

Tea Cultivation in Europe

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Foreword

The word "tea" used in the present article refers to any plant of the genus *Camellia* used for the aromatic features of its young leaves, mainly represented by the specie *sinensis*.



Figure 1: Madeleine-Françoise Basseporte (1701-1780), water colour on vellum "Thea bohea L, Chine", Thea Bohea L. was the name attributed at that time to *Camellia sinensis*. Source: Muséum national d'histoire naturelle (Paris) - Direction des bibliothèques et de la documentation

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Introduction

Tea is a very unique crop, as its cultivation, plucking and processing cannot be compared to any other classical crop, such as cereals, vegetables or fruits. It also provides one of the most common drinks consumed all over the world: 400 billion litres of tea can be brewed from the nearly 4 million tons of dried tea [Chen 2012] produced annually! Furthermore, it represents a considerable economic activity, not only in the regions where it is cultivated, but also in regions where it is marketed, distributed and consumed.

We present here a status of the cultivation of tea in Europe, what could be a possible business model, then, the approach proposed by the young association “Tea grown in Europe” (EuT) to promote and foster such activity.

History outline

Although the precise native land of *Camellia sinensis* is still debated, we can assume that it originates from an area located at the south-east of the Tibetan plateau, covering the south-western part of China, the northern parts of Myanmar and Thailand, and the north-eastern part of India. Wild plants were originally used by indigenous people mainly for curative purposes; such use was traced back as early as 2737 B.C. in ancient China (Yamanishi 1995). Then, tea has been cultivated in China, reaching a significant level during the Tang Dynasty (618-907 A.D.); at the same time, cultural aspects of tea cultivation, processing and consumption have also started to thrive, as testified by the famous “Classical of Tea” (Cha Jing) published by Lu Yu (Despeux 2015). It is mainly during that period that Chinese tea was gradually introduced to other Far East countries, namely Korea and Japan. Much later, early 17th century, it was introduced to Western Europe by Dutch merchants.

It is worth noting that Korea and Japan have started cultivation at a rather early stage², and have developed, on the basis of the Chinese background, specific methods to brew and consume tea which were integrated as an important part of their culture, such as the tea ceremony in Japan; regarding tea leaves processing, some innovative methods and products, such as the powder tea (“matcha”), have been developed. Similarly to China, the fabrication and consumption of tea in Japan and Korea remains largely focused on green tea. We remind here that green tea has to be processed rapidly after the plucking in order to avoid oxidation. Its aromas are very close to those of fresh leaves, but are rather fugacious: if not suitably preserved, most of the aromas are lost or modified after 2-3 months. Black tea, which is oxidised, exhibits very different aromas that appear more persistent in time.

Europe followed a radically different scheme: although the first tea plants reached Europe together with other exotic plants during the 18th century³, it seems that there has been rather limited initiatives to acclimate *Camellia sinensis* in Europe at that time; instead,

² In Korea, tea cultivation was already well advanced during the Goryeo Dynasty (918-1392).

³ The first introduction recorded was in Sweden, where the distinguished botanist Carl von Linné, who first classified tea in 1737, mentioned the successful cultivation of *Camellia sinensis* Uppsala in 1763 (Ukers 1935).

from around 1830, large-scale plantations were initiated in the colonies, mostly from seeds collected in China, first by the Dutch in Java and Sumatra, then by the British in India. Later, the British have further expanded tea cultivation to Ceylon and to different colonies in Africa: Kenya, Uganda etc.

The development of tea cultivation in India was rather tumultuous: after 40 years of vicissitudes and doubts, it has met an extraordinary success, triggering a revolution of the tea market. Indian tea captured most of the European and American markets, causing a serious economic crisis in the Chinese tea producing regions. This success relied also on the development of new machines for processing large quantities of leaves. Last but not least, new standards were set, from the methods and tools used for tasting, to the vocabulary used, often originating from Asian languages.

An important consequence of this production “off-shoring” to colonies was that black tea (i.e. oxidised tea) appeared as the “standard” product available in Europe: the subtle aromas of green tea (i.e. non-oxidised tea) initially shipped from China for sure degraded on its way to Europe; we can even assume that, after a sea shipping of more than 3 months⁴ with exposure to tropical temperatures, the green tea coming from China was partially oxidised when reaching Europe. Logically, the tea produced in India for the European and American markets was mainly black tea. Later, the Indian model was transferred to other colonies; other attempts in North and South America, as well as in Australia, were recorded at the end of 19th century or beginning of 20th century.

Regarding Europe, it is mainly at its surroundings, namely in Azores islands (part of Portugal), Georgia, Azerbaijan, Russia and Turkey, that tea cultivation and production have started at the end of the 19th century; most of these plantations are still in operation; these areas are represented as red dots in the map of Figure 2.

Tea plantations in the Azores were initiated in 1874, relying on the expertise of a Chinese native from Macau. Fourteen tea gardens were in operation in the North of the Island of São Miguel at the beginning of the 19th century. Two have survived, Gorreana and Porto Formoso, representing altogether around 40 hectares, constituting important local touristic spots.

In Georgia, at that time “Russian Transcaucasia”, it seems that the production has started in 1893 (Ukers 1935) on the eastern shore of the Black Sea, near Batumi, where 150 hectares of tea were planted, using seeds from China, India and Ceylon. Fifteen Chinese labourers were also hired at to run the plantation. In 1900, an experimental station was set-up by the Russian Ministry of Agriculture in Chakvi, providing local land-owner with seedlings free of charge, triggering a fast increase of the production. In 1913, the tea plantations covered 960 hectares, and were expanded to other regions, such as Guria and Martvili. Just

⁴ Even if the competition between “clippers” in the mid 19th century contributed to shorten down the shipping time, it took generally more than 100 days to ship tea from the Far-East to Western Europe.

after the world wide war and Russian revolution, tea production dropped dramatically; then, from 1923, under the leadership of the Soviet Union, consecutively to the government decision to become self-sufficient in terms of tea production, the land dedicated to tea has increased dramatically, reaching 34,000 hectares in 1933. Some tea plantations are still active.

It seems that the plantations of Sochi in Russia and Rize in Turkey were developed mostly using the material and expertise of Georgia. We know little about the tea plantations of Azerbaijan, initiated at the beginning of the 20th century and developed under the Soviet Union; geographically speaking, the Lenkeran-Astara region is very close the Iranian region of Lahijan, where most of the Iranian tea is grown.



Figure 2: Tea plantations in Europe and its surroundings

More recently, around 10 years ago, several individual initiatives have been launched in various European countries, namely France, Germany, Italy, Holland, Portugal, Spain, Switzerland and United Kingdom (highlighted with green dots in the map of Figure 2); in some cases, the experimental stage has been passed successfully, and “pilot production” is ongoing: high quality products as well as interesting growth perspectives are foreseen.

It is worth noting that similar initiatives have been launched in parallel in the USA, Australia and New Zealand, showing an emerging interest in developing tea production in countries where such cultivation is not traditional.

What business model for Europe?

Growing tea in Europe does not refer to any existing business model. When raising such idea, it is considered as romantic at best and nonsense at worst! We are however

convinced, and try to prove it here, that growing and manufacturing tea in Europe may generate a sustainable and profitable economic activity over the future years and may bring social benefits to Europe in terms of employment, environment and public health-care.

Currently, the main model for marketing and distributing tea in western countries consists on supplying tea from low-salary countries, at prices ranging from around 2 €/kg for the CTC (“crush-tear-curl”) used in tea bags, up to around 50 €/kg for high grade entire leaves. The consumer price after transformation is multiplied by a factor of 10 to 50. Transformation may include sorting, blending and packaging; as an example, the consumer price of tea bags currently amounts to around 25 €/kg compared to 2 €/kg of the CTC.

Our Association proposes a radically different model, focused on high grade products coming from chemical free, organic, non-intensive plantations, with most of the added value remaining at the producers’ level, which may appears by and large similar to the model currently followed by the production of high grade green tea in Japan or Korea. However, Europe being still at a pioneering phase, such comparison appears not fully relevant.

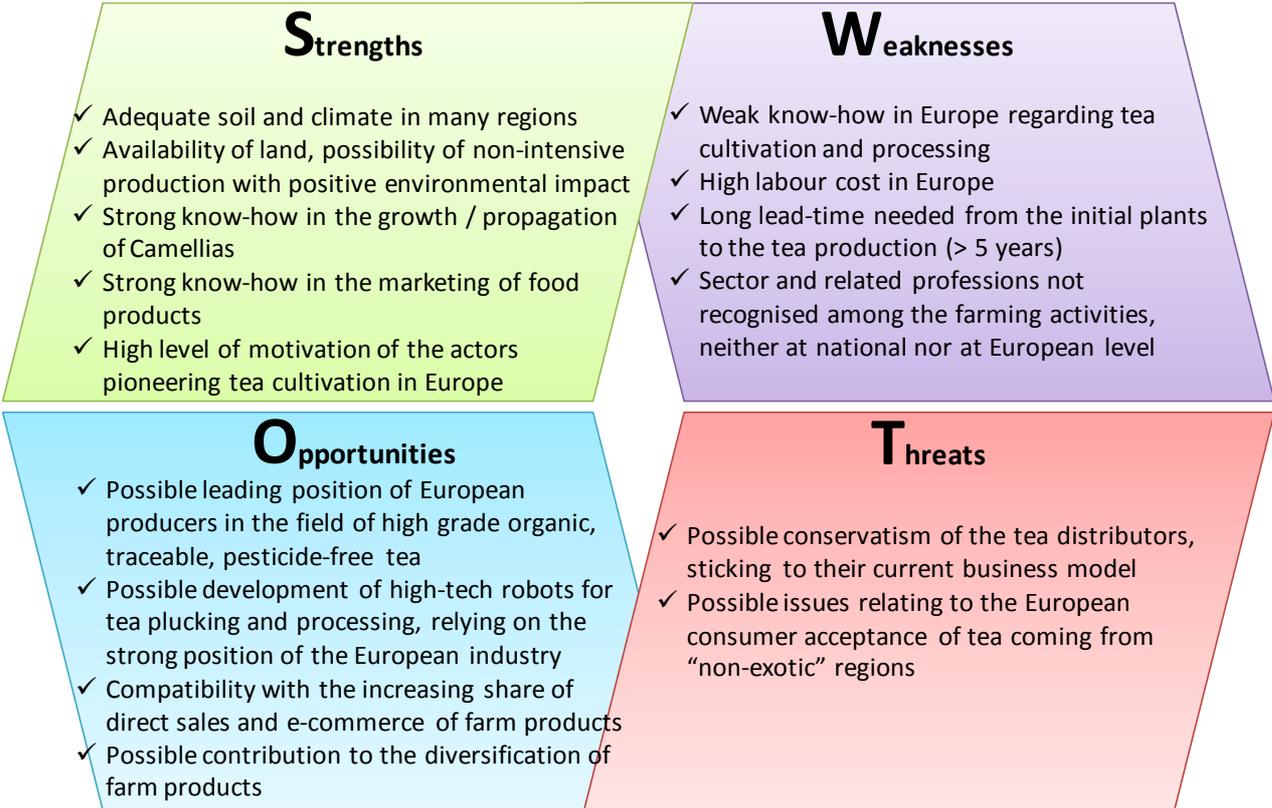


Figure 3: SWOT analysis: growing and manufacturing tea in Europe

A SWOT analysis summarising the positive and negative aspects of growing and manufacturing tea in Europe is presented in Figure 3. This analysis shows that European players have already developed very strong competencies in the cultivation and propagation of *Camellia*, but this strength is balanced by the very weak knowledge on how to conduct the plantation for tea production and how to process the leaves. Furthermore, although

Europe is experienced in producing high grade food products, such as wine, chocolates etc., we cannot take for granted that consumers will accept tea grown in Europe as a high grade product; indeed efforts will be needed to overcome conservatism of both customers and tea distributors.

Last but not least, most of the world tea production currently relies on low cost labour; in Europe, advanced technologies will have to be deployed to address such issue. We consider that robotics and photonics technologies are enablers to perform automated plucking and processing of tea leaves.

From a quantitative point of view, these new European tea plantations cumulatively represent at present only a few hectares. However, it undergoes a fast increase, nearly doubling each year; moreover, taking into account that recently planted tea will reach maturity after 7-8 years, it appears that, cumulating the two effects, the quantity of tea produced in Europe will grow exponentially over the following 15 years. A typical business model that should be applicable to the European plantations is shown in figure 4.

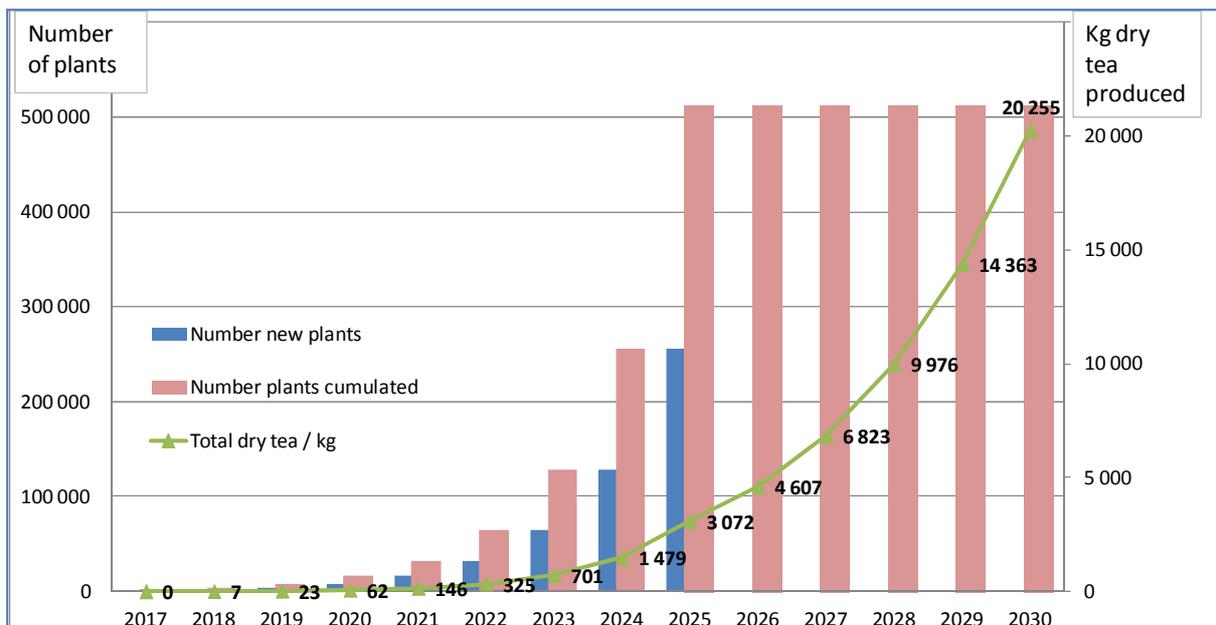


Figure 4: Production model

In this model, we consider a doubling of the number of plants every year, up to 512,000 plants in year 2025. Even without new additional plants beyond 2025, the quantity of dry tea produced would continue its fast increase, due to the fact that more plants will reach maturity, reaching an average quantity of dry tea produced by plants of around 40 grams/plant in 2030. Considering a density of 10,000 plants/hectare, it corresponds to a yield of 400 kg/hectare, much lower than the world average, estimated to around 1,110 kg/hectare (Chen 2012). The yield of 400 kg/hectares presented here is a plausible assumption for the production high grade tea.

Role of the EuT association

As a matter of fact, tea is grown around the world under extremely diverse geographic and climatic conditions, thus, it seems that growing tea is feasible in many regions of Europe. Recent experiences in France, Italy, Portugal, Switzerland and Germany have proven so.



Figure 5: The Tschanara tea garden in Odenthal (Germany).

However, the emergence of a significant economic activity would require the development of a specific know-how, not only for cultivation, but also for harvesting and processing. As mentioned above, growing tea in Europe is not a straightforward and simple path; it involves several weaknesses and threats, but also strengths and opportunities. The Association “Tea Grown in Europe” (EuT)⁵ created in December 2016 under the French status of non-profit Association, aims at developing efficiently such know-how, relying on a cooperation of the different players in Europe. Its object is to promote in Europe an economic activity domain based on the cultivation of tea plants on the European territory. This domain encompasses the whole value chain, from cultivation to transformation in marketable products.

To meet its object, the Association endeavours to set up links between the players of the domain, represent the Members of the Association towards institutions, establish multi-annual roadmaps, and prepare the submission of grants or public funding to the benefit of its Members.

⁵ EuT website: <http://tea-grown-in-europe.eu/>



Figure 6: A *Camellia sinensis* grown in Languedic and the green tea produced (right).

The association will also foster:

- The acquisition of knowledge and know-how by the European players of the domain, especially on the following aspects:
 - ✓ species and genotypes cultivated in the world and their adaptation to and to the various soils and climates across Europe;
 - ✓ techniques used worldwide for cultivation, plucking and processing and their adaptation to the European environment;
- The deployment of best practices for environment friendly cultivation, harvest and processing;
- The development of innovating technologies for cultivation, harvest and processing;
- The development of environment friendly tourism on the sites where tea is cultivated;
- The obtaining of National or European labels (such as the French “AOC” or the European “PDO”);
- The protection of botanic species considered by the Members as relevant to tea production in Europe.



Figure 7: The Chá Camélia tea garden in the Minho region (Portugal): an example of mixed cultivation of tea and fruit trees.

Conclusion and perspectives:

Growing and manufacturing tea in Europe is indeed a challenging and ambitious task; we believe that, if reasonably conducted, it should bring various social and environmental benefits to Europe. It is also highly innovative in terms of business model and techniques; we believe that, to be successful on a large scale, it should be supported by a set of practical innovations adapted to the European environment such as:

- Agro-forestry techniques involving tea and local trees;
- Use of tea plantations to the benefit of the environment (e.g. reducing carbon footprint, limiting erosion etc.);
- Robotised plucking.

The EuT association will foster these key innovations in close cooperation with the different stakeholders, including European farmers, tea distributors, European industry players and public authorities, offering to worldwide consumers the quintessence of the various European “terroirs” in the healthiest stimulating beverage.

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