

Chapter 11

Sugar Cane and the Environment under Dutch Rule in Seventeenth Century Taiwan

Hua-pi Tseng

Abstract In the sixteenth century sugar conquered the world and substituted honey became diet favorite and important in the world trade. In the seventeenth century, Taiwan started producing sugar under the Dutch rule. Sugar led Taiwan into the world trade and earned profit for the Dutch Eastern Indian Company. During the Dutch's rule, sugar cane also was one of the most representative tropic crops in Taiwan.

Sugar production always changes ecological system tremendously, because it would involve the exploitation of land, forests, and animals. In the sugar trade, empire powers exploited the lands they colonized to plant sugar cane. Kenneth Pomeranz & Steve Tipok had argued in their book, *The World that Trade Created*, Taiwan could be saved from sugar shock because of Zheng Chenggong who ruled Taiwan after the Dutch. It meant Zheng was key figure to preserve natural environment by not executing monoculture of sugar cane plantation policy in the land.

My paper will majorly tackle the sugar policies under the Dutch rule. It will analyze why the sugar cane plantation could be successful in Taiwan, whether sugar monoculture would sustain without Zheng's conquer, and what impacts on the environment through the plantation of sugar cane occurred in the land.

My current study shows that due to the contribution of Chinese labor and their plantation skill, and the nature of the species, sugar cane was successfully cultivated in Taiwan by the Dutch authority. The sugar industry in Taiwan was run under the model of "Chinese species, Chinese plantation skill, Chinese labor". Sugar cane changed the ecology and the demography of the land, when Chinese migrated to Taiwan regularly. **We may found that sugar influences Taiwan both naturally and culturally.** And it was not Zeng who saved Taiwan from sugar shock, because sugar shock won't have any chance occurred in Taiwan.

H.-p. Tseng (✉)
Chang Gung University & Chang Gung Memorial Hospital,
Taoyuan City, Taiwan, Republic of China
e-mail: hptseng1113@gmail.com

In the sixteenth century, Sugar conquered the world. It replaced honey and became a dietary favorite. It also became important in the world trade. In the seventeenth century, Taiwan started producing sugar under the Dutch rule. Sugar gained profit for the Dutch East India Company and introduced Taiwan to the world trade. During the Dutch colonial period, sugar cane became one of the most representative crops grown in Taiwan. Research showed that the production of sugar led to change in land use, which affected the ecological system and environment.¹ This article analyzes the sugar policies of the Dutch in Taiwan, to examine how sugar cane was successfully cultivated, as well as the environmental consequences of its cultivation in Taiwan.

Four volumes of *De Dagregisters van het Kasteel Zeelandia* and three volumes of *The Diaries of Batavia* were used as the primary material for this research. Two volumes of *The Collections of the Dutch Governors' Letters*, both translated into Chinese and published in Taiwan,² were also reviewed. Academic publications, such as Tonio Andrade's *How Taiwan Became Chinese: Dutch, Spanish and Han Colonization in the Seventeenth Century*, and Pol Heyns' *Economy, Land Rights and Taxation in Dutch Formosa*, as well as publications of some Taiwanese scholars, were valuable references for this research. Among works of Taiwanese scholars, Tsao Yung-ho's *Studies on the History of Early Taiwan*, Part I and II, were also important resources for this research. Tsao pioneered the research of Dutch in Taiwan since the 1950s and many have followed his footsteps.³

11.1 Sugar Cane in Taiwan Before Dutch Colonization

When was sugar cane first cultivated in Taiwan? Did Taiwan have its own indigenous species of sugar cane? In 1349, before the Dutch colonized Taiwan, Wang Ta-yuan mentioned sugar cane in *Brief Account of the Island (Dao Yu Zhi Lue)* 《島嶼志略》. He wrote about that indigenous people in Taiwan producing salt by boiling sea water and making wine with sugar cane juice. In 1603, Chen Di, a Confucius scholar of the Ming Dynasty, depicted his encounters in Taiwan in *Record of Eastern Indigenous People (Dong Fan Ji)* 《東番記》. He documented vegetables grown in the land, such as scallion, ginger, potato, and taro. He also

¹ David Watts' study on Barvades showed that the sugar cane plantation and the relationship with the exploitations of the environment. Cited from Joachim Radkau, *Nature and Power: A Global History of the Environment* (Cambridge: Cambridge University Press, 2008), pp. 152–153.

