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THE CORRELATION BETWEEN CLIMATE CHANGE AND THE FOOD SYSTEM

The role of five global goods from the Little Ice Age to the global warming

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SUMMARY

Introduction

Global warming is impacting our lives, and the predictions for the near future are everything except positive, making climate change one of the most urgent issues of the 21st century. Nearly every day, information on climate-related disasters, ice melting, and rising sea levels are being diffused through the media. Among the various aspects of climate change, its effects on the food system are highly worrying: agriculture is strictly dependent on climate, and the increase in extreme climatic events is causing severe damage to food production and crop cultivation around the world, even more so because they will have to match a population growth that is expected to reach 10 billion people in the next decades.[1] Conversely, agriculture is also one of the causes of climate change, coming second for greenhouse gas emissions, after energy consumption.[2]

In the fight against climate change, agriculture and food can make a huge difference. More and more often, we hear about the importance of reducing meat consumption, which accounts for more than half of all greenhouse gases from food production.[3] On the other hand, meat, oil palm, or soy are not the only food commodities with a strong connection with climate change: other global goods that we daily consume play an important role, too, whether negative or positive. And not only in the current global warming but also in the previous climate change, the Little Ice Age. In other words, while the current debate on climate and the food system mainly focuses on some specific goods, such as meat, others are left out of this debate, despite these being consistently present in our diet. This research tries to fill this gap by describing the historical, social, and economic conditions that, since the Early Modern Age, have created the relationship between such global goods, namely potatoes, maize, coffee, tea, and cocoa, and the two climatic crises; it also shows that the foundations of what is considered a modern phenomenon date back to centuries ago.

Probably most of us consume a cup of coffee or tea and eat some chocolate at least once a week, if not every day. However, few know that these global goods hide curious and ancient histories. The interest in these histories is the trigger to this research. Specifically, I wondered about when exactly coffee, tea, and chocolate, that today are deeply integrated into the European culture – think of Italian coffee, Swiss chocolate, or English tea –, first arrived on this continent. At the same time, I bumped into what is called the Little Ice Age, a period of regional cooling that is not studied in school years.

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[1] "Is the World Overpopulated?," The World Counts, accessed January 11, 2023 https://www.theworldcounts.com/populations/world/10-billion-people.

[2] "Historical GHG Emissions," Climate Watch, accessed December 7, 2022, https://www.climatewatchdata.org/ghg-emissions.

[3] "Meat accounts for nearly 60% of all greenhouse gases from food production, study finds," Oliver Milmann, The Guardian, September 13, 2021, accessed January 11, 2023, https://www.theguardian.com/environment/2021/sep/13/meat-greenhouses-gases-food-production-study.

This equally drew my attention, since, in a historical period where global warming has become part of our lives, I found it curious that only one century and a half ago the world was coming out of a climatic period that was the opposite of what we are currently experiencing. As the strong connection between food and climate is a topic of increasing interest lately, I decided to bring together these themes and draw a relationship between coffee, tea, and cocoa and the two climate changes of the last centuries: the Little Ice Age and global warming. However, having not found a strong link between coffee, tea, and cocoa and the Little Ice Age (in addition to the historical context), I searched for other global goods with characteristics similar to the three drinks that, instead, had some relationship with this period: potatoes and maize "met these requirements". As will be explained in this research, they arrived in Europe from the same distant lands, in the same historical period, and for the same historical-economic dynamics, before spreading around the world and becoming deeply integrated into the European diet – despite the five goods being part of the global diet, this research will focus on their role in Europe.

In other words, I chose to focus on five global goods that I deem important for their role in revolutionizing the European diet, to the point that today it might be incredible to think that Italian coffee or potatoes from Belgium – the famous Belgian fries –, only to name a few, are not native to Italy or Belgium. However, this work goes beyond the sole description of the history of the five commodities and the related context: it also aims at looking at these global goods through a different lens, one that does not see potatoes, maize, coffee, tea, and cacao as mere goods, foods, or drinks, that have "only" revolutionized the European diet, but as commodities that played some specific roles in global history: particularly, the five goods will be analyzed for their role in the climate changes of the last centuries.

Although the trade in goods across distant countries and regions has existed since ancient times, the acquisition by potatoes, maize, coffee, tea, and cocoa – and by other goods, too – of the status of "global goods" can be dated to the 16th century, when increasing quantities of wares began to be traded in bulk across the entire globe.[4] As global trade connections grew, the concept of consumption transformed: what was before linked to subsistence reasons – "to consume" meant using up goods, in the sense of exhaustion of matter – gave way to the modern concept of consumption, where tastes, lifestyles, and possessions define our identity, and where consumers' demands shape politics, economics, as well as the environment. In other words, from about the 17th century onwards, consumption ceased to be related to the "deterioration" of things and acquired a positive meaning,

[4] Anne Gerritsen and Giorgio Riello, ed., *The Global Lives of Things – The Material Culture of Connections in the Early Modern World* (New York: Routledge, 2016), PDF edition, 4-5.

especially after realizing that it was a source of enrichment for the state coffers. Specifically, we will see how the demand for luxury goods will contribute to the transformative process of the concept of consumption to the point that the world's powers exploited and degraded the environment to respond to market demands for these products: the new taste for coffee, tea, and cocoa had a relevant role in this process. Hence, what we acknowledge today as the patterns of modern consumption neither originated in the post-Second World War period, as the 20th-century literature argues, nor were born in the United States, or in Europe. Instead, it can be argued that modern consumption partly owes its meaning to the exchange of global goods starting from the 16th century and to the following implications derived from this new globe-encompassing phenomenon.[5] If on the one side, institutions were responsible for creating such demand – and thus for shaping the tastes and desires of the population –, on the other, consumption patterns transformed states and societies, as well as the environment. Global warming is one consequence of this.

Once they first set foot in the Old World, the five commodities were commonly viewed as exotic goods: after all, they were unknown to Europeans and arrived from distant, fascinating, and exotic lands. In this research, they have been divided into the categories of staple foods crops, in the case of potatoes and maize, and of (tropical) stimulating beverages for coffee, tea, and cacao – before the invention of chocolate, cocoa was a beverage. The correlation between these global goods and climate change is explained by attributing to the staple crops and tropical beverages two profoundly different, if not opposite, roles in the two climatic crises. These roles are linked to the natural differences between the two categories: while the staple food crops stand out for their nutritious properties, the tropical stimulant beverages are important for completely diverse reasons, among which figures their cultivation in plantations. In short, this work describes the role of potatoes and maize as an alternative and even life-saving staple food crops during the Little Ice Age, while the three stimulant drinks are presented as concomitant causes of global warming. In particular, I decided to focus on the arrival and integration of these five goods in Europe, even though the historical context widens the borders to the entire globe.

The first chapter is dedicated to the link between maize and potato with the Little Ice Age, while the second and third focus on the history and production of coffee, tea, and cocoa and their link to global warming. Finally, the last part presents some possible future directions to be taken in the field of sustainable agriculture.

[5] Frank Trentmann, *Empire of things – How We Became a World of Consumers, from the Fifteenth Century to the Twenty-first* (Penguin Random House, 2016), Kindle edition, 9-24.

The first chapter talks about the Little Ice Age, the historical context, and the history of potatoes and maize by emphasizing the role of the two staple crops as an alternative to grain during this climatic crisis. As mentioned above, the Little Ice Age is a period of general cooling that manifested throughout the world from about the 16th to the mid-19th century. The term "Little Ice Age" has been coined in the 20th century after the realization of a general decline in temperatures by about five degrees compared to the warm Middle Ages. This occurred in different ways and at different timing: frosts, great snowfalls, rainfalls, summer hailstorms, storms, and several periods of droughts hit many regions of the world. 1816 was called the "year without summer", while in the 18th century several European rivers, such as the Thames, the Seine, and even the Bosphorus froze. The famous episode of London in flames, in 1666, was due to one of the torrid summers typical of this period.

Occurring in the same period of the Plague and the wars of religion, the climate was everything except supportive of Europe and the damage brought by the extreme-weather events had drastic repercussions on agriculture. The Old World population relied on a diet based on cereals – mainly grain – for 80 percent: however, grain is neither highly nutritious nor highly productive (as are rice and maize), and, to aggravate the situation, the fertility of the soil was increasingly poor after each harvest. More and more damaged by the harsh climate, the grain seemed cursed, to the point that it contributed in part to the crisis of the feudal system – at the time, it was not certain what was the real fault of such misfortune, whether it was God's will, or because of the "witches". In other words, Europe had to find new alternatives to a way of living that had remained the same for more than a thousand years. And it did so: from the 16th and 17th centuries, before in the Netherlands and England, and then in the entire continent, the system underwent a radical transformation. In short, the rise in grain prices due to the harvest failures and the following revocation of customary rights of the poor, the purchase of lands by the wealthy for profitable purposes – before, these lands were accessible by anyone –, the decline in wages, and the cultivation of grain for exportation to urban markets, these elements together give an overview of how the restructuring of the rural economy, and the creation of a new market-oriented farming system, were taking hold in Europe.

On the other hand, the role of the Little Ice Age should not be interpreted as the only trigger of these transformations. This text adopts the point of view of the historian Philip Blom, who sees this period of icy winters and mild summers in a different light: according to the author, the Little Ice Age can be interpreted as a catalyst or accelerator of some processes already underway, and as a source of pressure that allowed further revolutions. In this sense, the climatic conditions favored the integration of the potato and maize: in front of the harvest failures and starving, the poor had no choice but to welcome these exotic products.

The potato and maize are both native to the Americas and were "discovered" by Europeans during their first explorations in the New World. Both were brought to Spain to be then diffused in the entire continent. While maize was soon integrated into the diets of the poor thanks to its similarities to the other cereals, the potato struggled more and had to defeat a great number of prejudices. What the tuber and the cereal have in common are their high-calorie value and high productivity. Thanks to these two characteristics, as well as their higher resilience to climate and adaptation to different soils, potatoes, and maize became on many occasions the perfect alternative to the delicate grain. The cases of Ireland (specifically for the potato) and northern Italy, for instance, testified that the two exotic crops have been responsible for the survival of many people. Not only that: studies have confirmed that potatoes and maize contributed to the population growth that occurred in these centuries.

The second chapter describes the historical-economic context related to the three stimulant beverages, as well as the history of coffee, tea, and cacao necessary to explain – in the third chapter – how they can be considered concurrent causes of global warming. This part of the text encompasses a period going from the first arrival of coffee, tea, and cocoa in Europe as luxury goods (17th century) to their wider consumption among all strata of the European population in the first part of the 19th century. In doing so, however, I decided to go even further back in time to deepen the history behind the concept of luxury. For this reason, a part of the second chapter is devoted to spices, which are important both for their role as the first luxury products and because the spice trade has paved the way to the discovery of those routes and countries that would prove crucial for the subsequent trade and production of coffee, tea, and cocoa.

From Ancient Rome until about the 15th century, spices were as valuable as gold. As a result, the "Land of Spices" (the East Indies) attracted the major European powers eager to fill their state coffers. First the Portuguese and the Spanish (16th century), then the English, Danish, French, and Dutch (17th century) imposed their power in the Indian Ocean. The competition which developed around these precious goods – desired by the European wealthy because they represented a true status symbol – led to interesting achievements, such as the circumnavigation of Africa by the Portuguese and the "discovery" of the Americas by Cristopher Columbus. Thanks to the spice trade, new commercial institutions such as the Dutch East India Company (VOC) and the English East India Company (EIC) – which were real joint stock companies with political and military powers – were established. As the European powers increasingly augmented their presence in the Indian Ocean, in Europe, the number of ships carrying large quantities of spices increased, too. This resulted in a decline in the price of such goods, which lost their prestigious position as luxury wares.

A subpart of the part on spices is dedicated to sugar, one of the protagonists of the spice trade. Sugar is relevant for this research because it inaugurated the system of production based on plantations, the

same where coffee, tea, and cocoa are cultivated, and due to its strict relationship with the three beverages: as it will be explained, the consumption of sugar and that of the three bitter beverages are connected.

In the 17th century, coffee, tea, and cocoa arrived in the Old World as exclusive drinks from Asia and the New World, the distant and "exotic" lands explored and colonized by Europeans. Coffee comes from Ethiopia, tea from China, and cocoa beans were part of the Maya and Aztec cultures: in their ways, these goods had been part of their local culture for thousands of years. When Europeans began to import these exotic products, they were viewed as luxury wares and were welcomed in the continent by an animated debate on whether or not they should be consumed. Indeed, their arrival in the Old World coincides with the period of the Reformation, Puritanism, and Pietism, whose religious rigor considered luxury and material desires as the cause of corruption. On many occasions, the beverages were prohibited and taxed; on others, they were given the most curious healing powers. Over time, the demand for these expensive products increased, and, consequently, coffee and cocoa plantations were set up in the New World, while the English and the Dutch began to grow tea in their colonies in the East Indies. Meanwhile, coffee houses opened all over Europe to sell the three beverages to those who could afford their high price.

The most relevant shift representing the "trickling down" effect of the consumption of these luxury goods from the upper to the lower classes occurred in the mid-18th century. In 1750, the apex of colonialism, a new era of global commerce was about to begin: the demand for coffee, tea, and cocoa fostered this commercial transformation. The long-distance journeys needed to import these goods into Europe involved a reorganization of capital that had to cope with the global market and that led to the creation of the financial market. The 17th-18th century-commercial transformation enabled Europe to enjoy a "consumer revolution". The old narrative that despised luxury goods was defeated, and the concept of consumption acquired a positive meaning: consumption was now seen as a source of revenue for the state; meanwhile, mercantilism was abandoned in favor of a new economic ideology that had freedom – to consume and to commerce – as its hallmark. Associated with the consumer revolution, what has been named the "industrious revolution" explains how the lower strata of the population began to reallocate their resources to be economically able to buy those goods which, slowly, were becoming accessible to anyone. In other words, consumption was no longer linked to subsistence reasons: to consume started to mean buying goods at the market and the new shops, but it was also related to the experience of attending the new social spaces (coffee houses) and to leisure, as well as to a question of identity and of a standard of living – or of imitating a standard of living.

Between the end of the 17th and the first decades of the 18th century, the demand for stimulant drinks exploded. Coffee and tea were now consumed even by the laboring classes to the point that they not only represented leisure and pleasure but also labor. The stimulants contained in the drinks served as a perfect aid for the heavy work in the newly industrialized cities and the fields; in worse cases, they acted as a true meal and helped calm the sense of hunger of the poorest. Despite cocoa struggling more in its path of diffusion – it was seen as the symbol of the aristocracy –, in the 19th century, it spread among the lower classes, too, especially when industries made possible its consumption in the solid form of a chocolate bar. In all this, the role of sugar was pivotal: none of these naturally-bitter drinks were consumed without adding the sweetener.

After tracing the historical context, the third chapter specifically focuses on the relationship between coffee, tea, and cocoa and global warming. It is widely acknowledged that, unlike the Little Ice Age, the current climate change and human history are strictly interrelated. Indeed, global warming is considered one of the pillars of the "Anthropocene", the epoch dating from the commencement of humankind's impact on the environment – the beginning of the Industrial Revolution is the starting period. Particularly, the two human activities responsible for global warming, and thus for greenhouse gas emissions into the atmosphere, are the burning of fossil fuels and deforestation. Furthermore, among the largest contributors to global emissions, figure the agricultural, and the "land use, land-use change, and forestry" (LULUCF) sectors.

In this chapter, before analyzing the role of coffee, tea, and cacao as concauses of climate change, four more general phenomena are explained to understand the context. The industrial revolution marks the transition from an agrarian towards an industrial society and accelerated the process toward the modern consumption patterns of mass consumption. Thanks to machines, steam power, and coal, industrialization enabled mass production; the transport revolution, in turn, created a deeply interconnected world: consequently, the growth of the market took huge dimensions and prices decreased as never before. The new means of transport, fast and efficient, facilitated colonial and military control: in other words, the dominant powers were those that had access to cheap energy.

Growing European prosperity and urbanization led to a substantial growth of the global population, which in turn required further industrialization and economic growth. To sustain the needs of the inhabitants of this planet and the increasing demand for commodities that could not be produced at home – including coffee, tea, and cocoa – the environment has been put under enormous stress.

The subchapters "Imperialism" and "Plantations and Deforestation" describes the dynamics which led to the establishment of coffee, tea, and cacao plantations around the world. To come into possession of those lands where the commodities essential for their economies were produced, temperate countries reshaped the worldwide landscapes, as well as their populations and labor

structures. Due to the expansion of land and sea empires from 1870 to 1945, the world's map changed several times: particularly, France and England owned most of the tropical territories suitable for cacao, coffee, and tea cultivation. The United States became a major power, too, while the Spanish, Portuguese, and Dutch influence declined. The global empires built by these countries go together with capital accumulation, population explosion, and urbanization, three factors that combined triggered a profound transformation and degradation of the worldwide landscapes, which manifested with an accelerated pace due to mechanization and driven by mass production.

After a brief part on the history and characteristics of the plantation system, the focus shifts to the environmental consequences of plantations and deforestation practices. Among these, the massive removal of forests for agricultural purposes is responsible for a significant part of CO2 emissions into the atmosphere. Monoculture and the use of fertilizers to address the productivity problems of plantations have contributed to soil degradation; once the soil has been stressed to the point of losing fertility, more forests are being cut to make way for new arable land. In addition, deforestation caused by plantations has led to the further removal of forests for road and railway construction needed for the export market. Despite the independence of the former colonies, these practices continued unabated to meet global demands.

The system of coffee, tea, and cocoa plantations is explained by attributing to each crop a region of the world – respectively, Latin America, Asia, and Africa. The production of the three tropical crops has many characteristics in common. Firstly, the establishment of their plantations – in the tropics and subtropics – has been responsible for massive practices of deforestation which contributed to the reduction of the global forest cover: the release of CO2 into the atmosphere coming from the removal of forests in Latin America, Asia, and Africa is one of the main causes of global warming. Secondly, plantation systems make use of intensive farming practices and chemical fertilizers – that on many occasions leach into water bodies resulting in harmful pollution –: these have led to soil erosion, loss of fertility, and loss of biodiversity. What is called the "shadeless" (or nearly shadeless) system exacerbates even more these phenomena: indeed, the near total absence of shade in cocoa, tea, and coffee plantations does not guarantee protection for the plants from climatic events, nor maintain the ecological balance, and biodiversity – besides, shade tree removal is responsible for CO2 emissions, too. Greenhouse gas emissions are also released in the processing of coffee, tea, and cocoa, which are heavily dependent on energy.

Sugar consumption is linked to a great extent to our tropical goods because most of the coffee, tea, and chocolate/cocoa consumed throughout the world contain a percentage of sugar. Hence, sugar production's impacts on the environment, and thus on climate, have been considered for being indirectly linked to that of the three tropical goods. Sugar production is famous for the drastic

environmental reshaping it has caused since the time of the first plantations in Maderia and the Azores. In addition to the emissions released by sugar mills and the use of pesticides and fertilizer, as with any other monoculture, a great number of chemicals are used to extract the sucrose from the plant: these turn into wastewater, which can contaminate the marine environment when the industrial effluents enter water bodies.

In short, the activities behind coffee, tea, cacao, and sugar production are responsible for deforestation practices, production and use of fertilizers, as well as for the use of energy – and thus of fossil fuels – required in farms, including the packaging and distribution phases. According to the IPCC Special Report on Climate Change and Land (2019), only the Agriculture, Forestry, and Other Land Use sector (AFOLU) accounts for about 25 percent of all GHG emissions, a portion of which is emitted by food systems and agricultural supply chains.[6]

In the final part of this text, I conclude that among the activities to combat climate change, sustainable agricultural practices – such as climate-smart agriculture practices (CSA) – should be undertaken: among these, there is the integration of shade trees in plantations and the creation of more resistant seeds. At the same time, the five global goods analyzed in the text are seen from a different perspective: that of victims of global warming. In fact, in addition to the roles they played as alternative crops, in the case of potato and maize during the Little Ice Age, or as a contributor to global warming, all five global commodities – they, as well as many others – can be said to be threatened by the current warming of temperatures. For this reason, a new system that prioritizes sustainability becomes essential to avoid giving up these five global goods, which today form an important part of our diet.

[6] FAO and CAAS, *Carbon neutral tea production in China – Three pilot case studies* (Rome: FAO, 2021), vii.

1. THE LITTLE ICE AGE AND THE DIFFUSION OF THE POTATO AND MAIZE

Today, the potato and maize form an essential part of the global diet. However, it was not always so. The story of how the two staple food crops arrived in Europe begins with the Columbian Exchange – the phenomenon occurring after the "discovery" of the Americas related to the exchange of plants, animals, and diseases between the New World and Afro-Eurasia – and follows with their spread throughout the continent at different timings, defeating prejudices and adapting to some regions more than others. As usually happens with any innovation, their integration in Europe was not smooth: the potato and maize needed a catalyst that could trigger their diffusion and win people's trust.

In this same period, the Little Ice Age (LIA) was making itself felt through some extreme-weather events that had drastic repercussions on European agriculture, at the time mainly based on fragile fields of grain. This dark period could be looked at in a positive light if considered as a catalyst for some ongoing transformations of the time: it was also thanks to the LIA that the potato and maize gained popularity and spread throughout Europe. These two exotic goods, in turn, are remembered for having played an essential role during a very torturous period for Europe.

1.1 The Little Ice Age

The Little Ice Age was a period of general cooling that manifested itself in different ways throughout the regions of the world from about the 16th to the mid-19th century. The term Little Ice Age was coined by François E. Matthes in 1939 to describe an interval of 4000 years associated with glacier advances and retreats. However, the term as intended today is used to refer to this shorter period, which begins right after what is called the Medieval Warm Period.[7] Temperatures began to drop unusually, with a difference of four or five degrees from the Middle Ages.[8] The initial phase of this period is characterized by advances of glaciers in Europe, while the final phase concludes with glaciers retreats; nonetheless, the occurrence of these climatic events, as well as the timing and nature of this phenomenon differ from region to region.[9]

Despite the documentation available, the debate on the LIA is still ongoing and scholars do not agree either on dating this phenomenon or on its manifestations. While some of them collocate the beginning of the LIA in the 14th century, others consider the second half of the 16th century as the

[7] Michael E. Mann, "Little Ice Age," in *The Earth system: physical and chemical dimensions of global environmental change,* ed. Dr Michael C MacCracken and Dr John S Perry (Chichester: John Wiley & Sons, Ltd, 2002), 504.

[8] Philipp Blom, *Il primo inverno: La piccola era glaciale e l'inizio della modernità europea (1570-1700)* (Venice: Marsilio Editori, 2018), Kindle edition, 14-17.

[9] Mann, "Little Ice Age," 504.

initial phase. Also, if many speak of an adjustment of the Earth's axis of rotation, others note especially a reduction of solar activity. However, most studies agree that the decrease in temperatures was accompanied by particularly intense seismic activity. Although the hypothesis offered by different scholars are diverse and, in some ways, contrasting, what is argued by the majority is that the eruptions led to an accumulation of dust and ashes in the atmosphere, which in turn created a screen effect responsible for increasing even more the cooling down of temperatures of the following months and years.[10] Both the reduced solar activity and the volcanic eruptions seem to have modified the climatic phenomena called "El Niño", which consists of a band of warm ocean water that develops in the central and east-central equatorial Pacific. During a "non-El Niño" period, the warming of the air above the equatorial Pacific creates a huge rain cloud, the monsoon, that is essential for harvests. In an "El Niño-year", the monsoon becomes weaker, and rains fall in America, rather that in Asia, provoking floods. If, normally, this phenomenon occurs every five years, in the mid-seventeenth century it occurred twice as often. Several scholars believe that it is no coincidence that the LIA records some of the weakest monsoons ever in East Asia. Finally, some scientists believe that the movements of this huge volume of water provoked in turn pressure on the tectonic plates in the Pacific. Hence, all these phenomena taken together seem to create a vicious cycle: the reduced solar energy causes a decline in temperature that increase the risk of El Niño events, which in turn might provoke volcanic eruptions around the Pacific. Once the volcanic eruption verifies, the risk of other El Niño events increases again. Although this connection may not be exact, most scholars agree that the LIA was characterized by each of these phenomena.[11]

1.1.1 Documentation

Evidence of climatic variations and extreme events of this period is given both by narratives of weather descriptions, including perceptions by individuals and authorities (direct data) and physics-based phenomena explaining the seasonal characteristics of snow and ice or the life cycle of plants and animals (indirect data). Among the direct data figure memoirs, annals, chronicles, daily weather observations, private correspondence, newspapers and journals, songs, meteorological observations, and pictorial evidence.[12] One example can be found in the paintings of Hendrick Avercamp (1585-1634), a Dutch painter belonging to the 17th-century Flemish painting school, famous for depicting

[10] Blom, *Il primo inverno,* 18.
[11] Geoffrey Parker, *Global crisis: war, climate change & catastrophe in the seventeenth century* (London: Yale University Press, 2013), 14-16.
[12] Rudolf Brázdil et al, "European climate of the past 500 years: new challenges for historical climatology," *Climatic Change,* no. 101 (January 2010): 7-40, https://doi.org/10.1007/s10584-009-9783-z.10-12.

winter landscapes. The very fact that the Flemish school is still known for depicting winter landscapes suggests that, in the 17th century, snow and ice were part of normal life. As regards Avercamp, one of his most famous paintings is *Winter Landscape with Skaters* (1608): even though the festive scene represented in the painting is the result of the author's imagination, the freezing sensation emerging from it gives an idea of the temperatures of the year. 1608 is considered almost the coldest year of history: rivers and canals froze both in the Netherlands and in London.[13] Nonetheless, paintings do not limit only to describing the harsh climatic conditions in the Dutch Republic or in England. It is not uncommon to see the glaciers advance of the French and Swiss Alps illustrated by artists of the time.[14]

With regards to indirect data testifying to the climate variations of this period, the violins of Antonio Stradivari are an interesting example. In fact, in the famous wood with which they were made, the still visible growth rings are very narrow: they reflect the succession of cold summers after 1650, which blocked the growth of the trees that Stradivari used to build the instruments.[15]

Institutional sources regarding the climate of this period are not as many as one would think, especially considering the gravity of the phenomenon. However, despite institutional bodies not being interested in studying climate, descriptions of weather were included in official documents, such as books of accounts, reports on weather damage related to claims for tax or other alleviations, official letters, and ship logbooks – the latter are crucial as they provide specific direct observations on the weather and wind of the places in the world to which the ships were directed.[16]

Relevant documentation on climate variability, regardless of the type of sources, is much less available in regions outside Europe. However, the book *A Temperate Empire* by Anya Zilberstein is an example of a collection of material coming from North America. The book focuses on climate in Northeast America in the times of colonization and the material collected testifies to the intense transatlantic debate about climate during the Early Modern Age. Weather conditions in Northeast America were becoming a problem, and colonists and Europeans from the Old World were worried about not managing to populate the new colonies since migrants were unwilling to move to such a cold place. The material collected by the author is also made of correspondence exchanged between elites in which it comes out the truth about the harsh conditions of Northeast America: the promotional material aimed at investors, merchants, and immigrants, that collocated the region in the temperate zone, was misleading. Along with letters, reports by explorers of the 16th century explained that the

[13] Blom, *Il primo inverno,* 12.
[14] Mann, "Little Ice Age," 505.
[15] Parker, *Global crisis,* 8.
[16] Brázdil et al, "European climate," 12-13.

region was so cold during winter and spring that it seemed to be in the Arctic, while summers, surprisingly, were so torrid that that region could have been considered subtropical.[17]

1.1.2 Examples of extreme climate events

A great part of weather's repercussions on cities and landscapes worldwide is well documented, especially from 1570 to 1685, when the decrease in temperatures of two degrees provoked several disasters. During these years, the LIA manifested itself through frosts, great snowfalls, rainfalls, summer hailstorms, storms, and several periods of droughts.[18] Together with 1608, also the years 1620 and 1621 are well remembered: Europe turned into a frozen kingdom for three months, rivers were crossed by heavy carts, and Asia was reachable via earth thanks to a frozen Bosphorus. 1666, too, is particularly illustrative since it shows that the LIA did not consist only of cold temperatures: springs and summers were torrid due to an uncommon absence of precipitations. A very famous example is the one in London, which in September of that year saw some 13000 houses burning: the blaze started in a bakery and was enough to leave 80000 people homeless.[19] Other well-documented episodes are 1617 in Catalonia, which experienced the " year of the flood", where bridges and houses were washed away by a month of continuous downpours; in 1614-1619, Angola and Sahel suffered a prolonged drought; Japan and China reported also abnormal cold springs and heavy snowfalls.[20] In North America the LIA provoked several disasters, too. Letters exchanged with Europeans settled overseas testified that they experienced one of the most torrid and dry summers ever; modern studies have confirmed that the summer of 1607 in Jamestown (Virginia) was the driest of the previous one hundred and seventy years.[21] Canada experienced prolonged droughts from 1614 to 1653, and in Mexico rain was absent from 1640 to 1642. Finally, on the other side of the Pacific, harvests of rice failed in Indonesia due to severe droughts in 1641 and 1642.[22]

As evidenced by the events mentioned above, one of the characteristics of the LIA is its diversity in the timing with which it manifested itself around the world. To give an example, while in the 17th century, European temperatures were uncommonly low, North America was not suffering particularly cold temperatures. By contrast, when North America was surviving the freezing 19th century, Europe was recovering from the previous colder period.[23] Some temperatures estimates obtained by studying

