lacking in tropical soils. Although Kediri is located in the equatorial region, its mountainous terrain and rainfall during the eastern monsoon helped maintain temperatures that were not excessively high. These environmental conditions favored the growth of cinchona in Kediri. Profits from the cinchona trade increased significantly over time. Following the introduction of the *Kinacultuur* policy by Van den Bosch, N.V. Nederlandsche Handel Maatschappij (N.V. NHM) exercised control over the cinchona trade in Java. The company's dominant role came to an end as the liberal faction abolished the forced cultivation system in 1870. The Agrarian Law (*Agrarische Wet*) was enacted on April 9, 1870, under *Staatsblad* No. 55/1870, followed by the Sugar Law (*Suiker Wet*) on July 21, 1870, under *Staatsblad* No. 136/1870. These policies opened the plantation sector in the Dutch East Indies to private capital.

Policies that favored private investment encouraged the establishment of additional cinchona plantations in Kediri and attracted investors from both Europe and the Chinese community. Private enterprises played a significant role in the development of the cinchona industry in the region. The large-scale expansion of cinchona plantations also generated substantial demand for labor. This development gave rise to a workforce of cinchona plantation *koeli* (laborers), whose welfare and interests were consistently neglected under colonial government policies. The cinchona trade monopoly in Kediri had consequences extending beyond the economic sphere into social life. One such consequence was the employment of female plantation laborers, who shouldered workloads comparable to those of their male counterparts.

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