² This paper also reviews the following books: J.H. Galloway, *The Sugar Cane Industry: The Historical Geography from its Origins to 1914*. Cambridge: Cambridge University Press, 1989; and Kenneth Pomeranz and Steven Topik, *The World that Trade Created*. N.Y. & London: ME. Sharpe, 2006, 2nd edition.

³ Yung-ho Tsao, *Studies on the History of Early Taiwan I&II*. Taipei: Linking Publishing, 1979, 2010. Tsao's researches enlightened many younger generations to devote to the study of early Taiwan history after the 17th century. Tsao died in 2014 (1920–2014).

listed a number of fruits, such as Coconut Palm, Taiwan Persimmon (velvet apple), Buddha's Hand Citron, and sugar cane.⁴

By 1624, the Dutch had established their ruling system in Taiwan. We found two records mentioning sugar cane in *The Diary of Batavia*, a Dutch document, in which they described animals, plants, vegetables and fruits present on the island. Many fruits were listed, including Siri, Pinang (areca catechu), banana, orange, watermelon, bottle gourd, sugar cane and others, but not coconut trees. It stated that there were plenty of such fruit plants around Da Yuan (大員) and Hsiuh Long (蕭壠), along Taiwan's southwestern plain.⁵ However, it seemed as though the indigenous people did not harvest fruit from those plants.

At that time, there was a large number of deer in the land. The indigenous people used to hunt deer and turn their skin and dried meat to merchandise sold to the Chinese at a low price, or exchanged for other goods.⁶ In the late 1620s, Sun-yi Peng 彭孫貽 (1615–1673) began writing *The Document of Conquering the Ocean* 《靖海志》, in which he documented the geography and landscape of Taiwan for almost five decades. He pointed out that many indigenous tribes lived under the mountains where there was fertile soil and exchanged goods with each other. Peng's book highlighted: "many poor immigrants came from Mainland China and lived along the coast. They grew sugar cane and produced sugar for a living." He estimated that there were thousands of Chinese families involved in the business of producing sugar.⁷

Through such documents, we learned that sugar cane already existed in Taiwan before the Dutch, and the indigenous people consumed sugar but not sugar cane. J. E. Heeres stated that there were some indigenous species of sugar cane in Taiwan before the Dutch arrived, because the environmental condition was very suitable for growing the plant,⁸ but no record of cultivation could be found. One possible reason for the lack of documentation is that the Chinese brought sugar cane to Taiwan before the Dutch, but it wasn't grown for business purposes. During the Sung Dynasty, sugar cane plantations were common in the south of the Yangzi River in China. Since Chinese people had been travelling between Taiwan and the mainland regularly, we can assume that the "indigenous species" of Taiwan—species that came before the Dutch—originally came from China.

⁴Di Chen, *Record of Eastern Indigenous People* (Taipei: Economic Research Center of Taiwan Bank, 1959), pp. 26–27.

⁵*The Diary of Batavia* (I) (Nan-tou: Taiwan Historica, 1970), p. 33.

⁶See the record of Feb. 1624, in *The Diary of Batavia* (I), p. 33.

⁷Peng Sun-yi, *The Document of Conquering the Ocean* (Taipei: Taiwan Bank, 1959), p. 56.

⁸J.E. Heeres, *Dagh-register fehouden int Casteel Batavis vant passerende daer ter plaetse als over geheel Nederlandts-India, Anno 1624–1629* ('s-Gravernhage: Martinus Nijhoff, 1896), p. 24; Cited from Pol Heyns, *Economy, Land Rights and Taxation in Dutch Formosa* (Taiwan, Translated by Zhen Wei-chung, Taipei: Zhong-zi Publishing, 2002), p. 57.

11.2 Sugar Cane Policies Under Dutch Rule (1624–1662)

After the Dutch colonized Taiwan, they established plantations to be cared for specifically by Chinese farmers.⁹ With the help of these farmers, the Dutch were able to launch their sugar business in Taiwan.¹⁰ There were 13 governors over the period of the Dutch colonization. Four of which—Hans Putmans, the 5th Governor (1629–1636), Johan van der Burch, the 6th Governor (1636–1640), Pieter Anthoniszoon Overtwater, the 10th Governor (1646–1649), and Nicolaes Verburch, the 11th Governor (1649–1653)—are representatives of the Dutch administration of sugar policies in Taiwan.

In 1632, Governor Putmans encouraged the Chinese farmers, providing financial aid and cattle, to grow sugar cane in Chi Kan (赤崁)—the first Chinese agricultural colony. The next year, a new species called “Bamboo Sugar Cane” was imported to Da Yuan. The harvest in 1634 was successful.¹¹ Then in 1635, the Dutch East India Company recruited two Chinese businessmen (also called landlords), Lin Hen-wan (林亨萬) and Su Ming-gang (蘇鳴崗) to Taiwan. Lin and Su led a total of 300 Chinese farmers to attend to the sugar cane fields assigned by the Dutch. Each of them had approximately 20 ha. It was estimated that 200–300 picul of black sugar were produced that year.¹²

At a meeting in 1635, Putmans decided to continue providing money and cattle to the Chinese farmers.¹³ In 1636, the Dutch Congress in Taiwan decided to waive taxes for 5–6 years, and guaranteed the purchasing price of sugar. They also built hospitals for the Chinese farmers.¹⁴ The Dutch found that indigenous people often harassed the farmers. Therefore, in 1635, to improve farming conditions, Putmans requested Batavia to send troops to attack Taiwanese indigenous people. Batavia sent 475 soldiers to Taiwan under the commend, and conquered Ma Dou She (麻豆社), which was the largest tribe in that area. The Dutch also signed peace treaties with other tribes nearby in 1636. In all, Putmans’ policies were aimed to facilitate sugar production in Taiwan.¹⁵

⁹ Tonio Andrade, *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the 17th Century* (Taipei: Yuan-Liu, 2008; Taiwan translation edition), p. 228.

¹⁰ VOC 1116, folio 319. Cited from Pol Heyns, *Economy, Land Rights and Taxation in Dutch Formosa* (Taiwan), p. 57.

¹¹ Tonio Andrade, *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the 17th Century*, p. 230; and footnote 28 on p. 245.

¹² Shu-sheng Chiang translated, *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL II: 1629–1648* (Tainan: Tainan City Government, 2002), p. 622.

¹³ Shu-sheng Chiang translated, *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL I: 1629–1641* (Tainan: Tainan City Government, 2000), p. 197.

¹⁴ Shu-sheng Chiang translated, *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL I: 1629–1641*, p. 197; also in Pol Heyns, *Economy, Land Rights and Taxation in Dutch Formosa* (Taiwan), p. 57–58.

¹⁵ Shu-sheng Chiang translated, *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL I: 1629–1641*, p. 262 & p. 232.

In order to reach the annual goal of sugar production, Governor Burch banned the eating of sugar cane grown in Chi Kan on August 13, 1639. The ban also declared that the Chinese farmers are not allowed to sell sugar to anyone besides the Dutch.¹⁶

The agricultural policies by the 7th governor Paulus Traudenius (1640–1643), the 8th governor Maximiliaen le Maire (1643–1644), and the 9th governor Francois Caron (1644–46), showed that the Dutch maintained a sugar industry throughout that time. By 1641, Taiwan had increased its sugar production and cultivated more land for that purpose. Around the same time, seeds of indigo plants were distributed to farmers, as the colonial government was also seeking other profitable agricultural investments.¹⁷ In 1645, the Dutch learned that the fertile soil in Taiwan was suitable for growing crops, especially sugar cane, which could produce an abundant amount of sugar for trade. According to the records, in 1645, Chi Kan area alone could produce 1,000,000 kg of white sugar, and up to 1,500,000 kg of sugar a year.¹⁸ Although the Dutch decided to import and grow several kinds of vegetables, such as ginns (*Wolfiporia extensa*) and ginger in addition to sugar cane, their focus was on sugar.

Governor Overtwater's policy on sugar was to cooperate with Chinese landlords to develop local sugar businesses and international trade. In 1639, he drafted seven landlords—Jacoma, Simtocq, Sanloe, Cambingh, Lampack, Boijcko, and Peco—to grow 262,000 sugar cane plants. Like Putmans, Overtwater protected Chinese farmers from the harassment of indigenous people and guaranteed the purchase price of sugar. Chinese farmers also grew other crops, including rice, tobacco, indigo, ginger, and ginns, for various demands.

The following table shows the numbers of sugar cane plants cultivated by the Chinese farmers led by the seven Chinese landlords.¹⁹

Landlord	Jacoma	Simtocq	Sanloe	Cambingh	Lampack	Boijcko	Peco
Number of sugar cane plants	50,000	30,000	40,000	12,000	30,000	70,000	30,000
Other crops	Rice, tobacco, indigo, ginger, ginns (<i>Wolfiporia extensa</i>), etc						

In the late 1640s, China was in short of food supply. Food shortages affected the production of sugar in Taiwan. Chinese famers were more inclined to grow rice instead of sugar cane, because rice could be sold at a better price. In 1649, Governor Verburch raised the price of sugar in response to this situation. It was proven to be

¹⁶ Shu-sheng Chiang translated, *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL I: 1629–1641*, p. 447.

¹⁷ See the records of February 1641, in *The Diary of Batavia* (II) (Taiwan), p. 311.

¹⁸ See the records of March 1645, in *The Diary of Batavia* (II) (Taiwan), p. 456; December 1645, in *The Diary of Batavia* (II), p. 472.

¹⁹ The reference of the table is drawn by the author, which can be seen in Pol Heyns, *Economy, Land Rights and Taxation in Dutch Formosa* (Taiwan), p. 60.

an effective strategy. He also took this opportunity to export Taiwanese sugar to Japan.²⁰

In the 1650s, the sugar business in Da Yuan had been revived. In 1651, the amount of sugar being produced had reached 120,000 kg per year. After 1652, the amount of sugar exported continued to increase due to the expansion of sugar cane fields from Da Yuan to other regions in central Taiwan. As a result, Taiwanese sugar changed its name from “Da Yuan Sugar” to “Formosa Sugar”.²¹ In December 1658, there was an abundant harvest of rice and sugar, and “Formosa Sugar” was traded to Japan, Iran, and China.²²

11.3 Sugar Cane Success in Taiwan

When the Dutch began their agricultural projects in Taiwan, they grew a variety of crops, for example, indigo, mulberry trees, cotton, and Cantonese ginger. Most of the crops had failed, but the cultivation of sugar cane was successful. There are a few explanations.

First of all, the growing condition in Taiwan and the nature of sugar cane plants were crucial to the success. In general, sugar cane grows well between the latitudes of 36° north and 30° south, and Taiwan is located precisely within that range. The Dutch imported “Bamboo Sugar Cane” from the southeastern part of China to Taiwan. The trunk of such variety is small but strong enough to bear wind. Therefore, it was easy to grow in Taiwan and had better chance to survive without well-established irrigation systems, which was lacking.²³ Notably, the natural environment was more suitable for the cultivation of sugar cane than for rice in seventeenth century Taiwan.

The contribution of Chinese labor was also crucial. It was an effective strategy of the Dutch to rely on Chinese farmers. The Dutch preferred Chinese workers to slaves from other continents, because they were skillful and more affordable. They were also more capable when working without instructions and supervision. As a result, the Dutch East India Company owned 60 slaves, but employed 3000 Chinese workers during that period.²⁴ The Dutch governors in colonial Taiwan had encouraged the cultivation of various crops since 1636, a policy that called for many

²⁰Letter written by P.A. Overtwater to C. van der Lijn and Batavia Congress on Feb. 1, 1649. See *De dagregisters van het kasteel Zeelandia, Taiwan 1629–1662, DEEL III: 1648–1655*, (Tainan: Tainan City Government, 2003) p. 101.

²¹Yoko Nagatsumi, ‘To Learn seventeenth century Taiwan Trade through Dutch Archives,’ translated by Shih-feng Liu (Taiwan), in *Proceedings of the Development of Chinese Ocean History*, No. 7, ed. by Shi-Young Tan (Taipei: Academia Sinica, 1999), p. 49.

²²The record was written on December 14, 1658. See Chen, Shao-kang trans., *Dutch in Formosa* (Taiwan, Taipei: Linking Publishing, 2000), p. 507.

²³Kouji Nakamura, ‘Introduction on Industry,’ in *Researches in the Taiwan History under the Dutch Rule*, Vol. I. (Taipei: Dawshiang Publisher, 1997), p. 69.

²⁴Pol Heyns, *Economy, Land Rights and Taxation in Dutch Formosa* (Taiwan), p. 58.

Chinese farmers to relocate to and settle in Taiwan.²⁵ Besides sugar, Chinese landlords were eager to grow rice, so they also recruited Chinese farmers to cultivate their land for rice,²⁶ and that attracted more people to immigrate.

In December 1645, the Dutch government in Taiwan learned that China was undergoing civil war, so they decided to waive the taxes of Chinese farmers in Taiwan to encourage agricultural production.²⁷ In 1649, during the civil war period between late Ming and early Qing dynasties, approximately 14,000 people fled to Taiwan from China. The population of Taiwan continued to increase since.

Acknowledging the Chinese immigrants' contribution to the colonial government, the first Dutch governor in Batavia, Jan Pieterse Coen, once stated: "No one could compete with the Chinese who have served us best." In 1649, Batavia Governor Cornelis van der Lijn wrote in a letter to Governor Pieter Overtwater expressing that the Chinese were the only "honey bees" who produced honey. He believed that without the Chinese, the Dutch East India Company would not have been able to maintain their authority in Taiwan.²⁸

11.4 Changes in Economy, Demographics and the Environment

The Dutch East India Company considered sugar a valuable product in the world trade. Under Dutch rule, sugar and other products from Taiwan were integrated into the Dutch's worldwide supply network. From there on, Taiwan was officially participating in the world trade, as J. H. Galloway mentioned:

Sugar cane was a crop of long-standing domestic importance throughout Southeast Asia before the first European merchants appeared in the region, and a few places, such as southwestern Taiwan, produced a surplus for export. During the years of colonial administration, the production of sugar in Java, Taiwan, the Philippines and Malaya was transformed, commercialized, and the four countries became significant exporters.²⁹

Taiwan had been isolated for thousands of years. In the seventeenth century, the Dutch not only laid a foundation for the sugar industry in Taiwan, they also brought Taiwan to the world.³⁰

The large number of Chinese immigrants changed the demographics of Taiwan. There was an estimated 100,000 Chinese who immigrated to the island during the four decades of Dutch colonization. Ever since the Dutch began recruiting farmers

²⁵ *The Diary of Batavia* (I) (Taiwan), pp. 179–180.

²⁶ *The Diary of Batavia* (I) (Taiwan), p. 193.

²⁷ *The Diary of Batavia* (II) (Taiwan), p. 469.

²⁸ *De dagregisters van het kasteel Zeelandia, Taiwan 1629–1662, DEEL III: 1648–1655*, pp. 96–97.

²⁹ J. H. Galloway, *The Sugar Cane Industry: A Historical Geography from its Origins to 1914* (Cambridge: Cambridge University Press, 1989), p. 208.

³⁰ Kenneth Pomeranz & Steve Topik, *The World that Trade Created* (N.Y. & London: ME. Sharpe, 2006; 2nd edition), pp. 126–128.

from mainland China to assist with agricultural activities in Taiwan, the nature of Chinese people's visits changed. In the past, fishermen from China's Fujian Province would come to Taiwan at certain times of the year to fish and conduct trade with the indigenous people and then return to the mainland. Under Dutch rule, more Chinese started to settle in Taiwan. Fishing activities increased as well.³¹ With the assistance of Cabessas—Chinese landlords—Chinese farmers became useful labor to the Dutch.³² Severe living conditions due to food shortage in southeastern China in the beginning of the seventeenth century, also propelled the Chinese to leave for Taiwan.

Chinese settlers were also allowed to enter the Formosa Congress Meetings as representatives. The close relationship between the Dutch and the Chinese settlers formed a “co-colonization” in Dutch colonial Taiwan.³³ This new political and demographic construct reflected the diaspora of trade and labor in East Asia,³⁴ which was a result of the world trade.

After the Dutch, when Zheng Chenggong was governing Taiwan (1662–1683), the Chinese immigrant population increased from 150,000 approximately to 200,000. The number reached 250,000 at the end of the seventeenth century.³⁵ Zheng, as a child of Ming Dynasty, intended to develop Taiwan as an anti-Qing Dynasty base.

Dutch agricultural policies in Taiwan changed the use of land and landscape. With permission from the Dutch colonial government, Chinese farmers started cultivating land beyond existing fields.³⁶ On Feb. 25, 1643, despite there being sufficient supply, the indigenous people in Da Yuan were demanded to grow more rice to increase the tax income for the Dutch East India Company. Chinese farmers had cultivated 3737 morgen of rice by 1654.³⁷ The Dutch also ordered them to cut down forests to create new farmland—a policy that led to rapid deforestation.³⁸ The process of creating new farmland also spoiled the habitat of deer in Taiwan, causing its population to decrease.

³¹ According to Yung-ho Tsao's study, there were about 100 boats sailing to Taiwan in 1631, and in 1637, 300–400 boats with 6,000–10,000 fishermen estimated. See Tsao, 'The Spread of Chinese People and the Exploitative Development in Taiwan,' in Tsao, *Historical Studies in Early Taiwan* (I), p. 10.

³² “Cabessa”, just like “Capitao” in Portuguese, was Chinese leader or landlord and chosen by the Dutch authority, and led Chinese farmers to do agricultural cultivation, and dealt with trade activities as well. The chosen Cabessa, as ruling class, could participate the Congress committee.

³³ Both Pol Heyns and Tonio Andrade mentioned this concept and phenomenon.

³⁴ Robin Cohen, *Global Diasporas: An Introduction* (Seattle: University of Washington Press, 1997), pp. 85–89.

³⁵ Yung-ho Tsao, 'Taiwan Reclamation during Zeng Ruling Era,' in Tsao, *Historical Studies in Early Taiwan* (I) (Taipei: Linking Publishing, 1979, 2006), p. 277.

³⁶ *The Diary of Batavia* (II) (Taiwan), p. 456.

³⁷ *De dagregisters van het kasteel Zeelandia, Taiwan 1629–1662, DEEL III: 1648–1655*, p. 289.

³⁸ Leonard Blusse & Natalie Everts eds. (translated by Peter Kang), *The Formosan Encounter: Notes on Formosa's Aboriginal Society: A Selection of Documents from Dutch Archival Sources*, Vol.2 (1636–1645) (Taipei: Shung Ye Museum of Formosan Aborigines, 2010), pp. 204–205.

The change in land use also affected the livelihood of the indigenous people, which had traditionally depended on fishing and hunting. The 1655 locust plague led to poor harvest of rice that year. The people pled for the right to hunt, but was denied by the authority.³⁹ It showed that the Dutch were strongly committed to policies favoring agriculture.

As a result of Dutch agricultural policies, cows in Taiwan became domesticated. The number of cows had increased rapidly since the 1630s. There were roughly 20 cows in the 1620s, and 360 by 1635.⁴⁰ Records show that more cows had been imported to Taiwan since.⁴¹ Contrary to the decline of the deer population, the number of cows grew with the development of agriculture.

11.5 Balance of Sugar and Rice

In *The World that Trade Created*, Kenneth Pomeranz and Steve Topik argued that, Taiwan had the highest chance of monoculture during the 1600s under Dutch rule. Sugar cane monoculture would have been caused by the demand for sugar production and the need for trade—an incident they called the “sugar shock”.⁴² They agreed that Taiwan avoided the sugar shock because sea merchant Zheng Cheng-gong’s invasion of Taiwan, which overthrew the Dutch, had brought attention to the importance of other crops, particularly rice.

However, before Zheng, the Dutch had experimented with the cultivation of several kinds of crops. They were seeking crops that could be grown successfully in Taiwan, especially the kinds that were valuable in trade. As promising as sugar seemed at that time, it wasn’t as profitable as the Dutch had expected. Also, local dietary needs demanded additional crops. The fact is, there was little chance that the Dutch policies on sugar cane could have resulted in monoculture. There had always been a variety of crops grown simultaneously in Taiwan.

While Pomeranz and Topik’s concern of the sugar shock was from an ecological standpoint, Zheng’s concern was political. As a child of the Ming Dynasty, Zheng took Taiwan as an anti-Qing base. Both Zheng and the Qing government realized that internal stability was key to keeping Taiwan under control, and having a steady supply of rice was important. Producing large amounts of sugar for foreign trade, on the other hand, was not.⁴³

³⁹*De dagregisters van het kasteel Zeelandia, Taiwan 1629–1662, DEEL III: 1648–1655*, pp.417–418.

⁴⁰Tonio Andrade, *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the 17th Century*, (footnote 33), p. 246.

⁴¹For instance, there is a record about cows being imported to Taiwan in December 1640. See *The Diary of Batavia* (II) (Taiwan), pp. 246–47.

⁴²Kenneth Pomeranz and Steven Topik, *The World that Trade Created*, pp. 126–128.

⁴³Kenneth Pomeranz and Steven Topik, *The World that Trade Created*, pp. 127.

While in Taiwan, Zheng administered the “wasteland reclamation program”—a system often applied by previous Chinese Empires to cultivate fields for rice production.⁴⁴ The British East India Company records revealed that, in 1683, the amount of sugar produced in Taiwan was one third of the average annual amount during the Dutch period.⁴⁵ Even though Zheng made food crops the priority, he didn’t give up on sugar production. Sugar was still beneficial in generating extra income for his regime in Taiwan.

The enormous profit gained by exporting sugar to Japan and the Philippines was one reason that prompted the Qing Empire to include Taiwan in its political territory.⁴⁶ Sugar production was continued after Qing defeated Zheng’s grandson and took over the island in 1683. But when more and more farmers started growing sugar cane instead of rice, the Qing government intervened. In the late 1670s, Kao Kong-chien (高拱乾), Administrator of Taiwan and Hsiamen, began to worry that sugar would take over rice, so he issued a ban on the cultivation of sugar cane, declaring the need for people to grow rice to prevent Taiwan from food shortages.⁴⁷ Besides, Taiwan had to supply food to Fujian, Canton, and Zhejiang provinces as well.⁴⁸

From the Dutch colonial period to Zheng’s regime, and later the Qing Dynasty, sugar and rice had always coexisted and become correlated agriculturally and economically. The balance between sugar cane and food crops demanded authorities to deliberate their policies on land use.

11.6 Conclusion

In the 1600s, imperial powers in the world trade, such as the British, Spanish, Portuguese, and the Dutch, established sugar industries in many colonies. Sugar was one of the most profitable colonial products at that time. When the Dutch colonized Taiwan from 1624 to 1662, they transformed sugar cane from its original state as a wild plant into a cash crop.

The cultivation of sugar cane plants and the production of sugar, systemized by the Dutch, impacted Taiwan in a few ways: First of all, Taiwan entered the world trade through producing sugar for the Dutch East India Company. The Dutch

⁴⁴ Yung-ho Tsao, ‘Taiwan Reclamation during Zeng’s Ruling Era,’ in Tsao, *Studies on the History of Early Taiwan (I)*, pp. 287–288.

⁴⁵ Kouji Nakamura, *Study of Taiwan History under Dutch Rule, Vol 1: Introduction & Industry* (Taipei: Daw Shiang Publishing Co., 1997, p. 78.

⁴⁶ Yong-he Yu, *Travel Accounts of Bi Hai* (Nan-tou: Taiwan Historica, 1996), p. 31.

⁴⁷ Kong-chien Kao, *The Accounts of Taiwan Region, vol. 10*, (Taipei: Taiwan Bank, 1958), pp. 250–251.

⁴⁸ The Compilation Committee of Taiwan Historical Sources ed., *The Archival Collections of Emperor’s Edicts on Taiwan Relation in Qing Dynasty, vol. 1*, (Taipei: Council for Cultural Affairs, Executive Yuan, 2004), p. 115, 164, 327, 418.

established a foundation of sugar industry in Taiwan, which continued after they left. Secondly, the large number of Chinese who immigrated to Taiwan and settled as farmers and workers changed the demographics of the island. They contributed their labor and farming skills to the cultivation of crops at first, and later became an important political asset for regimes that entered Taiwan after the Dutch. If “Asian species, American land, European skill, and African labor” was the trans-continental model of sugar production,⁴⁹ “Chinese species, Chinese farming skill, Chinese labor” was the Taiwanese format.

More importantly, the cultivation of sugar cane influenced policies of land use in Taiwan. Forests were cut down to create farmland. This resulted in deforestation of the southwestern Taiwan and changed the habitat of animals, which led to the decline of some species. On the other hand, the number of cows increased as they were employed for farming. Changes in land use also altered the lifestyle of the indigenous people whose livelihood depended heavily on hunting.

Sugar cane became an important part of Taiwan’s diverse agriculture. Even though sugar cane plantations was a major crop at that time, the Dutch colonial government, as well as local farmers, had always grown a variety of crops for different needs. The profit of sugar trade had tempted many to give up growing food crops. The danger of food shortage alerted authorities to not over-emphasize the production of sugar and overlook food crops, especially rice. Throughout the Dutch colonial period, Zheng Chenggong’s regime, and the Qing Dynasty, policies were enforced in Taiwan to maintain a balance between rice and sugar productions. Therefore, we can argue that the sugar trade in Taiwan under Dutch rule initiated a long-lasting debate in Taiwan regarding the politics of land use and food supply. Between the seventeenth century and the Japanese colonial period, the contradictory relation of rice and sugar in Taiwan was common. It can be concluded that sugar influenced Taiwan ecologically and culturally.

Bibliography

- Andrade, TA (2008) *How Taiwan became Chinese: Dutch, Spanish, and Han Colonization in the 17th century* (trans: by Wei-chung Zheng). Yuan-Liu, Taipei
- Chen, Di (1959) *Record of Eastern Indigenous people*. Economic Research Center of Taiwan Bank, Taipei
- Chen, Shao-kang (trans) (2000) *Dutch in Formosa*. Linking Publishing, Taipei
- Chiang, Shu-sheng (trans) (2000) *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL I: 1629–1648*. Vol. 1. 4 vols. Tainan City Government, Tainan
- Chiang, Shu-sheng (trans) (2002) *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL II: 1641–1648*. Vol. 2. 4 vols. Tainan City Government, Tainan
- Chiang, Shu-sheng (trans) (2003) *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL III: 1648–1655*. Vol. 3. 4 vols. Tainan City Government, Tainan

⁴⁹Toby Musgrave, *An Empire of Plants: People and Plants that Changed the World*. Chinese edition translated by Tong Hsiao-li (Taipei: Waltz, 2013), p. 72.

- Chiang, Shu-sheng (trans) (2011) *De dagregisters van het Kasteel Zeelandia, Taiwan 1629–1662 DEEL IV: 1655–1662*. Vol. 4. 4 vols. Tainan City Government, Tainan
- Cohen, R (1997) *Global diasporas: an introduction*. University of Washington Press, Seattle
- Everts, BL & N (eds) (2010) *The formosan encounter: notes on formosa's aboriginal society: a selection of documents from Dutch Archival Sources, vol 2 (1636–1645)* (trans: Kang P). Shung Ye Museum of Formosan Aborigines, Taipei
- Galloway, JH (1989) *The sugar cane industry: a historical geography from its origins to 1914*. Cambridge University Press, Cambridge
- Heyns, P (2002) *Economy, land rights and taxation in Dutch Formosa* (trans: Wei-chung Zhen). Zhong-zi Publishing, Taipei
- Kao, Kong-chien (1958) *The accounts of Taiwan region*. Edited by Taiwan Bank Research Center of Economy. Vol. 10. 10 vols. Taiwan Bank, Taipei
- Mazumdar, S (2009) *Sugar and society in China: peasants, technology, and the world market* (trans: Yie Li). Guangdong People's Publisher, Guangzhou
- Mintz, SW (1985) *Sweetness and power: the place of sugar in modern history*. Penguin, New York
- Musgrave, T (2013) *An empire of plants: people and plants that changed the world*. Chinese edition (trans: Tong Hsiao-li). Waltz, Taipei
- Nakamura, K (1997a) *Study of Taiwan history under Dutch Rule, vol 1: introduction & industry*. Edited by Mi-cha Wu. Vol. 1. 2 vols. Daw Shiang Publishing Co., Taipei
- Nakamura, K (1997b) *Introduction on industry*. In: *Researches in the Taiwan history under the Dutch rule, vol I*. Dawshiang Publisher, Taipei
- Peng, Sun-yi (1959) *The document of Conquering the Ocean*. Taiwan Bank, Taipei
- Pomeranz, K & Topik, S (2006) *The world that trade created, 2nd edn*. ME. Sharpe, New York/London
- Radkau, J (2008) *Nature and power: a global history of the environment*. Cambridge University Press, Cambridge
- Taiwan Historica (1970, 1990) *The diary of Batavia*. Vols. 1, 2, 3. 3 vols. Taiwan Historica, Nan-tou
- Taiwan Historical Sources, Compilation Committee (eds) (2004) *The archival collections of Emperor's edicts on Taiwan relations in Qing Dynasty, vol 1*. Council for Cultural Affairs, Executive Yuan, Taipei
- Tsao, Yung-ho (1979, 2010) *Studies on the history of early Taiwan (I&II)*. Linking Publishing, Taipei
- Yu, Yong-he (1996) *Travel accounts of Bi Hai*. Taiwan Historica, Nan-tou