

# The Colonial Sugar Industry in Indonesia and the Philippines: A Comparative Perspective

Nawiyanto<sup>1✉</sup>, Jose Wendell Capili<sup>2</sup>, Nina Mutiara Calvaryni<sup>3</sup>

<sup>1</sup> Universitas Jember, \* [nawiyanto.sastra@unej.ac.id](mailto:nawiyanto.sastra@unej.ac.id)

<sup>2</sup> University of the Philippines

<sup>3</sup> Wageningen University and Research

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**Abstract:** The sugar industry played a significant role in the colonial economies of Indonesia and the Philippines. Growing the same commodity for the global market, the conditions under which the sugar industry operated in the two places were quite different. Using historical methods and drawing upon secondary sources, this article compares the colonial sugar industry in Indonesia with particular reference to Java and the Philippines between 1890 and 1940. Unlike the case of Indonesia, where the sugar industry operated in densely populated lowland areas, the Philippine sugar industry was established in a sparsely populated region. However, the sugar producers in the two countries took various measures to make their ventures more efficient and competitive. This article will outline broadly the early development of the sugar industry in Java and the Philippines, followed by a discussion on the choice of production technology and the performance of the sugar industry in the interwar period to provide a better understanding of the different development of the sugar industry in Java and the Philippines. The sugar industry in Java was more successful in improving its productivity and efficiency, making the industry more competitive than the Philippines. However, the sugar industry in the two countries had different destinies when the global crises hit hard in the 1930s. Only because of the preferential treatment obtained in the American market did the less efficient sugar industry in the Philippines survive during the Depression. Meanwhile, Java's more efficient sugar industry collapsed due to the unfair protection policy in the world sugar market.

**Abstrak:** Industri gula memainkan peran penting dalam perekonomian kolonial di Indonesia dan Filipina. Menumbuhkan komoditas yang sama untuk pasar global, kondisi industri gula yang beroperasi di kedua tempat tersebut cukup berbeda. Dengan menggunakan metode sejarah dan memanfaatkan sumber-sumber sekunder, artikel ini membandingkan industri gula kolonial di Indonesia dengan referensi khusus di Jawa dan Filipina antara tahun 1890 dan 1940. Berbeda dengan kasus di Indonesia, dimana industri gula beroperasi di daerah dataran rendah yang padat penduduknya, Filipina industri gula didirikan di wilayah yang jarang penduduknya. Namun, produsen gula di kedua negara mengambil berbagai langkah untuk menjadikan usaha mereka lebih efisien dan kompetitif. Artikel ini akan menguraikan secara garis besar perkembangan awal industri gula di Jawa dan Filipina, dilanjutkan dengan diskusi mengenai pilihan teknologi produksi dan kinerja industri gula pada periode antar perang untuk memberikan pemahaman yang lebih baik mengenai perbedaan perkembangan industri gula di Jawa dan Filipina. Industri gula di Jawa dan Filipina. Industri gula di Pulau Jawa lebih berhasil meningkatkan produktivitas dan efisiensinya, sehingga industri ini lebih kompetitif dibandingkan Filipina. Namun industri gula di kedua negara mempunyai nasib yang berbeda ketika krisis global melanda pada tahun 1930an. Hanya karena perlakuan istimewa yang diperoleh di pasar Amerika, industri gula yang kurang efisien di Filipina dapat bertahan selama masa Depresi. Sementara itu, industri gula di Jawa yang lebih efisien terpuruk akibat kebijakan proteksi yang tidak adil di pasar gula dunia.



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## INTRODUCTION

The sugar industry has been one of the most significant contributors to the colonial economies of many countries. In colonial Indonesia, the sugar industry was the life belt of the economy (Mubyarto, 1984, p. 1). Between 1885 and 1930, sugar was ranked first among the chief export commodities from colonial Indonesia. In 1885, the value of sugar exports constituted 45 % of the total exports. By 1920, the share of sugar export to the total export values from colonial Indonesia rose to 48 %. Although in 1930, the share dropped to only 21 %, sugar still ranked first among the export commodities (Kartodirdjo & Surjo, 1991, p. 109; Furnivall, 1939, p. 337). In the colonial Philippines, sugar was 'the mainstay of Philippine foreign trade' (Sonza, 1977, p. vii; Ku, 1989, p. 62). The sugar industry has been 'one of the country's biggest industries' and 'the number one source of dollars in the Philippines' (Cherniguin, 1988, p. 187). Between 1910 and 1913, its contribution to the Philippines' total export value was about 20 %. Their shares increased in the following years. By 1931-1934, more than 50 % of the Philippines' total value of exports came from sugar (Valdepenas & Bautista, 1977, p. 117). During the first half of the 1930s, the Philippines' sugar exports were ranked third, defeating the Netherlands Indies as one of the most essential sugar-exporting countries (Cutshall, 1938, p. 157) and the most advanced sugar industry in the world in the 1920s (Van der Eng, 2004, p. 1257).