[17] Anya Zilberstein, *A Temperate Empire*: *Making Climate Change in Early America (*Oxford: Oxford University Press, 2016), 30.
[18] Blom, *Il primo inverno,* 14-17.
[19] Ibid., 37.
[20] Parker, *Global crisis*, 3.
[21] Blom, *Il primo inverno*, 43-45.
[22] Parker, *Global crisis*, 4.
[23] Mann, "Little Ice Age," 507.

different sources – from tree rings in western North America to ice core data from South America – have made a representation of the peak-cooling periods in some regions of the world: the coldest centuries of the LIA were the 17th century in Europe, the 19th century in North America, and the 17 th and 18 th centuries in the subtropical North Atlantic and the tropical Andes of South America.[24]

1.2 Harvest failures and agricultural crisis

The succession of periods of droughts greatly contributed to causing several crop failures: the damages were so relevant that the European productivity of 1570 was reached only in 1750.[25] However, the LIA cannot be seen as the only one responsible for the agricultural crisis, nor for the crises of the 17th century. At the time, Europe was living in a period of general crisis fuelled by many factors, such as the Reformation, the plague, the Renaissance, and the wars of religion. Together, these elements completely modified the balance of European societies and brought them to change course. As Philipp Blom explains in his book *Nature's Mutiny*, it is rare to find developments in the societies of the time that are strictly related to climate change in terms of cause and effect. However, according to the author, the LIA acted as a catalyst, as an accelerator of some already ongoing processes, and as a source of pressure that enabled further revolutions.[26]

If the condition of the crisis was evident, the role of climate change was not understood yet. The causes of the ongoing natural disasters and of the resulting agricultural crisis were sought in religion, and the solutions often consisted of physical punishments for those who were considered responsible for the disasters. In the North of Europe, especially in the German area, the fault for bad harvests was attributed to witches: the witch hunt provoked a sort of mass hysteria which caused the death of a huge number of innocent people.[27]

In Europe, the cooling of temperatures was catastrophic for agriculture, especially after the Medieval Warm Period, where harvests were generous despite agricultural technologies being still obsolete. When the agricultural crisis hit the region, the lack of technology was not the only obstacle: the cereal monocultures on which Europeans lived at the time did not help either, because they stressed the soils and made them less productive.[28] In fact, during the Late Middle Ages and the Early Modern Age, the great majority of the world's population lived on cereal consumption: the 70-80 percent of an

[24] Ibid., 508.
[25] Blom, *Il primo inverno*, 19.
[26] Ibid., 25.
[27] Ibid., 53.
[28] Ibid., 20.

ordinary diet was based on these carbohydrates, while the remaining and smaller part was constituted by meat, milk, cheese, and beverages such as beer and wine.[29]

In this period, 60-70 percent of the world's population practiced irrigated agriculture, consisting of irrigation through river water, which is highly nutritious. The 20 percent corresponded to the European and Mediterranean populations, which practiced dry agriculture, based instead on rainwater, and thus poor in minerals. In other words, during the 16th century, rice, maize, and potatoes, which were consumed by the 60-70 percent-side, were the most cultivated crops in the world.[30] In the dry-grain European farming system, instead, the staple cereals were wheat, barley, and rye, which are far less productive than rice, maize, or potatoes. To give an example, if the three European plants bear a dozen of grains at most for each seed head (or panicle), a panicle of rice is composed of at least a hundred grains.[31]

To aggravate the situation, it was very difficult for Europeans to regenerate the fertility of the land after a harvest, and periods of fallow were necessary one year out of three. Moreover, the ripening of cereals in regions of dry agriculture took longer periods of time, and, when the harvest period arrived, the crop could not be entirely consumed all of a sudden: a third had to be kept for the following year's seeding, while another portion was needed for feeding draft animals during the winter. This system used land extensively and was not suitable for high population densities.[32] By contrast, in regions of irrigated agriculture, where fallows are not necessary, the model of crop production was more efficient than the Western model. To give an example, one of the East-Asian techniques consists of a well-developed system of small and large river channeling that allows rice to grow in any type of territory, from mountains to valleys: despite following years of rice cultivation, or multiple cropping, the soil remains fertile, and water, essential for the sustainability of the plant, retains in the first inches of the clayish earth, that is full in nutritious organisms.[33] In short, while in regions of irrigated agriculture, a family could live on one or even fewer hectares of land, in Europe a family of four or five members had to rely on at least ten hectares of land.[34] Hence, having as staple crop food the delicate grain during the LIA did not make life easy for Europeans. By contrast, wet rice farming has no problem of soil exhaustion, and this was a blessing in periods of extreme crisis like the Black

[29] Alessandro Barbero, ed., *L'invenzione della modernità*: *Italia Europa Mediterraneo. Dall'antichità all'era della globalizzazione,* La Storia, vol. 19, no. 1 (Milano: RCS MediaGroup, 2017), 24.
[30] Ibid., 25-28.
[31] Francesca Bray, "Agriculture for Developing Nations," *Scientific American 271*, no. 1 (July 1994): 32, https://www.jstor.org/stable/10.2307/24942764
[32] Ibid.
[33] Ibid., 35
[34] Barbero, ed., *L'invenzione della modernità*, 24-28.

Death: contrarily to Europe, China managed to recover quickly from the plague thank to this system.[35] This would also explain why Europe, from the beginning, had never been so densely populated as Asia.

Besides being the most relevant staple food of Europeans, grain also shaped the economy of the continent directly and indirectly. During the Early Modern Age, grain had two main uses: it was both an input for agricultural and industrial activities and, clearly, its flour was used for human consumption – the quality depended on the social class. Specifically, the economic activities developing around this cereal, such as processing and transport, employed a great part of the population. Hence, being grain a source of revenue for the church, the state, and the nobility, it was also a cause of concern among state authorities: the nightmare of droughts and shortages of grain persecuted the entire society, and its price rise was one of the main causes of urban rioting.[36] In fact, as food corresponded to half of most families' expenditures, an increase in the price of grain could lead people to die of hunger, in the worst cases, or to spend everything on food and nothing on other products, resulting in many workers losing their job.[37]

Although the oscillation of degrees during the LIA may seem small, it should be considered that only 0.1C of change delays or advances the ripening of crops by one day.[38] Decrease in temperatures of only 0.5C in the summer can cause a harvest failure in the northern hemisphere. In Scotland, for instance, the warmer temperatures of the 16th century enabled farmers to cultivate at higher altitudes and on poor soils; but, in the 1640s, when temperatures dropped by 2C, the consequences were disastrous. In Sicily, between the 16th and the beginning of the 17th centuries, 70 "new towns" were built to produce grain for sustaining the growing population. If at the beginning farmers harvested large amounts of grain, in the 1640s productivity decreased by up to 80 percent.[39] After a great number of bad harvests, several Italian granaries were closed and prices of grain were skyrocketing.[40] Some decades later, in January 1709, Venice saw its lagoon becoming a skating rink and the Parisian temperatures decreased in one night from 9C to -9C: it was the coldest month registered in 500 years and the price of grain had never been so high during the entire ancient regime.

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[35] Jason W. Moore, "The crisis of feudalism: An Environmental History," *Organization & Environment 15,* no. 3 (September 2002): 31, https://www.jstor.org/stable/26162192.

[36] Sheila Pelizzon, "Grain Flour, 1590-1790," *Review (Fernand Braudel Center) 23,* no. 1 (2000): 87, https://www.jstor.org/stable/4024147987.

[37] Parker, *Global crisis*, 19.

[38] Ibid., 587.

[39] Ibid., 57.

[40] Blom, *Il primo inverno,* 50-51.

1.2.1 The crisis of the feudal system

It can be argued that the increase in the price of bread led to the crisis of the feudal system. As argued above, during the feudal era, agriculture, with its local cereal production, and landed property were at the basis of the social and economic order: farmers lived on harvests and nobility lived on farmers. When temperatures cooled down so much to seriously hinder grain production, the foundation of the feudal system began to collapse, and the crop crisis became the crisis of the aristocracy. Europeans were now forced to find new alternatives to a way of living that had remained the same for more than a thousand years.[41]

The economist and social historian Karl Polanyi explained in *The Great Transformation* (1944) that in feudal societies the economic enterprise was not finalized to achieve wealth or to climb the social ladder: rather, it was about maintaining a certain social status within a hierarchy purely dependent on the family in which you were born. Most of the farmers lived on subsistence farming, they did not attend markets and they never moved, except in some rare events, such as wars, droughts, or epidemics.[42] A part of their harvest was for their family, another was stored, and the rest was given to landowners.[43] Also, the land was not subject to any kind of commerce since it was considered the foundation of the feudal order. In a normal period, there was no reason to change the order of things, but when the crisis hit the region, something had to be changed. Karl Polanyi defined what happened later as a "great transformation" (16th and 17th centuries) and explained how rapid the innovation of the rigid social structure had been, even though the timing differs depending on the European region. One might wonder how it is possible for a society that remained the same for a thousand years to transform itself in such a brief period. Everything started in the Netherlands and in England in the 16th and early 17th centuries, where a renewed interest in agriculture was imposing itself against the old feudal principles. In the countryside, the increase in grain prices and the denial of certain rights, such as the right of "commons", triggered several revolts. The commons were state-owned lands peculiar for their communitarian use that permitted even the poorest to pasture animals or procure forage. Since in this period droughts occurred very frequently and crops failed at the same speed, landowners started to expel farmers from these lands to use them in more functional ways.[44] For instance, in a period of expansion as it was the mid-15th century, when horses were essential for transport, cereal crop fields were turned into lands for fodder production to respond to the new needs of governments. Other commons were transformed into lands for pasturage scopes, and this also

[41] Ibid., 99.
[42] Ibid., 95-98.
[43] Ibid., 20-21.
[44] Ibid., 91-98.

contributed to reducing the fields available for wheat cultivation. By the 16th century, a great part of Western Europe was specialized in wool production; this, however, occurred at the expense of the rural population's diet.[45]

Deprived of their lands and reduced to poverty by the rise in the price of bread, peasants continued to revolt. In the 18th century, acts of rebellion against feudal property, grain prices, and the revocation of customary rights were exploding in many parts of the continent. In England, Prussia, and central Europe, farmers were either forcibly expelled from their lands or forced to abandon them due to consecutive crop failures.[46] However, if in England the usurpation passed through a parliamentary procedure, in France landlords simply usurped lands and reserved enclosures for their own use. This benefitted the richest peasants who could allow paying the tax demanded by landlords, while the poor were harshly hit by their loss.[47]

In other words, commons began to be centralized in large estates and were given to some administrators to be managed for the new profit-oriented market which was taking form.[48] The rise in rents that accompanied these enclosures attracted the interest of merchants who considered them an investment.[49] But these merchants were not simple traders: they had to meet the requirements required by a new form of market focused on the growth of metropolises. According to state authorities, the ideal merchant had to be financially able to transport its wares and sell them in urban markets without a mediator.[50]

In a period of rapid change and extreme climatic events, the Dutch farmers tried to prevent the worse: they reclaimed huge swampy terrains, and built dams, canals, and windmills, to survive in a period of skyrocketing grain prices and a lack of new lands to cultivate. But the icy winters and rainy summers of the LIA and the consequent increase in imports of cheap wheat from abroad – which occur throughout Europe – have put even their innovative agriculture to the test.[51] Therefore, the impoverishment that during the 16th and 17th centuries hit European peasants, made rural-to-urban migration the only possibility for survival. The increase in grain prices, the peasants' privation of legal rights, the purchase of lands by the wealthy for profitable purposes, the decline in wages, and the cultivation of grain aimed at the sole exportation to urban markets, these elements together give an idea of why the rural displacement was the most common choice.[52]

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[45] Moore, "The crisis of feudalism," 312.
[46] Blom, *Il primo inverno,* 94.
[47] Pelizzon, "Grain Flour," 102-103.
[48] Blom, *Il primo inverno*, 91-94.
[49] Pelizzon, "Grain Flour," 102.
[50] Ibid., 113.
[51] Blom, *Il primo inverno,* 86-88.
[52] Pelizzon, "Grain Flour," 137-138.

Even though this might seem a reasonable solution, the flight from the countryside provoked drastic consequences for the rural poor: farmers did not know how to survive in cities, and on many occasions, the new conditions of life led them to live miserably or even to die.[53] In addition, although in times of crisis the poor used to crowd at the doors of the nearest towns for centuries, the number of miserable people in this period was higher. The defense of citizens from these "invaders" sometimes resulted in cases of social marginalization or even forced departure of the poorest: among them there were women, children, and the elderly, who did not know where to go. In the 17th century, these episodes increased and on several occasions the solution was imprisonment.[54]

In other words, the feudal system was in crisis. This was both because of the agrarian conditions – which sooner or later would have led to soil exhaustion anyway – and because the relationship between lords and peasants was not favorable to land reinvestment, since landlords could not but benefit from a system based on the tribute. In this context, the climatic crisis played the role of the straw that broke the camel's back: it undoubtedly accelerated the ongoing process of transformation, and, in the end, there was no alternative – and no more arable land – but to change the system. In this sense, European expansion overseas was crucial because the lands of the New World could be used for commodity production.[55]

Finally, the restructuring of the rural economy was taking hold in Europe. The renewed interest in agriculture no longer allowed smallholders to produce their grain in favor of a new market-oriented agricultural system controlled by landowners, merchants, and wealthy tenant farmers. By 1750, the newly confiscated lands and the higher cereal prices provoked an increase in the value of farmlands. But the novelty was that the quantity of wheat production was now determined by the demand coming from the market. This flexibility was possible thanks to landlords and merchants who, by controlling every process of grain production, from growing to transport, could respond to the market demands and, thus, set its conditions.[56]

Karl Polyani published *The Great Transformation* in 1944 without mentioning the Little Ice Age not even once: indeed, very little was known of it in the second half of the 20th century. In his book, Philipp Blom links the two concepts together. In particular, he develops the argument by Polanyi that describes how the social order of Europe rested on the feudal property and local cereal production; then, he argues that the concurrence of temperature decrease, damage to cereal production, and the

[53] Blom, *Il primo inverno,* 86-88.
[54] Massimo Montanari, *La fame e l'abbondanza: storia dell'alimentazione in Europa* (Bari: Gius. Laterza & Figli, 1993), 135-137.
[55] Moore, "The crisis of feudalism," 313-314.
[56] Pelizzon, "Grain Flour," 102-103.

crisis of the feudal system is no coincidence. According to Blom, the LIA can be considered the catalyst of the transformations occurring during the 16th, 17th, and 18th centuries.[57]

1.3 Agricultural innovations: new techniques and new plants

At the end of the 17th century, Europeans began to adapt to the crazy climate of those years. As just mentioned, some think that the LIA acted as a catalyst that put some pressure on ongoing transformations and enabled further revolutions: one of these was the introduction of crop rotation and the technique of mixed farming, which helped to increase land yield and labor productivity. Thanks to these innovations, fallow periods stopped existing, and breeding became linked to cereal agriculture: the forage substituted fallows, especially the one rich in nitrogen, to help with soil fertility; more forage meant an increase in breeding that, in turn, contributed to better fertilization, too.[58] Besides grass, other plants began to be grown for their restoring effects, such as turnips, potatoes, and maize. In some parts of Europe, these techniques were already popular, but they spread over the continent in the 18th century with the agrarian revolution.[59]

The Columbian Exchange brought some important innovations, too. In fact, although it followed the 15th century's explorations by Christopher Columbus, its first effects in Europe were felt by the middle of the 17th century. The transfer of plants from the New World to Europe was pivotal for the Old World to the point that many of those plants are today an essential part of its – but not only – diet: among them, maize and potatoes played an essential role and seemed like a godsend in a period in which grain was extremely unreliable. In fact, along with their restoring effects in poor soils, they are also relevant for their high value in terms of calories per hectare of land. After their arrival to the Old World, maize spread mainly in Spain, Portugal, southern France, Burgundy, the Balkans, and northern Italy, while the potato became popular in Northern England, many parts of France, Switzerland, northern Italy, Denmark, Sweden, Germany, Flanders, and Holland.[60] In these regions, – which were going through periods of wars, droughts, and epidemics – maize and potatoes contributed to a striking and rapid growth of the population from the 17th century onwards: the globalization of these new products allowed better nourishment that helped strengthen people's resistance to epidemics.[61]

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[57] Blom, *Il primo inverno*, 98.
[58] Barbero, ed., *L'invenzione della modernità*, 30.
[59] Giovanni Federico, "The economic history of agriculture," in *The Cambridge World History – Production, destruction, and connection, 1750-present: Part 1, Structures, Spaces, and Boundary Making,* ed. J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 90.
[60] Pelizzon, "Grain Flour," 134.
[61] Ibid., 44.

However, once arrived in Europe, the new exotic products did not spread rapidly but remained experimental crops for many decades. In the beginning, they were present only in the botanical orchards of some researchers, such as Carolus Clusius, the most famous researcher and passionate about plants of the time. He was famous especially for his botanical orchards of Wien, Frankfurt, and Leiden in which he would study the exotic plants he received from explorers coming from America and Asia.[62] Among the plants he collected, potatoes and maize were responsible for saving the lives of most of the poor rural people. Indeed, it was seen that when grain began to be grown exclusively for export to urban markets, famines did not occur in regions where these two plants were widely spread.[63]

However, their diffusion deepened the differences between city dwellers and rural populations: while the first ate bread, potatoes and maize became *the* food of the rural poor. This does not mean that city dwellers or wealthy people had never eaten maize and potatoes over this period, but in their different reality, these two foods were seen as supplementary staples.[64]

1.3.1 Potato

The potato was discovered in the high Andes of South America by the Spaniards in 1532. Even though there are no precise records about when it arrived in Europe, many scholars argue that the tuber first crossed the Atlantic Ocean aboard a Spanish ship; once the ship reached Spain, the leftover potatoes, which turned out to be a very nutritious food for the long travel, were planted in the Spaniard peninsula.[65]

The first mention of potatoes by European scholars was around the second half of the 16th century.[66] Clusius was one of these scholars: he argued in his *Rariorum plantarum historia* (1601) that potatoes were common in the North of Italy and were consumed both by people and animals. It is thanks to these words that the arrival of the plant in Italy can be dated to about 1580.[67] It should be considered the fact that if the potato was cultivated in some Italian orchards around these years, the tuber must have arrived in Spain at least four years before. A research carried out by E. Hamilton in 1934 confirmed this theory and dated the existence of the potato in Spain to 1573. The account books found by Hamilton were of the "Hospital de la Sandre" in Seville: his attention was drawn to the registration

[62] Blom, *Il primo inverno*, 80-81.
[63] Pelizzon, "Grain Flour," 137.
[64] Ibid.
[65] William H. McNeill, "How the Potato Changed the World's History," *Food: Nature and Culture 66*, no. 1 (Spring 1999): 71, https://www.jstor.org/stable/4097130271.
[66] J.G. Hawkes and J. Francisco-Ortega, "The early history of the potato in Europe," *Euphytica 70* (1993): 1-2, https://doi.org/10.1007/BF00029633.
[67] McNeill, "Potato," 73.

of the purchase of some potatoes, the prices of which imply that the tuber was probably considered a luxury food. [68]

In his article "How the potato changed the world", William H. mcneill explains that Basque fishermen are probably responsible for bringing the potato to the Irish coast – it is known that they considered the tuber a perfect food to keep during their trips at sea. This would explain how the potato was consumed in Ireland even before Irish people started to totally rely on it for survival reasons after the Cromwellian wars (1649-52).[69] The way in which the potato spread in Ireland is astonishing: fifty years after its arrival, it had become a staple food crop in most parts of the country. This is interesting also because, before arriving in Ireland, the potato was already cultivated in some parts of Spain, Holland, France, and Italy, but in these countries, it never became as popular as it was on the Irish island, and it did not diffuse so rapidly either. [70]

It might be argued that the spread of the potato in Ireland was facilitated by the cold and humid climate typical of this country – perfect for protecting the tuber against viruses –, the fertile and humus-rich soil, and the historical context of the period. The potato in fact made its first appearance in Ireland at the end of the 16th century when the country was living through one of the most turbulent periods of its history. Despite these conditions, the tuber integrated perfectly with the economic structure that regulated the life of the rural population.[71] What permitted this integration was also the fact that, contrary to the English, the Irish farmers had no obligation regarding the type of plant to cultivate in their lands. In addition, in the 17th century, the rural techniques and agricultural knowledge of the country were still very rudimental, and this allowed farmers to gladly welcome the potato, which did not require any effort to be cultivated.[72] For a population that went through so many wars and injustices as the Irish one, potatoes can be considered a real salvation: it might be argued that they mean the same thing to Ireland as rice does to China.

However, the Irish were not the only lucky ones, because the tuber took root in every place the Spanish stopped. Although at the beginning it was viewed with suspicion, the bad feelings disappeared when peasants realized that potatoes, because they grow underground, could pass unnoticed to military requisitioning, feared because they stole grain harvests from farmers. For this and for other reasons the tuber spread significantly along the Spain Road, in the Low Countries, and in some parts of France and Germany. As regards the arrival to England, the legend has it that the

[68] N. Redcliffe Salaman, *Storia sociale della patata*: *Alimentazione e carestie dall'America degli Incas all'Europa del Novecento* (Italy: Garzanti Editore s.p.a., 1989), 155-156.
[69] McNeill, "Potato," 71.
[70] Salaman, *Storia sociale della patata*, 164.
[71] Ibid.
[72] Ibid., 172.

potato made its first appearance when Francis Drake arrived in his motherland in around 1580 with a rich Spanish booty, after having circumnavigated the earth.[73]

Before talking about its diffusion, it should be first explained why potatoes did not spread in Europe as quickly as they did in Ireland. To give an example, even though there exist more than 5000 kinds of potatoes – as stated by the International Centre of the potato of Lima – once potatoes arrived in Europe, all varieties were reduced to one, probably because the new vegetable was viewed with much less interest compared to other exotic products, such as tomato. This occurred primarily because people realized that potatoes could not be easily transformed into bread, and, in their view, they could not equate the beloved cereals. Then, there was their resemblance to the precious truffle. Because of this, the negative characteristics attributed to truffles by many doctors were transferred to the potato: the fact that both plants grow underground made people believe that they were dangerous and deceiving.[74] Another factor that rose several suspicions about the tuber was the fact that it was not mentioned in the Bible: according to the majority, if God wanted people to eat potatoes, it would have been written in the holy books. Lastly, to make things worse, voices about poisoning potatoes and potatoes as the cause of leprosy diffused in the continent.[75]

In other words, for the first fifty years, most Europeans did not appreciate potatoes and did not know what to do with them. In Italy, the Paduan doctor Giovanni Domenico Sala was the last to mention the potato for at least one hundred and fifty years. He explained that people used to cook it on embers, but its roots were damp and cold and too nutritious to be easily digested, and he suggested its consumption only to farmers or other manual workers. And so, the Italians lost interest in potatoes, at least until the 19th century.[76]

Although cultivation of grain continued to prevail, and in spite of the first doubts, potatoes continued to be grown on a small scale in some parts of Europe. In the Northeast of England and other parts of the continent, people realized that the tuber could be a guarantee in case of poor grain harvest or seizure from soldiers or the State, as well as a very nutritious alternative to cereals, especially in a period characterized by a climate crisis and thus, famines. Some reformers of the 18th century had already understood that potatoes had no rivals in case of crop failure and they could be easily planted between a cereal crop and the following one, which permitted to avoid long annoying periods of fallow. In addition, it was becoming evident that this vegetable can adapt easily to different climatic

[73] McNeill, "Potato," 72-73.
[74] David Gentilcore, *Italiani mangiapatate: Fortuna e sfortuna della patata nel Belpaese* (Bologna: Il Mulino, 2013), 48.
[75] William L. Langer, "American Foods and Europe's Population Growth 1750-1850," *Journal of Social History 8*, no. 2 (Winter 1975): 53, https://www.jstor.org/stable/3786266.
[76] Gentilcore, *Italiani mangiapatate*, 48-50.

and environmental characteristics[77] and that it reaches maturity very quickly: if grain requires ten months to mature, the potato only needs three or four months.[78]

In the 18th century, the persistent distress and crop failures of this period led the lower classes to integrate potatoes into their diet.[79] In England, the agriculturist Arthur Young, after noticing the effects of the potato in Ireland, encouraged the British Crown to grant every family of more than three children half an acre of land for the cultivation of potatoes.[80] Meanwhile, in other parts of the continent, landowners and officials gave orders to convert fallows into potato fields.[81] For instance, Frederick the Great encouraged its cultivation in Germany, and the same happened in Hungary, where a government decision imposed its consumption after the 1772 famine. In France, the royals welcomed the tuber at their table, and Marie Antoinette even dressed in potato flowers to popularize it: she did so after listening to Antoine Parmentier, the French agronomist who gives the name to the famous potato dish – "Parmentier potatoes". With regards to the Netherlands, Joop Witteveen demonstrated in this essay that by the second half of the 17th century, the potato had become a staple food crop in a part of the Flanders. From there, its diffusion moved northward, with a peak after the cold winter of 1740, responsible for causing famine throughout Europe.[82] In the last decades of the 18th century, the tuber was treated as a staple food crop in most of the continent.

The uncommon increase in population which occurred in the second half of the 18th century shows that the integration of the potato into the European diet was the right choice to take. In fact, today it is well known that the high nutritious value of potatoes contributed to the population explosion of this period. William E. Langer explains in his article "Europe's initial population explosion" that, although improvements in grain production and agronomy were ongoing, these were felt only by the mid-nineteenth century. Hence, while the agrarian innovations should not be considered at all in the explosion of the European population, according to the author potatoes were decisive: only one acre of the tuber and one cow could satisfy the needs of each member of a poor family.[83] In addition, it was not uncommon that even the poorest were able to leave some potatoes to pigs, which, once sold, could provide them money to buy other essentials.[84] All of this was simplified by the fact that the

[77] Ibid., 23.
[78] Langer, "American Foods," 53.
[79] William L. Langer, "Europe's Initial Population Explosion," *The American Historical Review 96*, no. 1 (October 1963): 14, https://www.jstor.org/stable/1904410.
[80] Langer, "Population Explosion," 13.
[81] McNeill, "Potato," 74.
[82] Nelson Foster and Linda S. Cordell, ed., *Chilies to Chocolate: Food the Americas gave the world* (Tucson: The University of Arizona Press, 1992), Kindle edition, 13.
[83] Langer, "Population Explosion," 4.
[84] McNeill, "Potato," 75.

new vegetable could be grown even on small patches of the poorest land, and it did not need the efforts required for grain production.[85]

The importance of potatoes can be better understood when analyzed together with the Little Ice Age. In his book *Italy and the Potato*, David Gentilcore gives an idea of how the consumption of potatoes increased in Italy after, and as a response to some of the extremely cold LIA's summers. The author explains that the period in which potatoes became a part of the Italian diet coincides with the crisis of 1816-1817. From 1811 to 1818, some volcanic eruptions provoked an increase of dust in the atmosphere which, as already happened in previous phases of the LIA, had some climatic consequences. The uncommon phenomena, like the redness of the sun and the moon and some multi-colored twilights, arouse amazement among the European population; but the surprise was accompanied by distress and despair because these rare weather events are associated with some of the coldest and wettest summers of that period. It is not by chance that 1816 has been called the "year without summer". Consequently, several harvests failed.[86]

The adverse weather conditions led to harsh repercussions for cereal crops: the prices of wheat, rye, barley, and oat skyrocketed. Most European states reacted by limiting or prohibiting the export of cereals. In many Italian ports duties on imports were reduced: cereals arrived from all over the world, even from the United States, but this was no good news for the poor part of the population which lived in rural and mountain areas. The solutions adopted by Italian states differed: for instance, some charities in the North distributed soups, clothes, and even money to help people living outside and far from the cities survive the crisis. However, this was not enough: in the region of Friuli, a great number of people died, while episodes of violence and protests increased in other parts of the peninsula. In France and in the Netherlands, instead, protests consisted of real demonstrations of violence.[87]

Gentilcore explains that one of the solutions for this situation was the potato. He talks of Francesco Chiarenti, an Italian doctor with some progressive ideas and a supporter of the tuber. In his *Riflessioni e osservazioni sull'agricoltura Toscana e particolarmente sull'istituzioni de' fattori* (1819), Chiarenti argued against the state of agriculture in Tuscany, attributed the fault to the administrators of the estates, and talked of the reforms to adopt; he even taught readers how to sow the potato. Although at the beginning the tuber was viewed with suspicion, the 1816 crop failures convinced some Italian regions to trust this exotic plant.[88]

Nonetheless, the potato was already known and cultivated in some parts of Italy. For instance, together with other landowners in Tuscany, such as Chiarenti himself, after the famine of 1803, some

[85] Langer, "Population Explosion," 11.
[86] Gentilcore, *Italiani mangiapatate*, 14.
[87] Ibid., 15-16.
[88] Ibid., 19-22.

agronomists of the South managed to introduce potatoes in mountain areas; they were sold in the principal markets of the Gran Duchy of Tuscany, too. This explains that the new vegetable was gaining popularity, as evidenced also by the increase in books and pamphlets regarding potatoes between 1815 and 1819. To give an example, in the Gran Duchy of Tuscany, the civil authorities actively promoted the consumption of potatoes by handing out pamphlets about their qualities to citizens. Another example mentioned by Gentilcore regards Girolamo Bartolomei – a figure of the "Ufficio Generale della Comunità" of the Gran Duchy – who attached a booklet on the cultivation of the potato to each letter he sent to the victims of the 1816 famine living in Mugello. Finally, in 1815 the Austrian authorities promoted the potato in Lombardo-Veneto and established a government policy that allowed the rent of public terrains on the condition that tenant farmers agreed to cultivate the potato on a portion of land.[89]

However, the opponents of the new tuber made themselves heard. Like many other new products, in the beginning, the potato was viewed as an eccentric food, and the instructions on how, when, and where to cultivate it were not clear either. In addition, it was unclear in which food category to place it, and this provoked a feeling of uncertainty and antagonism in the part of the society used to privileging, for subsistence reasons, the same old crops. Moreover, tenant farmers were worried that landowners could substitute it for wheat, subverting their habits and the rigid diet they followed. Gentilcore also explains that farmers probably perceived this as something unmoral, given the fact that the people trying to impose the cultivation of potatoes were the same who continued to eat white bread and could afford a flexible and varied diet.[90]

When the agricultural crisis came to an end and was replaced by good harvests and almost perfect weather conditions in 1817 and 1818, in Italy potatoes were rapidly forgotten. In fact, if Italians had the possibility to choose, potatoes were not the first choice, and the old habits were resumed quickly. Wheat and maize were reintroduced, and the tuber became just forage, at least for the next decades.[91] It was only in the second half of the 19th century that potatoes spread on a large scale in the Italian peninsula and, sometimes, even substituted wheat. [92]

Even the potato has a dark side in its successful history, which is important for understanding how, sometimes, some foods can pass from being resources to being the cause of drastic events. Unfortunately, this story is set right in the place where the tuber has played a relevant role in the survival of the population: Ireland. Thanks to potatoes, the Irish population increased from two million at the end of the 17th century to eight million in 1841. However, these numbers precede the

[89] Ibid., 27-29.
[90] Ibid., 30- 33.
[91] Ibid., 37-38.
[92] Ibid., 94.

Great Hunger, the drastic phenomenon occurring from 1846 to 1847 that changed the former demographics of the island. This catastrophe was caused by a fungus, the *phytophthora infestans*, that harshly damaged the 1845 harvest and destroyed the one of 1846. The hunger and poverty which followed led to mass migrations and epidemics.[93]

It has been estimated that the Great Hunger and the epidemics caused between 1,1 and 1,5 million deaths more than normal. Unfortunately, in Ireland, the potato had rendered the population very fragile in front of the famine, especially because the Irish had based their diet solely on this plant and on milk. In the following decades, the new feudal regime, mass migrations, the delay of marriage, and the high number of unmarried people led to a substantial decrease in the Irish population.[94]

To conclude, despite the just mentioned event, and regardless of when, where, and how the potato diffused throughout Europe, thanks to its characteristics the tuber became a nutritious alternative in a period characterized by a climatic crisis, several crop failures, and famines. The cultivation of potatoes has allowed Europe to reduce its dependence on cereals, reduce the disastrous consequences in the event of failure to harvest, and, as a result, triggered a sudden increase in population.[95] Finally, the potato has become a common ingredient in European cuisine and can be cooked in an infinite number of ways.

1.3.2 Maize

After potatoes, maize is the other New World good responsible for expanding the European food supply and sparing the lives of thousands of people from dying of hunger.[96] It was imported into Europe in 1493 by Columbus,[97] and he himself wrote about this in 1498, in a letter informing the Spanish Royal Family about his last voyage. Although he made no direct reference to the year 1493, in a passage he explained that by the time he was writing, maize was present in big quantities in Castile, where Columbus himself brought it after his first exploration in the New World five years earlier.[98]

The history of maize traced back some 8000 years ago in Mesoamerica, and it is known for being one of the most successful accomplishments of plant breeding ever. In fact, during all its millennia of life, this plant has reached a degree of domestication completely unknown by the other cereals; indeed, if

[93] Massimo Livi Bacci, *Storia minima della popolazione del mondo* (Torino: Loescher Editore, 1989), 67.
[94] Ibid., 66-67.
[95] Robert Forster and Orest Ranum, ed., *Food and Drink in History*, Annales, vol. 5 (Baltimore and London: The Johns Hopkins University Press, 1979), 18.
[96] Foster and Cordell, ed., *Chilies to Chocolate*, 60.
[97] Luigi Messedaglia, *La gloria del mais e altri scritti sull'alimentazione veneta* (Vicenza: Angelo Colla Editore, 2008), 31.
[98] Ibid., 38.

today a maize kernel falls to the ground, it is nearly impossible that it will survive and reproduce. To understand how this is possible, it should be first known that the ancestor of maize is *teosinte,* which, contrary to maize, is still able to reproduce itself in the wild Mexican, Guatemalan, and Honduran lands. However, the fact that teosinte is totally different from maize made many scientists believe that the evolution from the ancient to the "modern" plant was the result of human intervention, which is likely to have started with ancient Mesoamericans. This domesticated plant was responsible for the foundation of some of the greatest cultures of history, such as the Aztecs, Mayas, and Incas.[99]

Once Columbus reached the New World, maize was popular in most of continental America and in the Caribbean islands. In fact, the many varieties of maize created by the native Americans led this plant to be suitable to the diverse agricultural situations of the entire continent, up to North America. In fact, in the North maize played a major role for indigenous societies, and it was also a matter of survival for the English colonists: it was thanks to maize that the Mayflowers Pilgrims and the first settlers at Jamestown in Virginia survived the harsh winters of the New World.[100]

The history of how maize spread throughout the world is not precise. However, what is for sure is that some positive characteristics of this plant made its adoption by Old-World farmers easier than that of the potato. This was helped by the fact that Europeans considered maize a cereal and, thus, regarded it as less suspicious than other exotic plants (such as the potato, indeed) and treated it as something familiar. In addition to this, its growing season, much shorter than that of grain, its high caloric value per unit of land – which makes it the most productive and nutritious cereal of all –[101] its high productivity, taste, and adaptability to grow on marginal lands, convinced the European population to include it in their diet and to continue its breeding to find the perfect variety for cultivation in local soils.[102] Also, the dense layers of husk and the thick clustering of kernels protect the plant and make it perfect for storage. Lastly, thanks to its adaptability to different climates and soils, maize could restore the productivity of the lands considered out of use.[103]

Before maize diffused in Europe, it was studied in the botanical gardens of France and Italy, as well as in the private garden of the king of Andalusia. In Spain, maize arrived in 1510, in Portugal in 1520, and in 1523 it made its first appearance in France. Depiste the Spanish being the first to grow the New World plant, at the beginning they did not fully appreciate it; the Hispanic world had a negative image of maize because, in the New World, it was associated with human sacrifices. By contrast, the

[99] Foster and Cordell, ed., *Chilies to Chocolate*, 47-51.
[100] Ibid., 53-54.
[101] Jerry H. Bentley, Sanjay Subrahmanyam, and Merry E. Wiesner-Hanks, ed., *The construction of a global world, 1400-1800 CE: Patterns of change,* The Cambridge World History*,* vol. 6, pt. 2 (Cambridge: Cambridge University Press, 2015)*,* 119.
[102] Foster and Cordell, ed., *Chilies to Chocolate*, 55.
[103] Ibid., 48.

exotic cereal had more success in Milan, at the time under the Spanish, which realized that this part of Italy was more suitable for maize cultivation than Spain, thanks to its more irrigated soils.[104]

The experiments of Milan in maize cultivation attracted the interest of Venetians, which were going through an unlucky period in their glorious history. In fact, the 1453 fall of Constantinople and the discovery of the New World had been crucial in determining the end of the previous maritime and commercial power: the international focus had shifted elsewhere. If foreign merchants were no longer interested to do business with Venice under the same conditions as before, the Orient, too, was not treating the Republic as once, and it increased the price of cereals that Venetians used to import in great quantities. In trying to tackle these obstacles, Venice changed course and bought some lands in the surroundings of its lagoon to start with a new political and economic strategy. It is at this point that the former maritime Republic decided to grow the new cereal everyone was talking about. By the end of the 16th century, maize production spread in Venice and beyond its borders, to reach the neighboring regions during the following century.[105]

Maize conquered the trust of Italian families, especially the poorest ones, in the form of polenta. Although maize may be the first cereal that comes to mind when thinking about polenta, it should be remembered that previously this recipe was already popular and was made with lower flours, legumes or even chestnuts, and had long been the meal of farmers. However, once it was realized that maize made delicious polenta, the other varieties of the dish were almost forgotten.[106] While maize flour was used to cook polenta in Italy, in France it was used to make the popular "millas", and in Romania to cook the "mamalinga".[107]

The new plant encountered a few obstacles in its path of diffusion. Indeed, if one considers the fact that farmers had had the same diet for centuries, the arrival of exotic and suspicious food could rarely be welcomed with open arms. To give an example, in the County of Gorizia, some documents report the existence of maize in the middle of the 16th century. Nonetheless, the first records of the plant in the market lists of the county appeared only in 1602, while in Udine in 1620: this shows that, in the case of Friuli, it took over half a century to integrate maize into people's diets.[108] Another Italian example can be found in the South of Italy. It might be deduced that the introduction of maize in this part of the peninsula, at the time governed by the Spanish, occurred in the first decades of the 16th century, given the continuous relations between Spain and Southern Italian ports. This, however, does not mean that maize was immediatly welcomed in the region. In his book *La gloria del mais*, Luigi

[104] Alessandro Giraudo, *Storie straordinarie delle materie prime* (Torino: add editore, 2019), Kindle edition, 138-139.
[105] Messedaglia, *La gloria del mais*, 103-105.
[106] Ibid., 151.
[107] Giraudo, *Storie straordinarie,* 140.
[108] Messedaglia, *La gloria del mais*, 170-171.

Messadaglia explains that to find some references to maize in official records one must wait until 1687, when the plant appeared in the market lists of Castelvetere (today Caulonia). In Avellino and Benevento, in Abruzzo and Basilicata, one will have to wait until the first decades of the 18th century. Finally, only at the end of the 18th century, maize gained popularity in the South of the Italian peninsula,[109] while in the same century, in the North, maize polenta appeared at the tables of nobles.[110] As usually happens, there must be some drastic event for people to open their minds and embrace innovations. In fact, it is no coincidence that maize cultivation greatly and rapidly increased in Italy after the famine of 1764: the rise in the price of grain encouraged the consumption of this nutritious cereal.[111] In the Venetian surroundings, the qualities of maize were already considered useful in dealing with famines, as evidenced by an 1883 writing reported by Messedaglia about the use of maize in Treviso to face the 1612 famine.[112] Nonetheless, the peak of maize consumption occurred after the crisis of subsistence of 1816 – the year without summer –: after this event, maize replaced grain.[113]

However, the success of maize soon faded with the advent of a new disease: the pellagra. As is well known today, maize is poor in niacin, and a deficit in this vitamin (which is part of the B vitamins) is directly connected with the incidence of this terrible disease, characterized by symptoms that range from weakness, neurasthenia, dermatitis – pellagra is known for causing yellow skin –, diarrhea, and dementia, to death.[114] In Europe, the increase in the cases of pellagra followed the increase in consumption of the cereal: Italy, Spain, France, and other Eastern European regions were hit by the disease. In Spain, pellagra appeared probably in the late 17th century, while in Italy, it struck the poorest during the 19th century, when the latter began to depend totally on this cereal because of the conditions brought by the Napoleonic wars, and climatic conditions: it spread especially in Veneto, Lombardy, and Emilia, and on a smaller scale in Marche, Umbria, and Tuscany.[115] It is interesting to notice that in the South, where maize did not manage to win people's trust, pellagra never arrived. In Italy, the disease became a national problem in the second half of the 19th century and disappeared only in the first decades of the last century.[116]

Although abuse of maize could cause pellagra, at the same time, the integration of this cereal into the diet of Europeans was responsible for a rapid increase in the population. Together with potatoes,

[109] Ibid., 219.
[110] Ibid., 152.
[111] Ibid., 219.
[112] Ibid., 169.
[113] Massimo Livi-Bacci, "Fertility, Nutrition and Pellagra: Italy during the Vital Revolution," *The Journal of Interdisciplinary History 16,* no. 3 (Winter 1986): 441, https://www.jstor.org/stable/204498.
[114] Ibid., 431.
[115] Ibid., 411.
[116] Ibid., 443.

maize played a consistent role in the sudden demographic growth occurring by the mid-1700s. To give some examples, during the 18th century, Spain doubled the number of its inhabitants, while the Italian population grew from eleven to eighteen million people.[117] In fact, thanks to its high level of productivity, the famines that struck the continent after the wars and the extreme climatic events of the 18th century had less dramatic effects on the population.[118]

1.4 The Little Ice Age, the potato, and maize: final remarks

To conclude, this chapter has explained the diffusion of two relevant crops, potatoes, and maize, during – and in a way thanks to – the Little Ice Age. Although the climatic crisis has not been considered a direct cause of the spreading of the two plants, the LIA has been interpreted here as a catalyst for some transformations that were occurring during this period. In particular, it has been shown how the extreme climatic events of the LIA were responsible for provoking huge damages to European agriculture, resulting in successive bad harvests that forced the population to find new alternatives to the old rural traditions. It was in this same period that the potato and maize were brought to the Old World through the Columbian Exchange. Potatoes struggled more to defeat prejudices, but once realized their potential, the European population gladly integrated them into their diet; for maize, it was easier, as people recognized its resemblance to other cereals and treated it as something familiar.

The two plants have many characteristics in common, relevant for the role they had during the Little Ice Age: they both came from the New World, they can easily adapt to European conditions, and, most importantly, they have a high-calorie value and are highly productive. However, as is usually the case with novelties, it took some time before people fully integrated potatoes and maize into their diet, or before they realized that they could be an alternative to wheat. The LIA accelerated the process that saw Europeans reduce their dependence on old cereals and welcome the two new plants. The peak spread of maize and potatoes occurred mainly after periods of famine caused by the rise in the price of wheat – partly due to climatic disturbances. This has saved the lives of thousands of people and has even been one of the causes of the population explosion in Europe between 1750 and 1850.

[117] Langer, "American Foods," 59.
[118] Giraudo, *Storie straordinarie,* 139.

2. THE HISTORY OF COFFEE, TEA, AND COCOA: FROM LUXURY TO A WIDER CONSUMPTION

Around the same period as potatoes and maize, other exotic goods arrived in Europe. Coffee, tea, and cacao have been grouped under the category of tropical stimulant beverages. They differ from the two food staple crops in many ways: contrary to the potato and maize, they can only be cultivated in the tropics (or sub-tropics) and thus they are impossible to grow in great quantities in Europe, a characteristic which led to some profound historical and economic consequences worldwide. Secondly, coffee, tea, and cocoa do not have the same nutritional value as the other two crops, and consequently, they fulfilled a different function from that of nutritional alternative to grain during the Little Ice Age's famines – although they did help workers to reduce the feeling of hunger. Consequently, these factors imply that, besides the historical period, coffee, tea, and cocoa have no solid connections with the Little Ice Age – at least for the purpose of this research. Instead, this chapter analyzes the historical and economic dynamics that enable the relationship between the three beverages and global warming and prepares the ground for a detailed explanation in the next chapter. The role the three global goods performed when they first arrived in Europe was that of luxury commodities: they took the place of the precious spices, which until then were at the origin of the European leading states' profits. For this reason, understanding the history of spices is also important to explain the history of coffee, tea, and cacao, both because in this period they also fell into the category of luxury goods and because the spice trade paved the way to discovering those roots and countries that would become the theater of a new era of global trade, where coffee, tea, and cocoa played an important role. Indeed, the demand for these luxury drinks increased so much that the consequent decrease in price made them available to the lower classes. In this context, coffee, tea, and cocoa contributed to enabling a new conception of consumption, the modern one.

2.1 The first luxury goods and European colonialism

As already argued, the context in which luxury goods arrived was of transformations, also resulting from the new and more solid interactions between Europe, Asia, and the Americas. From the late 16th century and the early 17th century, in many parts of the world the centralization of political power empowered governments in Asia, Europe, and Africa to the detriment of aristocrats, warlords, and other executive figures whose previous independence diminished the power of the central

authority.[119] The result was that the novel centralized governments engaged in new missions in foreign lands, which, in the case of Europe, laid the foundations for overseas colonial dominions.

In a period where spices were as valuable as gold, Europe financed expeditions that aimed at reaching the Indies, the Land of Spices. Two factors rendered these missions possible: firstly, the competitive atmosphere pushed governments to create strong alliances with the economic elites, such as commercial firms, investors, or lending institutions that could finance such operations. Secondly, the "military revolution" the leading European states underwent empowered the military capacity of the commercial powers and proved essential for the dominion over the Indies.[120]

Since the mercantilist policies pursued by European governments aimed at controlling the spice trade – and since the Americas had not been discovered yet –, the first reasonable route to take was across the coasts of Africa, aiming at circumnavigating the continent to arrive in the Indian Ocean. During the 16th century, the Portuguese and the Spanish established on the coasts of this ocean, while the English, Danish, French, and Dutch set up their trading posts in the 17th and 18th centuries.

In other words, during the 16th, 17th, and 18th centuries, the control of the spice trade was the cause of great competition between the leading states of Europe. However, one might wonder why spices attracted Europeans so much to finance dangerous missions and risk the lives of some of their best navigators, merchants, and other authoritative figures. What is studied at school as "the age of discovery", is much more than simple curiosity and spirit of adventure: the courage and heroism of the explorers were fed by a great economic mechanism dictated by the purchase of some exotic luxury products that would have allowed a considerable profit to the state. Thanks to profits such as the spice trade, the coffers of European states could finance the wars they had waged in Europe.[121]

In other words, spices became the protagonists of the European food system. At the time, physicians believed that the "heat" of these products could support the digestive process, and this led to an increase in the use of spices among the wealthy, which dusted them on foods or consumed them at the end of meals, often accompanied with spiced wines.[122]

It might not be clear yet why spices were desired to such an extent to be even considered luxury products, since they are neither healing nor nutritious: indeed, as luxury products in general, they do not have any essential function, at all. To explain why mankind had been longing for spices for so long, it should be first clarified what the concept of luxury entails. Luxury products – which as we

[119] Charles H. Parker, *Global Interactions in the Early Modern Age, 1400-1800* (New York: Cambridge University Press, 2010), Kindle edition, 14.
[120] Ibid., 16.
[121] Francesco Antinucci, *Spezie: Una storia di scoperte, avidità e lusso* (Bari: Gius. Laterza & Figli, 2014), Kindle edition, position 50-57.
[122] Massimo Montanari and Françoise Sabban, ed., *Storia e geografia dell'alimentazione_1* (Turin: UTET Libreria, 2006), 259.

have argued are almost useless – are the object of desire because they represent and reproduce a highly desirable image of the man who owns them: they represent a status symbol, and this means that only a few can possess them, and those who do are at the top of the social ladder.[123] Luxury goods are rare, distant, and very expensive. Moreover, in the case of spices, the magical aura that the East emanated in this period increased their value even more; someone even believed that they came from the earthly paradise.[124]

Nonetheless, the history of luxury goods began even before the Crusades or the Middle Ages. In Ancient Rome, luxury was represented by precious stones and materials, perfumes, and spices. These wares arrived from the Orient and passed through the port city of Alexandria – conquered by the Romans in about 50 BC – where the greater commercial traffics went through, to end in the richest houses of the Roman Empire.[125] When Constantinople became the capital of the empire in 400 AD, it joined Alexandria as the leading city for the distribution of spices from the East.[126] Then, history changed, empires fell, and new powers arouse, but luxury never stopped. In 1200, Venice built its empire on the wealth derived from the trade in luxury goods, of which it now had a monopoly.[127]

One of the wares the maritime Republic bought from the East was pepper, which is considered the most desired spice in history, from the times of Ancient Rome until Venice and beyond.[128] Even though pepper has no particular function, its high value implied that only one journey was enough to make huge profits. Like other luxury products, it was yearned for its symbolic value: richness, power, and, thus, social status. Pepper, as well as other spices, was the cause of long voyages to the East that Europeans had financed for more than one thousand five hundred years.[129]

The Portuguese replaced the Venetian Republic in the spice trade. With the information provided by Henry the Navigator (1394-1460) – the Portuguese prince who set up the plan for reaching the Indies through Africa – and by Bartolomeu Dias – the first to round Africa and to "discover" the Cape of Good Hope –, Vasco da Gama circumnavigated the African continent and arrived in Calicut in 1497. Then, he returned to Lisbon with his vessel full of spices.[130] This voyage of discoveries led to the conquest of Hormuz, on the Persian Gulf, Goa, along the Malabar coasts, Macao, and Malacca, in today's Malaysia. The Portuguese introduced a new principle of power in the Indian Ocean, where the sea had never belonged to any sovereign state before. Through armed commerce, Portugal

[123] Antinucci, *Spezie*, position 94-290.
[124] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 259.
[125] Antinucci, *Spezie*, position 94-290.
[126] B.G. Stone, "The spice trade," *Journal of the Royal Society of Arts 112*, no. 5097 (August 1964): 705, https://www.jstor.org/stable/41367670.
[127] Antinucci, *Spezie*, position 94-290.
[128] Ibid., position 608-766.
[129] Ibid., position 94-290.
[130] Stone, "The spice trade," 705.

organized its presence in Asia with two main institutions: "Casa da India" and "Estado da India". The first was a commercial enterprise headed by Lisbon that established a monopoly over the principal Asiatic imports, such as pepper from Malabar, cinnamon from Ceylon, and other luxury spices from the Moluccan Islands. The second, instead, was the political and military organization that run the Portuguese commercial empire.[131]

Portugal was imitated by Spain, England, Holland, and France. Sponsored by Spain, in 1519, the explorer Ferdinand Magellan managed to complete what Christopher Columbus tried to do and reached the East Indies going westwards; however, the Spanish success was soon over with the famous defeat of their Armada in 1588. In 1577, Francis Drake successfully followed the route taken by Magellan: this encouraged the English Crown to finance a series of expeditions that culminated with the decision to create the English East India Company (EIC) in 1600. Meanwhile, the Dutch, too, set up the Dutch East India Company (VOC) in 1602.[132]

The VOC was a private company under the control of the state, which had sovereign powers over the territories it occupied; it was also assigned the monopoly of commerce over the area between the Cape of Good Hope and the Magellan Strait. The VOC acted as a strategic agent both politically and commercially speaking, for being able to put together the functions of the state with those of a capitalistic enterprise. This was possible also thanks to the military improvements that allowed the Company to impose its power in the East Indies to ensure its profits. After various attempts to defeat the Portuguese empire, the VOC built its empire headed by Batavia (now Jakarta) and established trading and military posts in Java and Celebes. Where Portugal failed, the Dutch Company gained a monopoly over the production of spices in the Moluccan islands. The Dutch were also the only ones able to develop trading links with Japan, which was important for its silver reserves, in a period when the lack of means of payment was a problem for the entire European commerce. The last phase of the VOC expansion was after the Thirty Years War when it took Ceylon from the Portuguese and strengthened its African colony.[133]

Meanwhile, the British were trying to establish their autonomous commerce with the Indies. After the creation of the English East India Company, the English Crown obtained the monopoly over the imports from the Indies, as well as the right to export silver, which was an essential requirement for trading in the Indian Ocean. The EIC was a real joint stock company, but it lacked the political and military support from the state that the VOC had. The profit from pepper, the ware they first imported from the Indies, was decreasing, and the EIC decided to diversify its imports by furnishing the English

[131] Paolo Capuzzo, *Culture del consumo* (Bologna: il Mulino, 2006), 28-29.
[132] Stone, "The spice trade," 705-706.
[133] Capuzzo, *Culture del consumo*, 30-31.

market with tissues, such as sink, and indigo. The broadening of its commerce encouraged the EIC to build some strongholds in the Indian subcontinent, which led to conflicts with the Portuguese. The 1651 act of navigation drew the mercantilist order of English commercial politics and allowed imports from extra European countries only via English ships. By the late 17th century, armed commerce became the cornerstone of the English commercial strategy: by then, the EIC had set up trading posts in Bombay, Madras, and Calcutta, which would be crucial for the successive colonization of the peninsula. Charles II proclaimed Bombay the first city under the EIC administration, and it became the capital of the English presence in India. At this point in history, a great part of the English population was involved in the businesses of the Company.[134]

With regard to the French, the attempts by Jean-Baptiste Colbert in the Indies did not achieve significant results. In fact, the French presence was felt in Asia only in the second half of the 17th century, when the VOC and the EIC were already too powerful. Moreover, the interests of the French commercial bourgeoisie did not permeate the political structure of the country, as happened in the case of Holland and England. This does not mean however that France was left out of the afflux of exotic products; indeed, it absorbed more than one-third of the Dutch imports.[135] Anyway, France had more success on the American continent.

Finally, in the 17th century, the mechanism that had ruled European cuisine for centuries, dictated by the use of spices in every recipe, underwent some radical changes. When everything seemed to be going well, the huge amount of pepper arriving back from the 1603 English commercial expedition remained unsold. What happened was that European imports had increased so much that pepper was no longer so exclusive and rare as it was in the past. This triggered a decline in the price of the spice that allowed the lower classes to buy it: pepper lost its prestigious position in the market. The Dutch, which by then were at the head of the spice trade, thought well to focus on other spices, such as the clove and the nutmeg. However, the fall of pepper provoked some consequences that applied to the entire European cuisine: as Francesco Antinucci explains in his book *Spices: A history of discoveries, avarice, and abundance*, one spice did not function if taken alone, and it must be considered within the symbolic system linked to the mechanism of cooking. Due to the new popularity of pepper and its removal from the sophisticated meals of rich people, this "code" – that is, cooking – changed; consequently, ingredients and flavors had to change with it. Spices were outdated, and the new culinary system did not include them.[136]

[134] Ibid., 32-34.
[135] Ibid., 34-35.
[136] Antinucci, *Spezie*, position 1444-1485.

2.1.1 The discovery of America and the slave trade

In a sense, the spice trade might be considered responsible for the discovery of America. If at first the primary way to achieve commercial power involved the circumnavigation of Africa, the discovery of the New World changed perspective and revolutionized European and world trade. In an atmosphere of high competition against the Portuguese, Spain did everything possible to find routes to the Land of Spices.[137] The three ships captained by Christopher Columbus, a Genoese mariner sponsored by the Catholic Monarchs of Spain, crossed the Atlantic in an attempt to reach Asia by sailing west. After the famous mariner dropped anchor off the coast of Hispaniola, for the following twenty years Spain thought that Columbus had accomplished his mission: the discoverer even dubbed the indigenous Arawak as "Indians". When the Spanish realized that those lands were not the Indies, they opted for a new strategy consisting of pure control of those lands and their inhabitants.[138] In this "new" side of the world, a new economic dynamic was about to develop, directed towards the conquest of local wealth and, later, the production of the luxury goods most desired by the European elites.[139] Unlike Asiatic trading posts, the European settlements in the New World were stable. During the 16th century, the Spanish occupied Peru, Mexico, and the Caribbean islands, while the Portuguese settled in Brazil; a century later the French and English established their colonies in North America and, later, in the Caribbean.[140]

The relationship between European states and their colonies overseas was of a pure colonial kind. In search of riches and treasures, the colonizers pillaged everything they found; their military superiority and their religious fanatism revealed extreme violence that brought to a total detriment of the native social and economic institutions. By the mid-1500s, the population of the Caribbeans had nearly disappeared, also due to the diseases "imported" from the Old World. The Spanish, that were interested in mines, created a labor system based on the exploitation of African slaves for the extraction of precious stones. The English, instead, settled in Barbados and Jamaica in the mid-17th century and created the first sugar cane plantations. In 1740, 90 percent of the Jamaican population was constituted of African slaves, while the rest were whites. In general, the decimation of American natives saw a decrease in the number of inhabitants from forty to thirteen million people in two hundred and fifty years.[141]

[137] Ibid., position 1113.
[138] Parker, *Global interactions*, 28-29.
[139] Ibid., 19.
[140] Ibid., 35.
[141] Ibid., 36.

The system of plantations was characteristic of the tropical regions of America, and a symbol of the New World. In fact, the sole aim of plantations was the production of tropical goods for exportation to the Old-World urban markets: the tropical climate was suitable to cultivate products such as sugar, coffee, and cocoa. In contrast, the climate in New England was more favorable to the cultivation of European crops, which supported the expansion in the production of goods that served to feed the growing European working classes – including wheat.[142] As highlighted in the previous chapter, the decision to move the cereal cultivation process abroad was a solution to the problems relating to cereal crops tested in Europe.

While the American indigenous population was rapidly dying under the power and violence of the invaders, the European leading states increasingly needed a strong labor force physically able to work in plantations, especially in tobacco and sugar ones. The decision to buy slaves in Africa led to the establishment of the Atlantic slave trade. The process of this triangular trade mainly consisted of three steps: Europeans charged their ships with iron, pearls, clothes, spirits, gunpowder, and muskets, sailed to the western African coasts, and, once there, tried to gain the support of local powers to trade their wares with slaves.[143] Generally, in the 17th and 18th centuries, there were two ways in which Europeans conducted the purchase of slaves: the first was a "shipboard trade" and consisted in anchoring their vessels off the African coasts and commerce with slave merchants either on board or near the ships; the second is the "factory trade", and allowed Europeans to set up small colonies on the coasts to run the trade, while merchants, soldiers, and supervisors permanently stayed in Africa to guard the colony.[144] Once the ships were filled with slaves, they headed west to America, where Africans would be exchanged for products that had to be exported to Europe, such as brown sugar, cocoa, coffee, rum, and cotton.[145] The slave trade was facilitated by the fact that both the selling of slaves by the locals and their transportation to America were legal. The only colony different from the others was Angola, founded in 1575 by Portugal, where the Portuguese had to actively combat for capturing slaves.[146]

Between the 16th and 19th centuries, the transatlantic slave trade was responsible for the importation of eleven million African slaves to America. However, recent studies estimate that the number of slaves that left the coasts of Africa in these centuries is between thirteen to fifteen million, despite a

[142] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 426.
[143] Capuzzo, *Culture del consumo*, 38-39.
[144] John Thornton, "The slave trade and the African diaspora," in T*he Cambridge World History – The Construction of a Global World, 1400-1800 CE: Part 1, Foundations,* ed. Bentley, Subrahmanyam and Wiesner-Hanks (Cambridge: Cambridge University Press, 2015), 139.
[145] Capuzzo, *Culture del consumo*, 38-39.
[146] Thornton, "The slave trade," 140.

great part of them dying on board.[147] In the 16th century, the countries of destination included Cuba, Puerto Rico, Santo Domingo, the Antilles, and Mexico; at the end of the 17th century, 50 percent of slaves were headed to Columbia, and, later, to Venezuela for cacao cultivation. With regards to the English West Indies, almost two million slaves arrived in Jamaica and Barbados, and half a million in the thirteen colonies of the North. In the French colonies, slaves were divided between Santo Domingo, Martinique, and Guadeloupe to work especially in plantations of sugar, coffee, and cacao.[148] It is widely acknowledged that African slaves outnumbered Europeans in every region of the New World, apart from North America.[149]

In short, as Europeans colonized the continent, the American colonies turned into markets for the exportation of goods to the Old World. The first product to inaugurate the economic dynamic of production for exportation was sugar, whose history, however, does not begin in America but is as ancient as the history of spices.

2.1.1 Sugar

Sugar was grown in India more than four thousand years ago. Under the order of the Persian emperor Dario I (510 BC), farmers cultivated sugar cane to produce a sweet and dense syrup that was dried on big leaves to crystallize. The syrup could be used as a preservative for other foods or to enrich the royal tables.[150]

In 360 BC, Europeans came to know about the existence of sugar thanks to Alexander the Great. Nearchus, one of the emperor's best navigators, talked of sugar as a plant capable of producing honey without the involvement of bees. The physician-botanist Pedanius Dioscorides also described the plant as like honey but with the consistency of salt, and suggested its consumption to heal the stomach, intestine, kidneys, and bladder. However, neither the Greeks nor the Romans really appreciated sugar and continued to consume honey – this was also because sugar was very expensive.[151]

In China, India, and Southern Persia, sugar was commonly cultivated, and sugar loaves were prepared for commerce through improved refining techniques. In Palestine, Syria, and along the Nile in Egypt, too, refineries and big mills turned such regions into quite advanced areas for sugar production. Slaves were forced to cultivate the plant under harsh conditions, and this provoked some rebellions, such as a nearly fifteen-years revolt (869-883) of black slaves Zani, in the region of Basrah. Meanwhile, sugar

[147] Ibid., 144.
[148] Capuzzo, *Culture del consumo*, 38-39.
[149] Thornton, "The slave trade," 135.
[150] Giraudo, *Storie straordinarie,* 98.
[151] Ibid., 99.

cane began to be cultivated also in the Arab-Andalusian kingdom in Southern Spain. Little more than a century later, the crusades triggered an increase in the demand for sugar after Christians started to appreciate the precious good in Orient: its cane began to be planted in Cyprus, Crete, Malta, and Sicily.[152]

Both Venetian and Genoese merchants realized the potential of sugar and gained a monopoly over the "Arab salt". Venice and Genoa imported sugar from the Levant and diffused it to Northern Europe. In this period, Venice could boast of having the first refinery in Europe: from 1305 to 1350, ships carrying the precious ware arrived in its ports from Cyprus, Syria, and from the geographical region between the Tigris and the Euphrates.[153] This resulted in the further development of commercial relations between Europe and the Near East. However, after the conquest of Constantinople in 1453, this trade was hindered by the Turks' expansion: by the end of the 15th century, the Orient no longer sent sugar to Europe. However, the sweet taste of the "spice" had spread throughout Europe, and sugar refineries multiplied in Sicily over the 16th century to satisfy the increasing demand, while in Spain plantations were active since the 15th century for the exportation to Northern European countries.[154]

The first colonies exclusively dedicated to sugar plantations were Madeira and the Azores. The two groups of islands were "discovered" by Prince Henry the Navigator, who bumped into these lands at the beginning of his voyage through the Atlantic coast of Africa. The prince colonized and exploited the climatic conditions of these islands to produce sugar, whose demand was skyrocketing.[155] Besides establishing the first colony dedicated to sugar plantations, Prince Henry the Navigator bought African slaves for plantation labor: he was laying the foundations of the translatlantic slave trade.[156]

In the 16th century sugar was the most important exotic product sold by European grocers. If before it was only available in pharmacies as medicine, once its use was extended to cooking, the sweetener became a primary ingredient for new sugary foods and multi-story cakes of the richest tables in Europe.

After "discovering" the New Continent and understanding how to make the most of the Caribbean lands, Spanish settlers took sugar overseas to meet growing demands. However, the first experiments on sugar production were almost disappointing, as the native Arawak were not easy to coerce into plantation labor. The production issues that plantation owners were facing increased with the growing number of deaths among the indigenous population; in addition, the discoveries of gold and silver

[152] Ibid.
[153] Ibid.
[154] Jean-Luis Flandrin and Massimo Montanari, ed., *La storia dell'alimentazione* (Roma-Bari: Gius. Laterza & Figli, 1997), 490.
[155] Antinucci, *Spezie*, position 975-993.
[156] Capuzzo, *Culture del consumo*, 27.

mines shifted the attention of Europe away from Caribbean islands, at least until the mid-17th century, when almost all these lands were transformed into sugar plantations by European planters.[157]
In the mid-1600s, the English settled in Barbados and Jamaica, where the creation of sugar plantations became a symbol of these islands. Saint Domingue boasted thirty sugar mills; some years before sugar factories were built also in Mexico and in many other parts of Spanish America. However, the Spanish never became great exporters of sugar; by contrast, the Portuguese specialized in this: they multiplied their plantations in Brazil and sent sugar to Lisbon and Antwerp, which took on the role once held by Venice as the main center of refineries and distribution.[158]
Sugar remained a luxury product until the second half of the 17th century when it passed from being taken as a medicine, spice, and preservative to being consumed as a sweetener.[159] As happened with other spices, the decline in the symbolic importance of sugar occurred as it spread among the lower classes. Its diffusion as a sweetener is also linked to the European infatuation for the three beverages which were taking over the role of luxury goods: coffee, tea, and cocoa.[160]

2.2 The advent of luxury beverages: coffee, tea, and cocoa

In the 17th century, coffee, tea, and cocoa replaced spices in the European hall of fame of luxury wares. The three beverages arrived on the continent in the form of exclusive drinks, from Asia and the New World, those distant lands explored and colonized by Europeans, where these goods had been part of the local culture for thousands of years.
Being the concept of luxury entangled with elements of moral, religious, economic, social, and political nature, it is no surprise that many viewed luxury goods as corrupters of public morality, and this was the cause of an animated debate throughout the 17th century. In fact, it should be remembered that the historical context of Europe's explorations was also that of the Reformation, Puritanism and Pietism, which demanded a strong personal ethic and morality that could not but despise the diffusion of such stimulant substances.[161] For this reason, they have been often prohibited and taxed.[162]
However, against this religious background, scientific inquiry, reasoning, and experimentation were replacing transmitted knowledge: the most affected sciences were botany and medicine. In the context

[157] Parker, *Global interactions*, 29.
[158] Capuzzo, *Culture del consumo*, 36.
[159] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 427.
[160] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 492.
[161] Rudi Matthee, "Exotic Substances: Introduction and Global Spread of Tobacco, Coffee, Cocoa, Tea, and Distilled Liquor, Sixteenth to Eighteenth Centuries," in *Drugs and Narcotics in History*, ed. Roy Porter and Mikuláš Teich (Cambridge: Cambridge University Press, 1995), 24.
[162] Marcello Carmagnani, *Le isole del lusso: Prodotti esotici, nuovi consumi, e cultura economica europea, 1650-1800* (Turin: UTET Libreria, 2010), 4-5.

of the new medicalization of society and theories on the working of the human body, coffee, tea, and cocoa drew the attention of botanists and physicians, who attributed to them interesting healing powers.

2.2.1 Coffee

Around 500 BC, coffee berries were grown in Ethiopia. They were smashed, kneaded with salt and fat, and then, the resulting blend was baked and consumed as a special bread which, being full of caffeine, gave strength and resistance to those who ate them, such as the militaries.[163] From Ethiopia, coffee spread to Yemen, and from its port city, Mocha, to the Middle East; around 1510, it arrived in Cairo.[164]

In the Ottoman Empire, Muslims came to know coffee after the conquest of Mesopotamia. Here, coffee was considered a medicine, with a powerful effect on the digestive and cardiovascular system: in the Muslim pharmacopeia the drink played a prominent role, to the point that the Ottoman sultans even invented the "coffee's officials", the owners of slaves in charge of preparing the beverage for their superiors.[165]

In the Muslim world, coffee diffused especially thanks to the pilgrims visiting Mecca every year. In Damascus, the first coffee house was inaugurated in 1530, while in Istanbul, the first shop was opened by two Syrian merchants in 1555: in a few years, the city counted more than five hundred coffee shops. The dependence on this substance was increasing so much that Muslim men went to these spaces instead of attending the mosque, the reason why coffee was banned for some time. However, when its legality was restored, coffee became the national drink of the Turks; it was so fundamental for women that it could be a cause for divorce, especially if husbands forgot to prepare their daily cups of caffeine.[166]

The first European to drink coffee might have been the German physician Leonhard Rauwolf, who tasted it for the first time in Aleppo, in 1573. Only twenty years later, his Italian colleague Prosper Alpinus wrote about coffee in his herbal treaties. However, its first appearance in Europe occurred thanks to the Venetian and Armenian merchants, who brought it to Italy and France from Istanbul and Cairo.[167] As happened with sugar, the Venetian and Genoese merchants did not miss the opportunity to buy some fresh coffee beans to grow on their own: the price of roasted coffee was very

[163] Giraudo, *Storie straordinarie,* 165.
[164] Matthee, "Exotic Substances," 27.
[165] Giraudo, *Storie straordinarie,* 165.
[166] Ibid., 165-166.
[167] Antinucci, *Spezie*, position 1747.

high and could be sold only to the Church, rich people, and European courts. The first shipping of coffee arrived in Venice in 1615 after the traveler and writer Pietro della Valle, fascinated by the Orient, arouse the interest of Italians through some letters, published by one of Pietro's friends, in which he described the qualities of this Oriental good. In a short time, the City of the Doges became the crossroad for the commerce of the beverage[168] and it sold it for the first time in 1640; some years later, the first European coffee house was inaugurated in its lagoon.[169]

In the following decades, several coffee houses opened throughout the Continent and became the meeting places where talks on politics, and philosophical and scientific debates took place. In Vienna, the beverage arrived after the defeat of the Turks, which had attacked the city for the second time: five hundred bags of coffee were left on Austrian lands during the retreat.[170] Paris inaugurated the Procope in 1672, the famous coffee shop where Thomas Jefferson and Benjamin Franklin enjoyed drinking coffee when they traveled to France.[171] The first English coffee house, instead, was opened in Oxford by a Greek merchant in 1650.[172] In Saint Mark's Square, the still-existing coffee house Florian opened in 1720: it was attended by famous personalities of the reach of Casanova, Madame de Staël, and Proust. The coffee houses-debates were very expensive for their interlocutors: to give an idea of the value of coffee at the time, in 1650 Parisian markets sold one pound of coffee at the equivalent of 2000 euros today; in London at 1500.[173]

The European demand for coffee was growing, and imports consequently increased through the maritime trade. London, Amsterdam, and Marseille became the main competitors of the Venetian Republic. Meanwhile, the provenance of coffee diversified.[174] The Dutch understood the potential of coffee and included it in the commercial activities of the East India Company; however, only in 1661, a decent amount of beans arrived in Holland.[175]

Before the advent of coffee houses, which turned coffee into a sociable beverage, Europeans treated the plant as a medical agent. Spice dealers and groceries sold coffee beans as a drug to help digestion, stomachache, respiratory issues, and against sleepiness. Since both Christian and Islamic medicine referred to Galenic medical notions, it is no surprise that Europeans attributed to coffee the same proprieties as the Persians and Arabs. For instance, in the 1600s, coffee was widely prescribed by English physicians as a cure for alcoholism: this quality, and the rumors about its anti-aphrodisiacal

[168] Giraudo, *Storie straordinarie,* 166.
[169] Matthee, "Exotic Substances," 27.
[170] Giraudo, *Storie straordinarie,* 166.
[171] Ibid., 170.
[172] Matthee, "Exotic Substances," 40.
[173] Antinucci, *Spezie*, position 1797.
[174] Giraudo, *Storie straordinarie,* 166.
[175] Matthee, "Exotic Substances," 27.

effects, guaranteed the Puritan approval of the exotic medicine. As a result, when coffee houses' owners inaugurated their activities, they encouraged people to drink coffee for its healing powers.[176] If on one hand coffee was conquering the wealthiest Europeans, on the other the properties of this excitement cocktail were turning on an important debate in the continent.[177] This debate unfold in a period of morality and religious impositions that attributed to the new drink characteristics of frivolousness that could distract mankind from maintaining a certain discipline. The threat to moral order made Europeans adopt some restrictive measures against coffee, as happened when the Ottoman sultan Murad IV closed all the coffee houses of its empire from 1630 to 1640.[178] Like in the Islamic empire, in Europe the opponents of coffee associated the exotic substance with attitudes of idleness; coffee houses were even believed to be spaces of sedition. For instance, after London was burnt in 1666, King Charles I suppressed the just-opened coffee houses, which according to his officials were dangerous because they fed some unwelcome political opinions. Surprisingly enough, the best supporters of this decision were women, who believed that their husbands drank too much coffee: they submitted a "Women's Petition Against Coffee" to show their concern for the side effects of the beverage. In fact, wives were convincing themselves that coffee caused disorder, both domestically and sexually speaking; they complained about their husbands being inactive and for the wasted time, and money they spent in these places where, besides, women were not even admitted.[179]

These beliefs seemed to not affect other countries in Europe, which, nonetheless, taxed coffee for other reasons. Beer brewers were preoccupied because the popularization of coffee could be the end of their activities. In France, for instance, the government imposed a tax and restrictions on this exotic drink. The same did the English from 1663 to 1689, after they, too, noticed a reduction in the consumption of beer in favor of the new cocktail. In Germany protests grew stronger: for a part of the 18th century, coffee was prohibited to protect brewers because its import could damage the sales of malt and barley. In some cases, the removal of such measures had to wait until the arrival of Napoleon.[180] On the other hand, in England, coffee became soon an ally of the bourgeois ethic of labor and of productiveness and a symbol of the culture of rationalism, which preached lucidity, freedom of thought, and sharpness.[181]

Coffee-growing countries were those colonies conquered by the same European leading powers that had monopolized the spice trade. Plantations of coffee were established in the Antilles by the French,

[176] Ibid., 31.
[177] Antinucci, *Spezie*, position 1754.
[178] Ibid.
[179] Matthee, "Exotic Substances," 36.
[180] Ibid., 37.
[181] Montanari, *Fame e abbondanza*, 156.

the Dutch, and the English. In 1714, Amsterdam offered Luis XIV a plant of coffee, the same seeds that in 1723 were carried to Martinique: from the French colony, coffee was then distributed in all the others, especially in Saint-Domingue.[182] This latter, yielded to France in 1697, became the most profitable colony of all history exporting coffee and sugar.[183] The English grew the first plant in Jamaica in 1723, while in 1714 the Dutch planted the first coffee seeds in Suriname from the botanical garden of Amsterdam.[184] In 1723, the wife of the governor of French Guyana offered a Portuguese official some little plants of coffee, which would be the mothers of those plantations that, in the 19th century, turned Brazil into the first world producer of coffee.[185] Regarding the East Indies, English, and Dutch merchants used to buy coffee in Mocha;[186] however, in 1707, the Dutch, unsatisfied with the Asian control of the coffee trade, pillaged a plantation in Mocha and transplanted the plant to Java, Sumatra (the Dutch Indies)[187], and Ceylon – before it was taken by the English.[188]
Sometimes, the conditions of exploitation of slaves had political consequences, as in the case of the Haitian revolution occurring from 1791 to 1804 in Saint-Domingue. Saint-Domingue became the first and only colony where a slave insurrection resulted in a national liberation: the French government was expelled, and the free Republic of Haiti was established.[189]

2.2.2 Tea

According to tradition, the consumption of tea in China dates back to 2737 BC.[190] The Chinese stored and transported the leaves of tea in the form of "tiles", which were modeled with vapor, dried, and pressed. Then, they were mixed with a small quantity of rice flour, animal blood (especially bovine), and sometimes even fertilizer, to compact the product. The image impressed on the tile could be of an animal, a temple, or a landscape and it differed depending on the variety of tea – green, white, or medicinal. After letting them rest in dry and windy places to make the leaves lose moisture, the tiles were transported to regions where tea was not produced. The infusion was considered stimulating both for the mind and for the body and was drunk during ceremonies.[191] Tiles were also used as

[182] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 496.
[183] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 428.
[184] Giraudo, *Storie straordinarie,* 167.
[185] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 496.
[186] David Grigg, "The worlds of tea and coffee: Patterns of consumption," *GeoJournal 57*, no.4 (2002): 286, https://www.jstor.org/stable/41147739.
[187] Giraudo, *Storie straordinarie,* 167.
[188] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 496.
[189] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 428.
[190] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497.
[191] Ibid.

currency and became widely accepted in Mongolia, Siberia, Tibet, and Turkmenistan, too. According to the Chinese government, tea necklaces could also be used to make a payment.[192]

With the Tang dynasty (618-907) tea became a fashion beverage and "tea houses" spread all over China.[193] Then, under the Song dynasty, this culture diffused at the agricultural and cultural level to the extent that the emperor Hui Zong is remembered as the "emperor of tea": indeed, despite being a terrible sovereign, he loved tea so much that he wrote a treaty on the twenty different varieties of the plant. Meanwhile, as Marco Polo reported in his writings, the old wooden bowls used to drink the infusion were replaced with the advent of the prestigious porcelain industry. Matteo Ricci instead described in detail the ceremonies of tea consumption and the difference between Japanese and Chinese tasting: the former were faithful to traditions and drank the foam of tea, while the latter began to drink it with sugar.[194]

The diffusion of tea followed the one of Buddhism, but the infusion was welcomed by other religions, too, (such as Ortodoxhy, Zen, and Taoism) for being a powerful ally of meditation, fasting, and wakefulness. For instance, in 641, when the royal Chinese princess Wencheng married the Tibetan king and moved to Lhasa, her entourage took Buddhism, tea, and silk to Tibet. The same happened to Japan in the 8th century, when the Japanese monks returned from China carrying religious texts and tea leaves.[195] In Korea, tea arrived in the 7th century; later, it spread to central Asia.[196] In Russia, it diffused when Tsar Michael I was given seventy kilos of leaves by the Mongol khan. In 1679, Russia signed a contract with China to import tea in exchange for its furs: the transportation cost increased the price of the beverage and made it available only to rich people. After Peter the Great had banned any relation with China in 1706, Catherine II of Russia relaunched the tea commerce: in 1796, it imported nearly half a million kilos of leaves every year on the back of camels. Meanwhile, in Siberia, the tiles were used as currency until the Second World War.[197]

Although Europeans had already read about tea from Marco Polo, they had to wait until the establishment of maritime companies to taste the infusion.[198] Japan was the first country from where ships loaded with tea leaves raised anchor towards Europe, at the beginning of the 17th century. Due to the Portuguese expeditions to the Extreme Orient, and its trading post in Macao, it is likely that the first to drink tea were the Portuguese, and it is highly probable that during the second half of the 16th

[192] Giraudo, *Storie straordinarie,* 154-155.
[193] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497.
[194] Giraudo, *Storie straordinarie,* 155.
[195] Antinucci, *Spezie*, position 1761-1770.
[196] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497.
[197] Giraudo, *Storie straordinarie,* 156.
[198] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497.

century, Lisbon was the first city to welcome a shipment of tea.[199] The princess of Portugal Catarina Henriqueta de Bragança, wife of king Charles II, introduced the British islands to the beverage:[200] when the English king saw his wife drinking tea for healing her cold in 1667, he ordered the English East India Company to import it from China. In 1678 the Company bought some tea in Java, where Chinese junks moored waiting to trade their wares. In Holland, instead, tea consumption was first reported in 1637, when physicians were accused of being paid by the Dutch East India Company to sell the exotic drink as full of exceptional qualities. In France, too, tea was drunk for its benefits: the French Cardinal Mazarin drank it to "protect himself from gout". Even the English owners of coffee houses advertised the luxury beverage as a drink suggested by every physician, while in Russia the alleged medical effects of tea encouraged its consumption before and after drinking liquor.[201] In short, as tea arrived in Europe, it was quickly appreciated by people for its therapeutic image, an image which lasted until today. However, in 1674, the infusion was still a luxury, and it was rare to find a merchant who sold it.[202]

The Church encouraged tea consumption, too, especially Calvinism and Puritanism, which considered the drink as the best solution against alcohol. Indeed, while alcohol was associated with the disorder and even with Satan, tea became the symbol of sobriety. Its reputation was the result of the proof that tea could not intoxicate, but, instead, could heal.[203] In England, the infusion was so appreciated that, at the beginning of the 18th century, coffee houses sold more tea than coffee, imports consistently increased, and consumption reached the lower classes. In France, instead, tea consumers were viewed as snobs, and in the 1700s, tea was still sold as a medicine. In Italy and Germany, the beverage was known only in literary and artistic circles.[204]

Unlike coffee, until the 1840s, tea came only from China because the Japanese had closed their borders from the rest of the world until 1853, and Korea ceased to grow it. Then, the English and the Dutch began to grow tea in their colonies in the East Indies: the first attempts succeeded in 1834 in Assam and in Ceylon in 1842;[205] meanwhile, the Dutch managed to acclimate the plant in Java in 1826.[206]

The British East India Company controlled tea imports from China to Britain.[207] The only problem was that the EIC had to pay China with silver, and its refusal to do so triggered the Opium Wars. To

[199] Ibid.
[200] Giraudo, *Storie straordinarie,* 157.
[201] Matthee, "Exotic Substances," 31.
[202] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497.
[203] Matthee, "Exotic Substances," 35.
[204] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 498.
[205] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 498.
[206] Grigg, "Tea and coffee," 287.
[207] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 429.

avoid hemorrhages of money, the British Crown had an idea that cost the lives of a large part of the Chinese population – whose country was already in decline –: tea began to be exchanged for Indian opium, and the deadly dependence of the Chinese on this drug led their government to declare war. In addition, tea may also be considered responsible for triggering the revolt of the thirteen English colonies in North America. To tackle its crisis of finances, London increased the taxation of goods imported from its colonies, especially on tea, and the EIC found itself with a great amount of unsold tea. Hence, through the Tea Act, the British authorized the Company to sell tea without applying any tax; this, in turn, resulted in a crisis for the American importers that in 1773 attacked three English ships full of leaves moored in Boston. These tensions led to the Independence War.[208]

2.2.3 Cocoa

Before the arrival of Europeans in Central America, the Aztecs and the Mayas had a particular monetary system: they exchanged goods with gold powder, cotton fabric, copper, or cacao beans. The latter were usually stored in bags containing 24.000 units, could not stay underground and did not last very long – as explained by the Italian diplomatic and historian Pietro Martire d'Anghiera in the 15th century. Hence, to avoid these dark coins to lose value, local powers run cacao production until the 18th century. The emperor collected taxes in the form of beans until 1550; it is estimated that his treasure counted a trillion cacao beans, which meant about 2,5 million kilograms. There also exists relevant documentation on the value of cacao beans. For instance, in 1545, in Tlaxcala, Mexico, a hen's egg cost two beans, a turkey's egg three beans, a rabbit ten, and the services of a prostitute more than a hundred, the same of a slave. The daily salary of a worker was forty beans, but the quality and size of the beans are of three types, thus, generalization is not possible. This method was not free of falsification, and dishonest payers tried to substitute cacao beans with little stones of the same size and color.[209]

Cocoa (the beverage made with cacao) was very important for the Mesoamerican culture and had multiple functions. One of its varieties, different from the one used in payments, was thought to be a food of the gods, and it was smashed to produce a beverage used in religious ceremonies. Its preparation consisted in obtaining a paste made by the Aztecs by mixing cacao beans with other ingredients, such as pimento, maize, fruit, and even magic mushrooms. This cocktail was only reserved for the emperor, politicians, religious chiefs, and soldiers. The preparation differed

[208] Giraudo, *Storie straordinarie,* 157-158.
[209] Ibid. 133.

depending on the scope: cocoa could be served as a sweet drink, a medicine, an aphrodisiac, or as food. [210]

Many of the Europeans who had been at least once in the New World wrote about these interesting dark beans. In *Historia de las Indias*, Bartolomé de Las Casas, a Spanish colonist who became then a Dominican friar, wrote that cocoa represented a symbol of power in the culture of the Aztecs and the Mayas. It was the same bitter and spiced drink called *xocoatl* that was offered to Columbus on the 30th of July 1502 during its fourth and last voyage by a nobleman whose head was covered in feathers.[211] This, at least, is how some narrated the story. Others wrote that when the explorer was heading southwest in his fourth expedition, he bumped into the Guanaja island, in front of the Honduras coast: here, Christopher seized a canoe carrying bags filled with cacao beans.[212] Regardless of what the truth is, what is for sure is that once Columbus tasted the beverage, he neither liked it nor understood the value of what he was drinking.[213] And he was not the only one, because the 16th century-European descriptions of cocoa were all negative.[214] Some decades later, in his book *Historia del Mondo Nuovo*, the traveler and merchant Girolamo Benzoni explained that the Spanish inhabitants of the New World had adapted to the method of payment of those lands, and they even began to measure their richness with cacao beans. In Brazil, a part of the Portuguese troops' salary was given in beans: this method of payment existed until the First World War in some isolated tribes of Mexico and Central America. Going back to Benzoni, the merchant agreed with the negative reviews on the beverage, which, he wrote, was something that only pigs could appreciate.[215]

In 1594, Pope Clement VIII tasted a cup of chocolate offered by a friar back from Latin America. The decision of the Church regarding the authorization, or not, to drink the new beverage depended on whether chocolate could be considered a food or a beverage, and, thus, whether it could be consumed during periods of fasting. After six years of debate, the Church decided that if the drink was mixed with water, then it could be allowed since it did not break the fast – in this way the Church did not lose its cocoa lovers-believers. The Jesuits became great distributors and promoters of chocolate in Europe. Dominicans instead, were more rigid, and banned and criticized the beverage because they believed that it heated the blood.[216]

However, the commercial activities of the religious disturbed the Spanish merchants, who wanted the monopoly of cocoa distribution in Europe. The Church lost its position in the market, especially after

[210] Ibid.
[211] Giraudo, *Storie straordinarie,* 133.
[212] Antinucci, *Spezie*, position 1785.
[213] Giraudo, *Storie straordinarie,* 133.
[214] Antinucci, *Spezie*, position 1788.
[215] Giraudo, *Storie straordinarie,* 133-134.
[216] Ibid., 135.

the nuns of Oaxaca sweetened the drink with honey, sugar, and spices.[217] The Mexican tradition tells that the merit of adding the sweetener to chocolate goes to these religious women who took advantage of the increase in sugar cane plantations in Mexico. If, in the beginning, Europeans could not get used to this beverage because it was too bitter and very foamy, after the addition of sugar, the previous negative descriptions of chocolate "sweetened": the Spanish creoles started to appreciate the sweet drink and began to export it to Europe.[218]

Although some cacao beans were sent to Charles V by the conqueror of Mexico Hernan Cortés already in 1527, the first real shipment of cacao fruits arrived from Veracruz to Spain in 1585. At the end of the century, chocolate was believed to be a precious drink with medical effects, and it was drunk for breakfast, after lunch, and even as a snack by Spanish aristocratic women.[219] The healing properties attributed to cocoa by the Spanish were clearly influenced by the Indian usage of the beans: one of the Mesoamerican varieties of cacao was used to prepare a drink against stomach-ache and catarrh; the Aztecs, instead, drank cocoa for healing diarrhea and dysentery.[220]

Cocoa spread from Spain to other areas of Europe. Although there are no precise dates for the arrival of chocolate in Italy, it is believed that by 1595, the beverage was known in Florence and Venice, and, at the beginning of the following century, Naples had tasted the new drink, too. From Naples, cacao was exported to Germany.[221] In 1621, the Dutch East India Company imported it to Amsterdam from Venezuela; from Holland, it was sent to England, while in Belgium it appeared in 1635. In France instead, it arrived thanks to Anne of Austria, who brought it to the royal court for its marriage with Luis XIII.[222] Later, it became fashionable with the spouse of Anne's son Luis XIV, Maria Teresa, who was used to drinking chocolate in Spain and popularised its consumption among the nobility. Meanwhile, the only French merchant authorized by the king to sell chocolate was David Chaillon, who could also boast of selling coffee and tea. Only in 1692, the sale permission was extended to other merchants, but only the richest could allow chocolate, which cost even more than the other two exotic drinks.[223]

Europe learned how to prepare chocolate through the Spanish texts, especially the famous treaty on the preparation of chocolate by the physician Antonio Colmenero de Ledesma. Colmenero explained that cacao beans had to be dried and ground; then, sugar could be added, along with spices; after having grounded all the ingredients, the resulting paste would be heated and mixed; finally, water had

[217] Ibid.
[218] Matthee, "Exotic Substances," 30.
[219] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 492-493.
[220] Matthee, "Exotic Substances," 30.
[221] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 493.
[222] Giraudo, *Storie straordinarie,* 135.
[223] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 492.

to be added to stir the mixture. When Colmenero's work was translated into English, chocolate became known also for its alleged aphrodisiac effects. Unlike the Spanish, the English preferred to drink chocolate with milk, or even with eggs; sugar, instead, was recommended by both.[224]

Before Northern Europeans defied Spain for the control of the Caribbeans, cacao was already grown in these islands.[225] Specifically, from the 1660s, it was cultivated in English Jamaica, while the French exported it from Saint-Domingue; however, Venezuela remained the first cacao supplier for a long period.[226] In the same century, cacao plantations diffused until the Philippines and Indonesia, and later in São Tomé.[227] In response to the growth in the demand for chocolate, plantations spread in West Africa during the 19th century.[228]

2.3 Toward the removal of the "luxury" label

The apex of colonialism, 1750, was also the beginning of a new era of global commerce. In this period, European cuisine had left spices aside to experiment with new savors; particularly, tea, coffee, and cacao, accompanied by sugar, were about to transform the European food system: the three beverages "trickled down" to the other social strata, including the laboring classes, and lost their status as luxury stimulants.[229]

However, the history of the removal of the "luxury" label from these goods did not unfold smoothly. In fact, at the end of the 17th century, the debate about luxury was dividing society between those considering these goods as corrupters of public morality and those advocating their inclusion.[230] In particular, luxury was seen with disapproval by the Church, because it distracted the faithful and because it was viewed as a synonym for avarice and lust. Moreover, it was believed to drain money from the state coffers.[231] However, others were beginning to see things differently: among these, there were physicians, who encouraged the consumption of coffee, tea, and cocoa for their therapeutic properties; whether they truly believed in this or not, they could certainly benefit economically from these colonial goods.[232] In fact, many began to realize that if these products would have entered everyone's basket of consumption, they could have been a relevant source of revenue for the state.[233]

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[224] Kate Loveman, "The Introduction of Chocolate into England: Retailers, Researchers, and Consumers, 1640-1730," *Journal of Social History 47*, no.1 (Fall 2013): 28-30, https://www.jstor.org/stable/43306044.
[225] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 429.
[226] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 493.
[227] Ibid.
[228] Ibid., 494.
[229] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 424.
[230] Carmagnani, *Le isole del lusso*, IX.
[231] Trentmanm, *Empire of things*, 8.
[232] Capuzzo, *Culture del consumo*, 41.
[233] Carmagnani, *Le isole del lusso*, IX.

Charles Davenant, a 17th century-English writer known for his works on economics and politics, was one of them: he argued that the main reason for commercial profit derived from luxury, which produces richness. This kind of richness, however, was not contemplated in the mercantilist reasoning.[234]

2.3.1 A commercial transformation: the new era of global commerce

In the last decades of the 17th century, a new relationship between the real economy and the financial economy was forming. This was determined by the growth in the trade of new commodities and by the innovations in the mercantilist organization.[235] In fact, the demand for sugar, tea, coffee, and cacao, as well as for Indian cotton, was expanding, and the exotic products increasingly spread in the European continent. However, the very long-distance voyages required to import these wares in Europe, along with the necessity to properly arm the ships for the trip, implied a re-organization of capital which had to cope with the new market.

Behind the establishment of the EIC and VOC companies, there were the innovations occurring in the mercantilist organization, characterized by the increase in monetarization, the creation of new payment methods and of mechanisms of commercial credit favored by banking institutions, and the spread of mercantilist-financial networks. These mechanisms furnished the state with economic resources and consequently led to an expansion of public spending. The relationship between merchants and governments was possible through the creation of statal commercial depositories where the imported wares were stored without paying duty; here, they waited either to be used for internal consumption or to be re-exported, always exempted from taxes.

A new financial market was developing, and Amsterdam was the first example of a European financial center. Towards the end of the 17th century, the Dutch city had connections with the principal financial centers of the Mediterranean, England, the Americas, the North and East of Europe, Germany, and Asia. In other words, all continents communicated with Amsterdam, and this facilitated the interaction between the stock market, merchant bankers – a figure born from the new division of mercantile labor – foreign correspondents, and the East and West Indies companies.[236]

The transformation of credit and of the mercantilist organization was influenced, especially in England, by a new politics that aimed at building a fiscal-military state characterized by a strict connection with the new institutions and financial techniques. In England, the monarchy and the

[234] Ibid., 10.
[235] Ibid., 20.
[236] Ibid.

parliamentary were more and more involved in the long-distance commerce of the companies: shareholders limited the nobiliary and corporate interests and favored the liberalization of internal commerce. Thanks to the politics adopted in the late decades of the 17th century, England had exclusivity on the re-export of Asian, African, and American wares and became an important center for re-exportation. Then, from 1690 to 1704 the country adopted the system "d'entrepôt" and eliminated taxation to be able to compete with the other two dominant centers of re-exportation, Holland, and France.[237] At the beginning of the 18th century, 60 percent of English imports came from Europe – a quarter of these were Asiatic or Antilleans wares –; substantial commercial fluxes arrived from North America, too.[238] A third of the English re-exportations (especially coffee, tea, sugar, cotton, and tobacco) were sent to Holland: here, they were re-exported once again to other sides of Europe. With the stagnation of the Dutch trade from the mid-18th century, the English and French trades expanded.[239]

Between the second half of the 17th century and the first half of the 18th century, imports of extra European wares increased by six times. The participation of Asia and the Americas reached one-third of the total value: this also shows that extra European products played an important role in the rapid growth and transformation of commerce.[240] Specifically, the discovery of the Americas led to a new conception of the world which entailed a more global/oceanic orientation: the Mediterranean was no longer perceived as the center of the world.[241]

2.3.2 The consumer revolution and the industrious revolution

The 17th-18th century-commercial transformation was crucial to allow Europe to enjoy a consumer revolution.[242] Here, luxury goods can be considered responsible for the reformulation of the concept of consumption from being linked to subsistence reasons, as it had been until then, to be attributable to new a form of consumption, the modern one.[243]

The consumer revolution acted as the scenario of the passing from the old economic mentality to a new one. Mercantilism, which had dictated the rules of colonial expansions during the Early Modern Age, was fading away in favor of political economy, an economic science whose principles

[237] Ibid., 27-28.
[238] Capuzzo, *Culture del consumo*, 34.
[239] Carmagnani, *Le isole del lusso*, 27-28.
[240] Ibid., 31.
[241] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 424.
[242] Kaoru Sugihara and R. Bin Wong, "Industrious revolutions in early modern world history," in *The Cambridge World History – The Construction of a Global World, 1400-1800 CE: Part 2, Patterns of Change*, ed. Bentley, Subrahmanyam, and Wiesner-Hanks, (Cambridge: Cambridge University Press, 2015), 293.
[243] Carmagnani, *Le isole del lusso*, VIII.

overpassed the traditional moral criteria governing society and expanded the previous meaning of consumption. New values, such as land, commerce, and credit were appearing and contributed to putting an end to the agricultural society and the feudal system.[244]

In this context, the idea of luxury was relativized: the former prohibitions towards the consumption of some specific goods could no longer stand in an era of commercial freedom. It is indeed freedom the most important pillar of political economy, to be intended as the freedom to commerce and to consume: the main focus is on individual initiative, and the aim is the maximization of profits. [245]

As argued above, the concept of consumption underwent a transformation. Until that moment, "to consume" meant to use up goods, in the sense of exhaustion of matter – for instance, it was used in relation to the digestion of food and drinks. Cities can be considered as stages where to look at how the concept of consumption changed: urban lifestyle worked as an accelerator of the specialization made possible thanks to global trade. In cities and towns, material desires were fuelled by the new shops offering all varieties of goods: as they sprang up in cities, shopping became a leisure. Behind the new consumption patterns, there was also a question related to identity: people's attempts to buy luxury to imitate the upper classes and to be treated above their social position are also important. The novelty was that desires for luxury and for material things were now seen in a positive light: the previous narrative and orthodoxy that considered them as the cause of corruption were fading in front of a modern ideology that viewed luxury and material desires as a means to achieve progress, civilization, and richness. [246] In this sense, "consumers" were pushed to desire those goods that would enrich the state coffers. In turn, consumption was also responsible for changing society's and states' behavior.

From the last decades of the 17th century, coffee, tea, and cocoa contributed to fostering the spontaneous economic interaction between production and consumption. This was possible also through the culture of politeness – an example of institutions framing behavior and consequently, market demand –, which facilitated the establishment of the modern patterns of consumption: coffee houses and exotic beverages were only some of the new symbols characteristic of a population that favored social spaces, leisure, and fashion. In other words, the middle class established its place in society around the concept of politeness, and thus through fashionable tea sets and coffee cups, as well as fine clothes and social events: politeness was putting into practice the enlightenment values of sensibility and compassion.[247] This also shows how consumption began to be interrelated not only with things, but also sociality, standard of living and leisure.

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[244] Ibid., 3-4.
[245] Ibid., 3-10.
[246] Trentmann, *Empire of things*, 93-98.
[247] Ibid., 107-108.

The consumer revolution can be associated with what the economic historian Jan de Vries called the "industrious revolution", taking place from the mid-17th century until the beginning of the 19th century. According to de Vries, "industrious" consumption meant that people started to work harder and longer to buy goods available in the market; a rise in real wages permitted an increase in consumption.[248]

The household economy was a fundamental actor in the growth of the market. The latter was indeed fuelled by the rise in consumer demand, possible in turn by a reallocation of the households' resources. Decision-making was a relevant factor in this: the change in the behavior and decisions made by the English, North-western European, and Colonial American households led to an increase both in the supply of marketed goods and in the demand for commodities offered in markets. This was the result of the combination between the commercial-economic context and the ongoing change in tastes.[249] Specifically, the optimization of time and resource allocation between the members of the (lower-class) family can be noticed in the decrease in leisure time, and in the concentration of labor on the production of market-oriented goods, rather than on production for direct consumption. Most of the industrial laborers of the Early Modern Age were non-specialized people, such as peasants or wives and children, the latter ones employed particularly in the textile sector or other activities where physical strength was not necessary. On one hand, the industrious revolution reveals the (self) exploitation of children and women and is characterized by the suppression of leisure time. On the other hand, the figure of the wife benefitted from an increase in decision-making. In fact, being increasingly involved in market-oriented production signified both that women earned their own money – which could be spent, for instance, on clothes or goods for the home – and that they had no longer the time to produce homemade goods, which were thus replaced by products bought at the market.[250]

The famous poem *Fable of the Bees* by Bernand de Mandeville (1705) proved the great interest in material culture during the industrious revolution. In his once-scandalous poem, Mandeville, a Dutch immigrant to England, argued that the "vices" of society (like pride and vanity) developing around luxury goods were beneficial to industry and could lead to the prosperity of the state. The diffusion of the ideas of Mandeville allowed an understanding of the importance of the changes in international trade. At the turn of the 18th century, the relationship between the new economic doctrine and the

[248] Sugihara and Wong, "Industrious revolutions," 293.
[249] Jan De Vries, "The Industrial Revolution and the Industrious Revolution," *The Journal of Economic History 54*, no. 54 (June 1994): 255-257, https://www.jstor.org/stable/2123912.
[250] Ibid., 257-262.

prosperity of the nation finally demolished the mercantilist idea of the state power and of the rural aristocracy.[251]

2.4 Tea, coffee, and cacao consumption in the lower social classes

Between the end of the 17th and the first decades of the 18th century, the consumption of exotic stimulants exploded, and Europe responded to the demand shift. It is interesting to notice that the increasing demand for the former luxury goods did not depend merely on growing incomes or a decrease in prices, but it was persistent despite periods of price fluctuations.[252] This shows that the consumption of coffee, tea, and cocoa was becoming a habit among all strata of the population. In fact, it would be nonsense to believe that only the wealthy drew the demand: it was the laboring class and the middling tradesmen who formed the bulk of trade, although they could not enjoy the leaves and beans of the highest quality – the VOC was famous for selling tea of very low quality, which could also be bought in barrows along the Dutch streets.[253] The trickle-down process began in part from the introduction of servants to the new hot beverages by their masters, who, in turn, added some grams of tea or coffee to their salary at the request of their employees.[254]

England and the Dutch Republic, which by then had the most influential companies, were deeply engaged in this trade, and, thus, data and studies on these two countries are useful to show how luxury products spread among the lower classes. In general, the English and Welsh imports increased from 16.9 percent in 1700 to 34.9 percent in 1800. With regards to the Dutch Republic, a study carried out on Weesp, an industrial city near Amsterdam, testifies the increase in the consumption of these beverages: before 1700 there was no sign of coffee or tea in the inventories of the city, while in the 1730s nearly all of them included at least a reference to both. In addition, a study of Antwerp conducted by Bruno Blonde and Ilja van Damme documents that by 1730, 60 percent of households, including the modest ones, drank tea, with the percentage rising to 100 percent in the richest houses. The same study also shows that the number of purveyors of tea, coffee, and chocolate increased in the same period.[255]

As seen before, when coffee and tea first arrived, they were imported only in limited quantities and did not catch on as drinks in all social classes, but only among the wealthy. Although one might think that tea – which was purchased in substantial quantities only in Canton – had contributed more to the

[251] Carmagnani, *Le isole del lusso*, 34-35.
[252] Anne E.C. McCants, "Exotic Goods, Popular Consumption, and the Standard of Living: Thinking about Globalization in the Early Modern World," *Journal of World History 18,* no. 4 (December 2007): 461, https://www.jstor.org/stable/20079448.
[253] Ibid.
[254] Trentmann, *Empire of things*, 89.
[255] McCants, "Exotic Goods," 461.

increase in imports, coffee was not penalized for not having a single source: since when the Dutch transplanted their trees to Java at the beginning of the 18th century, coffee spread rapidly, and continued in the following twenty years, when plantations were built in the tropical West Indies and later in Central America.[256] In the 1730s, in the Dutch capital, coffee and tea corresponded to nearly one-quarter of the VOC sales. In England instead, tea became the most important import among colonial goods since 1730: smuggling accounted for great growth for the country, and it was thanks to the black market that tea became a habit also among consumers living distant from the center of London (both socially and geographically speaking).[257] In fact, although the EIC had included tea in its imports from 1686, these were hindered by a tax that would prevent its availability to ordinary people, and that caused an increase in tea smuggling until 1784, when the duties were repealed.[258]

At the beginning of the 18th century, Paris hosted 380 coffee houses; 600 at the end of the century. In 1782, the French historian Pierre Jean-Baptiste Legrand d'Aussy explained that there was no home where coffee was not drunk, and there was no laborer who did not have breakfast with coffee and milk.[259] However, what distinguished the elites from the "inferior" people in coffee consumption was that the first enjoyed the beverage in the "cafés" of the capital, while the latter bought it at the market.[260] Even in London coffee houses were springing up everywhere, and in the 18th century, they served more tea than coffee. In fact, tea was soon preferred to coffee in England, especially due to the EIC businesses with China: from 1670 to 1797 tea constituted 81 percent of the total value of the wares transported by the company. At the end of the 18th century, every peasant drank tea, even twice a day.[261]

With the advent of the industrial revolution, the spread of the three stimulants, also called "food-drug", increased. Indeed, data on the growth in imports of such commodities have shown that their increasing consumption was strictly connected to the affirmation of an urban lifestyle focused on the industry.[262] Especially from the 19th century, the effects these beverages had on the mind and body were a source of attraction for workers, especially among the rural population, which viewed the stimulant drinks as an aid against the pressures typical of the industrial environment. In this sense, tea, coffee, and sugar accompanied Europeans on the path of the industrial revolution, to the extent that they not only represented leisure and pleasure but also labor: in fact, the calories provided when combining sugar with coffee and tea were easily digestible and perfect to be consumed before work.

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[256] Ibid., 443-447.
[257] Ibid.
[258] Matthee, "Exotic Substances," 43.
[259] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 495.
[260] Steven Topik, "Coffee as a Social Drug," *Cultural Critique,* no. 71 (Winter 2009): 93, https://www.jstor.org/stable/25475502.
[261] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 497-498.
[262] Montanari and Sabban, ed., *Storia e geografia dell'alimentazione*, 432.

From the 1820s, tea replaced cereal soups and beer – the breakfast of English workers for a long time –[263] while urban workers of the continent preferred coffee. In specific cases where the coffee tax was still high, the poor drank a substitute drink made from roasted vegetables, tubers or fruit.[264]

There is also a dark side to this story which is thought to have facilitated the adoption of these substances. Although little is known about this, it seems that the new goods acted as substitutes – in this case especially tobacco – for some psychoactive plants taken by peasants to induce hallucinations and reduce the feeling of hunger.[265] Arrived in Europe through the Columbian Exchange, tobacco has many similarities with coffee, tea, and cacao. Firstly, the diffusion and consumption of tobacco are part of the same historical, cultural, and social dynamics that developed around coffee, tea, and cacao. Moreover, like the three drinks, tobacco was first known for its supposed therapeutic purposes; then, at the turn of the 17th century, it rapidly spread among the population – the wealthy consumed it in the form of snuff, while the poorer with the pipe – and experienced the same prohibitions as the other stimulants. However, the main similarity between the four exotic products is that they are stimulants and, thus, responsible for creating addiction – despite the effects of nicotine being much stronger than those of the three drinks. Their psychoactive component has been considered by some historians, such as Fernand Braudel, an essential factor that helped the poor tackle the feeding difficulties of the period under analysis. David Courtwright even talked of a "psycho-active revolution" conducted by the four plants, along with alcohol.[266] Hence, the poorest workers began to prefer the new goods to other psychoactive plants, probably due to their more predictable and less invasive effects.[267]

Going back to coffee, tea, and cacao, the sophisticated commercialization of these products reached by the end of the 18th century, along with the innovations provided by the industrial revolution, such as the new technologies of transport, allowed an increasing availability of coffee, tea, cocoa, and sugar in urban markets: the demand for these goods was higher than that for the products of the nearby countryside.[268] They were commercialized on a large scale, industrially processed, and stocked in storehouses to supply the urban markets. In England and in Holland, even before the industrial revolution, an expanding side of the population attended markets, and this favored the growth and diversification of consumption: in this period, it has been estimated that around 10 percent of the food expenditures of peasants were colonial products. Initially, this was a cause of shock among the wealthy, who could not stand the fact that the working class imitated the consumption patterns of the

[263] Capuzzo, *Culture del consumo*, 42-43.
[264] Topik, "Coffee Social Drug," 94.
[265] Capuzzo, *Culture del consumo*, 42-43.
[266] Stefano Levati, *Storia del tabacco nell'Italia moderna (secoldi XVII-XIX)* (Roma: Viella s.r.l, 2017), PDF-book, 7-9.
[267] Capuzzo, *Culture del consumo*, 42-43.
[268] Ibid., 41.

upper ones. In 1765, Jonas Hanway, a social reformer, thought that seeing "common people" in the streets drinking tea was a curse for his nation. He lamented that peasants drank more tea than they ate bread; even charcoal burners carried tea on their carts.[269]

In the following century, the temperance movement of Victorian Britain diffused the idea of a sober consumer culture that encouraged tea consumption. In the 1830s and 1840s, tea parties hosted debates and speeches – while serving tea and various sweets – on the importance of drinking tea rather than alcohol to carry out a sober life, a crucial requisite for the working classes. Tea drinking was viewed as the solution to the dilemma of industrialized England: it was a way to render workers and consumers more efficient. In some cases, tea parties were authentic mass spectacles attended by the working and middle class, and they encouraged cross-class interactions. For instance, the Temperate Tea Party of Preston, an industrial town, is remembered as a famous public banquet where 540 working men and women reunited and listened to speeches and songs on sobriety and free trade.[270]

In the thirteen British colonies across the Atlantic Ocean, tea was initially more appreciated than coffee, but neither coffee nor tea was drunk as much as in Europe, and coffee shops were not widespread. However, in the 1830s, the colonies began to prefer coffee to tea, probably due to the arrival of immigrants from coffee-drinking European countries.[271] The first signs of decline in the preference for tea had already occurred after 1776 due to the North Americans' opposition to the high tax on tea, which sparked the first incidents of the revolutionary wars.[272] In parallel, the decrease in the price of coffee from 1683 to 1783 was the result of increased resistance to the EIC and to the vicinity of the French colonies and coffee plantations of St. Dominique and Martinique – and later of Brazil. In 1832, with the abolishment of the taxes on coffee, prices had never been so low. Three decades later, during the Civil War, the hot drink played a relevant role for the army: unlike the War of Independence, where rum was rationed among soldiers, coffee was considered a necessity in both rations, to the point that some argued that the military had developed a dependence on it.[273] Although tea continued to be drunk – tea parties like the British were popular among the elites –[274], the United States soon became the largest coffee market in the world.[275]

As for chocolate, it was the only beverage that did not spread among the lower strata of society during the 18th century. It was consumed in particular in Italy and Spain but remained limited to religious

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[269] Ibid.
[270] Erika Rappaport, "Sacred and Useful Pleasures: The Temperance Tea Party and the Creation of a Sober Consumer Culture in Early Industrial Britain," *Journal of British Studies 52*, no. 4 (October 2013): 990-1000, https://www.jstor.org/stable/24700889.
[271] Topik, "Coffee Social Drug," 95.
[272] Grigg, "Tea and coffee," 292.
[273] Topik, "Coffee Social Drug," 95.
[274] Rappaport, "Tea party," 1015.
[275] Topik, "Coffee Social Drug," 95.

and social elites. In fact, because of its alleged aphrodisiac properties, chocolate gained the satirical image of a drink for lustful women and lazy rich men. As a symbol of aristocratic idleness, it opposed the activism and rationality preached by the bourgeoisie.[276]

Despite chocolate being mainly sold in coffee houses, the first "chocolate houses" were established in England in the 1660s. Nonetheless, in this period chocolate never reached the popularity of coffee and tea, also due to its still high cost.[277] In fact, despite an increase in its consumption from the early 18th century, chocolate drinkers were either those who could afford to attend chocolate and coffee houses or people who could buy the pastilles and the equipment for preparing the homemade drink. However, there was also a less expensive version of the drink made with the addition of milk and eggs, which reduced the need for cocoa.[278] In any case, chocolate began to spread widely at the turn of the 19th century when industries made possible its consumption in the solid form of a chocolate bar, the children's new favorite snack.[279]

As pointed out in the first part of this chapter, the spread of sugar as a sweetener is also linked to the European infatuation with the three drinks and similarly, the spread of coffee, tea, and cocoa was accompanied by an increase in sugar consumption. In fact, while in their places of origin, the three drinks were appreciated for their bitter taste, in Europe, as they became the beverage of the working class, they began to be served hot and with sugar. In other words, as Sidney W. Mintz explains in his *Sweetness and Power*, the success of tea, chocolate, and coffee coincided with the success of sugar. The increase in consumption of any of the three exotic beverages was extremely desirable for West Indian sugar planters because it resulted in an indirect increase in the demand for sugar.[280] Studies on the diet of working houses and hospitals at the end of the 18th century demonstrate that England had enough sugar for every citizen. In the Dutch Republic, despite the financial crisis of the late 18th century, sugar was bought even by the poorest orphanages.[281]

2.5 Final remarks

Coffee, tea, and cocoa are such a significant part of the European diet today that it might be thought that it has always been so. However, the history of these products has deep foundations laid long before the first European influence. The role these drinks played in their places of origin was equally important; before Europe developed an interest in these products, tea, and coffee, principally, were

[276] Montanari, *Fame e abbondanza*, 158.
[277] Loveman, "Chocolate into England," 35-38.
[278] Ibid., 39.
[279] Flandrin and Montanari, ed., *Storia dell'alimentazione*, 494.
[280] Sidney W. Mintz, *Storia dello zucchero: Tra politica e cultura* (Torino: Giulio Einaudi editore s.p.a., 2020), 144-151.
[281] McCants, "Exotic Goods," 454.

already traded outside their countries of origin. About two centuries after the European competition in the Spice Land led to important discoveries, a new era of global trade was about to be inaugurated, and the three exotic drinks acted as protagonists. 1750 marks its apex: the European increase in political and military power, the rapid global expansion, the colonial empires, the slave trade and the system of plantations, the commercial and fiscal transformations, the consumer revolution, the fading of the mercantilist policies in favor of political economy, and the industrial revolution – which will be better explained in the next chapter – are all important for the understanding of the food system in the 18th century-Europe. Above all, coffee, tea, and cacao were central to the transformation of the concept of consumption; their imports were also crucial to triggering the economic change that occurred during this period. The 19th century, however, was about to bring about some further changes in the history of the three products.

3. COFFEE, TEA, AND COCOA: AMONG THE CAUSES OF CLIMATE CHANGE

Today we are living in a period of global warming. Although it was only recently realized, it can be argued that the causes of current heat waves, melting ice at the poles, and extreme climatic events, date back to the 18th century. Unlike the Little Ice Age, the causes of global warming are attributable to human activities: these are in part rooted in the dynamics explained in the previous chapter and, consequently, also develop around the patterns of consumption and production of coffee, tea, and cocoa. In other words, it can be argued that three of the most appreciated global goods in the world are concurrent causes of global warming.

3.1 Climate change

The term "Anthropocene" is used to refer to the epoch dating from the commencement of humankind's impact on the environment. Although it might be argued that in world history mankind had already imposed its power over the environment – Venice was a swamp that was turned into a beautiful city – it is generally agreed that 1760, the beginning of the Industrial Revolution, is the starting period in which the world entered the Anthropocene. One of the aspects of the Anthropocene is the current climate change which is, indeed, anthropogenic, contrary to the climatic crises of the past. Indeed, if the former Little Ice Age was a natural phenomenon, what started to occur in the second half of the 19th century was a new kind of human-caused climate change that began to impose itself due to the amount of carbon accumulated in the atmosphere. The main causes for this were – and still are – the burning of fossil fuels, the biggest step that brought the planet into the modern age, and deforestation. [282]

The burning of fossil fuels, like coal, oil, and gas, is responsible for generating greenhouse gas emissions, which, in turn, form a blanket around our planet that retains the sun's heat and raises temperatures. Carbon dioxide and methane are examples of greenhouse gas emissions, and they are mainly emitted by gasoline and coal, used for instance to drive a car or to heat a building; in general, the largest contributors to global emissions are the energetic, industrial, transport, building, agricultural, and land use (Land Use, Land-Use Change and Forestry – LULUCF) sectors.[283]

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[282] J.R. McNeill, "Energy, population, and environmental change since 1750: entering the Anthropocene" in *The Cambridge World History – Production, destruction, and connection, 1750-present: Part 1, Structures, Spaces, and Boundary Making*, ed. J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 71-72.

[283] "What Is Climate Change?," United Nations: Climate Action, accessed December 7, 2022, https://www.un.org/en/climatechange/what-is-climate-change.

The main characteristic of climate change is the warming of the lower atmosphere: from the 1800s, the increase in temperatures was 1.1C, and the 2011-2020 decade is estimated to have been the warmest in history. The glacial melt and the consequent sea level rise (by 30 cm from 1850 to 2015) are the hallmarks of climate change; storm surges, extreme weather events, such as droughts and floods, salty water seeping into the aquifers, famines, mass migrations, the expansion of disease vectors as mosquitoes, and animals forced to find new habits or become extinct are some among the other consequences of the global warming. In addition, one main difference of this climatic change from the others is the velocity with which it is occurring: as Anthony J. McMichael explains in his book *Climate Change and the Health of Nations*, the rate of global warming is faster than any other change in global climatic conditions ever verified in history. According to the author, average temperatures might rise by up to 4C by the end of this century: the last time this happened was fifty-five million years ago, but this climatic change took thousands of years to occur, rather than only a century.[284]

Strangely enough, before talking about global warming, the world's population was more worried about the possibility of a new ice age. In the 1970s, some extreme climatic events provoked several crop damages and famines throughout the world, which led to increasing attention on climate by the scientific community and politicians. In 1974, a just built Ad Hoc Panel came to some curious conclusions according to which the temperatures of the following decades would decrease until 2015 to slightly increase until 2030; the panel even foresaw that after one hundred years climate would cool once again. Hence, in these years some plans to regulate climate and face the return of "global cooling" were being discussed; one among these planned the sending of huge mirrors, which were supposed to work as other suns, into orbit. However, this might seem less weird if it were reminded that, as a matter of fact, from the 1940s to the 1970s temperatures decreased by 0.3C, due to a combination of fog and smog that reduced solar radiation. [285]

The "re-discovery" of global warming dates from the 1970s, too. In his famous work *A Cultural History of Climate*, Wolfgang Behringer uses the term "rediscovery" since the first studies on the atmosphere and on how it retains the heat from the sun's rays had been carried out at the beginning of the 19th century by the French physicist Jean-Baptiste Joseph; in addition, greenhouse gases had been already discovered in 1859 by the Irish physicist John Tyndall, while the issue behind CO2 emissions was brought into attention by the prize-winner Svante August Arrhenius at the end of the 19th century. About seventy years later, while politicians were talking about some absurd plans to

[284] Anthony J. McMichael, Alistair Woodward, and Cameron Muir, *Climate Change and the Health of Nations: Famines, fevers, and the fate of populations* (New York: Oxford University Press, 2017), 230.
[285] Wolfgang Behringer, *A Cultural History of Climate* (Cambridge: Polity Press, 2010), 188-189.

fight a potential global cooling, Syukuro Manabe and R.T. Wetherald realized that higher CO2 levels in the atmosphere would provoke a substantial increase in temperatures. Following this perspective, in 1975, research was carried out to understand the environmental spin-off related to the growth in air travel: in 1977, there was a consensus that the planet had entered a phase of global warming. Climatologists concluded that greenhouse gases, and particularly CO2 emissions, are the main causes behind this phenomenon, and other human impacts on the ecosystem, such as deforestation, were also considered relevant factors. The first data after the establishment of the Global Environment Monitoring System (GEMS) confirmed, indeed, that the burning of fossil fuels, deforestation, and changes in land use are responsible for raising CO2 levels in the atmosphere. [286]

Since the early 1990s, countries have met to discuss and carry out negotiations and agreements on how to combat climate change. The first World Climate Conference was held in Toronto in 1988 and tried to find out a solution to the new worrying discoveries; in the same year, the Intergovernmental Panel on Climate Change (IPCC) was established to conduct research on climate, and after two years, its report was a starting point for what is known as the Earth Summit, the United Nations Conference on Environment and Development, which was held in Rio de Janeiro in 1992; one of its documents is the United Nations Framework Convention on Climate Change (UNFCCC) (1994), a relevant framework on climate aiming to reduce and stabilize greenhouse gases. In 1995, COP 1 of Berlin recognized that the efforts to halt climate change had not been sufficient; one year after the 1995 IPCC Report, COP 2 in Geneva concluded for the first time ever that climate change was a consequence of human actions on the environment. Hence, the 1997 COP 3 of Kyoto issued a binding international law – for the first time – to limit gas emissions, but some states, such as China and India, refused to adopt restrictions since they were in a phase of economic and industrial development; by contrast, the European Union, the United States, Japan, and Canada committed to reducing gas emissions by 8, 7 and 6 percent respectively.[287] Based on the principle of "common but differentiated responsibility and respective capabilities", the Kyoto Protocol entered into force in 2005 and required only industrialized countries to limit their GHG emissions, according to specific individual targets. A major flaw in the treaty was the fact that it did not bind developing countries to reduce gas emissions; however, some among them, such as China and India, are known to be major carbon emitters.[288]

It was not until the 2015 Paris Agreement that it was acknowledged that climate change is a worldwide problem and that the sole commitment of industrialized countries is not enough. The main

[286] Behringer, *Cultural History of Climate,* 182-191.
[287] Ibid., 191-192.
[288] "What is the Kyoto Protocol?," Karsten Würth, United Nations: Climate Change, accessed December 8, 2022, https://unfccc.int/kyoto_protocol.

goals of this legally binding international treaty – entered into force on 4 November 2016 – include preventing the global temperature from rising by 2C above preindustrial levels while trying to keep it below 1.5C and reach global net-zero emissions.[289] To achieve these objectives, emissions must be reduced by 45 percent by 2030 to reach net zero by 2050. In the same year of the Paris treaty, the 2030 Agenda for Sustainable Development was adopted by all United Member States. Among its 17 Sustainable Development Goals (SDGs), which are a call for action by countries, Goal 13 focuses on action to combat climate change: however, since all goals depend on each other, Goal 13 will not be achieved without reaching Goal 7 on affordable and clean energy, for instance, or Goal 12 on responsible consumption and production.[290]

Despite the commitments, the number of CO2 emissions in the atmosphere is still growing and experts generally agree that not even the goals set by the Paris Agreement are sufficient. If CO2 emissions had declined by 5.2 percent in 2020 due to COVID-19, they rose by 6 percent with the end of restrictions to reach their highest level in history.[291] The UN Emissions *Gap Report 2022: The Closing Window – Climate crisis* explains how countries are failing to fulfill the Paris goals and calls for a rapid transformation of the system: after the recent predictions of a rise in temperature of 2.8C by the end of the 21st century, this has become more urgent than ever. The Report looks at the changes required to undertake this transformation: among them, changes in the food systems are of paramount importance. [292]

3.2 The beginning of the Anthropocene: industrialization

As mentioned above, the massive burning of fossil fuels from the Industrial Revolution is one of the triggering factors for global warming. The Industrial Revolution took first place in Britain and refers to the revolutions occurring in the field of production, power, and distribution from about 1750. It marks the transition from an agrarian towards an industrial society and accelerated the process toward the modern consumption patterns of mass consumption. The leading and first sector that underwent the Industrial Revolution is the textile sector, so much so that the designer of the spinning jenny, Richard Arkwright, is also considered one of its leading figures.[293]

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[289] "What is the Paris Agreement?," UNFCC, United Nations: Climate Change, accessed December 8, 2022, https://unfccc.int/process-and-meetings/the-paris-agreement.

[290] "17 Goals to Transform Our World," United Nations: Climate Action, accessed December 8, 2022, https://www.un.org/en/climatechange/17-goals-to-transform-our-world.

[291] "Goal 13: Take urgent action to combat climate change and its impacts," Sustainable Development Goals, accessed December 9, 2022, https://www.un.org/sustainabledevelopment/climate-change/.

[292] "Emissions Gap Report 2022," UNEP, United Nations Environment Programme, October 27, 2022, accessed December 10, 2022, https://www.unep.org/resources/emissions-gap-report-2022.

[293] Behringer, *Cultural History of Climate,* 171.

The primary characteristics of the revolution are machines, steam power, and coal. In their ways, they created fast and more efficient mechanisms of production because they allowed a reorganization of the dynamics behind productivity: in the new division of labor, machines took the place of former craftsmen.[294] The steam engine was first used in mills and factories – the textile industry being the first – and, then, in ships, railroads, and coal mining. However, it was with mass production that it became of paramount importance when there began to be a need for more efficient means of transport. The increase in transport capacity caused another wave of industrialization that, in turn, led to a growth in the demand for fuel and iron. In fact, despite the steam engine could be powered by wood, it was run on coal because the British forests had been nearly cleared due to shipbuilding. Coal, which was already employed for heating, achieved a major role in the iron and steel industries and became essential in railways: the first steam train was inaugurated in 1825 and linked Stockton to Darlington. Then, rails were built throughout the European continent, specifically from 1870 to 1910.[295]

According to the economic historian Robert Carson Allen, coal was responsible for making the industrial revolution happen in England rather than in the Low countries. This fossil fuel has been laying under the English soil for millions of years, and, thus, it was the source of cheap energy for the country – especially after it could be easily extracted thanks to steam power –, and fostered the process of substituting capital for labor. The more London grew thanks to international trade, the more the coal industry expanded. Although coal was also present in north-eastern France, across Belgium, and in Germany, this was ignored before the 19th century: the Low Countries, which were experiencing urbanization, too, purchased coal from the Newcastle industry. In short, coal was one of the most sought-after commodities in this period, because most technologies depended on this fuel.[296]

It could be argued that the innovations in the transport sector made the world enter a new era because they created a deeply interconnected world. Although even before steam the volumes of trade had increased, before 1830 the intercontinental market was still very restricted compared to the numbers of the following centuries. It was only after 1830 when the new technologies were applied to trade that the growth of the market took huge dimensions. Trains and steamships led to shorter times for the transportation of goods, which provoked a further decrease in the price of commodities such as, indeed, coffee, tea, and cacao. In their essay "When did globalization begin?" Kevin H. O'Rourke

[294] Paul Josephson, "The history of world technology, 1750-present," in *The Cambridge World History – Production, destruction, and connection, 1750-present: Part 1, Structures, Spaces, and Boundary Making*, ed. J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 137.

[295] Behringer, *Cultural History of Climate,* 171-175.

[296] R.C Allen, "Why the industrial revolution was British: commerce, induced invention, and the scientific revolution," *The Economic History Review 64*, no.2 (May 2011): 357-381, https://www.jstor.org/stable/41262428.

and Jeffrey G. Williamson argue that the "big bang" of globalization, which they intend as the integration of international commodity markets, occurred in the 19th century. According to them, if the pre-18th century trade was made of non-competing goods (like our three stimulating beverages), in the 19th century, there began a new era of trade in competing goods favored by a solid decline in transport cost enabled by the transport revolution occurring in around 1820 and 1850 – also in Asia, and on routes around Egypt and the Black Sea –, and thus by steamships, railroads, as well as the building of the Suez Canal. Data collected by the authors show that in the Atlantic, from the 1830s to 1913, there was a decline in transport costs of 45 percentage points. This number is even bigger than the one referring to the decline of transport costs in the post-Second World War.[297]

Although in the 1800s the impacts of the massive burning of fossil fuels were not known yet, from when coal was first burned it started to reach the atmosphere in the form of carbon dioxide. If it had been kept underground – coal as much as other fossil fuels – rather than burned and released into the atmosphere, what is currently a very quick carbon cycle would have remained instead much slower and more stable.[298] Although at the time no one knew what the carbon cycle was, every London citizen could notice the unusual dark sky of the polluted capital. Coal remained the protagonist among fossil fuels until it was realized that oil brings double the energy per ton of coal. Since the 1960s, oil has overpassed coal as the first fossil fuel used around the world, and its position remains until today.[299]

For as long as a century after the second half of the 19th century, Europe, North America, and Japan were the only regions that could allow an abundant use of cheap energy, and this put them in a position of control and dominance, but also of responsibility for the first drastic environmental impacts. Indeed, their level of industrialization implied that they needed large quantities of raw materials to sustain their economies and population: these also came from plantations. As it will be explained later more in-depth, plantations of coffee, tea, and cacao, among many others, were established by these countries through massive deforestation; the fact that these crops exhaust soils nutrients rapidly encouraged further removal of forests since practices of conservation were too costly. All of this was possible through machinery and transport fuelled by the burning of fossil fuels. Moreover, the new innovative, faster, and more efficient means of transport facilitated colonial and military control as well as enabled the mass migration of the labor force required in the world's plantations.[300]

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[297] Kevin H. O'Rourke and Jeffrey G.Williamson, "When did globalization begin?," NBER Working Paper, no. 7632 (April 2000): 3-20, http://www.nber.org/papers/w7632.

[298] "Deforestation and Climate Change," Annika Dean, Climate Council, August 21, 2019, accessed December 10, 2022, https://www.climatecouncil.org.au/deforestation/.

[299] McNeill, "Entering the Anthropocene," 55.

[300] Ibid., 58-57.

Urbanization is also a consequence of industrialization. In fact, it was not by coincidence that in 1750 the most urbanized countries were the Netherlands, England, and Northern Italy, since these areas were economically more advanced and wealthier than others. By the end of the 19th century, in the second phase of industrialization, chemicals, steel, and oil contributed to higher levels of industrialization in Europe, North America, and Russia. The consequences of urbanization are many: cities are made of concentrations of people who consume vast amounts of fuel and import resources; this makes them great polluters. Before improvements in sanitation were accomplished, cholera and other diseases provoked by pollution were the causes of everyday deaths among city dwellers.[301]

Along with industrialization, growing European prosperity also led to a rise in the demand for distant commodities that could not be produced in the motherland.[302] Moreover, without the improvements in the standard of living, the world's population would not have reached eight billion inhabitants. This was possible through the interrelation of more factors; among these, there is the integration of new nutrient foods in the European diet, such as potatoes and maize; the achievements in medicine – the beginning of modern medicine does not date before the 1880s –; and the improvements in cleanliness and sanitation that reduced the number of germs and diseases.[303] As a result, mortality rates started to decline both in Europe and in colonial towns. [304]

Another relevant factor was the invention of new technologies and machines for the agricultural sector, which turned massive lands into farmland[305] and substituted the labor force. The Second Industrial Revolution also played a crucial role in agriculture: pressure from the growing population and demand for crops led to early attempts to combine the chemical industry with agriculture. The invention of chemical fertilizers and pesticides aimed to restore exhausted soils and led to a constant increase in production per unit of land; at the same time, however, they are one of the main causes of pollution.[306]

Industrialization and growing prosperity enabled a growth of the global population that, in turn, required further industrialization and economic growth – it is estimated that from 1700 to 1900 the

[301] Lynn Lees Hollen, "World urbanization, 1750 to the present," in *The Cambridge World History –Pomeran Production, destruction, and connection, 1750-present: Part 2, Shared Transformations?*, ed. by J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 45-47.

[302] Kenneth Pomeranz and J.R. McNeill, "Production, destruction, and connection, 1750-present: introduction," in *The Cambridge World History – Production, destruction, and connection, 1750-present: Part 1, Structures, Spaces, and Boundary Making*, ed. J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 14-16.

[303] Philip D. Curtin, *The rise and fall of the plantation complex: essays in Atlantic History* (New York: Cambridge University Press, 1990), 147-148.

[304] Hollen, "World urbanization," 47.

[305] Curtin, *The plantation complex,* 147-148.

[306] Pomeranz and McNeill, "Production, destruction, and connection," 14.

global population grew from 679 million to 1.65 billion.[307] This vicious and unsustainable cycle satisfies the needs of eight billion inhabitants of this planet – despite doing it in an unequal way –: this dynamic, in turn, has enormous implications for the environment.

3.3 Imperialism

One of the major actors during the Anthropocene has been imperialism. Imperialism, intended as the creation by Western countries of empires in non-Western countries, was behind the dynamics that link plantations and deforestation, industrialization and economic growth, mass migration, and globalization.[308] As explained before, temperate countries reshaped the worldwide landscapes – as well as their populations and labor structures – to come into possession of those lands where the commodities essential for their economies were produced.

Around 1750, the world was divided into very diverse political units, among which there were land empires, such as the Russian, Ottoman, and Chinese, and overseas empires, which were mainly European. Nonetheless, only the overseas empires will be taken into consideration in this analysis because it is in these spaces that coffee, tea, and cocoa plantations were established. As explained in the previous chapter, at this point in history the Portuguese colonies included Brazil, and some posts on the eastern and western coasts of the African continent, as well as in Goa, Sri Lanka, Macao, and other parts of Asia; Spain had an enormous empire in the Americas and in the Philippines. The Dutch were in South Africa, the Americas, and Southeast Asia, but from the second half of the 18th century, the English – which had colonies in the Caribbeans, North America, and South Asia – took on the role the Dutch had been holding until then in the Indian Ocean. In addition, some 18th-century wars resulted in the English conquests of many territories under the French, which had colonies on the same sides of the world of the English Crown.[309]

Due to the expansion of land and sea empires from 1870 to 1945, the world's map changed several times. In the 1930s, about 85 percent of the planet was either subject to a form of imperial system or was a former European colony, even though the latter could not broad a proper form of independence – they remained objects of economic and diplomatic pressures and dependence of the former colonial empires. The imperial and colonial powers could easily shape the world's borders and even name what was under their control; for instance, the scramble for Africa – that took place at the 1885 Berlin

[307] Sing C. Chew, *World Ecological Degradation: accumulation, urbanization, deforestation 3000 B.C – A.D. 2000* (Boston: AltaMira Press, 2001), 32.
[308] McNeill, "Entering the Anthropocene," 69.
[309] Danielle Kinsey, "Assessing imperialism," in *The Cambridge World History – Production, destruction, and connection, 1750-present: Part 1, Structures, Spaces, and Boundary Making,* ed. J.R. McNeill and Kenneth Pomeranz (Cambridge: Cambridge University Press, 2015), 336.

Conference – refers to the division of Africa and the attribution of its territories to Italy, Spain, Portugal, Great Britain, France, Germany, and Belgium*:* Liberia and Abyssinia were the only African states left aside.[310]

Most of the tropical territories under the European powers were suitable for cacao, coffee, and tea cultivation, specifically those owned by the French and the British. France, besides its influence in different African countries, had territorial possessions also in Asia, as well as the colonies of New Caledonia and French Polynesia; successively, it was given the former German colonies of Cameroon and Togo. In the 1930s, Great Britain, which was France's main enemy on the global scene, was the head of a widespread global empire and had colonies in the Caribbeans, the Indian Ocean, south Asia, Africa, and possessions such as New Zealand, and British Guyana.[311]

Unlike these two great imperial enterprises, the former colonial powers of Portugal, Spain, and the Dutch Republic were no longer as influential as they were in the 16th and 17th centuries. Latin American countries slowly gained independence from the Western countries: at the beginning of the 20th century, Spain – which had lost Cuba and yielded the Philippines, Guam, and Puerto Rico to the United States – only had a few possessions in northwestern Africa. In the same period, Portugal, which had lost Brazil in 1822, still had important colonies in Africa (such as Mozambico) and had some influence in Asia and the western Pacific. The Dutch Republic lost a great part of its colonies: the only expansion during this period took place in the Dutch East Indies.[312]

If the Spanish, Portuguese, and Dutch influence declined, the United States was about to become a superpower on the global scene. The conquest of Hawaii and the acquisition of the Spanish colonies were significant steps for the US.[313]

The global empires built by these countries go hand in hand with the accumulation of capital, population explosion and urbanization, three factors that have caused a profound transformation and degradation of world landscapes, which was manifested with an accelerated pace due to mechanization and driven by mass production. Although many colonies achieved independence in the 18th-19th centuries, these practices continued to support Western consumption patterns. Among the activities destructive to the environment, deforestation aimed at the creation of crop plantations has been one of the most serious.[314]

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[310] Tony Ballantyne and Antoinette Burton, *L'età degli imperi globali: 1870-1945* (Torino: Giulio Einaudi editore s.p.a, 2022), (or.ed. Tony Ballantyne and Antoinette Burton, *Empires and the Reach of the Global* (Harvard University, 2012), ix

[311] Ballantyne and Burton, *Imperi globali,* ix-xv.

[312] Ibid., xv- xvi.

[313] Ibid., xvii.

[314] Chew, *World Ecological Degradation*, 131-132.

3.4 Plantations and Deforestation

As mentioned before, the first plantations in history were of sugar cane and were set up in the eastern Mediterranean at the time of the Crusades. The growing demand of Europeans for foodstuffs and raw materials that could only be produced in tropical climatic conditions led to the establishment of plantations in the New World. There, the combination of African labour imported through the slave trade, European expertise, management capacities, and animal breeding, the newly discovered plants, and the suitable New World's climate and soil, made the perfect conditions for the development of the plantation system.[315] After the discovery of America, plantations were set up in the Caribbean islands and in Brazil; then, they diffused in Latin America and North America (until the Mason-Dixon line), as well as in the Indian Ocean.[316]

The Democratic Revolution – a term which groups some 18th century-political revolutions, such as the French and the American revolutions –[317], its implication in overseas colonies – like the 1789 Haitian Revolution and the abolition of slavery –, and the 19th century-industrialism brought some changes in the plantation complex. Despite an apparent period of crisis, plantations diffused to other parts of the world, such as Africa and Asia, fostered by transport innovation, the slave trade in Africa – which existed until 1880 –, and a cheap Asian workforce.[318]

The plantation complex is not a mere form of "tropical agriculture" but is a system with deep economic, social, and political implications. Industrialization is its hallmark: besides the cultivation phase, commodities are prepared to be transported to the world's markets, particularly those of the Western countries, where such products cannot be grown due to the temperate climate – or, better, they cannot be grown in commercial quantities.[319] In fact, plantations only produce crops that can be grown in the tropics and subtropics – in some cases also in neighbouring regions – and specialize in the production of single products for exportation: among these, there are sugar, coffee, cacao, and tea – tea plantations are also called "gardens" in North India and "estates" in Ceylon.[320]

In other words, plantations are international in nature, because they depend on external countries, markets, and finances. They can be linked to topics such as mercantilism, slavery, movements, and revolutions for independence, imperialism, and capitalism. Until the second half of the 20th century,

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[315] Richard B. Sheridan, "The Plantation Revolution and the Industrial Revolution, 1625-1775," *Caribbean Studies 9,* no. 3 (October 1969): 7-8, https://www.jstor.org/stable/25612146.

[316] Curtin, *The plantation complex,* x.

[317] Ibid.,144.

[318] Leo Waibel, "The Tropical Plantation System," *The Scientific Monthly 52*, no. 2 (February 1941): 158, https://www.jstor.org/stable/17375.

[319] Grigg, "Tea and coffee," 284.

[320] Ida Greaves, "The 'Plantation' in World Economy," *Revista Geografica 23*, no. 49 (2nd Semester 1958): 76-79, https://www.jstor.org/stable/41890098.

one of the main characteristics of plantations was their dependence on a distant metropolitan center (metropolis), which generally, but not always, owned this economic enterprise and influenced it politically and economically: both the capital and the business arrived from distant regions located in the temperate zones.[321] In his essay "the Economics of Agricultural Resource Use and Development in Plantation Economic", George L. Beckford explained that even when there was no direct control from the metropolis, the plantation system remained indirectly politically and economically controlled by these powers.[322] Many argue that the type of commerce between metropolis and plantations was similar to the trade between town and countryside;[323] the plantation system would compel the colonies to trade only with the metropolis.[324]

Another difference between the plantation system and other types of farms is that the former is characterized by the combination of an unskilled workforce, highly technical and scientific expertise, as well as the possibility of investing in costly avant-garde equipment and in the building of factories[325] – processing and packaging equipment were brought to the colonies from the Old World and required massive investments both in the European metropolis and in North America.[326] It could be argued that the commodities produced in plantations were not the first to be cultivated exclusively in specific parts of the world for exportation to foreign markets: as seen before, spices were exported far before the existence of plantations. The difference is that spices did not need the plantation system since mass production was not yet necessary – they were luxury goods, indeed. Another example is sugar, which has been considered a spice for a long time. In the first half of the 20th century, sugar was in a small part still produced outside plantations: for instance, the natives of the Dutch East Indies prepared a syrup-like sugar different from the more popular solid version. This "outdated" technique of sugar production was due to two factors: the lack of capital necessary to build, in this case, expensive sugar mills for producing solid sugar, and the lack of highly technical and scientific expertise able to use them – Europeans have historically considered themselves the sole ones able to run these enterprises.[327]

In plantations, agricultural industrialization goes hand in hand with monoculture. Since each plantation commodity (like coffee or sugar) requires expensive machines designed and built for its sole preparation, this necessarily means that every plantation is dedicated to the production of one

[321] Ibid., 79.
[322] Backford, "Plantation Economies," 324.
[323] Greaves, "The 'Plantation' in World Economy," 79.
[324] Sheridan, "The Plantation Revolution," 9.
[325] Waibel, "The Tropical Plantation System," 156.
[326] Sheridan, "The Plantation Revolution," 9.
[327] Waibel, "The Tropical Plantation System," 156.

only crop.[328] Usually, at first, plantations produce high profits thanks to fertile and virgin soil; however, since crop rotation or periods of fallow are not included in this type of agriculture, the soil is easily and frequently subject to exhaustion. Hence, new varieties of crops, improved irrigation, and massive use of fertilizers come into play,[329] as well as a constant preparation of new arable lands. The resulting high sensitivity of monocrops to external factors, such as climate change or market prices, explains why many plantation areas have shifted to the cultivation of other products – Ceylon shifted from producing cinnamon to coffee, cinchona, tea, and then rubber.[330]

Plantations are strictly linked to the practice of deforestation. Deforestation is responsible for the release of CO2 emissions into the atmosphere, which, in turn, exacerbate global warming. Indeed, trees and plants absorb CO2 from the atmosphere by rendering forests important carbon sinks: forest clearing impedes this natural process to occur while it causes the release of the CO2 stored in trees.[331] It is estimated that nowadays, 11 percent of CO2 emissions are due to deforestation.[332]
Although practices of clearing forested land have existed for as long as people have lived on this planet, from the 18th century onwards, a massive amount of trees in Eurasia, North America – in these two, forests slowly returned –, Latin America, Africa, and Southeast Asia were cut or burned by humankind due its need for farmland and timber.[333] In the last three centuries, 12 million km^2 of forests and woodlands have disappeared, and at the end of the 20th century, about 18 million km^2 were under cultivation.[334] In around 1910, the forest cover was at its lowest point in history, and after 1950, it decreased by about 60 percent.[335] As reported in the 2020 FAO report *The state of the World's Forests*, in 2020, the global forest cover corresponded to 30.8 percent, while, in 1990, the percentage was of 32.5. Africa and South America are the two areas that experienced the greatest loss from 2010 to 2020. Conversely, Europe and Asia have reported a reversed pattern of forest gain in the last three decades.[336]

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[328] Ibid., 157.
[329] Backford, "Plantation Economies," 340.
[330] Waibel, "The Tropical Plantation System," 157.
[331] United Nations Environment Programme, *Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies* (Nairobi: United Nations Environment Programme, 2022), 58. https://www.unep.org/resources/emissions-gap-report-2022.
[332] "Green Climate Fund approves FAO project to reduce emissions by promoting zero-deforestation cocoa production in Côte d'Ivoire," FAO, August 19, 2020, accessed January 7, 2023, https://www.fao.org/africa/news/detail-news/en/c/1304298/.
[333] McNeill, "Entering the Anthropocene," 73-74.
[334] Navin Ramankutty and Jonathan A. Foley, "Estimating historical changes in global land cover: Croplands from 1700 to 1992," *Global Biogeochemical Cycles 13*, no. 4 (December 1999): 997-998. doi/10.1029/1999GB900046.
[335] McNeill, "Entering the Anthropocene," 73-74.
[336] FAO and UNEP, 2020. *The State of the World's Forests 2020. Forests, biodiversity and people* (Rome: FAO, 2020), 10-11. https://doi.org/10.4060/ca8642en.

As argued above, the profound reshaping of landscapes throughout the world has been dictated by a growing demand for commodities that could not be produced in the motherland. Indeed, the leading cause of deforestation is large-scale agriculture, which is, in turn, driven by market pressures and food preferences of the worldwide population.[337] Once again, the countries responsible for massive practices of deforestation are the same that built global empires and established plantations: in the 18th-19th century, the political-economic interests of Great Britain, France, Belgium, Portugal, Spain, Italy, Holland, and later the United States, were responsible for a global trend of deforestation. Between 1700 and 1850, 128 million hectares of forested land were cleared to obtain land for crop cultivation.[338]

Latin America can be considered the symbol of the European-agricultural imposition: entire forests were cleared to be turned into, for instance, sugar, coffee, and cacao plantations, to the point that wood began to lack and had to be imported from Europe.[339] Asia was subject to large-scale deforestation, too. By the end of the 19th century, 187 million acres of land were cultivated to respond to colonial demands for wood or cash-crop cultivation. Even though the Indians had already transformed the environment for their agricultural purposes, British colonialism and export trade policy in India were the main drivers of this process. Crops cultivated in the Indian lands were sold to the global market at a price five times higher than food crops: for this purpose, southeast Delhi suffered from the removal of 6 million acres of forested land, resulting in environmental impacts such as soil erosion and salinization; in addition, the increased land temperatures and hot winds caused periods of droughts in the second half of the 19th century. Moreover, it should be remembered that deforestation for crop plantations goes hand in hand with forest removal to make room for railroads and railways to transport goods for the export market. [340]

In the 19th century, trade in Southeast Asia was controlled by European powers, as it has been in the previous centuries: the territories from India to Burma, some colonies in the Malayan archipelago, and Borneo were under British hegemony, Indonesia was controlled by the Dutch, and Indochina by the French; the Philippines were under Spanish dominion – before being yielded to the United States. Needless to say, the forest cover of these countries was drastically reduced for the work of European empires in search for territories to transform into arable land for sugar or coffee cultivation, for instance, for the export trade, or for wood to use as fuel for processing such commodities and for building construction. To give an example, the island of Luzon in the Philippines was subject to intense deforestation because its trees were required in the form of fuel for sugar refineries; research

[337] FAO and UNEP, *World's Forests 2020,* 82.
[338] Chew, *World Ecological Degradation*, 132-133.
[339] Andrew Isenberg, ed., *The Oxford Handbook of Environmental History* (New York: Oxford University Press, 2014), 158-160.
[340] Chew, *World Ecological Degradation,* 136.

on deforestation in the Philippines has shown that before the arrival of the US, trees covered 70 percent of the archipelago's surface. The consequences for the environment were (and still are) many, including soil erosion, loss of soil fertility, and loss of biodiversity. [341]

In the 20th century, the removal of forests continued. Indeed, the decolonization of Africa and Asia did not change such practices: on the contrary, with the aim to build their nation-states and modernize, countries from the two continents initiated developmental plans supported by foreign aid from former colonial countries and Western multinational corporations. These "modern" plans required the exploitation of the natural resources of each country, as well as cheap labor available to work in sectors that, according to neocolonial policies, would have modernized the newly independent nations: the establishment of monoculture cash-crop plantations and highway and railway construction shaped the environment to a large extent. Africa would host 15 percent of the world's forests, mainly in the west and equatorial central Africa: by 1995, half of it had disappeared. With regard to Southeast Asia, in the late 20th century, the process of deforestation was more intense than ever. In short, in the 1960s and 1980s, many agreements were made with former imperial countries based on Western models of modernization, industrialization, and development: the main goal was the strengthening of the export-oriented economy; the signatories were local political elites and merchants as well as foreign companies and agencies that supported the operations through financial aids and advice.[342]

Nowadays, the forests of what has been named by the West the "Third World" continue to be cut to meet the demands of the global market. In addition, with the world's population that is expected to grow to 9.5 billion people by 2050, current deforestation processes for agricultural purposes might be nothing compared to future ones.[343]

3.4.1 Coffee plantations: Latin America

Coffee is the first drink in Europe – but not in Great Britain and Ireland – and is widely appreciated in the United States. Specifically, 71 percent of the world's coffee is drunk in temperate countries and the most appreciated varieties come from the trees of *coffee arabica* and *coffee canephora (robusta)*, despite there being also other varieties – every coffee producer of the world focuses on the cultivation of one specific variety according to commercial requests or for historical reasons.[344] The entirety of coffee production takes place in the tropics, which host different microclimatic and

[341] Ibid., 136-138.
[342] Ibid., 140-143.
[343] Ibid., 141.
[344] Grigg, "Tea and coffee," 283-284.

physical conditions suitable for more varieties of beans: most of the production is concentrated between the Tropics of Cancer and Capricorn, in what has been called the "Coffee Belt".[345]

Coffee, which is the most valuable agricultural commodity, corresponds to a great part of the value of some Latin American countries' total exports[346]. Coffee exportation mainly derives from South and Central America[347] where frequent rainfall, temperature and soil characteristics of mid- and high-altitude areas form the perfect conditions for the growth of the African shrub.[348] In the 19th century, Latin America, and particularly Brazil, has become the main producer of coffee: in 1910, only one-tenth of the world's coffee was not produced in this region; its production declined to the present 60 percent after Southeast Asia and East Africa began growing coffee substantially in the 1920s.[349]

The coffee industry is mainly composed of small coffee farms and highly managed plantations: both respond to commercial requirements and are based on intensive farming. The production of coffee from seed to one's small cup unfolds through many steps of a chain connecting farmers to roasters (coffee companies). This chain usually includes the "middlemen", exporters, government, and importers, even though these can differ depending on the country and the industry. In some cases, some cooperatives or farms carry out several production processes at the same time: [350] for example, small agricultural cooperatives also deal with processing and export, and plantations usually have a mill on site. On the other hand, small farms only focus on agriculture[351] – the vast majority of Costa Rica's coffee industry, which is a large exporter of coffee, consists of small farms that own five to less than twenty hectares of land.[352]

From when coffee beans are planted below the tropical ground until when our coffee maker is filled with ground coffee, coffee production divides into ten steps. Firstly, the seed is planted in shaded nurseries; once robust, it is permanently planted during the wet season. After 3 or 4 years, the shrub begins to bear red fruits, called coffee cherries, which are harvested once they reach a deep red colour: in the harvest period, generally occurring once a year, the picking of the crop can be done either by hand or through a mechanized process, as it happens in the flat Brazilian lands. After the harvest, the cherries are processed either through the age-old dry method, which is used in places where water is

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[345] Melissa Vogt, "The international coffee industry," in *Variance In Approach Toward A 'Sustainable' Coffee Industry In Costa Rica: Perspectives from Within; Lessons and Insights* (Ubiquity Press, 2019), 42-43. https://www.jstor.org/stable/j.ctv11cvx7c.10.

[346] Grigg, "Tea and coffee," 283-284.

[347] Greaves, "The 'Plantation' in World Economy," 83.

[348] Robert A. Rice, "A Place Unbecoming: The Coffee Farm of Northern Latin America," *Geographical Review 89*, no. 4 (October 1999): 557. http://www.jstor.com/stable/216102.

[349] Grigg, "Tea and coffee," 286-287.

[350] Vogt, "The international coffee industry," 39-46.

[351] Melissa Vogt, "Overview of the contemporary Costa Rican coffee industry," in *Variance In Approach Toward A 'Sustainable' Coffee Industry In Costa Rica: Perspectives from Within; Lessons and Insights* (Ubiquity Press, 2019), 77. https://www.jstor.org/stable/j.ctv11cvx7c.12.

[352] Vogt, "Costa Rican coffee industry," 68.

not abundant – they are raked, turned several times, and covered in case of rainfall and at night until the moisture decreases – or through the modern wet method. The latter requires the removal of the pulp from the skin through a pulping machine; then, the beans go through some water channels and rotating drums to be separated by size. Successively, they are inserted in water-filled fermentation tanks that remove a layer of mucilage from the bean; after being further washed, they are ready to be dried. In the drying phase, the fermented beans are sun-dried on tables that regularly turn them – this process is specific to the wet method. Before being exported, the hulling machines remove another layer from the beans; later, they are sized and sorted to make sure that only the finest quality is exported: after the milling phase, what is now called "green coffee" can be exported. Before being roasted, however, coffee beans are tasted by the "cuppers", who evaluate their quality. Once approved and exported, green beans pass through the roasting machine – usually of the importing country, since they must be consumed as quickly as possible – at very high temperatures: here, coffee beans acquire their brown color. At this point, coffee is ready to be ground and brewed.[353]

Coffee production is well-known for its impacts on the environment: the first comes from deforestation, which is the main cause of soil erosion. In the 1830s, in Brazil coffee replaced sugar cane as the first cultivated product: the forests of Minas Gerais and Espirito Santo were the first to be removed to make room for coffee plantations. The fresh air of those hills seemed perfect for the growth of coffee trees, but the consequent erosion of the soil made these lands unsuitable for continuing cultivation and were abandoned: the solution was the removal of the Brazilian internal forests. At the end of the 19th century, Brazil lost 7.5 million acres of forests because of coffee. Railroad construction to create and reach plantations was responsible for deforestation, too: by the end of the 1800s, 6 thousand kilometers of railroads took the place of millions of south-eastern Brazilian trees; their maintenance required wood and, thus, further trees. Throughout the 20th century, Latin America continued to cultivate export cash crops such as sugar and coffee: virgin forests were easily removed in great quantities thanks to bulldozers, tractors, and other technologies.[354]

In addition to deforestation, intensive cultivation techniques for maximizing yield have a strong impact on the environment and biodiversity. It is widely recognized that plantations release a large number of nitrates into the soil. Moreover, during the processing phase of coffee berries, water contamination is common: when berries are washed to obtain coffee beans, the pollutants contained in them – which after fermentation become very acidic – are released into the water. [355] Usually, coffee processing factories discharge into the environment chemicals such as boron, chloride and

[353] "10 Steps from Seed to Cup," NCA, accessed January 4, 2023, https://www.ncausa.org/about-coffee/10-steps-from-seed-to-cup.
[354] Chew, *World Ecological Degradation*, 135-141
[355] Vogt, "Costa Rican coffee industry," 79-80.

arsenic. In Salvador, more than 200 factories are accused of contaminating the rivers of the country, while in Nicaragua, 37 plants were allowed to discharge toxic substances into Lake Managua.[356]

Another indirect cause of deforestation, deterioration of land, and agricultural soils is the overexploitation of natural resources by the Latin American impoverished peasantry. This happened especially in the 1960s and 1970s when peasants did everything they could to sell their labor power to the capitalist sector and provide for their families. Contrary to the more sustainable traditional agricultural techniques, to be employed, peasants had to adopt some practices that neglected soil conservation and provoked its erosion and loss of fertility. In other words, the capitalistic sector led to an ecological crisis, but it was, in turn, dependent on environmental exploitation.[357]

In his essay "Imperialism, Revolution, and the Ecological Crisis of Central America", Daniel Faber gives an overview of the ecological and human conditions promoted by US imperialism in Central America for the establishment of capitalist export agriculture and industry. After the Second World War, Central American countries did not experience the same economic boom as the United States and remained dependent on the markets of the First World country: coffee and banana were the main export commodities of this world's region and guaranteed 90 percent of Costa Rica's, El Salvador's, and Guatemala's profits. With US economic and military aid aimed to promote the establishment of large-scale agricultural estates, forests, and wildlife habits were destroyed to leave space for "latifundios" specific to the production of export crops, including coffee. Foreign financial aid supported the expansion and improvement of coffee farms in Costa Rica and Honduras. Hence, through the Alliance for Progress – the multibillion-dollar US aid program for Latin America – Central America became part of the world economy with the role of supplier of non-expensive agricultural products and raw materials. However, the development of capitalist agriculture brought further inequalities and a much deeper economic dependence on the US; it had profound ecological impacts, too. Indeed, to support the maximization of productivity, costs were minimized to the point that environmental and safety regulations were inexistent: industries were free to damage the environment without any consequence – apart from the ecological and social ones. In other words, the Alliance has allowed the construction of different types of industries responsible for pollution and negative externalities, such as polluted water and the resulting health problems, which have caused the death of many people; among the guilty appear pesticides-formulation plants and coffee processing factories. [358]

[356] Daniel Faber, "Imperialism, Revolution, and the Ecological Crisis of Central America," Latin American Perspective 19, no. 1 (Winter 1992): 22, https://www.jstor.org/stable/2633550.
[357] Faber, "Imperialism, Revolution, and Ecological Crisis," 27-28.
[358] Ibid., 17-22.

The 20th century's neoliberal economic policies were aimed at the modernization of agricultural techniques. Along with this, the International Coffee Organization's agreement emphasized quantity over quality in coffee production – also the World Bank and other multilateral agencies promoted coffee expansion, technification, and "optimization" of production. For this reason, in North Latin America, most coffee fields have been subject to intensification, with more and more areas of this region having industrialized coffee production after the second half of the century. If initially, local farmers refused to adapt to new agrochemical strategies, a fungal disease that affected the cultivation of coffee in Brazil in 1970 convinced even the least inclined to modernize – the modern techniques included the use of chemical fertilizers, such as insecticides, herbicides, and fungicides. Moreover, if traditional coffee plantations could boast a system of shade with trees of 25 meters, the height of the shade trees used in modern systems – trees that, besides, are almost non-existent – do not exceed 8 meters. In recent times, agronomists have explained the importance of shade for protection against strong winds, freezing, hail, and heavy showers of rain – the canopy helps to hinder erosion caused by wind and water –, for the absorption of moisture, and because it softens the fluctuation in temperature and humidity. The modern technified farms are shadeless (or near) because the first US documents related to the pruning of coffee shrubs also imposed the pruning of shade trees: in this way, coffee shrubs are much more exposed to natural risks because the absence of shade trees alters the ecological balance. In short, traditional shade coffee systems are proper habitats rich in biodiversity, while modern coffee systems are more similar to industries.[359]

3.4.2 Tea plantations: Asia

Despite the leading role of coffee among agricultural commodities, tea is the second most consumed drink in the world, only after water.[360] Indeed, tea is preferred to coffee in almost all the African continent, in the countries of the former Soviet Union, and in Asia – apart from the Philippines, Israel, and South Korea. Asia is the first world tea producer, followed by East Africa, while in the Americas, only Argentina is relevant for production.[361]

Despite the cultivation of the tea plant – namely, *camellia Sinensis* – taking place near the Equator, India and China mostly grow tea in the subtropics.[362] China is the first producer of tea, although it only exports a small percentage of what it produces. Tea cultivation in China relies on tea gardens

[359] Rice, "A Place Unbecoming," 554-568.
[360] "Markets and Trade: Tea," FAO, accessed January, 4, 2022, https://www.fao.org/markets-and-trade/commodities/tea/en/.
[361] Grigg, "Tea and coffee," 283-287.
[362] Ibid., 284.

owned by Chinese families, but exportation is still mainly controlled by the state.[363] In India – which comes second after China for tea production – tea industry is one of the largest of the country.[364]

The history of Indian tea production began at the time of English imperialism. When the Mughal Dynasty disintegrated, the English, French, Dutch, and Portuguese competed for the Indian lands: in 1877, Queen Victoria of England was proclaimed Empress of India. However, the history of the strict relationship between tea and England began when the English conquered Assam. In 1838, the first eight crates of tea produced in this Indian state were sent to England; Thomas Twining, who at the time was an English tea merchant, immediately understood the potential of the Assam tea.[365]

Tea plantations in Assam were run by English "tea planters" who had to manage the work of the "coolies": the latter took care of everything else, from deforestation to tea transportation, apart from the harvest, that at the time was carried out by women – at the turn of the 20th century, 40 percent of tea plantation workers were women.[366] By the 1840s, large-scale deforestation was carried out in Assam for tea (and coffee) plantations.[367] At the beginning of the 20th century, the colonial culture was still present in this region: local tribes living in forests increasingly saw their habitat destroyed to make room for tea plantations – along with coffee and cotton ones –: the only way out was to work for their new masters. [368]

The English brought tea to the Indian Eastern Himalayan piedmont, in West Bengal. In Darjeeling, which is a town on the foothills of the Himalayas, tea plantations were created by growing some Chinese leaves and others imported from Assam: in 1872, the Italian Louis Madelli managed as much as six hundred hectares of tea plantations, which, considered the strict area of Darjeeling, is a lot.[369]

Another important area of West Bengal is Jalpaiguri District, which plays a prime role in tea manufacturing and production. After 1865, the District fell under the British Empire: at the time it was covered by a thick forest inhabited by an indigenous population; then, the first tea garden was inaugurated in 1874.[370]

The increasing process of deforestation in Jalpaiguri District, Assam and Darjeeling Himalaya to meet global demands for tea led to a dominance of tea plantations to the detriment of forests. Probably, the establishment of the first tea estate in Jalpaiguri corresponds to the first practice of

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[363] Linda Reali, *Storie del tè: monaci e mercanti, regine e avventurieri* (Roma: Donzelli Editore, 2019), 237-238.

[364] Pawel Prokop, "Tea plantations as a driving force of long-term land use and population changes in the Eastern Himalayan piedmont," *Land Use Policy 77* (2018): 52. https://doi.org/10.1016/j.landusepol.2018.05.035.

[365] Reali, *Storie del tè*, 174-177.

[366] Ballantyne and Burton, *Imperi globali,* 33.

[367] K. Sivaramakrishnan, "Science, Environment and Empire History: Comparative Perspectives from Forests in Colonial India," *Environment and History 14*, no. 1 (February 2008): 44, https://www.jstor.org/stable/20723651.

[368] Reali, *Storie del tè*, 241-242.

[369] Ibid., 179.

[370] Prokop, "Tea plantations Himalayan piedmont," 52.

deforestation in this zone. Forests were also removed to make room for factories for tea processing, areas for nurseries, and other empty lands for future plantations – this occurred only in large plantations Between 1874 and 2010, forest cover decreased by 69.5%, and about half of it was converted into tea plantations. This has led to a loss of biodiversity and soil fertility,[371] so much so that, in recent years, Assam tea growers have complained of problems of low land productivity.[372]

The journey of tea from cultivation to everyone's cup is quite a long process. Before leaves are ready to be harvested it takes three years – in the tropics, harvest is done continually throughout the year. Usually, tea plants – which are perennial evergreen plants –[373] can reach up to 20 and 30 meters in height, but they are pruned to be easily reachable.[374] Once plucked, the tea leaves are sorted according to size; then, they are processed at the tea factory before being inserted in their little tea bags – this process takes no longer than twenty-four hours. In the beginning, teas are more or less the same: the difference in flavors is given by the next phases. For instance, to make black tea there are two methods: the most used is the Orthodox Method, which is composed of six steps – withering, rolling, oxidation (fermentation), drying, sorting, and packaging. In the first process, tea leaves are placed over a wire mesh and dried for about fifteen hours to reduce their natural moisture; then, they are passed through a rolling machine that turns them and makes them thin; at this point, tea can be oxidated. Oxidation is the process that differentiates tea: leaves are put on tables and left there for no more than two hours at 26C: the more they stay there, the more they react with air, and the more the color is intense and the taste strong – green tea is the only variety in which this process is skipped. Finally, leaves are dried once again, until they reach 3 percent of moisture; now, they can be sorted and packed.[375]

In addition to deforestation, tea factories have other environmental impacts. First, they rely heavily on energy, especially in the drying phase of tea, where dryers are powered by gas, diesel and even firewood – which cause further deforestation.[376] According to a study on GHG emissions in Sri Lanka's tea industries, the packaging phase is responsible for the highest release of CO2 emissions.[377]

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[371] Ibid., 53-58.

[372] "Tea Sector In Assam Facing Worst Existential Crisis In History," Vishal Pareek, Gplus, May 10, 2022, accessed January 3, 2022, https://www.guwahatiplus.com/exclusive-news/tea-sector-in-assam-facing-worst-existential-crisis-in-history.

[373] Mainaak Mukhopadhyay, "Cultivation, Improvement, and Environmental Impacts of Tea," *Environmental Science*, April, 26, 2017, https://doi.org/10.1093/acrefore/9780199389414.013.373.

[374] Mukhopadhyay, "Environmental Impacts of Tea," 2.

[375] "How Is Tea Made - All About the Process," Twinings, accessed January 5, 2022, https://twinings.co.uk/blogs/news/how-is-tea-made.

[376] J. Vidanagama and E. Lokupitiya, "Energy usage and greenhouse gas emissions associated with tea and rubber manufacturing processes in Sri Lanka," *Environmental Development 26* (2018): 47, https://doi.org/10.1016/j.envdev.2018.03.006.

[377] Mohan Munasinghe, Yvani Deraniyagala, Nisitha Dassanayake, and Harshani Karunarathna, "Economic, social and environmental impacts and overall sustainability of the tea sector in Sri Lanka," *Sustainable Production and Consumption 12* (2017): 162,https://www.researchgate.net/publication/319309412_Economic_social_and_environmental_impacts_and_overall_sustainability_of_the_tea_sector_in_Sri_Lanka.

Electricity, diesel, and oil are also required for land preparation, leaves collection, transport and other management activities.[378]

Studies carried out by environmental associations criticized the use of pesticides not allowed by European law in countries such as India, China, and Kenya.[379] The 2012 Greenpeace report called "Pesticides: Hidden Ingredients in Chinese Tea" explains that after some tests conducted on nine famous Chinese tea companies, several samples presented illegal pesticides toxic both for human and environmental health.[380] The massive use of pesticides, insecticides, and weedicides can have drastic environmental impacts, such as soil degradation, erosion, and loss of fertility. To give some examples, manual weeding through scrapers in Sri Lanka provoked a loss of up to 30 cm of topsoil, which resulted in soil erosion of 40 metric tonnes. The extensive and erroneous use of insecticides can destroy biodiversity by killing beneficial insects.[381] Moreover, nitrogenous fertilizers reduce the capacity of shade trees to fix nitrogen – like for coffee, shade trees are essential for tea plantations.[382] To make things worse, nitrogenous fertilizers can also cause the release of other substances in the ground that might leach into rivers. Water contamination is common in tea factories in underdeveloped countries which cannot afford effluent treatment plants.[383]

3.4.3 Cacao plantations: Africa

Cacao is produced in Africa, Latin America, Indonesia, and Papua New Guinea. However, as much as 70 percent of the global cacao supply comes from West African smallholder farmers.[384] Specifically, Côte d'Ivoire is the largest cacao supplier and producer of the world – one-third of the world's cocoa supply is imported from this country –[385], followed by Ghana. Parallelly, the European Union imports as much as 60 percent of the world's cacao, which makes it the world's largest importer. [386]

As highlighted in the second chapter, initially, the spread of chocolate was slower than that of tea and coffee. In the 19th century, however, chocolate consumption experienced a boom thanks to

[378] Vidanagama and Lokupitiya, "Tea manufacturing in Sri Lanka," 47.
[379] Reali, *Storie del tè*, 255.
[380] Greenpeace, *Pesticides: Hidden Ingredients in Chinese Tea* (Greenpeace, 2012), 2.
[381] Mukhopadhyay, "Environmental Impacts of Tea," 14-15.
[382] Ibid., 5.
[383] Ibid., 15.
[384] FAO and UNEP, *World's Forests 2020,* 90.
[385] "Zero-deforestation cocoa sweetens World Food Day," FAO, accessed January 4, 2022, https://www.fao.org/climate-change/news/detail/en/c/1314699/
[386] "EU boosts sustainable cocoa production in Côte d'Ivoire, Ghana and Cameroon," Directorate-General for International Partnerships, European Commission, January 26, 2022, accessed January 4, 2022, https://international-partnerships.ec.europa.eu/news-and-events/news/eu-boosts-sustainable-cocoa-production-cote-divoire-ghana-and-cameroon-2021-01-26_en

innovations that eased the preparation. Indeed, before the establishment of the chocolate industry, only a few had the privilege – and patience – of making hot chocolate at home, especially because cacao beans and equipment for preparation, such as a mortar and pestle, were expensive. Things began to change when the first chocolate businesses and factories were inaugurated during the second half of the 18th century, supported by mechanization thanks to the industrial revolution. Parallelly, cacao plantations were increasingly established throughout the world and raw cacao started to be mass-produced.[387]

Although the first African cocoa plantation was opened in São Tomé in the early 19th century, cocoa production in Africa developed considerably from the 1870s in British and French possessions.[388] During the 20th century and after the independence of West African British colonies (Ghana and Nigeria) and French colonies (Cameroon and Côte d'Ivoire), Great Britain and France continued to indirectly control the cacao market through marketing boards that recalled the colonial ones. Only in the mid-1980s, these West African countries began to privatize this sector through a series of reforms.[389]

Cocoa processing starts with the harvesting of its beans, which is done through the cutting of the ripe seed pods from the trees. Once harvested, cacao plantation workers remove the interior beans along with the pulp attached aided with machetes. Then, cacao beans are laid on tables for fermentation, which might require up to seven days, and are turned several times to be drained away. Once they fill with moisture and acquire a reddish-brown color, they are sun-dried to reach 7,5 percent of moisture. Successively, it is the turn of the roasting phase, which gives the flavor to cocoa, followed by a winnowing (or cracking) process, where the shell and meat (nib) of the bean are separated. The nib is then ground to obtain the cacao butter, and to form what is called "chocolate liquor", or cocoa mass – here, there is an optional process of alkalization, followed by roasting and grinding. In the phase related to chocolate manufacturing, the different combinations of cocoa liquor, cocoa butter, and sugar create the varieties of chocolate. Conching is the most complex procedure: conche machines develop the flavor of chocolate. Finally, liquid chocolate is cooled down after being poured into bars

[387] Annerose Menninger, "New beverages in early modern Europe: The rise of coffee, tea and chocolate (16th-18th century)," in *Il cioccolato – Industria, mercato e società in Italia e Svizzera (XVIII-XX sec.)*, ed. Francesco Chiapparino and Roberto Romano (Milano: FrancoAngelil s.r.l., 2007), 237-238.

[388] F.N. Howes,"The Early Introduction of Cocoa to West Africa," *African Affairs 45*, no. 180 (July 1946): 152-153, https://www.jstor.org/stable/719425.

[389] P. Abbott, "Cocoa and cotton commodity chains in West Africa: Policy and institutional roles for smallholder market participation," in *Rebuilding West Africa's Food Potential,* ed. A. Elbehri (FAO/IFAD, 2013), 258-259.

or blocks.[390] For producing cocoa powders, hydraulic pressing is used to transform cocoa liquor into cocoa butter and cocoa cakes, which then will be ground to obtain the powder.[391]

The cocoa supply chain splits into more activities – the one specific to Cameron has been taken as an example. Production occurs at the level of small farms held by minor farmers. The latter sell their beans to agents or directly to cooperatives, which, in turn, give them to exporters (either local or multinational) waiting at the port. From the port, cocoa beans arrive at processors that transform them into the desired product (butter, powder, liquid). Generally, fermentation and drying are carried out in cocoa farms – although sometimes drying might be done by traders at the port or in cooperatives –, while, usually, developed countries take care of cocoa processing.[392]

In the last decades, cocoa production has been attacked and accused of risky working conditions and for its environmental impacts. Deforestation and forest degradation associated with cocoa production are unfortunately increasing: Côte d'Ivoire is guilty of having one of the highest rates of deforestation ever recorded – in the 1970s and 1980s, about 90 percent of cocoa expansion entailed the removal of forests;[393] between 2019 and 2020, 2 percent of forest cover was lost.[394] Agriculture is accountable for two-thirds of forest removal in this country, and about 40 percent of it is caused by the global demand for cocoa.[395] Moreover, although several stakeholders, such as chocolate companies – the chocolate industry in 2017 bought 43 percent of all cacao produced during that year –[396], are encouraging and financing deforestation-free production, this seems to hardly affect this practice, which continues even in protected places.[397] When cacao plantations are affected by diseases, the solution usually consists in abandoning the area and searching for new virgin forests.[398]

In cacao plantations, the three shade systems that can be used are the rustic cocoa, zero, and planted shade system. The rustic cocoa method is richer in shade trees and thanks to the high percentage of shade, canopy biodiversity is higher than in the other two meethods. In the zero-shade system, biodiversity and soil fertility are much more threatened. In many cases, in a cocoa production cycle, shadow trees are planted to protect young cocoa trees; however, they are removed when the plants

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[390] "Processing Cocoa," ICCO, accessed January 8, 2022, https://www.icco.org/processing-cocoa/.

[391] Anett Winkler, "Coffee, Cocoa and Derived Products (e.g. Chocolate)," in *Food Safety Management*, ed. Yasmine Motarjemi and Huub Lelieveld (Academic Press, 2014), 269.

[392] Abbott, "Cocoa in West Africa," 260-261.

[393] Robert A. Rice and Russell Greenberg, "Cacao Cultivation and the Conservation of Biological Diversity," *Ambio 29,* no. 3 (May 2000): 169. https://www.jstor.org/stable/4315022.

[394] VividEconomics, *State and Trends of Deforestation in Cote d'Ivoire (2019-2020)* (United Kindgom: VividEconomics, 2020), 2.

[395] "Green Climate Fund approves FAO project to reduce emissions by promoting zero-deforestation cocoa production in Côte d'Ivoire," FAO, August 19, 2020, accessed January 7, 2022, https://www.fao.org/africa/news/detail-news/en/c/1304298/.

[396] "Zero-deforestation cocoa sweetens World Food Day," FAO, accessed January 4, 2022, https://www.fao.org/climate-change/news/detail/en/c/1314699/.

[397] "Green Climate Fund approves FAO project to reduce emissions by promoting zero-deforestation cocoa production in Côte d'Ivoire," FAO, August 19, 2020, accessed January 7, 2022, https://www.fao.org/africa/news/detail-news/en/c/1304298/.

[398] Abbott, "Cocoa in West Africa," 266.

have grown. As seen with tea and coffee, a lack of shade trees leads to a loss in productivity, and intense use of fertilizers is often required. [399] An analysis carried out on the environmental impacts of cocoa production shows that the production and the application of fertilizers and pesticides have an important role in this. However, the industrial processing stage, as well as energy consumption during boiling and roasting, causes the most harmful environmental impacts.[400]

3.4.4 Sugar

Throughout this thesis, sugar has been mentioned many times in the context of luxury goods, for being the first crop in history to be grown in plantations, and for its connection with coffee, tea, and cocoa – sugar is the sweetener that made Europeans like the three beverages. In short, while in the native countries, the three drinks were preferred bitter, in Europe, the addition of sugar to coffee and tea is still a fundamental step for most consumers of coffee and tea. As for chocolate, most will agree on how difficult it is to eat a chocolate bar with 0 percent sugar.

From the time the very first sugarcane plantation was established, the world's forest cover was reduced: from the hills of Madeira to the Canaries and Azores, trees were removed to make room for plantations and sugar mills, while soil erosion and degradation followed: the ecosystem of the Canaries was the first victim of European imperialism – only in the 20th century, soil fertility was partly restored thanks to programs of reforestation. Once sugar was brought overseas, the same happened: extensive works of deforestation were carried out in coastal Brazil and in the Caribbeans, the environment was transformed, and ecosystems were degraded. By 1665, the island of Barbados was left with a small forest and with little biodiversity.[401]

In short, commercial sugar production can be considered the greater exploiter of the tropical American environment – and of its social systems. As for every agricultural crop, these practices were intensified due to the building of transport infrastructures. Finally, when the United States rose as a world power, large-scale sugar production displaced small producers. What Richard P. Tucker in *Insatiable Appetite* calls the "sweet tooth of Europeans and Americans" has dictated the patterns of sugar production and caused the consequent environmental impacts.[402]

Among other environmental impacts figure the use of pesticides and fertilizers and the release of CO2 emissions by sugar mills, as well as the chemicals used to extract the sucrose. The latter turn into

[399] Rice and Greenberg, "Cacao Cultivation," 168-171.
[400] Augustine Ntiamoah and George Afrane, "Environmental impacts of cocoa production and processing in Ghana: life cycle assessment approach," *Journal of Cleaner Production 16* (2008): 1738, doi:10.1016/j.jclepro.2007.11.004.
[401] Richard P. Tucker, *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World* (University of California Press, 2000), 18-22.
[402] Ibid., 60-61.

wastewater, which is generated at nearly all phases of sugar processing: unfortunately, when the industrial effluents enter waterbodies, they contaminate the marine environment and have severe impacts on the fauna and flora.[403]

3.5 Food systems and greenhouse gas emissions

The release of greenhouse gas emissions into the atmosphere is the cause of climate change. Specifically, energy corresponds to nearly three-quarters of global emissions, while agriculture comes second.[404] According to the IPCC Special Report on Climate Change and Land (2019), the Agriculture, Forestry and Other Land Use (AFOLU) sector accounts for about 25 percent of all GHG emissions, a portion of which is emitted in food systems and agricultural value chains.[405] Moreover, the food system is responsible for about 30 percent of the world's total consumption of energy: the activities behind coffee, tea, cocoa, and sugar production are responsible for deforestation and land clearing, the production and use of fertilizers, as well as for the energy consumption required in farms, including the packaging and distribution phases.[406]

[403] Nadia M. Akbar and Mahmood A. Khwaja, "Sugar Production," in *Study on Effluents from Selected Sugar Mills in Pakistan,* (Sustainable Development Policy Institute, 2006), 9-14. https://www.jstor.org/stable/resrep00611.6.
[404] "Historical GHG Emissions," Climate Watch, accessed December 7, 2022, https://www.climatewatchdata.org/ghg-emissions.
[405] FAO and CAAS, *Carbon neutral tea,* vii.
[406] "Climate Action Fast Facts," United Nations: Climate Action, accessed December 20, 2022, https://www.un.org/en/climatechange/science/key-findings.

4. TOWARD SUSTAINABLE AGRICULTURE

Our planet is currently facing global warming, and for the first time in history, the fault has been attributed to humankind. Greenhouse gas emissions into the atmosphere have indeed intensified as never before from the times of industrialization and with the massive practices of deforestation and changes in land use, carried out by some powers in response to the demands of the global market for agricultural commodities, fuelwood, and for infrastructure building. Along with this, the improved standard of living led to a growth in the world population that has rendered this cycle unsustainable. Since the realization that the world is experiencing a substantial increase in temperatures, international agreements and world conferences have been held by countries throughout the planet to discuss potential sustainable solutions to limit CO2 emissions and, thus, the rise in temperatures. Despite the first underestimations of the issue, the 2015 Paris Agreement finally confirmed that the international community is facing a global problem; sustainability has become the rule to combat climate change. The general goal of the treaty is to prevent temperatures from rising by 2C above preindustrial levels: to do this, net zero emissions must be reached by 2050. Parallelly, the interconnectedness of the goals set by the 2030 Agenda for Sustainable Development emphasizes the fact that the achievement of a sole goal is nearly useless if the remaining sixteen ones are neglected: for instance, committing to fighting climate change (goal 13) would be wasted time if goal 15 on Life on land – "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" – [407] is ignored.

Since one of the themes of this text is the relationship between cocoa, tea, and coffee with climate change, the words "forests" and "deforestation" appear many times throughout the text. Indeed, being deforestation one of the causes of climate change, the unsustainable production of these three tropical crops – which is strictly connected with this activity, as it is for other agricultural and non-agricultural commodities – has been analyzed for its drastic environmental impacts. It should be remembered that, although the third chapter highlights the negative characteristics of coffee, tea and cocoa (and sugar) considering their production as a concomitant cause of global warming, the relationship between these crops and climate change can also be seen from another perspective. The same can be done for potatoes and maize. In this research, I chose to emphasize their role as a "life-saving" alternative to

[407] "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss," United Nations – Department of Economic and Social Affairs, accessed January 11, 2023, https://sdgs.un.org/goals/goal15

wheat during the Little Ice Age. However, this does not mean that they can only be linked to the Little Ice Age and have nothing to do with climate change – for instance, their production also contributes to GHG emissions. In short, the relationship between the potato, maize, coffee, tea, and cacao with climate change (global warming) can also be viewed from the perspective of these global goods as being victims of the rise in temperatures – the same analysis might be carried out for the LIA, too.

Agriculture contributes to climate change and, in turn, suffers its effects. Besides what has been explained in this text, agriculture is also responsible for releasing methane and nitrous oxide, two powerful greenhouse gases released from livestock after digesting some rich-in-fertilizer animal feed. While in some parts of the world, such as the European Union, commitments to halt this process have slightly reduced emissions, in the rest of the world, agriculture is doing the opposite: from 2001 to 2011, global agricultural emissions increased by 14 percent.[408]

The effects of climate change threaten crops, which need the right amount and quality of water, soil, sunlight, and heat. In many parts of the world, extreme heat waves and lack of rainfall are becoming relevant issues because they affect the growing seasons of some plants; in general, extreme weather events, such as droughts or storms, are a problem for most cultures.

In the third chapter, it has been mentioned how tropical crops like coffee, tea, and cacao are more and more exposed to the vagaries of climate also due to near-shadeless (or shadeless) systems that are the result of centuries of deforestation, and thus, due to the lack of trees that would provide them protection. Recent studies have underlined how coffee will be harshly affected by climate change. To give an example, among the various climate-related impacts, in 2012-2013, global warming helped the propagation of coffee leaf rust that pushed Central America to declare a state of emergency after destroying more than half of its plantations. In general, by 2050, a 50 percent decline in the number of most suitable coffee-producing areas is expected: specifically, the most appreciated *coffee arabica* is poorly tolerant and hypersensitive to the warming of temperatures and the consequent diseases.[409] Similarly, in a 2018 survey, tea farmers in Assam – where more than half of Indian tea production takes place – have described the increasing challenge of growing tea due to droughts and intense rainfall. The latter is the cause of erosion and it damages the roots of tea, while droughts foster the spread of pests and diseases.[410] Regarding cacao, its production is not expected to have a better future than the other two crops. Droughts, for instance, considerably affect cocoa growth: they can cause

[408] "Agricoltura e cambiamento climatico," Agenzia europea dell'ambiente, lastly modified may 5, 2021, accessed January 12, 2023, https://www.eea.europa.eu/it/segnali/segnali-2015/articoli/agricoltura-e-cambiamento-climatico

[409] "The most unexpected effect of climate change," Improving lives, accessed January 10, 2023, https://www.iadb.org/en/improvinglives/most-unexpected-effect-climate-change

[410] "How climate change might affect tea," Anna Nowogrodzki, Nature, February 6, 2019, accessed January 10, 2023, https://www.nature.com/articles/d41586-019-00399-0#ref-CR1

plants to dry up and seeds to die or become smaller, an increase in insect attacks, and a general decrease in yield. Equally, heavy rains can foster disease invasions, damage flowers (which might lead to a loss of fruits), and provoke landslides that destroy cocoa trees.[411] Finally, while it is true that the productivity of the three crops in tropical countries will decrease, on the other hand, countries outside the tropics should become suitable for the cultivation of tropical crops thanks to warmer temperatures. In some regions of the world this is already happening, as in Sicily, where, recently, avocados are cultivated.[412]

The potato is considered one of the most important crops in the global food system. Despite the high tolerance of tubers to droughts, potatoes can suffer climate change, too: for instance, some species of potatoes, such as the Irish one, are sensitive to droughts and landslides, and potato biodiversity is under threat, especially wild varieties. In addition, potato diseases caused by extreme changes in climate could lead to profound consequences for the system of production.[413] As for maize, according to a NASA study, it will also be affected by climate change, with forecasts of a 24% decrease in harvests by the end of the century – this could have severe global implications. Jonas Jägermeyr – the author of the study – explained that this is due to increased temperatures, variations in precipitation patterns, and CO2 concentrations. He also argued that such a decrease in crop yields was not expected, at least not since the last study conducted in 2014.[414]

In the fight against climate change, every person should get used to taking good habits in their everyday life and consume fewer foods than others and vice versa; however, a deep change in production methods is also of paramount importance. The increasing global demand for food puts agriculture, and thus, the environment, under high stress: hence, since global food production cannot be reduced for obvious reasons, the only solution lies behind more sustainable practices and habits. Among these, there is a more efficient use of fertilizers, a reduction of food waste and of consumption of meat and dairy products, and the integration of more innovative techniques.[415]

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[411] Manon Mireille Dohmen, Martin Noponen, Reiko Enomoto, Christian Mensah, and Sander Muilerman, *Climate-Smart Agriculture in Cocoa – A Training Manual for Field Officers* (World Cocoa Foundation and The Rainforest Alliance, 2018), 6.

[412] "What climate change means for the future of coffee and of other popular foods," Sarah Gibbens, National Geographic, January 26, 2022, accessed January 12, 2023, https://www.nationalgeographic.com/environment/article/what-climate-change-means-for-future-of-coffee-cashew-avocado

[413] FAO, *Potato fact sheets – To deepen understanding of the potato's role in world agriculture, the economy and global food security, FAO specialists compiled a series of factsheets on key issues in potato development* (Rome: FAO, 2008), 2

[414] "Global Climate Change Impact on Crops Expected Within 10 Years, NASA Study Finds," Ellen Gray, NASA – Global Climate Change, November 2, 2021, accessed January 10, 2023, https://climate.nasa.gov/news/3124/global-climate-change-impact-on-crops-expected-within-10-years-nasa-study-finds/.

[415] "Agricoltura e cambiamento climatico," Agenzia europea dell'ambiente, lastly modified may 5, 2021, accessed January 12, 2023, https://www.eea.europa.eu/it/segnali/segnali-2015/articoli/agricoltura-e-cambiamento-climatico

Climate-smart agriculture (CSA) is an approach that guides agrifood systems toward the adoption of sustainable and climate-resilient practices. With the Paris Agreement and the SDGs in mind, the CSA develops around three main goals: increasing (better) productivity; enhancing resilience, and reducing sensitivity to climate shocks, pests, and diseases, while improving adaptation; reducing emissions for each calorie or kilo of food produced, while at the same time avoiding further removal of forests for agricultural purposes.[416]

These practices are extremely relevant especially because, currently, around 690 million people are hungry – as reported by a 2020 study–[417]: sustainable cultivation of potatoes might support achieving the Zero Hunger (sustainable development) goal.[418] In this sense, this nutritious staple is being considered – along with other tubers and roots – for its potential role of a climate-resilient plant and of a possible alternative crop able to cope with climate change – interestingly, this is the same role it played during the Little Ice Age. Nonetheless, some recent climatic events – such as the one in Uganda in 2017, where 80 percent of potato production was lost – have shown that even the most resilient potato specie can be threatened, and a sustainable system of production, which should include risk management, must be taken into account.[419] For instance, in Africa, some ongoing projects focus on improvements in the potato value chain and on the adoption of CSA practices. Potatoes are vital against poverty and for fighting in favor of food security even more so because, in developing countries, their consumption more than doubled between 1960 and 2005. In countries like the African ones, where climate change has greatly diminished the productivity of maize and other staple crops, potatoes could become lifesaving, thanks to their high productivity and because they require less water and land than maize.[420]

As for coffee, tea, and cocoa, some similar CSA practices include the integration of shade trees in plantations – agroforestry practices –, and the creation of more resistant seeds. For instance, scientists are currently experimenting with the creation of new crossbreed varieties of coffee more resistant to climate change.[421] As for tea, the Working Group on Climate Change (WGCC) of the Intergovernmental Group on Tea (IGG/Tea) highlights that adaptation and sustainable measures should include the growing of resistant and tolerant tea plant varieties; diversifying production in

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[416] "Climate-Smart Agriculture," The World Bank, accessed January 10, 2023, https://www.worldbank.org/en/topic/climate-smart-agriculture

[417] Ibid.

[418] "Potatoes: So Familiar, So Much More to Learn," FAO, May 20, 2022, accessed January 11, 2023, https://www.fao.org/publications/highlights-detail/en/c/1529406/

[419] FAO, *Climate risk management for the roots and tubers sectors in Africa* (Rome: FAO, 2020), 1-2.

[420] "Improving food security by safeguarding potato yields," G•Stic, accessed January 11, 2023, https://www.climate-action-programme.be/project/climate-smart-agriculture-solutions-for-potatoes/.

[421] "What climate change means for the future of coffee and of other popular foods," Sarah Gibbens, National Geographic, January 26, 2022, accessed January 12, 2023, https://www.nationalgeographic.com/environment/article/what-climate-change-means-for-future-of-coffee-cashew-avocado

lands of low-yielding tea; cultivating tea along with shade trees, which could be other tree crops like rubber – intercropping would also improve soil conditions –; shifting to organic cultivation; and practices of water conservations that should include water harvesting as well as drainage systems.[422] Agroforestry, in particular, is a land-use management system that is increasingly taken into consideration when dealing with sustainable agricultural practices and tropical crops. Along with leading to effective growth in the forest cover, and thus partly repairing the effects of deforestation, this system of shade trees plantation also boosts tropical crops productivity, while having positive impacts on the soil.[423] As reported in the 2020 FAO report *The state of the World's Forests,* African governments, and privates are committing to ending deforestation caused by cocoa production. For instance, Cocoa Forest Initiatives in Ghana and Côte d'Ivoire (World Cocoa Foundation, 2017) and the Green Cocoa Landscape Programme in Cameroon (IDH, 2019) are two initiatives aiming at supporting sustainable and climate resilience practices of cocoa production. Specifically, cocoa agroforestry systems are being taken into account: indeed, although they cannot equate to natural forests, shade trees can be vital for the preservation of biodiversity, restoration of degraded lands, and for keeping high levels of productivity at the same time.[424]

Among the efforts to combat climate change, the international community is increasingly committing to combat deforestation and forest degradation, too. To give an example, in December 2022, the European Union agreed on a law to combat these two practices driven by EU production and consumption. Once adopted, the EU market must make sure that the production of some key goods on its market – among them, coffee, cocoa, and derived products such as chocolate, or beef – had not contributed to deforestation. Some years earlier, in COP 19 held in Warsaw (2013), the REDD+ framework (Reducing Emissions from Deforestation and forest Degradation) was created. Recognized in Article 5 of the Paris Agreement, REDD+ guides world's governments to achieve sustainable management of forests, and thus to carry out activities and implement plans that can reduce emissions from deforestation and forest.[425]

The 2022 COP27 held in Egypt made some little steps forward in the fight against climate change with the agreement on the establishment of a "loss and damage" fund to compensate for climate change impacts experienced by developing countries. However, the UN Secretary-General highlighted the fact that this fund is useless if Africa will turn into a desert or if islands will be

[422] FAO, *Socio-economic implications of climate change for tea producing countries* (Rome: FAO, 2015), 6.

[423] "Deforestation in the Production of Tea," Jacob Gorvitz, Commodity Trading Guru, May 6, 2021, accessed January 12, 2023, https://commoditytrading.guru/sustainability-ethics/deforestation/deforestation-in-the-production-of-tea/#google_vignette

[424] FAO and UNEP, *World's Forests 2020*, 90-91.

[425] "What is REDD+," United Nations: Climate Change, accessed January 12, 2023, https://unfccc.int/topics/land-use/workstreams/redd/what-is-redd?gclid=Cj0KCQiA_P6dBhD1ARIsAAGI7HDkUo2-vQnnlGuerXU41SdvthTL3wCa-9nrybEfDdSs4t9laK5y_iwaAm8LEALw_wcB

submerged by rising sea levels. At the same level, frameworks on sustainable forests and climate-smart agriculture practices are useless if not combined with a phase-out of fossil fuels to stop GHG emissions. However, fossil fuel is a sensitive argument for the international community since nowadays we deeply rely on this kind of energy, and changing would imply a total transformation of the system. The COP27 held in Egypt in 2022 made no progress on this matter, at least no more than it was done in COP26.[426]

Ironically, the main sponsor of COP27 – held in 2022 in Egypt – was Coca-Cola, one of the world's largest plastic polluters. Every year, 120 billion disposable plastic bottles are produced by this multinational; since 99% of the plastic is made of fossil fuels, this time the protests against COP27 have been more intense than usual.[427] However, Coca-Cola was not the only scandal and controversy of the Climate Conference: in the fight to abandon fossil fuels such as oil, the choice of the host country might seem equally controversial as Egypt is an OAPEC country. In other words, while the fight against climate change and the need for a sustainable transition in all sectors, including agriculture, is more urgent than ever, the controversy surrounding this fight raises many questions about our future.

[426] "COP27: Progress at a grassroots level," Carl Wright, The Round Table, November 25, 2022, accessed January 12, 2023, https://www.commonwealthroundtable.co.uk/general/climate-change/cop27-progress-at-a-grassroots-level/

[427] "Biggest Plastic Polluter named Sponsor for COP27 – Greenpeace Reaction," Greenpeace International, September 30, 2022, accessed January 12, 2023, https://www.greenpeace.org/international/press-release/55960/coca-cola-biggest-plastic-polluter-sponsor-cop27-greenpeace-reaction/

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Riassunto in italiano

Nella lotta al cambiamento climatico, l'agricoltura e l'alimentazione possono fare una grande differenza. Sempre più spesso sentiamo parlare dell'importanza di ridurre il consumo di carne, che rappresenta più della metà di tutti i gas serra derivanti dalla produzione alimentare; tuttavia, la carne, l'olio di palma e la soia non sono gli unici alimenti che hanno un forte legame con il cambiamento climatico. Anche altri beni globali che consumiamo quotidianamente svolgono un ruolo importante, e non solo nell'attuale riscaldamento globale, ma anche nel precedente cambiamento climatico, la "piccola era glaciale". In altre parole, mentre l'attuale dibattito sul clima e sul sistema alimentare si concentra principalmente su alcuni prodotti specifici, molti altri ne vengono esclusi, nonostante siano altrettanto presenti nella nostra dieta. Questa ricerca cerca di colmare questa lacuna descrivendo le condizioni storiche, sociali ed economiche che sin dalla prima età moderna hanno reso possibile il rapporto tra tali beni globali e i due cambiamenti climatici; allo stesso tempo, dimostra che le fondamenta di quello che è considerato un fenomeno moderno risalgono a secoli fa. In particolare, ho scelto di concentrarmi su cinque alimenti: la patata, il mais, il caffè, il tè e il cacao.

Tale scelta è nata dall'interesse verso le storie di questi cinque beni, che oggigiorno costituiscono una parte integrante della dieta europea – e globale. In un primo momento può sembrare quasi incredibile pensare al fatto che essi non siano in realtà nativi dell'Europa, ma siano originari di terre molto più lontane, sia geograficamente che "culturalmente" parlando: il famoso caffè italiano, il cioccolato svizzero, il tè inglese, le patatine fritte del Belgio, e la polenta di mais, devono la loro fama di prodotti "tipici europei" a dei fenomeni storici che risalgono a qualche secolo fa.

Una volta arrivati Europa tra il XVI e il XVII secolo, questi cinque prodotti erano comunemente visti come "beni esotici": dopo tutto, arrivavano da terre molto lontane, alcune appena "scoperte". In questa ricerca, sono stati divisi in due categorie: le patate e il mais nella categoria di prodotti alimentari di base, mentre il cacao, il tè e il caffè in quella di bevande (tropicali) stimolanti – prima dell'invenzione del cioccolato, il cacao era una bevanda.

La correlazione tra questi beni globali e il cambiamento climatico si spiega attribuendo alle colture di base e alle bevande tropicali due ruoli profondamente diversi, se non opposti, nelle due crisi climatiche degli ultimi secoli. Essi sono legati alle differenze naturali tra le due categorie: mentre le due colture alimentari di base si distinguono per le loro proprietà nutritive, le bevande stimolanti sono qui considerate per motivi completamente diversi. In breve, viene analizzato il ruolo delle patate e del mais come colture alimentari alternative, e perfino salvavita, durante la piccola era glaciale, mentre le tre bevande stimolanti sono presentate come cause concomitanti del riscaldamento globale.

In particolare, ho deciso di concentrarmi sull'arrivo e sull'integrazione di tali beni in Europa, anche se il contesto storico amplierà i confini europei al mondo intero.

La piccola era glaciale è un periodo di raffreddamento generale che si manifestò dal XVI secolo circa alla metà del XIX secolo. Il termine "piccola era glaciale" fu coniato nel XX secolo dopo la realizzazione da parte degli studiosi di un abbassamento generale delle temperature di circa cinque gradi rispetto al Medioevo: gelate, forti nevicate, piogge torrenziali, grandinate estive, tempeste e lunghi periodi di siccità colpirono le regioni del mondo con una frequenza insolita ed allarmante. Tra gli eventi più ricordati troviamo l'anno 1816, anche chiamato "l'anno senza estate", e il 1666, quando Londra bruciò tra le fiamme di un piccolo incendio propagatosi a dismisura a causa della siccità di quell'anno. Nel XVIII secolo, invece, la laguna di Venezia e i fiumi europei, tra cui il Tamigi, la Senna e il Bosforo, si ghiacciarono più volte.
In un contesto storico europeo segnato dalla peste e dalle guerre di religione, il clima fu tutt'altro che favorevole, tanto che gli eventi meteorologici di questo periodo ebbero delle ripercussioni a dir poco drastiche sull'agricoltura. La popolazione europea si basava su una dieta a base di cereali – prevalentemente grano – per l'80 per cento. Oltre al fatto che il grano di per sé non è né nutriente né produttivo come il riso e il mais, la poca fertilità della terra aggravava la situazione diventando sempre più scarsa dopo ogni raccolto. Estremamente danneggiato dagli eventi climatici, il grano sembrava maledetto, tanto che la crisi del cereale provocò in parte quella del sistema feudale, la cui economia era basata su di esso. A causa di ciò, dopo più di mille anni l'Europa fu costretta a innovarsi: dal XVI-XVII secolo, prima nei Paesi Bassi e in Inghilterra e poi in tutto il continente, il sistema subì una trasformazione radicale. Il costante aumento del prezzo dei cereali dovuto ai fallimenti del raccolto e la conseguente revoca dei diritti consuetudinari dei poveri, l'acquisto di terre da parte dei più abbienti per scopi redditizi – terre che, fino a quel momento, erano condivise da tutti –, il calo dei salari, e la coltivazione del grano per l'esportazione verso i mercati urbani, spiegano come l'economia rurale stava cedendo il posto a un nuovo sistema agricolo orientato al mercato.
Tuttavia, la piccola era glaciale non dev'essere considerata l'unica causa di una tale trasformazione. Questa ricerca riprende il punto di vista dello storico Philip Blom, che vede questo periodo di inverni gelidi ed estati miti sotto una luce diversa: secondo l'autore, la piccola era glaciale può essere interpretata come un catalizzatore di alcuni processi già in corso, o, ancora, come una fonte di pressione che, in un periodo già tormentato, spinse verso una rapida trasformazione del sistema. In tal senso, le condizioni climatiche favorirono anche l'integrazione della patata e del mais nella dieta europea: di fronte ai continui fallimenti del raccolto e alla fame, la parte più povera della popolazione

europea, inizialmente sospettosa di fronte ai nuovi alimenti, non ebbe altra scelta se non iniziare a coltivare patate e mais al posto del delicato grano.

La patata e il mais sono entrambi nativi delle Americhe e furono "scoperti" dagli europei durante le prime esplorazioni del Nuovo Mondo. Entrambi furono importati nel Vecchio Mondo dalle navi spagnole, per poi diffondersi successivamente in tutto il continente. Mentre il mais si integrò più facilmente nella dieta dei poveri, che notarono quasi subito la sua somiglianza con il grano, la patata dovette sconfiggere un gran numero di pregiudizi. Se le due colture hanno qualcosa in comune, è certamente il loro alto valore calorico e l'alta produttività: grazie a queste due caratteristiche, così come alla loro resilienza al clima e all'adattabilità a terreni diversi, le patate e il mais diventarono l'alternativa perfetta al grano europeo. Il caso dell'Irlanda (per la patata in particolare) e dell'Italia settentrionale testimoniano che le due colture furono responsabili della sopravvivenza di molte persone. Non solo: molti studi confermarono che le patate e il mais contribuirono in gran misura all'importante crescita demografica dei secoli in considerazione.

Il secondo capitolo descrive la storia e il contesto storico-economico delle tre bevande stimolanti e pone le fondamenta per spiegare poi, nel terzo capitolo, come caffè, tè e cacao possano considerarsi cause concomitanti del riscaldamento globale. Il periodo analizzato comprende il momento in cui i tre beni arrivarono in Europa sotto forma di beni di lusso, nel XVII secolo, fino agli anni in cui caffè, tè e cacao iniziarono ad essere consumati anche dai più poveri, tra il XVIII e il XIX secolo. Prima però, una parte del testo si concentra sulla storia del concetto di lusso, vista la sua importanza nel cambiare il concetto di consumo. Per questo, il secondo capitolo è anche dedicato alle spezie, che sono cruciali sia per il ruolo che rivestono in quanto primi prodotti di lusso nella storia, e perché il commercio delle spezie ha spianato la strada per la scoperta delle rotte e dei paesi in cui tutt'ora si svolgono il commercio e la produzione di caffè, tè e cacao.

Dai tempi dell'Antica Roma fino al XV secolo circa, le spezie valevano come l'oro. Così, la "Terra delle Spezie" – le Indie Orientali – attraeva le principali potenze europee: portoghesi e spagnoli (XVI secolo), e successivamente inglesi, danesi, francesi e olandesi (XVII secolo) fecero di tutto per guadagnarsi una fetta del commercio nell'Oceano Indiano. La competizione sviluppatasi attorno a questi beni preziosi – desiderati dai più benestanti perché rappresentavano un vero e proprio status sociale – portò a curiosi risultati, come la circumnavigazione dell'Africa e la "scoperta" dell'America. Grazie al commercio delle spezie si crearono nuove istituzioni commerciali, come la Compagnia olandese delle Indie orientali (VOC) e la Compagnia inglese delle Indie orientali (EIC), delle vere e proprie società per azioni con poteri politici e militari. Man mano che aumentava la presenza europea nell'Oceano Indiano cresceva anche il numero di navi importatrici di spezie: il successivo declino dei prezzi fece si che quest'ultime persero la loro posizione prestigiosa di merci di lusso. Tra le varie

spezie, lo zucchero – al tempo era considerato una spezia –, riveste un ruolo rilevante in questa ricerca, poiché diede vita al sistema di produzione basato sulle piantagioni – che è lo stesso in cui si coltivano caffè, tè e cacao – e grazie al suo stretto rapporto con le tre bevande stimolanti: come vedremo, il consumo di zucchero e quello delle tre bevande sono in gran parte collegati.

Nel XVII secolo, caffè, tè e cacao arrivarono in Europa dall'Asia e dal Nuovo Mondo come bevande di lusso. Il caffè veniva dall'Etiopia, il tè dalla Cina e il cacao dall'America: tutti e tre svolgevano un ruolo importante nelle culture locali da migliaia di anni. Una volta che iniziarono ad essere importati nel Vecchio Mondo, furono accolti da un animato dibattito che cercava di comprendere se fosse "morale" o meno integrare dei beni (estranei) di lusso nella propria cultura. D'altra parte, il loro arrivo in Europa coincise con il periodo della Riforma, del puritanesimo e del pietismo, il cui rigore religioso considerava il lusso e i desideri materiali come la prima causa di corruzione dell'anima. Per questo, tè, caffè e cacao furono più volte tassati dai sovrani europei, e perfino proibiti; alcuni, invece, gli attribuivano dei poteri curativi. Nel corso del tempo, l'aumento della domanda per le tre bevande aumentò, tanto che gli europei istituirono diverse piantagioni di caffè e cacao nel Nuovo Mondo, mentre gli inglesi e gli olandesi iniziarono a coltivare il tè nelle colonie delle Indie Orientali. Nel frattempo, furono inaugurate le prime "coffee houses": in poco tempo l'Europa si vide costellata di queste strutture che, inizialmente, venivano frequentate dai più abbienti della società, gli unici che potevano permettersi di consumare delle bevande dal prezzo estremamente elevato.

Il periodo in cui il consumo di questi beni di lusso si allargò dalle classi superiori a quelle inferiori si aggira intorno alla metà del XVIII secolo. Nel 1750 il sistema commerciale stava diventando di natura sempre più globale, e la forte domanda di caffè, tè e cacao favorì questo fenomeno. Il nuovo mercato globale e i lunghi viaggi necessari per importare queste merci in Europa resero indispensabile la riorganizzazione del capitale; allo stesso tempo, nacque il mercato finanziario.

La trasformazione commerciale del XVII-XVIII secolo permise all'Europa di godere della "rivoluzione del consumo". Il concetto di consumo è importante perché è a causa della domanda dei consumatori se l'ambiente è stato ampliamente rimodellato dall'essere umano. Tuttavia, un tempo il verbo "consumare" era legato all'esaurimento della materia (per esempio, alla digestione di cibi e bevande). In questo periodo, il concetto di consumo subì una trasformazione: "consumare", inteso come comprare i nuovi beni offerti dal mercato, frequentare negozi e spazi sociali – come le "coffee houses" –, iniziò ad essere visto come qualcosa di positivo e di ricercato, che arricchiva le casse dello stato; allo stesso tempo, riguardava anche la socialità, lo svago, ed era perfino una questione di identità e di status. Associata alla rivoluzione del consumo, la "rivoluzione industriosa" spiega come gli strati più bassi della popolazione iniziarono a ridistribuire le proprie risorse per essere economicamente in grado di acquistare questi beni che, pian piano, stavano diventando accessibili a

chiunque. Intanto, il mercantilismo svanì e lasciò spazio a una nuova mentalità economica, i cui principi si basavano sulla libertà di consumare e di commerciare.

Nel XVIII secolo, il consumo delle bevande stimolanti esplose. Il caffè e il tè iniziarono ad essere bevuti anche dalle classi lavoratrici, al punto che non rappresentavano più solamente il tempo libero e il piacere, ma anche il lavoro: le sostanze stimolanti contenute nelle tre bevande fungevano da aiuto perfetto per il pesante lavoro nelle nuove fabbriche e nei campi; allo stesso tempo, aiutavano a combattere il senso di fame dei più poveri. