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**Tea Supply Chain in East Asia**

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**Abstract**

East Asia is a major tea-consuming and -producing area; however, few studies have examined the East Asian tea industry from the perspective of the supply chain. Based on field and desktop studies of the tea markets in Taiwan and China, this paper provides an overview of each market together with detailed case studies. In this analysis, the characteristics of the tea industry and the main problems in the current supply chain in terms of governance, upgrading, and food safety and quality control are identified. This paper will help fill the gap in studies of the East Asian tea industry from the perspective of the supply chain.

**Keywords:** food safety, supply chain analysis, tea

**JEL classification:** O13, Q13, Q17

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## 1. Overview

Nowadays, tea is a popular drink worldwide and is sold as loose tea leaves, tea bags, bottled tea drinks, and a variety of specialty drinks. According to the 2015 Tea Report of the Food and Agriculture Organization of the United Nations, world tea production rose by 3.1% from 2010 to 2011, which was down from the 5.7% increase from 2009 to 2010. However, except for unfavorable weather conditions causing a drop in tea production in countries such as Kenya, Sri Lanka, and Malawi in 2012, the price of tea has risen continuously since 2010, bolstered by increasing demand in the emerging markets. Tea consumption and production are predicted to continue to sustain (FAO 2015).

There is a long history of tea production and consumption in the major tea-producing region of East Asia; however, increasing globalization, the appearance of new trends in how tea is consumed, and the development of fierce competition from tea-producing countries in other parts of Asia and Africa, means that the tea industry in East Asia is facing many new challenges. Of the countries in East Asia, China<sup>i</sup>, Japan, Taiwan, and Korea<sup>ii</sup> are tea-producing countries that keep a record of data at the Food and Agriculture Organization of the United Nations. China, Japan, and Taiwan are the three largest tea producers and consumers relative to their size. In the 10 years from 2003 to 2012, China was the largest producer of tea, and its production has continued to increase year on year (Fig. 1). Japan was the second largest tea producer in the region and it had a more stable production pattern with little fluctuation in production volume. Taiwan was the third largest tea producer, given its size, and it too had a stable production pattern. Compared with China, Japan, and Taiwan, Korea had a much smaller production of tea.

In this paper we provide an overview of the current situation in the tea industry in China and Taiwan, the first and third largest tea-producing regions in East Asia, respectively, from the perspective of the supply chain, which here is defined as “a network of labor and production processes whose end results is a finished commodity” (Hopkins and Wallerstein 1994). Studying the tea supply chain is essential for identifying how the tea industry can adhere to the strict quality and business standards of the domestic and international markets so that it can develop long-term sustainability.

This paper is divided into two chapters, with one chapter each covering Taiwan and China. Each chapter presents the results of a tea supply chain analysis of the selected country, focusing on the major stakeholders, their internal links and relationships with other sectors, and the value chain governance; discusses current issues in the tea supply chain in terms of quality control, production, and market expansion for sustainable development; and introduces practical solutions and policy recommendations to these issues and provokes further research in the study area.

The supply chain analyses presented in the following chapters track tea production “from the tea garden to the cup.” In these analyses, the roles of the government and the public sector have been emphasized to reveal the influence different stakeholders and agents have on the supply chain. Furthermore, to identify current issues in the tea industries of the two countries, interviews with stakeholders, including tea-grower associations, government officials, and representatives of research institutes and universities in China and Taiwan, were conducted and the information obtained is presented as case studies to provide detailed information regarding the tea supply chain.

## **2. Literature review on the agri-food supply chain**

Literature on the agri-food supply chain is similar to that on the global value chain in that it covers governance, territoriality, institutions, and prospects for up- or downgrading. Due to the unique characteristics of individual agri-food products, research on the agri-food supply chain has been focused on food safety and quality control (i.e., traceability) (Wilson and Clarke 1998; Aramyan et al. 2007), vertical coordination and management of the supply chain (e.g., the influence of supermarkets on smallholder farmers) (Fearne, Hughes and Duffy 2001; Dolan and Humphrey 2000; Hobbs and Young 2000; Pelupessy and Van Kempen 2005; Burch and Lawrence 2007; Swinnen and Maertens 2007; Stringer and Le Heron 2008), and certification and agri-environment governance (Taylor and Fearne 2006; Higgins, Dibden and Cocklin 2008; Maertens, Minten and Swinnen 2012).

Specific to research on the supply chain in the tea sector, the available research examines topics such as tea garden management, the export of tea from developing countries to developed countries, and labor welfare. However, few studies have examined the stakeholders within each stage of the supply chain (i.e., production, processing, marketing, management, and sales). One possible reason for this may be the high differentiation of tea products within each stage of the supply chain, which also makes it difficult to conduct a general analysis of the industry. Therefore, to help fill the gap in the literature with regard to the tea supply chain in East Asia, the present paper presents the results of general supply chain analyses of two major East Asian tea-producing regions, Taiwan and China, which are supported by case studies of representative stakeholders in the supply chain.

### **3. Tea supply chain in Taiwan**

#### 3.1 Introduction

Tea trees were first brought to Taiwan by migrants from Fujian Province, China, around 200 years ago. They began cultivating tea and a production region was established in the northern cities of Taipei and Hsinchu. In 1865, John Dodd, a British businessman, shipped 120 t of Taiwanese tea from Tamsui Port to New York City, USA, marking the start of the export of Taiwanese tea. From the time on, tea was Taiwan's largest export commodity till the start of the Second World War.

Between the end of the First Sino-Japanese War in 1895 and the start of the Second World War, Taiwan was under Japanese rule. During this period of colonization, the Japanese government enhanced the country's infrastructure by building a railway connecting the country's north and south, improving the electricity and water supplies and sewage system, enhancing rice production, and establishing a forestry industry. In terms of agriculture, the banana, sugar, and tea industries were particularly developed. The first Tea Research and Extension Station was established in 1903 in Yangmei District of Taoyuan City. In this station, a variety of techniques used in tea production were developed. In the same year, the Tea Research Institute was established in Taipei City and it began training and educating young tea experts and quality assurance agents at tea companies and the Ministry of Agriculture and Forestry.

To supply the Japanese domestic demand for black tea, the Black Tea Experiment Institute was established near Sun Moon Lake in Nantou City in 1930. To establish a means of managing the tea industry for its long-term development, many tea production management regulations were created in the same period by the government. Rice farmers and tea farmers were widely awarded for good production and a large

number of tea farms appeared. The income for these tea farms mainly came from harvesting tea leaves, which left room for the development of middlemen and nearby tea manufacturing and processing factories.

Each tea farm and processing and manufacturing factory was required to be registered. Processing and manufacturing factories were also required to obtain production and business permission from the Ministry of Agriculture and Forestry. These strict management regulations fostered the successful development of the Taiwanese tea industry and the world-famous Formosa Oriental Beauty tea was established at this time. Once the Chinese government regained control of Taiwan, the regulation of tea farm management was stopped in 1982.

Nowadays, the majority of Taiwanese tea is consumed by the domestic market. In fact, the demand for tea is so high that there is a shortage of tea for the domestic market. In Taiwan, 75% of tea is imported and only 25% is produced domestically, which lends weight to the expression that “Taiwan owns the tea leaves but not the industry.” Figure 2 and 3 show the traditional and modern tea supply chains in Taiwan. The traditional one was established at a time when Taiwan’s economy was dominated by agriculture. There are six stages, or stakeholders, in the traditional supply chain, with each stage having a distinct responsibility and role. With technological advancements and changes in the structure of the economy, some of these stages have disappeared or they have merged with other stages, that is, the tea supply chain in Taiwan has to a large extent become vertically integrated. The traditional supply chain gradually transformed into the modern one.

#### *Farmers*

For 200 years, Taiwanese tea was produced by farmers in rural mountain areas,

who mainly produced crude black tea. The combination of remote location and inconvenient transportation system created a role for tea vendors. Tea was sold by the farmers to vendors who came to the rural areas to collect and take the tea back to cities and towns to sell to wholesaler or retailer. When foreign export began to increase, tea became a major export commodity. During the period when Taiwan was under Japanese rule, with the support of the government, tea cultivation spread from the city of Taipei to the city of Hsinchu, and yields and export volume increased. However, until the 1920s, the Taiwanese tea industry was still predominantly based on small-scale handcrafting. The defining characteristics of traditional tea production were decreasing profits due to increasing labor costs and land rent, and an increasing demand for drier (i.e., lighter) tea.

#### *Vendors*

Vendors visited rural tea gardens to collect crude tea and transport it to teahouses in Taipei. There were two types of vendors: local small-scale vendors and large-scale vendors located near Taipei city. The smaller vendors collected little commission, whereas the larger vendors acted more like local agents.

#### *Storage*

The storage stage of the supply chain developed into the middleman or dealer who earned storage fees and commission later in the modern supply chain.

#### *Re-processing house*

Re-processing houses refined and roughly processed the tea leaves before packing and reselling them to the next stakeholder on the chain.

#### *Trader*

Traditionally, the majority of traders were foreign banks. They hired *maiban*



(the Chinese way of calling trader) to perform quality control on their behalf. Since *maiban* were the only link to foreign banks, they often bullied the re-processing houses and demanded bribes. With increasing trade, the *maiban* became less important and eventually disappeared.

### *Packaging and Transport*

Tea was traditionally transported short-distance by manual labor and long-distance by ship. Tea must be packaged to prevent exposure to humidity. Nowadays, packaging materials are usually imported from south China (e.g., from Xiamen, Fujian).

The Taiwanese tea trade has been an important part of the country's economic development. Since the Second World War, Taiwan has transformed from an agricultural to an industrialized economy and the tea industry has gradually become less important for Taiwan's economic development. Tea is no longer a popular exporting commodity. Taiwanese tea has lost its competitiveness on the export market due to the TWD appreciation, increased labor costs, and changes in tea drinking trends toward green tea and shredded black tea. Nowadays, Taiwanese tea is mainly consumed by the domestic market. In fact, domestic demand has increased since the 1980s as Taiwanese people have become affluent and the demand for higher quality goods has increased.

Although the export of tea is becoming less and less popular, the Taiwanese government does not want to completely give up on the international market. Therefore, it is trying to further explore alternative foreign markets while continuing to expand the domestic market. The Taiwanese government has designated Wenshan and Sanxia districts near Taipei City and Dongding in the middle of Taipei as three special premium tea-production regions. The government trains tea farmers in those regions on the use of

the most advanced technology and provides ongoing technological assistance. The Ministry of Agriculture also organizes tea competitions to promote the development of premium teas, which benefits the winning farmers by helping them establish their own brands. In this way, the government is encouraging greater tea production and sales by indirectly influencing the development of the market. In addition, with the boost to the economy brought about by Taiwan's inclusion as one of the Four Asian Dragons, Taiwanese people are becoming more affluent and more willing to spend more on drinks that they perceive to be of high quality or to have health benefits. Indeed, the domestic per capita consumption of tea has rapidly increased from 0.344 kg in the 1980s to 1.3 kg in 2015.

With the help of government-led promotions, Taiwan produced about 14,000 mt of crude tea in 2013, which was about 12,000 mt of oolong tea and black tea, 1,300 mt of other special flavored teas, and about 500 to 800 mt of green tea (for the production of foam tea and other specialty tea drinks). Table 1 shows the Taiwanese production data for tea (harvested area and yield) from 2003 to 2012, according to the records of the Food and Agriculture Organization of the United Nations. The total area of tea harvested decreased about 29% and although the yield remained stable, production dropped by about 28%.

Unfortunately for the Taiwanese industry, there are now cheaper, easier-to-obtain substitutes available for Taiwanese tea from countries in Southeast Asia such as Vietnam, Sri Lanka, and India. In 2013–2014, Taiwan more produced black tea but exported less than before. In 2014, Taiwan exported only 3,737 mt of tea; however, it was at an average price of 11.10 USD/kg, which is about 6.09 times higher than the price at which Taiwan imported crude tea. Taiwan now only exports a very small

amount of high-value premium tea. In recent years, premium Taiwanese tea has become increasingly popular on the world market thanks to the Taiwanese government increasing its promotion of Taiwanese tea at international tea exhibitions and fairs and also an increase in the number of Chinese tourists visiting Taiwan. There has also been an increase in the demand for Taiwanese tea in mainland China after the signing of the Economic Cooperation Framework Agreement.

According to the secretary general of the Taiwan Tea Manufacturers' Association, instead of increasing tea exports, Taiwan has moved up in the global tea value chain by exporting recipe ingredients and the technology for making specialty tea-based drinks such as foam tea and bubble tea. According to Taiwan Tea Manufacturers' Association records, in 2013 the total value of tea produced was worth 453 million USD, canned tea drinks was worth 75.52 million USD, foamed tea drinks in the hotel and restaurant and retail sectors was worth 302.07 million USD, export was worth 2.9 million USD, and domestic sales including gift purchasing was worth 54 to 75 million USD. Between January and June 2015, compared with the same period in 2014, green tea exports increased by about 192 mt, with 131 mt exported as foam tea ingredients in packages weighing less than 3 kg<sup>iii</sup>. The export of oolong tea in packages weighing more than 8 kg decreased by 8 mt, with total exports to mainland China of 572 mt. The export of black tea in packages weighing less than 3kg increased by 306 mt for foam tea ingredients, but not as fine black tea leaves.

To supply domestic demand, Taiwan also imports tea. Taiwan imports black tea from India, Indonesia, Kenya, Sri Lanka, and Vietnam for tea drinks; green tea from Indonesia, Japan, Sri Lanka, and Vietnam (although the import of green tea is decreasing due to increasingly strict sanitary standards imposed by the Taiwanese

government); oolong tea from Indonesia, Vietnam, and Thailand for processing into drinks; and small amounts of Pu'er tea from China and Vietnam. Except for green tea and Pu'er tea, the majority of imported tea is for domestic consumption. The imports of black tea and oolong tea are processed into tea bags, canned tea drinks, and foam tea drinks. Locally produced black tea and oolong tea are consumed as fine leaves in the traditional Asian tea-drinking way. Imported tea usually includes the bottom part of the tea leaves, tea tree branches, and other crude ingredients so it is imported at a very low price, making it ideal for use in mass production.

It is likely that for the foreseeable future, Taiwan will continue to focus on what it is good at, which is Baozhong tea and oolong tea. The production and demand for black tea and green tea are increased rapidly, and the government has identified several special types of black tea and green tea to promote as highlights in the Taichung Sun Moon lake area. Thus, the Taiwanese tea industry is developing in two directions. One direction is the development of high-value premium tea leaves for domestic traditional consumption, with small amounts exported to China and Japan for sale as gifts or luxury goods. The other direction, and one that now characterizes the Taiwanese tea industry, is the development of mass-produced foam tea and canned tea drink products. After processing cheap imported raw materials from developing countries, these products are then exported with high value added. To meet the increasing domestic and international demand for these products, Taiwan will require greater imports, or the greater production, of small-leaf or shredded tea for large-scale commercial use.

The analysis presented above has shown that tea has played a significant role in the development of the Taiwanese economy and is deeply rooted in the country's

culture. With rapid economic growth and globalization, the Taiwanese tea supply chain has become increasingly integrated. The market structure has developed simultaneously in two directions, that is, toward both high-value premium tea leaves and ingredients for mass-produced tea drinks. High-value premium tea leaves are domestically produced and consumed, although a small amount is exported to neighboring countries.

Ingredients for processed tea drinks are mainly cheap raw materials imported from developing countries.

### 3.2 Case studies for the Taiwanese tea industry

The case studies discussed below are based on information collected during field research conducted in Taiwan in November 2015 to obtain basic information on the tea industry from the perspective of the supply chain. These representative case studies provide more specific details of the industry and supply chain. Taiwanese tea is mainly produced in the north, so the three case studies are related to the tea industry in northwest Taiwan; two of the case studies are concerning tea farmers and one is concerning a tea exporter. For reasons of privacy, the interviewees' and company names have been changed.

#### *Case 1: Sun (farmer)*

Sun is a farmer who owns a small 4-ha tea farm in Miaoli County in the Northwest of Taiwan. He and his wife do all the farming, except for harvesting, and take care of the immediate processing of the harvested tea. They grow three types of tea: oolong, baozhong, and Tai-Tea (a new variety developed and promoted by the government).

Oolong and baozhong represent the majority of their harvest (180–640 kg tea leaves). They process the fresh tea leaves into crude tea and fine tea of different grades,

which they then sell to local small-enterprise middlemen. Throughout Taiwan, local middlemen set up small retail stores along the access routes into each tea-producing county. Most middlemen are local residents and they live above or behind their store. When middlemen from larger cities, wholesalers, representatives of tea-processing factories, or exporters come to a tea-producing county to buy crude tea, they will generally go to this type store to choose the products they need.

Sun also sells his tea directly to large-enterprise middlemen or wholesalers from Taipei City when they come to buy in bulk. He has no long-term fixed contract with any of these buyers, which is the norm in the Taiwanese tea industry. Since the taste, fragrance, color, shape, and other subtle factors are subject to the weather, harvesting time (even down to the precise hour the leaves are harvested), processing techniques, and techniques used by the farmers and processors, it is almost impossible to keep the taste of the tea consistent between batches. Therefore, since no supplier can guarantee batch-to-batch consistency, buyers will look for the tea that best meets their down-stream requirements at the time of buying.

Sun produces Tai-Tea to obtain the government subsidy. Tai-Tea was developed through the government's extension innovation service. The Taiwanese government holds tea competitions to foster the development of the domestic tea market. Tai-Tea was the winning tea in one such competition. The government actively promotes winning teas, giving them high visibility in the domestic market. Most consumers who don't have much knowledge regarding the quality of tea will buy such teas with following government's promotion. In addition to influences on the demand side, the government also gives more generous subsidies to farmers who grow the winning teas. Therefore, with the increase in demand and generous government

subsidies, tea farmers tend to grow the competition winning tea. However, according to Sun, growing Tai-Tea is not easy. It requires more labor and other farming inputs than other teas, and the processing is also challenging for small-sized farms like his due to the complexity of the process. However, Tai-Tea is currently over-priced on the market due to its popularity among consumers. This high pay-back drives the supply of Tai-Tea, which invariably leads to other traditionally popular teas falling in both supply and demand.

The most expensive part of tea farming is harvesting the tea leaves. Tea must be picked from the trees as soon as possible once harvesting has started. For high-quality tea leaves, harvesting requires intensive labor. Sun usually hires helpers from tea factories. Usually, for his 4 ha of land, Sun hires 40 people and provides food and accommodation. He pays wages of 3,000 TWD per person per day, and each workday lasts around eight to 10 hours or until the daily quota is met. The hiring of labor for the harvest is the farm's largest expense.

Sun follows traditional tea-production processes for control quality. For Tai-Tea, he receives personal training and assistance from a professional sent by the government. He has hazard analysis critical control point (HACCP) and ISO9001 certifications to attract large-enterprise buyers from Taipei city. When Sun sells his tea to wholesalers, or when he participates in tea competitions, a quality report is required, the costs of which the farm must bear.

Although Sun's tea farm is small, since he is upstream of the tea supply chain, he has the capacity to integrate tea processing into his farming. However, for tea that requires more complex processing techniques, such as Tai-Tea, there is a limit to his processing capabilities and so he has to outsource this processing to a local tea factory.

*Case 2: Lee (farmer)*

Lee runs a large, 25-ha tea farm in Hsinchu. He was able to expand his farm from 1.5 ha to its current size with financial support from his family's other business in the manufacturing sector. Lee produces baozhong tea, oolong tea, and black tea, but he particularly focuses on Oriental Beauty tea, which is a famous premium tea from Taiwan.

Lee outsources the production of baozhong, oolong, and black tea to other farmers who take care of these teas on his behalf. He has 5 to 6 employees at any one time who assist him with the farming and in managing the business. Lee takes care of the Oriental Beauty tea himself because this provides the core competitiveness of his farm and requires the more complex production techniques compared with the other teas his farm produces. Oriental Beauty tea has a unique sweet taste compared with other traditional bitter-tasting teas. This sweetness comes from the tea tree's reaction to the feeding of the tea green leafhopper (*Jacobiasca formosana*) on the leaves, so only the tips of the tea leaves from trees that have the appropriate amount of feeding are collected. This limited supply makes Oriental Beauty a very premium tea that fetches high prices on the market.

Lee's farm is very integrated and includes farming, processing, sales, and marketing. Lee runs marketing and tea tourism campaigns through the Internet directly to consumers both domestically and internationally. Lee's brand has become an established name thanks to his winning one of the government's tea competitions. His Oriental Beauty tea has won the first prize twice and has received the excellent prize (which is awarded to extraordinary tea, higher than the first prize) once. With the



established of his brand name, Lee now promotes his products on the Internet via Facebook, Line, and other social media. He also runs tea-tasting and tea-making programs to attract consumers and tourists to his farm from all over the world.

In terms of quality control, because Lee's farm has been participating in the government's tea competitions, all of his production standards adhere strictly to the competition requirements. He also conducts organic farming with organic inputs provided by the government. The Taiwanese government is promoting organic tea farming by providing free training, free inputs, and free public consultancy. With the good relationship he has built with the local government through the tea competitions, Lee became a pioneer in the area when he adopted organic farming techniques. He has HACCP, GLOBALG.A.P, and Taiwan local certification for organic farming (Taiwan is yet to develop international benchmarked certification for organic farming).

*Case 3: JC (factory)*

Although the Taiwanese tea industry has traditionally been focusing on the domestic market, factory JC has specialized in the export of tea since 1924 and the time of Japanese colonization. Becoming independent from Mitsui Norin in 1955, factory JC joined the Tea Production Association and changed their business from processing crude tea to exporting refined tea. In the 1970s, the factory was renovated. Prior to 1998, the company only exported crude tea, but with the changing structure of the Taiwanese tea market, factory JC started to export fine tea leaves, including the premium Oriental Beauty tea.

Factory JC is currently certified for ISO9001, HACCP, and the SGS UKAS management system. Its business is half domestic/half export oriented. It continues to export crude and fine tea leaves to Japan, China, Southeast Asia, Europe, and USA. Its

main customers are Japanese trading companies and retailers from other countries.

Factory JC exports crude tea for canned tea drinks and foam tea drinks, as well as fine leaves of oolong tea and Wenshan baozhong tea.

In addition to the fine tea leaves, factory JC also exports crude tea bought from Southeast Asian countries such as Indonesia, Sri Lanka, and India, which it repackages for export. The company heavily emphasizes quality control in its export business by providing technical guidance to local suppliers and conducting random tests on the crude tea it imports and on the tea ingredients it exports after processing in their factory in Nantou County (central Taiwan). The quality standards adhere to specific requirements for importers.

JC recently established its own brand of fine tea leaves, DG, which meets all the international standards of the tea product. JC intends to export DG products to the international market to establish a Taiwanese traditional tea brand in the world market. DG brand tea is currently sold both internationally and domestically. Domestically it is sold in large shopping malls and shops in tourist areas as a premium tea.

JC is considering expanding their business in 2016 to also include the export of organic tea. Although the supply of Taiwanese organic tea is currently very small, and there is none available that is internationally certified, JC would like to adopt organic teas as part of a long-term, sustainable business strategy.

JC is an example of a downstream stakeholder reinventing itself to integrate with the upstream stages of the supply chain. Although JC considers itself a pure exporter, it also owns a storage and transportation facility and processing factories, and it also acts as both middleman and wholesaler to source tea produced domestically and internationally.

### 3.3 Summary

The Taiwanese tea industry is now predominantly domestically focused. Taiwan imports crude tea from developing countries in Southeast Asian to produce the key ingredients for tea drinks, which it then sells domestically and internationally, particularly to other countries in East Asia. This process produces high value-added products. Overall, Taiwan does not export much branded tea leaves. The domestic tea supply chain affects its position in the international market.

The domestic tea supply chain in Taiwan has four main characteristics. The first is that the majority of the tea producers in the supply chain are smallholder farmers. These tea farmers all have basic processing capabilities to process fresh tea into crude or fine tea leaves. Some of the larger tea enterprises are highly integrated and sell products directly to consumers. Given the remote location of the tea farmers, there are an increasing number of tea tourism programs organized by tea farmers to attract consumers, middlemen, and wholesalers to the farms. This appears to be an effective marketing strategy, and has resulted in increases in the sales of high-value premium teas.

The second characteristic is that the role of the middleman has declined in importance as the tea supply chain become more vertically integrated, both downstream and upstream, and the transportation infrastructure has been developed. Together, these factors have resulted in a fall in the price of tea for consumers.

The third characteristic is that there is a marked amount of government intervention in the supply chain through the tea competitions to the extent that the government now has governance of the Taiwan tea supply chain. There are certainly

many benefits brought about by the tea competitions, such as fostering domestic demand, establishing famous tea varieties and brands, awarding tea farmers, and encouraging greater production. However, the judges in the tea competitions are mostly government officers who have limited knowledge of the tea sector; therefore, the government promotion of a certain type of tea or innovation may to some extent be political motivated. More collaboration between tea experts and specialist research institutes and universities would make the tea competition open, transparent, and fair to all tea farmers.

Finally, there remains a lack of internationalization and standardization in the Taiwanese tea industry, which is preventing greater international participation. Many international public and private standards, such as international organic standards and UTZ, are not yet available in the Taiwanese market, and the industry is still using its own unit of weight (1 Taijin = 600 g), which makes it difficult to do business in the global market.

## **4. Tea supply chain in China**

### 4.1 Introduction

China has the longest history of tea production and consumption in the world. Chinese people started drinking tea as early as the 2nd century BC. Globally, China remains the largest tea producer and third largest exporter after Sri Lanka and Kenya. China has the largest number of tea growers in the world, with about 80 million people working on tea farms that provide more than one million tons of tea for the domestic and foreign markets every year. Figure 4 and 5 show the tea imports and exports of China from 2003 to 2011. Both experienced an increasing trend. Tea drinking is part of everyday life in China and it is closely associated with the country's culture and history. Table 2 shows China's tea production from 2003 to 2012. China has continued to increase the total tea plantation area, which has resulted in its yield of tea increasing from about 8,000 to 11,000 Hg/Ha. During this time, the harvested area increased by about 60%, which is likely due to the increasing price of tea on the world market.

Chinese tea is mainly produced in the south of the country, with the main production provinces located in four main areas: south China (Fujian, Guangdong, Guangxi, and Hainan) for black tea, oolong tea, and flower tea; southwest China (Yunnan, Guizhou, Sichuan, and south Tibet) for black tea, green tea, TuoCha tea, and Pu-erh tea; south Yangtze River (Zhejiang, Hunan, Jiangxi, Anhui, Jiangsu, and Hubei) for green tea, black tea, dark tea, and flower tea; and north Yangtze River (Henan, Shaanxi, Gansu, Anhui, Jiangsu, and Hubei) for green tea. Figure 6 is a map of the major tea-producing provinces in China. South Yangtze River has the largest output followed by south China. Fujian Province has been the top tea-producing province for many years, contributing about 20% of the China's total tea output in 2007 (Chen

2009).

According to the World tea production and trade report of FAO, about two thirds of China's tea output is consumed domestically. Most domestically consumed tea is green tea, which occupies almost half of the market share. The second- and third-most consumed teas are flower tea and oolong tea, respectively. The remaining one third of the output is exported. Tea is the fifth top agricultural export after garlic, rice, soybean meal, and citrus. Most exported tea is green tea. China is the largest green tea exporter in the world. The export of black tea has been decreasing since the 1990s due to the implementation of new pesticide regulations in the European markets and it remains low. Most tea exports are from the south Yangtze River and south China tea-production areas, specifically from the Zhejiang, Anhui, Fujian, and Guangdong provinces. The major exporting destinations are Africa, the rest of Asia, and Europe. The top importing countries are Morocco, Japan, Uzbekistan, USA, and Russia.

The export price of Chinese tea is low at about one half the domestic price. Taking production costs into consideration, the export of red tea is losing money, the export of green tea has little profit, and the export of black tea is losing its competitiveness due to fierce competition from other exporting countries. Most exported tea is mass-produced tea that is sold at a low price.

The defining characteristic of the Chinese domestic tea supply chain is that the grower is located close to the market, so most tea farmers are able to sell their products directly to consumers (Chan 2009). After harvesting fresh tea leaves, tea farmers either sell the leaves directly to primary tea-processing factories or branded tea factories or they process it themselves into crude tea. Crude tea is a little bit more expensive than fresh leaves and can be stored for longer, so most skilled tea farmers who have the

means choose to sell processed tea leaves.

In general, there are four distribution channels in the domestic tea market that tea farmers can use. The first is tea farmers can sell fine tea leaves that they handpick for brand tea factories. Brand tea factories then process the leaves and sell them to middlemen. The middlemen then sell the tea wholesale or through retail stores, tea houses, supermarkets, or specialty stores. This tea is usually top-grade fine tea.

The second distribution channel is tea farmers can sell tea leaves and buds to processing factories that are mass-producing tea. Processing factories process the fresh tea into crude tea. They then sell this crude tea to refineries that sort, select, and reprocess the crude tea into finished tea. Refineries mainly engage in mass production and they sell their products to wholesalers who then sell them to hotels and restaurants.

The third distribution channel is tea farmers can process their fresh tea leaves into crude tea themselves and sell the processed leaves to refineries, brand tea factories, or middlemen that visit their farms. Tea farmers in tea production areas where top-grade fine tea is in limited supply sometimes sell their tea to directly to middlemen and wholesalers looking for tea supplies.

The final distribution channel is for the tea farmer to become involved with vertically integrated brand tea companies. These brand tea companies own a production base and are engaged in tea production, processing, sales, and marketing. They place orders with tea farmers for fresh leaves and then oversee the remaining stages of the supply chain before finally selling the tea to consumers through their own retail stores.

Most of the tea that China exports is mass-produced crude tea. Tea farmers sell fresh leaves to primary processing factories that process the leaves into crude tea, which is then sold to refineries. Refineries select, sort, and sometimes blend teas according to

their buyers' requirements for the finished tea. Larger refineries with mass-production capabilities, foreign trade professionals, and an export license will sell the finished tea directly to foreign buyers (middlemen or brand owners). Smaller refineries will usually outsource export of the finished product to foreign trading companies. Refineries that have export licenses but lack foreign trade professionals also rely on foreign trading companies.

#### 4.2 Case studies for the Chinese tea industry

The case studies discussed below are based on information collected during field research conducted in China in November 2015 to obtain basic information on the tea industry from the perspective of the supply chain in a large country with a multifaceted tea industry. The field research was conducted in Fujian and Jiangsu, two representative provinces in the south China and south Yangtze River tea-production areas. For reasons of privacy, the companies' names have been changed.

##### *Case 1: AB (refinery)*

Company AB is a 100% Japanese-invested refinery with a total investment of 400 million USD. The company is located in Fujian Province, and its business includes the processing, sale, and export of tea. The company has 50 employees, including administration staff, researchers, and quality control experts. The factory production capacity is 3000 t of finished tea per year.

Japan is one of the top importers of Chinese tea. Since 2005, Japan has been importing oolong tea from China for the manufacture of oolong tea drinks. For better quality control of the raw materials, the Company AB was established within a major production region so that they could buy fresh tea leaves or crude tea directly from the supply base. When purchasing raw materials, the company requires that tea farmers



have certain quality certifications from third parties such as the China Inspection and Quarantine office. They have several long-term contracted suppliers and contracts are renewed every year. If a supplier's product does not meet the quality requirement, the contract is canceled. After purchasing a batch of tea, the company conducts their own quality testing with advanced analysis equipment to make sure the product meets their buyers' requirements. After refining the crude tea, company AB blends the finished tea according to their buyer's requirements. There are tea-tasting experts within the company to guarantee consistency of the taste, color, and fragrance of the finished tea.

Company AB only does business-to-business commerce. An overview of the factory's production process is shown in Figure 7: refine the raw materials purchased according to internal standards; bake, with temperature and time controlled to sanitize the product while preserving the taste; mix and blend to the buyer's requirements. Company AB mainly processes oolong tea, which they export to Japan, but they also process some jasmine tea and black tea, which they export to other Asian countries.

Company AB has the standard ISO series, HACCAP, and GlobalGMP certifications. Renewing these certifications is part of their annual fixed costs. Another large part of their fixed costs is the chemicals used in analyzing the tea. These fixed costs total about 40,000 CNY per year. The major cost-related challenge company AB faces is labor costs. With an increasing minimum wage requirement and the rise of the standard of living in China, labor costs have increased substantially. The company's value added from crude tea to finished tea is about 15%, which is very little given the high costs of labor. Furthermore, the company feels competition pressure from Vietnam and Indonesia because these countries have a comparative advantage in cheaper labor costs.

The Japanese oolong tea market boomed from 2000 to 2005, after which demand started to fall. In 2002, Japan's total import of oolong tea was 22,000 t, which dropped to 15,000 t in 2004. To explore other markets to compensate for the shrinking Japanese market, the company tried to export finished oolong tea materials to Singapore at a high profit. However, due to the increasing costs of labor in China, the Singapore market was soon lost to companies based in Indonesia and Vietnam. The high quality of its products is the only comparative advantage company AB has. Japan is now the only export market Company AB has, and although it fully meets the Japanese market requirements, problems of surrounding product quality in the Chinese market resulted in the Japanese government increasing the quality requirement for imports, which in turn has reduced company AB's profits.

As a refinery, company AB connects tea farmers with food companies (importers). Because of their strict quality control and advanced re-processing technique, company AB adds value to the crude tea products produced by local farmers and sells them to the global market as intermediate products.

*Case 2: WZ (Brand-owning tea company)*

Company WZ is a brand-owning company located in the village of Changzhou, Jiang Su Province. It is ran by a former tea farmer who rented an old collective-owned tea factory and its production base to start the company in 2001. The rental price of the factory is adjusted every five years and has increased from 1,200 CNY per hectare to 3,600 CNY per hectare. Company WZ has expanded to include three production bases, one in Danyang (founded in 2008) and two in Jintan, with a combined area of 167 ha. Company WZ collaborates often with the local Academy of Agriculture Science and the owner has founded a non-profit tea research institute.

Company WZ's business has two parts. The first is premium tea and the company owns one brand each of green tea, white tea, and black tea. The green tea is the top grade and it comprises 60% to 70% of the total output. Because the green tea contains only the very tip of the tea leaves, the labor costs for harvesting are very high. Although these costs are mitigated by relatively low processing costs, the green tea still has the highest production costs among the company's products. The company's black tea accounts for about 20% of the total output and their white tea accounts for only a very small large share of sales.

The second part of company WZ's business is green tea powder. The company bought a Japanese tea powder-manufacturing machine and learned how to use it by the Academy of Agriculture Science. With assistance from the tea research institute and local universities, company WZ successfully managed to master the technique for making green tea. Green tea powder accounts for the second-largest share of the company's total sales at 40% to 50%. The green tea powder is mainly sold to domestic food companies, but some is exported. New Zealand is the largest export destination, followed by USA, Southeast Asian countries such as Laos, and certain countries in Europe. Company WZ has signed a contract with some large food companies (e.g., Dairy Queen and Oreo) as their preferred green tea powder supplier.

Company WZ has 65 long-term employees. Nine people are employed to manage the tea garden. The remaining employees are administration and accounting staff. Because company WZ sells their products directly to consumers, there is no need for the company to have a large sales and marketing department. In addition to the long-term employees, because tea is a labor-intensive product, the company requires a lot of labor input. Every year during the harvest season, company WZ hires temporary

staff from other provinces (mainly Henan and Anhui provinces). These workers are paid by output at about 50 CNY per 500 g tea they harvest. Company WZ also provides these temporary workers with accommodation and food. The average cost for hiring these temporary workers is about 150 to 160 CNY per day, which is quite a financial layout compared with the company's other costs.

In the domestic market, company WZ's sales were about 20 million CNY in 2014. These sales were mainly of spring tea (products sold from the end of March to early May), which are sold at a price of 1,000 to 3,000 CNY per 500 g. Green tea powder, which is mainly manufactured in summer and autumn after the end of the busy period of spring tea-making, accounts for a relatively small sales share at 10 to 20 t every year. The customers in the domestic market are mostly big companies and government offices who purchase Company WZ's tea as gifts because of its premium quality and high price. However, this market has been affected by the "eight-point code to cut bureaucracy and maintain close ties with the people" introduced by the Chinese government in 2012. As a result of this crackdown in bribes and corruption, the consumption of expensive luxury goods has also decreased. Company WZ also sells its products directly to consumers. It has two retail stores in Nanjing and Fuzhou, which are the capital cities of two major tea-production provinces, to make sure no other similar products appear on the market.

Company WZ has recently started exporting green tea powder and organic tea. The organic exports are mass-produced crude tea. Company WZ entrusts trade companies with the export of their products. In 2015, company WZ obtained an export license and intends to start to run the export side of the business on its own. The owner's daughter, who studied agricultural science at a university in Canada, is

currently working at the biggest state-owned agriculture company in China but will soon return to company WZ to take charge of the exporting business.

Company WZ adheres to all the export standards of quality control and separates the production of organic products from that of conventional products. The company conducts internal quality testing of all the tea produced in the production base and purchased from tea growers in the village. About 70% of the tea is purchased from the farmers collective in the village. Agricultural input that meets the standards set by company WZ are purchased from the farmers collective. In terms of organic tea production, company WZ uses non-chemical fertilizer only, which is mainly dove waste (purchased from a neighboring dove breeding factory). Weeds are removed manually without the use of chemicals.

In the future, as a result of the fall in demand for luxury goods, company WZ intends to expand their products to the middle-grade tea market aimed at regular tea drinkers. Middle-grade tea is less demanding in terms of harvesting and so company WZ can use machine harvesting to reduce labor costs. Company WZ also intends to close their retail stores and switch to using Taobao and other Internet shopping platforms. Company WZ faces the challenges of high labor costs and a lack of labor supply during the harvesting season. In addition, the complex business rules, various quality standards, and overlapping of administration by different government offices have created many obstacles that the business has had to overcome.

Company WZ is a highly integrated large-size tea company. As one of the leading agriculture companies in the city, its business includes tea planting, processing, refinery sale and exporting, as well as research and development. In addition to the regular tea products, it also produces tea powder, a byproduct of processing tea, which it

successfully exports to global food companies in other countries as an intermediate product. Company WZ is actively expanding into producing organic products and lower grade tea products to expand the business horizontally.

#### 4.3 Summary

The current tea industry structure and supply chain in China has been greatly influenced by past government policy and regulation. For example, from the 1950s to the 1970s, the government monopolized the tea business and implemented the contract responsibility system from 1979 to 1985. After 1985, the distribution of tea followed the market economy and it wasn't until 1999 that tea exporting was finally fully liberalized. However, in 2012, the “eight-point code to cut bureaucracy and maintain close ties with the people” was implemented and the demand for premium tea decreased.

With the influence of policy and regulation, China's tea industry is now polarized into premium tea for the domestic market and mass-produced tea for the export market. The premium tea market has been over-priced for a long time and these products are generally used only as gifts not for regular consumption. With the implementation of the “eight-point code,” this high-end market has been greatly diminished and the price of this over-priced premium tea has dropped. Therefore, tea growers and tea companies are beginning to explore the middle-grade tea market.

For the export tea business, there is opportunity for businesses to move up on the global tea value chain by adding value to their products, for example, by producing tea byproducts. The Chinese tea supply chain is controlled by both the government and the consumer, the international tea value chain is governed by the producers. Therefore there should be opportunities for Chinese tea exporters to move to finished tea products from mass-produced raw materials. By enhancing the capacity of the tea industry and its

influence on the world market, Chinese tea producers may have the chance to direct the future development of the global tea value chain.

Chinese tea farmers are mostly small-sized family-owned enterprises. Most small-sized tea farmers process the fresh leaves by themselves, which is especially common in Zhejiang Province. The trading of fresh leaves is very rare, especially for famous types of tea because they are usually made from top-grade hand-picked leaves, the processing of which does not necessarily require any special techniques or machines. In contrast, refineries that export tea are becoming more and more independent. Through economy of scale they have become a market power of their own because most exported tea is mass-produced tea that refineries can obtain through regular orders with tea farmers.

Increased labor costs have become the biggest challenge for tea production in China. As it loses its comparative advantage to other tea-exporting countries, the Chinese tea industry is likely to try to move up in the global tea value chain for future sustainable development.

## 5. Conclusion

This paper presents a discussion of the tea supply chain in Taiwan and China, two major tea-producing regions in East Asia. Although not all of the details of the two tea supply chains have been discussed, the supply chain analysis and representative cases discussed here present a unique study from the perspective of the structure of the supply chain. This analysis will hopefully help guide researchers and policy makers towards examining the challenges that the tea industry is facing. Further research is now needed to provide a more quantitative analysis of the tea supply chain in East Asia as a whole.



## References

- Aramyan, L. H., Oude Lansink, A. G., Van Der Vorst, J. G., & Van Kooten, O. (2007). Performance measurement in agri-food supply chains: a case study. *Supply Chain Management: An International Journal*, 12(4), 304-315.
- Burch, D., & Lawrence, G. (2007). Supermarkets and agri-food supply chains: transformations in the production and consumption of foods. *Supermarkets and agri-food supply chains: transformations in the production and consumption of foods*.
- Chen, W. (2009). From Tea Garden to Cup: China's tea sustainability report. *Social Resources Institute, China*. See [http://somo.nl/publications-en/Publication\\_3089/at\\_download/fullfile](http://somo.nl/publications-en/Publication_3089/at_download/fullfile).
- Dolan, C., & Humphrey, J. (2000). Governance and trade in fresh vegetables: the impact of UK supermarkets on the African horticulture industry. *Journal of development studies*, 37(2), 147-176.
- Fearne, A., Hughes, D., & Duffy, R. (2001). Concepts of collaboration-supply chain management in a global food industry. *Food Supply Chain Management: Issues for the Hospitality and Retail Sectors*. Oxford, 55-89.
- Higgins, V., Dibden, J., & Cocklin, C. (2008). Building alternative agri-food networks: Certification, embeddedness and agri-environmental governance. *Journal of Rural Studies*, 24(1), 15-27.
- Hobbs, J. E., & Young, L. M. (2000). Closer vertical co-ordination in agri-food supply chains: a conceptual framework and some preliminary evidence. *Supply Chain Management: An International Journal*, 5(3), 131-143.
- Maertens, M., Minten, B., & Swinnen, J. (2012). Modern Food Supply Chains and Development: Evidence from Horticulture Export Sectors in Sub-Saharan Africa. *Development Policy Review*, 30(4), 473-497.
- Pelupessy, W., & Van Kempen, L. (2005). The impact of increased consumer-orientation in global agri-food chains on smallholders in developing countries. *Competition & Change*, 9(4), 357-381.

Stringer, C., & Le Heron, R. B. (Eds.). (2008). *Agri-food commodity chains and globalising networks*. Ashgate Publishing, Ltd.

Swinnen, J. F., & Maertens, M. (2007). Globalization, privatization, and vertical coordination in food value chains in developing and transition countries. *Agricultural economics*, 37(s1), 89-102.

Taylor, D. H., & Fearne, A. (2006). Towards a framework for improvement in the management of demand in agri-food supply chains. *Supply Chain Management: An International Journal*, 11(5), 379-384.

Wilson, T. P., & Clarke, W. R. (1998). Food safety and traceability in the agricultural supply chain: using the Internet to deliver traceability. *Supply Chain Management: An International Journal*, 3(3), 127-133.

## Tables and Figures

Figure 1. East Asian Tea Production by Country/Region (Data source: FAO)

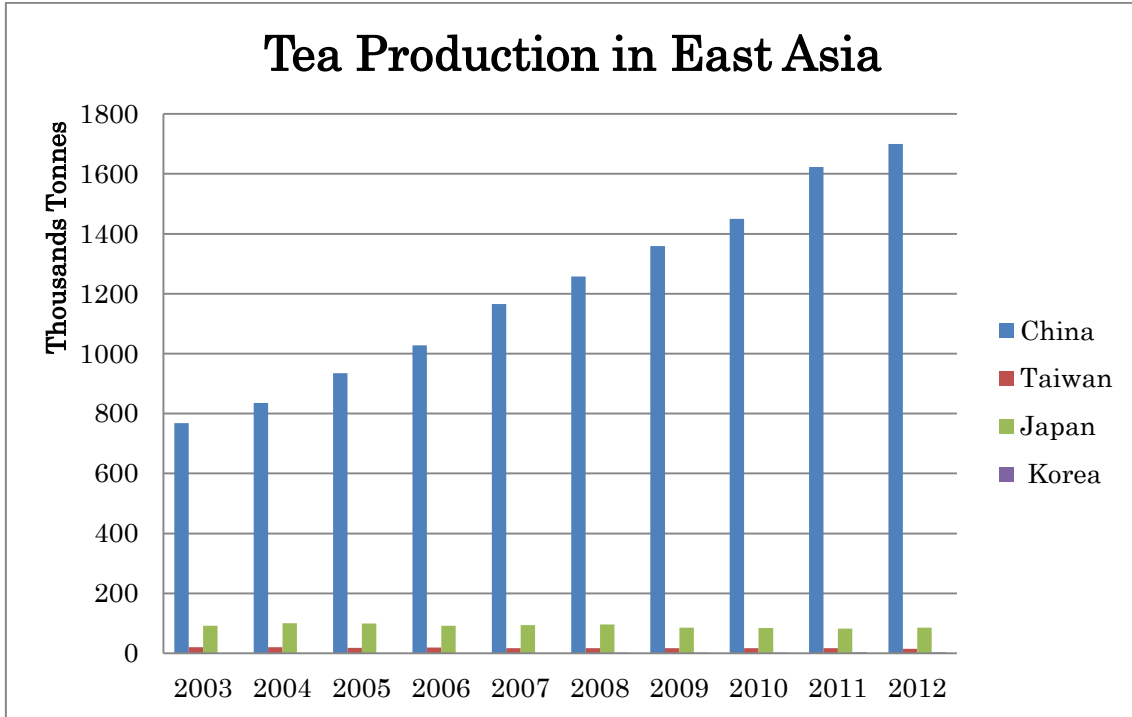


Figure 2. Taiwan's Tea Supply Chain—Traditional



Figure 3. Taiwan's Tea Supply Chain—Modern

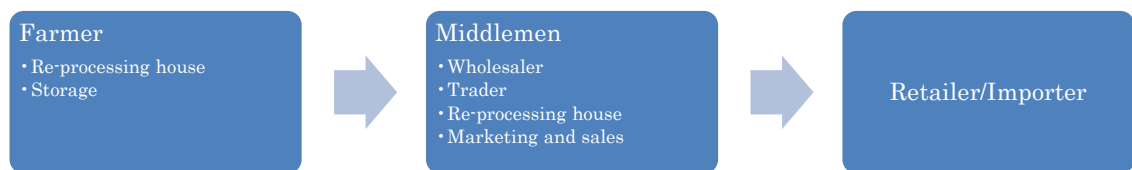


Figure 4. China Tea Exports (Data source: FAO Statistics)

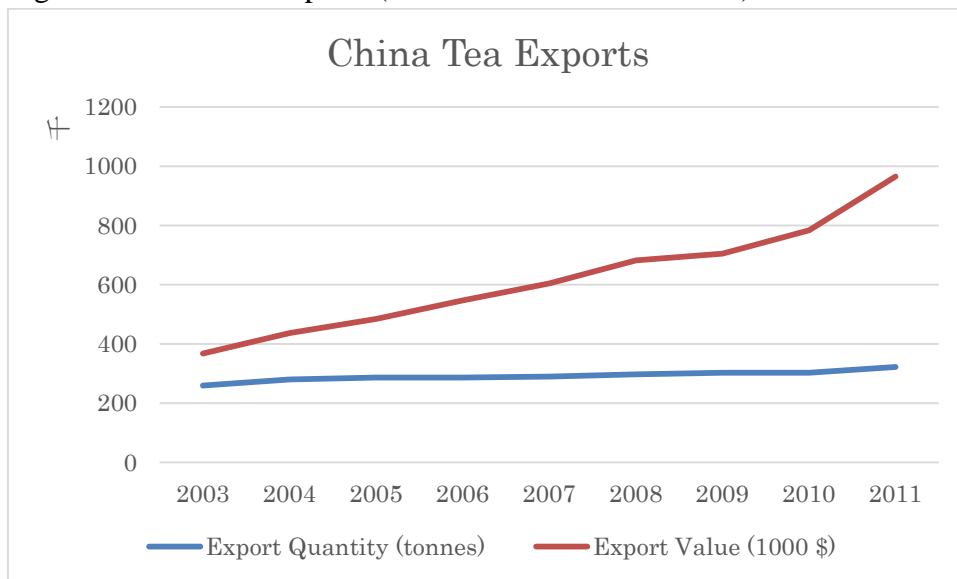


Figure 5. China Tea Imports (Data source: FAO Statistics)

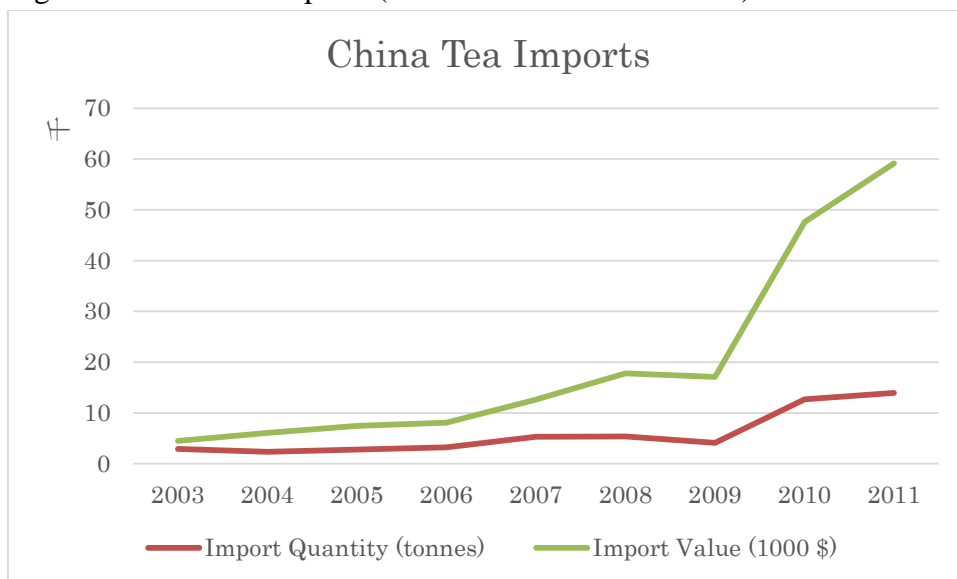


Figure 6. Distribution of the Tea-producing Provinces in China (from the Internet: <http://www.cha-shifu.com/>)

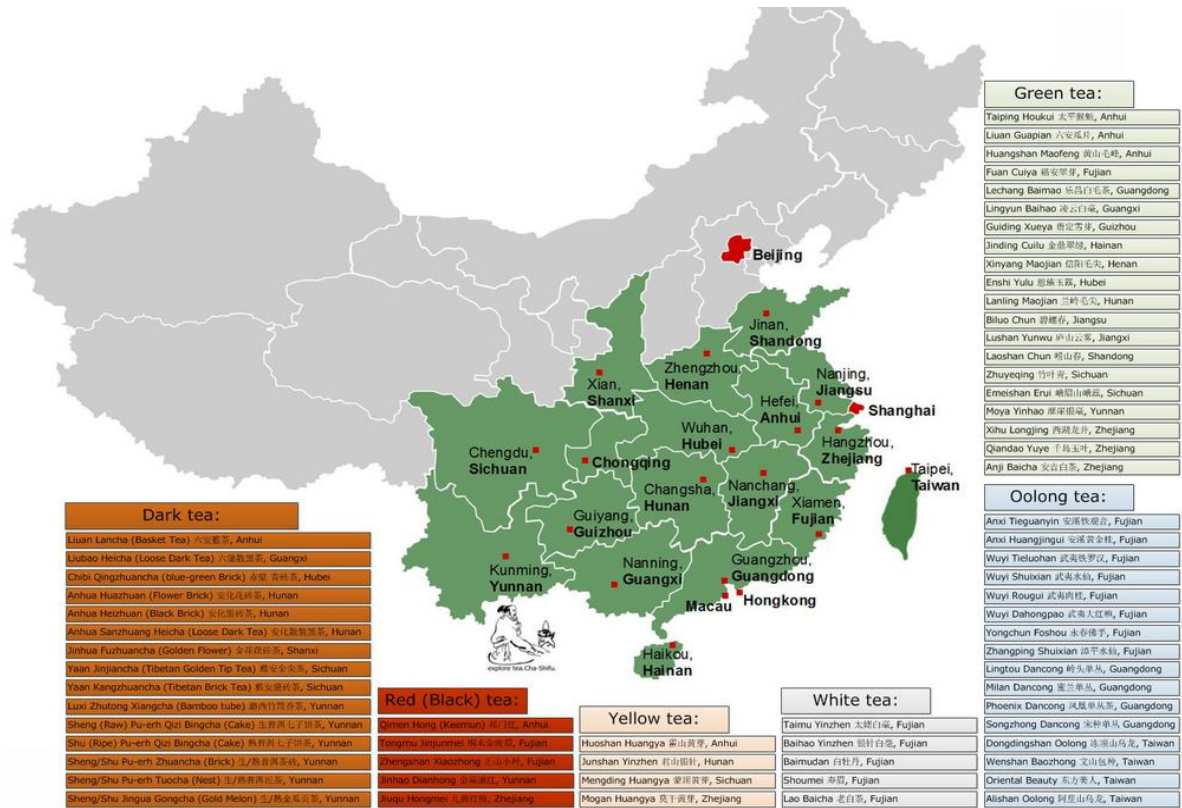


Figure 7. Company AB's factory production process chart



Table 1. Taiwanese Tea Production from 2003–2012

Year	Area harvested (Ha)	Yield (Hg/Ha)	Production (Mt)
2003	18,200	11,360	20,675
2004	17,462	11,563	20,192
2005	17,064	11,019	18,803
2006	16,740	11,556	19,345
2007	15,732	11,125	17,502
2008	15,174	11,456	17,384
2009	14,873	11,282	16,780
2010	14,530	12,021	17,467
2011	14,100	12,277	17,310
2012	13,000	11,463	14,902

Data source: FAO Statistics

Table 2. Chinese Tea Production from 2003–2012

Year	Area harvested (Ha)	Yield (Hg/Ha)	Production (Mt)
2003	925,200	8,302	768,140
2004	982,700	8,499	835,230
2005	1,041,500	8,976	934,857
2006	1,100,300	9,343	1,028,000
2007	1,242,000	9,384	1,165,500
2008	1,283,200	9,801	1,257,600
2009	1,306,000	10,406	1,359,000
2010	1,405,000	10,320	1,450,000
2011	1,499,900	10,821	1,623,000
2012	1,500,000	11,333	1,700,000

Data source: FAO Statistics

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- i In this paper, China does not include Hong Kong or Macau
  - ii Republic of Korea
  - iii For tea exports, packages weighing less than 3 kg are classified as tea drink ingredients; larger packages are classified as fine tea leaves.