Much scholarly attention has been paid to the colonial sugar industry. Some studies focused mainly on the development of the sugar industry and its impact on the local economy and society. This cluster of studies has been well illustrated, for example, by Elson (1984) on Pasuruan, and most recently by Wasino, Hartatik, and Nawiyanto (2019) on Mangkunegaran's sugar industry, and Khotimah and Dwikurniarini (2019) on sugar industry of Kediri, and Agnes Petrus (2021) on sugar industry of Jepara. There has also been a general study examining the broad development of the sugar industry in colonial Indonesia, for example, by Perdana and Susanto *et al.* (2019). Meanwhile, in other countries, scholarly attention to the development of the sugar industry has also been paid, for example, by Billig (1993) on the Philippine sugar industry from the colonial era to the early 1990s. Griggs (2011) examines the development of the sugar industry in Australia and how the industry innovated its production, and Standberry (2022a) on the development of the sugar economy in Jamaica and its current situation (Standberry, 2022b). A

study by Riaz U Dean (2021) examines sugarcane crop production and sugar manufacturing in Fiji.

However, little scholarly attention has been paid to comparatively studying the sugar industry operating in different areas both regionally and especially internationally. This feature can be seen when compared with the robust regional/case studies. A few exceptions include Wasino and Nawiyanto (2018) comparing the Mangkunegaran principality and the extreme corner of East Java, Aguilar (2017) comparing two sugar areas, the Negros and Calamba of the Philippines, and Anthony Reid's study (2014) comparing colonial sugar industry of the Netherlands East Indies and India, and by Cartwright (2021) describing the life on colonial sugar plantations of the European colonies across the globe. The studies must be further developed, given the complexities of the global sugar industry's complexities. Comparison of the sugar industry is an intriguing topic to research because sugar has been a major global commodity. More importantly, some sugar-producing countries have supplied the world's sugar needs for around two hundred years and even competed for dominance in the international market.

Based on the existing gap, this article compares the colonial sugar industry in Indonesia with particular reference to Java and the Philippines between 1890 and 1940. A comparison of the two cases of the sugar industry is interesting because they have quite different features. In terms of performance, the sugar industry of Java was widely known for its efficiency, and that of the Philippines could have been more efficient. However, during the 1930s crisis, the sugar industry of Java collapsed, while the Philippine sugar industry survived and continued to grow. Why did it happen? To answer the question, the first section broadly outlines the early development of the sugar industry in Java and the Philippines. The following section explores the differences between how the sugar industry operated in the two regions. Particular emphasis is given to how the sugar industry obtained land and labour, which became the foundation of sugar industry operations. The following section deals with the choice of production technology, followed by the performance of the sugar industry in the interwar period, which provides a better understanding of the different development of the sugar industry in Java and the Philippines.

## METHOD

This study is a comparative historical enquiry into Southeast Asia's sugar-producing countries, coloni-

al Indonesia and the Philippines. The historical method is the best way to work on this subject. Historical method basically consists of four major stages, namely: heuristics, source criticisms, interpretation, and 4) historiography (Storey, 2011). The source materials used here are secondary in nature. They cover relevant publications in articles and books on the sugar industry in colonial Indonesia and the Philippines. Important source materials from the colonial era included Cutshall for the Philippine Sugar industry and Furnivall for the Indonesian sugar industry. A more recently published statistical data compiled by Clemens et al. was also used here. The two countries' publications on the sugar industry have almost exclusively dealt with the subject from a single regional/national perspective. None has been produced from a much broader perspective. Drawing upon the secondary sources, this article moves beyond the traditionally practiced historical research by using a comparative perspective. By doing this kind of endeavour, much attention will be paid to finding out the existing commonalities and differences in the development and operations of the sugar industries in the two colonial countries.

#### **THE EARLY DEVELOPMENT OF THE SUGAR INDUSTRY**

It is commonly believed that sugar cane had been grown both in Indonesia and the Philippines before the appearance of Western people in Southeast Asia (Furnivall, 1939, p. 10; Sonza, 1977, p. 1). Prior to the 19<sup>th</sup> century, sugarcane was cultivated in Java (Boomgaard, 1988, p. 159), whereas, in the Philippines, the cultivation of sugarcane was found in the Visayas and Luzon (Sonza, 1977, p. 1). According to Ku (1989:33), the Chinese brought sugar cane into the Philippines. However, sugar remained an unimportant export commodity in the Philippine economy for a long time. Sugar cultivation was mainly oriented toward fulfilling the needs of the domestic market (Quirino, 1974, p. 32).

Only after the establishment of western plantations did sugar become an increasingly important commodity produced on a large scale with an export market orientation. In the case of colonial Indonesia, the expansion of sugar plantations took place rapidly under the Cultivation System (1830-1870). Under this system, which van den Bosch introduced, peasants were ordered to plant sugarcane on their lands instead of the tax payment (Suroyo, 1993, p. 154). The need for land and labour on the sugar plantations was fulfilled by using the traditional tax collection mechanism through compulso-

ry deliveries and compulsory labour services. In other words, the colonial authority just intensified the traditional system employed by the indigenous rulers.

In practice, sugar production was the so-called 'a sugar contract system'. The contractors were almost always European or Chinese. In this sugar contract, the government determined a specific area of sugarcane planted by the villagers within a particular radius of the sugar factory. Here, the colonial government guaranteed the availability of lands and labourers needed for the sugar plantations by forcing the involvement of villagers. Meanwhile, the contractor undertook to build a factory, sometimes with capital support from the government. In this factory, the contract holder processed the sugarcane and delivered a certain amount of sugar produced to the government at a price stipulated in the contract agreement (Fasseur, 1992:34, 87).

Unlike Java experienced an impressive development of sugar plantations under the Cultivation System (1830-1870) implemented systematically by the colonial authority (Knight, 1988, p. 75), sugarcane did not play a substantial role in the Philippine economy until the first half of the 19<sup>th</sup> century when Nicholas Loney developed a sugar plantation on the island of Negros (Quirino, 1974, pp. 32-33). This lesser significance of sugar and other cash crops was inseparable from the fact that the Spanish government was less interested in exploiting the Philippine economic resources for a long time. The importance of the Philippines was only a base needed for securing the transshipment of Chinese goods, particularly silk to Acapulco and Mexican gold and silver to Canton (Sonza, 1977, p. 4).

#### **THE SUGAR INDUSTRY BETWEEN 1880 AND 1920**

By 1890, the sugar industry in Java and the Philippines had entered a modern era, which was basically due to a process taking place in the previous decades. In the case of Java, this development dated from 1870 with the implementation of a liberal policy in colonial Indonesia to replace the so-called Cultivation System. Meanwhile, in the Philippines, it dates from the 1860s marked a new era in the development of the Philippine sugar industry. During these decades, there was an expansion in the sugar industry in the two regions.

In colonial Indonesia, implementing liberal policy in 1870 gave private entrepreneurs wider opportunities to invest in the colony (Fieldhouse, 1987, p. 333). In line with this policy, several private

entrepreneurs began to involve themselves in developing sugar plantations. Meanwhile, in the case of the Philippines, the involvement of Loney in establishing sugar plantations on the island of Negros attracted some planters to develop sugar plantations. The excellent price of sugar in the international market was a crucial factor in encouraging many farmers to become involved in sugar plantations (Valdepenas & Bautista, 1977, p. 96).

There were several differences in the operation of the sugar industry in Java and the Philippines. The first difference concerns the production of land. In Java, the land requirement was mainly fulfilled by leasing lands from the indigenous peasants (Boomgaard, 1988, p. 159) and partly from the indigenous rulers of Yogyakarta and Surakarta (Van der Eng, 1996, p. 212). Sugarcane was usually cultivated in rotation with the peasants' food crops, showing the close integration of sugar production with indigenous agriculture (Allen & Donnithorne, 1957, p. 78). Consequently, the sugar plantations operated under a land constraint because they could not lease as much land as they wanted without considering the food security interests of the peasants.

Unlike the Javanese sugar industry's cultivation of sugarcane on peasant lands, which were relatively very small, in the Philippines, sugar cultivation was conducted on *haciendas* or extensive agricultural lands obtained by purchasing the property of colonial officials or local people (Larkin, 1993, p. 66; McCoy, 1992, p. 119). These *haciendas* were owned by landlords (*hacinderos*) and religious orders (Cushner, 1976, p. 27; Quirino, 1974, p. 41). With the abundance of land, the development of the sugar industry in the Philippines did not encounter a land constraint. This constitutes a stark contrast between Java and the Philippines.

Another difference is found concerning the production of labor. In contrast to the land, labour was abundantly available in Java. In the second half of the 19<sup>th</sup> century, Java was categorized as a densely populated region, indicated, for example, by the colonial policy of emigration from Java to the outer islands, especially Sumatra (McDonald, 1980, p. 88). Therefore, the sugar plantations in Java did not encounter a labour shortage, the requirement of labour being satisfied by the use of wage labour recruited from the surrounding villages (Boomgaard, 1988, p. 159).

In labour recruitment, however, a particular problem also emerged. This was due to the unfamiliarity of Javanese labourers with the wage labour system, which was relatively new in Javanese society

(Burger, 1957, p. 186). To overcome the problem, sugar producers depended heavily on the support of village headmen as mediators to guarantee the availability of plantation labourers. The village headmen usually also played a crucial role in making contract agreements, supervision, and wage payments (Burger, 1957, pp. 254-255).

Unlike the case of Java, the Philippine sugar industry was established in a sparsely populated region. This was true particularly on the island of Negros where virgin lands were cleared for service for establishing sugar plantations (Quirino, 1974, p. 43; Sonza, 1977, p. 46). This feature also differed from the earlier sugar plantations in Central Luzon, which were much smaller. Establishing a sugar industry in sparsely populated regions caused a severe lack of labour. Therefore, the sugar industry depended heavily on recruiting labour from the more densely populated regions. Workers were mainly recruited from Iloilo (Quirino, 1974, p. 35; Larkin, 1993, p. 60), with some also being recruited from Panay and Antique (Sonza, 1977, p. 84).

With the expansion of sugar plantations on the island of Negros, two different systems of plantations emerged. In the 1890s, the sugar plantations on the island of Negros had formed a directly-administered hacienda system (McCoy, 1992:109; Ku, 1989:56). One key element of this system was the use of wage labour employed seasonally, called *sacadas*, as the basis of sugar production. The employment of wage labour recruited from migrant workers was seen as more profitable than tenant-based sugar production because the cost of production could be reduced. Using the tenant system was viewed as unproductive, particularly during the growing time of sugarcane before it was harvested (Ku, 1989, p. 56).

In contrast, the sugar plantations established in Luzon were operated based on a share tenancy system (Ku, 1989, pp. 53-54), locally called *the agsa* system (Sonza, 1977:69,86; Larkin, 1993, pp. 74-75). Under this arrangement, the landowners usually provided the land, seeds, agricultural implements, milling facilities, and cash in advance. Meanwhile, the tenant (*inquilinos*) provided his labour for working the lands, planting, cutting, conveying the sugarcane from the fields to the mills, and processing the cane into sugar (Ku, 1989, p. 54; Quirino, 1974, p. 45).

In that system, the tenants producing sugar took the risks associated with possible failure of sugarcane cultivation and fluctuation in sugar prices in the international market. Bad crops and low sugar prices would ensure the tenants. Only a poor

result and even left them to shoulder the loss. In contrast, the factories took risks in the Javanese sugar industry, not based on a share tenancy system (Van der Eng, 1996, p. 216).

Another important difference is the control and ownership of the sugar industry. In the case of the Javanese sugar industry, from the 1890s, the sugar industry had implemented modern management. The 1880s sugar crisis forced the planters to replace the private individual enterprises with limited liabilities companies with headquarters and most of the shareholders in the Netherlands (Furnivall, 1939, p. 198; Allen & Donnithorne, 1957, p. 83; Boomgaard, 1988, p. 16). The sugar enterprises were no longer managed by the owners but given to the salaried managers who were responsible to the company's directors (Furnivall, 1939, p. 198; Allen & Donnithorne, 1957, p. 83).

In contrast to Java, in the case of the Philippines, the control of landlords over the sugar industry was very strong. Therefore, the existence of sugar plantations as a family business is a significant feature of the Philippine sugar industry. The business in sugar plantations later provided a solid material basis for several families to gain powerful influences not only in economic affairs but also in the political arena. Examples were Benedicto, Basilio Lopez, and Cojuangco families, who had businesses rooted mainly in the sugar industry until recently (Ku, 1989, pp. 51-53).

Apart from the existing differences, several similarities can also be noted. Both in the Philippines and Java, the sugar industries' development was inseparable from financial institutions' support. The establishment of the sugar industry was an intensive business. Therefore, the need for credit was high, not only in the initial stage but also in the expansion stage. In the case of the Philippines, several influential commercial houses, such as the Manila firm, Ker and Co., and Russell and Sturgis and Co., played an essential role in providing the sugar planters with credit to develop plantations. Meanwhile, several firms like the Banco-Espanol Filipino, Peele Hubbell and Co., Russel Sturgis and Co., and Loney and Ker helped the sugar planters to import new machinery (Sonza, 1977, p. 57; Ku, 1989, p. 42; Larkin, 1993, p. 48).

During American colonization, establishing the Philippine National Bank in 1916 also contributed to expanding sugar plantations. This bank was primarily designed to assist agricultural producers by supplying them with credit. The sugar industry owed much of its financial assistance to the Philippine National Bank, becoming the most prominent

bank due to the financing provided to the sugarmen (Quirino, 1974, p. 56; Nagano, 1993, pp. 217,221). Six large centrals, namely Bacolod-Murcia Co., Binalbagan Estate, Maa Sugar Central, Isabela Sugar Co., Talisay-Silaly Milling, and Pampanga Sugar Development Co., were financed in their initial state by the Philippine National Bank (Quirino, 1974, p. 56; Nagano, 1993, p. 224).

Like in the Philippines, the Javanese sugar industry also needed financial assistance. This demand was met by the existing financial institutions such as the *Nederlands Handels Maatschappij* (NHM), the *Handels Vereeniging Amsterdam* (HVA), the *Handelsbank*, the *Internationale*, the *Koloniale Bank*, and the *Dorrepaal Co.* Most of these financial institutions were Agricultural Banks (*Cultuur banken*) concentrating their operations heavily on providing credit for the agricultural sector (Furnivall, 1939, pp. 196-198; Van Laanen, 1990, p. 248). In 1884, for example, there were 29 sugar plantations financed by *N. I Handelsbank* and *Koloniale Bank* financed 12 and 9 sugar plantations, respectively. In addition, the *Handels Vereeniging Amsterdam* supported financially four sugar plantations (Furnivall, 1939, p. 197).

Undoubtedly, the sugar industry benefited greatly from the credit the existing financial institutions provided. This credit was used, for example, to provide lands, sugarcane seeds, agricultural implements, warehouses, transport, and wage payments. More importantly, credit availability also allowed the planters to import machinery needed to modernize the factory so that traditional equipment was gradually replaced. In the Philippines, for example, steam-powered mills were introduced to replace wooden mills operated by animal power (Ku, 1989, pp. 41-42). The adoption of modern machinery also happened in Java, as indicated by the remarkable rise in the imports of machinery in this period (Furnivall, 1939, p. 200).

To support the sugar industry, improvements in infrastructural facilities were also made. In the case of Java, concerning sugar cultivation, irrigation facilities were improved (Furnivall, 1939, p. 199). To facilitate the conveying of products, the colonial government took an active part in providing railways, roads, and seaports (O'Malley, 1988, p. 230). An important example was the construction of railways between Semarang and Vorstenlanden (1862), Batavia and Bogor (1864), and Surabaya and Malang (1875) (Furnivall, 1939, p. 204). Another line connecting Surabaya with Pasuruan, Probolinggo, and Klakah was constructed between 1878 and 1885, followed by a line from Klakah-Jember to

Panarukan (1897) (Broersma, 1912, p. 169).

Improvements were also made in the case of the Philippines. One significant improvement was the adoption of *lorchas* fleets, which could take much heavier loads to facilitate the conveying of sugar from Negros to the Iloilo port (Sonza, 1977, pp. 61-62). This was partly because the conveying of sugar products depended mainly on water transportation, and also haciendas were usually situated close to the island's river (Sonza, 1977, p. 34; McCoy, 1992:117,109; Larkin, 1993:28,66,85). Different from Java, which had railways connecting the principal seaports of Jakarta, Semarang, and Surabaya with the inland areas in the second half of the 19<sup>th</sup> century, most railways in the Philippines were constructed in the 20<sup>th</sup> century (Larkin, 1993, pp. 85-85).

With the availability of financial support and infrastructural improvements, the sugar plantations expanded greatly. In Java, private sugar plantations increased from 46 in 1875 to 152 in 1895. Most of them were situated in the residencies of East Java, such as Surabaya, Pasuruan, Probolinggo, Besuki, and Kediri (O'Malley, 1988, pp. 208-209). Meanwhile, in the Philippines, the expansion also took place primarily on the island of Negros. Only during 30 years, the island of Negros was transformed from a less critical region into a center of sugar plantations with 821 sugar mills, from a sparsely populated region with only 18,805 inhabitants in 1855 into a more densely populated region with 308,272 inhabitants in 1898 (McCoy, 1992, p. 113). By 1918, the population rose to 392,292 (Larkin, 1993, p. 61).

## PRODUCTION TECHNOLOGY

The different situations of the sugar industry in Java and the Philippines led to choices of production technology. The Javanese sugar industry was operated in a densely populated area. This meant that there was competition in using land between the sugar industry and food crop cultivation. In this context, the strategy to increase sugar output was maximizing yields from relatively small lands. This was mainly done by intensifying land use through improvements in production technology. Unlike Java, however, the sugar industry encountered a labour constraint in the Philippines. As already pointed out, labour was relatively expensive, so adopting labor-saving technology significantly enhanced its efficiency.

Adopting new production technology in the Javanese sugar industry began in the 1880s, particularly after sugar prices in the international market

dropped. The price of good quality sugar decreased from f. 19 a *pikul* in 1877 to f.9 in 1884 (Furnivall, 1939, p. 196), exacerbated by the growth and protection of European beet sugar (Elson, 1984, p. 137; Van der Eng, 196:215; Ku, 1989, p. 46; Quirino, 1974, p. 41). The protection policy caused the loss of lucrative European markets for Javanese sugar, with sugar producers in Java forced to look for other markets as outlets for the sugar they produced.

Consequently, competition in the sugar market became increasingly tight. The sugar producers in Java felt the need to increase their competitiveness in the international market, without which the Javanese sugar industry would not have been able to compete with the other sugar-producing countries like the Philippines, Cuba, and West India enjoying preferential treatment from the United States and the British empire. The only choice was to reduce production costs per product unit by improving the production technology. In this context, the need for research institutions was crucial, with the sugar producers in Java establishing sugar research institutions in Tegal (1885), Semarang (1886), and Pasuruan (1887) (Van der Eng, 1996, pp. 77-78). These institutions actively conducted experiments to improve the technical aspects of sugar cultivation and develop high-yielding sugar varieties.

In sugarcane production, improvements were made by adopting the Reynoso system in the early 20<sup>th</sup> century (Knight, 1993, p. 18). The use of this system in opening up sugar fields was very labour intensive (Van der Eng, 1996, p. 218), which suited the situation in Java, where labour was relatively cheap. Adopting production techniques, which absorbed more labourers, was an appropriate way to increase their competitiveness. Besides adopting the Reynoso system in preparing sugar fields, to increase sugar productivity, the sugar producers in Java also increased the use of fertilizer to stimulate the growth of cane plants in the fields. This was combined with the development of superior varieties. One of the most achievements was Java's Wondercane, POJ 2878 (Knight, 1993, p. 19; Van der Eng, 1996, p. 218).

With improvements in sugarcane production technology, there was a significant increase in sugar productivity, as indicated by the fact that over the period between 1914 and 1931, sugar production in Java doubled even though the acreage of cane cultivation rose by only one-third (Brown, 1997, p. 218). More specifically, sugar yield substantially increased from 4,6 tons per hectare between 1870-1879 to 9,5 tons per hectare in 1900-1909 and 16,6 tons per hectare in 1936-1940 (Booth, 1988, p. 223).

The rise in sugar productivity was also inseparable from the improvements in sugar manufacturing technology, which contributed significantly to reducing the unit cost of sugar and increasing sugar productivity. New techniques in processing sugarcane were adopted to replace the old ones. For example, the open pan system used in boiling cane juice was replaced by steam-operated vacuum pans. The sugar factories were also equipped with a 'triple effet apparatus' which could reduce fuel and labour inputs and increase the quality and quantity of sugar. These mechanical improvements reduce the losses of cane juice and potential sugar in the processing (Knight, 1993, pp. 14-15; Van der Eng, 1996, p. 219). In addition, the factories also adopted steam mills to replace water mills and ox carts with narrow-gauge railways to transport cane from the fields to the factories (Knight, 1993, pp. 18-19; Van der Eng, 1996, p. 219). Subsequently, the colonial sugar industry in Java became one of the most efficient sugar industries in the world (De Boer, 1978, p. 97).

Like Java, several technical improvements in sugar production were also made. In contrast to Java, though, the Philippine sugar industry's problem was a labour shortage and labor expense. Therefore, the strategy to increase efficiency relied mainly on labor-saving technology. One of the significant improvements in sugarcane production was the adoption of tractors (Larkin, 1993, p. 154). The use of tractors in preparing sugar fields was much more efficient than the use of manual workers. This was also combined with the increased use of fertilizer, the adoption of better sugar seeds, and the construction of drainage canals (Larkin, 1993, p. 154). Behind such improvements were the scientific research institutions, for example, the Philippine Sugar Association (Ku, 1989, pp. 77-78) and the state-owned research facility, La Carlota Station (Larkin, 1993, p. 154). These research institutions conducted experiments on fertilizer constituent tests, new varieties of cane, and methods of cane cultivation to overcome various problems facing the sugar industry.

In terms of sugar manufacturing technology, there were also efforts to modernize the machinery in the Philippine sugar industry. In the last decade of the 19<sup>th</sup> century, steam-powered mills replaced wooden mills (Ku, 1989, pp. 41-42; Sonza, 1977, pp. 55-56; Sa-onoy, 1982, p. 40). The adoption of modern technology also took place under American colonization (McCoy, 1992, p. 124). Centrifugal mills were developed to replace steam and animal-driven mills. Narrow-gauge rails were also constructed to

transport cane from fields to factories (McCoy, 1992, p. 125). These innovations increased sugar productivity and reduced the costs of sugar production.

Not all sugar factories, however, adopted progressively modern production technology. In 1932, for example, the planters in Luzon still cultivated low-yield indigenous varieties of cane in more than 50 % of the fields, whereas in Negros, more than 25 % of the sugar fields (Larkin, 1993, p. 155). Consequently, sugar productivity in the Philippines was still low compared to the other sugar-producing countries. 1932-1933, for example, sugar productivity in the Philippines was only 5.8 tons per hectare, whereas, in Java, it reached 15.7 tons per hectare (Larkin, 1993, p. 155).

The lack of enthusiasm of Philippine sugar planters to adopt more efficient production technology was closely related to their preferential treatment, such as free tariffs, quotas, and favorable prices obtained in the American market. The availability of protected access to the American market discouraged them from improving the competitiveness of Philippine sugar against the other sugar-producing countries. The protected access to the American market was inseparable from the involvement of American capital in the Philippine sugar industry. The Philippine sugar industry became one part of the American domestic economy (Larkin, 1993, p. 80). Therefore, the survival of the sugar industry in the Philippines was also an American interest. American capital was invested, for example, in the San Jose sugar factory in Mindanao pioneered by Welch, Havemeyer, and Senft (Quirino, 1974, p. 49). Another American investment in the sugar business was the Calamba Sugar Estate in Canlubang, Laguna, organized by Alfred Ehrman. In addition, several American sugar mills were also established on Negros Occidental (Quirino, 1974, pp. 51-53).

The mill's success in San Carlos encouraged the establishment of other American sugar mills in Central Luzon. In the Visayas, especially Cebu, Leyte, Panay, and Negros (Quirino, 1974, p. 55). This was followed by establishing the Ormoc Sugar Company in 1929 and the Hawaiian Philippine Company (Quirino, 1974, pp. 60-61). Meanwhile, Claus Spreckels joined Alfred Ehrman of the Canlubang Sugar Estate in developing Pampanga Sugar Mill (Quirino, 1974, p. 61). The involvement of American entrepreneurs in the Philippine sugar plantations guaranteed the preservation of free access to the lucrative American market, which also offered considerably higher prices than the prevail-

ing international prices (De Boer, 1978, p. 120).

Unlike Philippine sugar, the sugar produced in Java did not enjoy preferential treatment. The sugar producers in Java also had no sizeable metropolitan market, with the Dutch market needing to be more significant to absorb the sugar output from Java (Knight, 1993, p. 5). Therefore, after the loss of the lucrative American market in early 1900, the sugar industry in Java relied heavily on Asian markets such as British-India, Singapore, China, Japan, and Australia (Boomgaard, 1988, p. 161). However, Java sugar had to compete with other producers in these markets. Moreover, the competition climate in the sugar market became increasingly tight in line with the expansion of sugar plantations in sugar-producing countries. In this situation, continuous efforts were needed to improve efficiency to ensure the competitiveness required to survive in the world market. With this competitiveness, the Java sugar industry could survive in the competition.

#### THE SUGAR INDUSTRY DURING THE INTER-WAR PERIOD

In the 1920s, the sugar industries' performance in Java and the Philippines was awe-inspiring. This is indicated by the rise in sugar export in both regions.

The table 1 shows that sugar exports tended to increase in the 1920s, reflecting roughly the rise in sugar production. In Java, the increase in sugar production was not caused by the increase in sugar factories. The number of sugar factories remained stagnant (Boomgaard, 1988, p. 158). The explanation is partly associated with the expansion of the

**Table 1.** Sugar Exports from Java and the Philippines between 1921-1930 (in tons)

Year	Java	Philippines
1921	1,677,079	289,876
1922	1,435,775	362,072
1923	1,827,496	271,983
1924	1,878,394	357,830
1925	2,067,636	546,832
1926	1,736,558	511,232
1927	2,215,763	553,324
1928	3,069,253	569,938
1929	2,981,159	695,868
1930	2,838,092	743,980

Source: Clemens, Lindblad, and Touwen (1992, p. 61); Quirino (1974, pp.57-58)

area under sugar, rising from 159,000 hectares in 1921 to 199,000 hectares in 1930 (Boomgaard, 1988, p. 158). Another critical factor was the increase in sugar productivity due to the use of high-yielding sugar varieties like POJ 2078, supported by various technical improvements, for example, irrigation facilities (Furnivall, 1939, p. 428; Mubyarto, 1984, pp. 5-6).

Unlike Java, the rise in sugar outputs in the Philippine was hardly due to increased productivity. Sugar productivity in the Philippines was much lower than in Java, where the level of sugar productivity between 1929 and 1934 reached 1,327 quintals per hectare. Sugar productivity in the Philippines was only 361 quintals per hectare (Valdepenas & Bautista, 1977, p. 127). With this level of productivity, the Philippine sugar industry failed to emerge as an efficient sugar producer compared to the other sugar-producing countries like Formosa, Cuba, and Hawaii, with levels of productivity reaching 683, 381, and 1,357 quintals, respectively (Valdepenas & Bautista, 1977, p. 127).

The main explanation was mainly associated with the increase in sugar factories and an expansion of the area under sugar cultivation. In the Philippines, 35 new sugar factories were established between 1910 and 1930. These new sugar factories were scattered in Pangasinan, Mindoro, Negros, Batangas, Pampanga, Panay, Luzon, Tarlac, and Ilocos (Quirino, 1974, pp. 71-73). Examples of sugar factories established from 1920 to 1930 were Bacolod Murcia Milling Co., La Carlota Sugar Central, Victorias Milling Co., Hawaiian-Philippine Co., Central Azucarera, Mabalacat Sugar Development Co., Binalbagan Estate, Pilar Sugar Central, Hind Sugar Co., Central Luzon Milling, Central Azucarera, Cebu Sugar Co., Central Leonor, and the Philippine Starch and Sugar Co (Quirino, 1974, pp. 72-73). Regarding acreage, the lands devoted to sugar cultivation went up from 72,000 hectares in 1902 to 305,890 hectares in 1938 (Valdepenas & Bautista, 1977, p. 117).

During the 1930s Depression, the condition of the Philippine sugar industry was much better than the sugar industry in Java. At the time when the Javanese sugar industry experienced significant deterioration, the Philippine sugar industry still experienced an impressive expansion, as reflected in export figures. Although after 1934, the sugar exports were lower than the peak years from 1932 to 1934, they were still much higher than the outputs in the 1920s, except in 1935.

The explanation for the survival of the Philippine sugar industry was not its competitiveness but



**Table 1.** The Sugar Exports from Java and the Philippines between 1931-1940 (in tons)

Year	Java	The Philippines
1931	1,844,947	752,932
1932	1,887,963	1,016,568
1933	1,388,892	1,078,553
1934	1,397,271	1,152,841
1935	1,410,119	516,233
1936	1,009,771	899,838
1937	1,142,128	871,045
1938	1,196,454	868,253
1939	1,587,375	874,728
1940	916,476	976,474

Source: Clemens, Lindblad, and Touwen (1992, p. 61); Quirino (1974, pp. 57-58)

rather the protected access to the American market. The American market was the most essential destination for the Philippine sugar export. In 1920, for example, the American market absorbed 52 % of the total Philippine sugar exports, and by 1925 it increased to 74 %. In the depression years, almost all the Philippine sugar exports were directed to the American market (Larkin, 1993, p. 150), consisting of duty-free entry and the permitted quota of sugar export. With the American favourable measures, the Philippines was promoted to become one of the world's cane sugar producers. With Hawaiian and American capitals, the Philippines was ranked eleventh in 1910, seventh in 1915, fifth in 1925, and third in 1934 (Cutshall, 1938, p. 155).

Even though a quota system was also imposed on the Philippine sugar export based on the Tydings-McDuffie Law and the Jones-Costigan Act (Quirino, 1974, p. 88; Sa-onoy, 1982, pp. 55-56; Ku, 1989, pp. 69-70), efforts made by the Philippine Sugar Association through lobbying and bribery resulted in relatively fascinating amounts of the sugar quota. There was only a tiny difference between the sugar outputs and the permitted export quota (Larkin, 1993:150; Valdepenas and Bautista, 1977:126-127). The Philippines received a proportionate share of 15.49 % to 15.67 % of American sugar consumption for three years from 1934 to 1936 (Quirino, 1974, p. 88). In absolute figures, the permitted quotas of sugar export during the three years of 1934, 1935, and 1936 were respectively 1,015,000 short tons, 999,308 short tons, and 1,055,386 short tons (Quirino, 1974, p. 89). With

the American preferential treatment, the sugar industry in the Philippines grew during the Depression (Van der Eng, 2004, p. 1257).

Unlike the Philippines, the Javanese sugar industry was miserable because the Dutch market needed to be more significant to absorb its product. The primary market for sugar produced from Java was Asian countries such as Japan, China, and India. The Javanese sugar industry faced severe problems when these sugar-importing countries began to cut down their sugar imports due to the economic crisis and to protect the domestic sugar industries. As a result, Java's most efficient sugar producers had yet to gain a market for their products (Allen & Donnithorne, 1957, p. 85; Furnivall, 1939, p. 429). Adopting the Chadbourne Plan in 1931, followed by various restrictive measures, brought changes in the Javanese sugar industry. Sugar cultivation was reduced significantly from about 199,000 hectares in 1930 to only 84,000 hectares in 1933. By 1935, there were only 28,000 hectares of land under sugarcane. Meanwhile, the number of sugar mills also decreased from 179 in 1930 to only 97 in 1933, and by 1935, there were only 40 sugar mills in operation (Boomgaard, 1988, p. 158). Sugar production in Java dropped sharply, and the industry unavoidably collapsed, losing its role as the foundation of the Dutch colonial economy.

## CONCLUSION

Based on the given discussion, two main conclusions can be drawn. First, there were significant differences between the sugar industries in Java and the Philippines. The sugar industry in Java operated in a densely populated region. Labour was relatively cheap, and the need for labour in the sugar industry was met by recruiting wage labourers from the surrounding villages. The main problem was land constraints because sugar plantations in Java had to share the lands with food crops cultivation. The lands cultivated with sugarcane were mainly leased from the local peasants, except in the principalities Yogyakarta and Surakarta, where special arrangements were made with the indigenous rulers. In contrast, the sugar industry was developed in haciendas in the Philippines. Rather than land, labor was the main problem facing the Philippine sugar industry. The operation of the sugar industry, particularly on the island of Negros relied heavily on migrant labour. Unlike in Java, where the sugar factories took all the risks of business emerging from the failure of crops and market shocks, the sugar farmers in the Philippines shouldered the risks using a share tenancy system.

Second, the sugar industry in both regions made several improvements to increase competitiveness. In Java, where labour was relatively cheap, adopting production technology using this cheap human resource was significant. This was indicated by adopting the labour-intensive Reynoso system in preparing the sugar fields. Unlike Java, the relatively expensive labour forced the Philippine sugar producers to adopt labour-saving production technology. Therefore, they preferred to use tractors rather than labour-intensive techniques in preparing the sugar fields. In sugar manufacturing, the sugar producers in the two places generally realized the importance of adopting modern machinery. The Javanese sugar producers were much more progressive in modernizing the sugar factory because their survival depended entirely on the competitiveness of the sugar produced. This was achieved through technical innovations in cane production and modern manufacturing technology, which could increase sugar productivity and reduce sugar costs per unit.

In contrast, free access to the lucrative American market discouraged the sugar producers in the Philippines from increasing their competitiveness, as indicated by the low sugar productivity compared to Java. Only because of the preferential treatment obtained in the American market did the less efficient sugar industry in the Philippines survive during the Depression. Meanwhile, Java's more efficient sugar industry collapsed due to the unfair protection policy in the world sugar market.

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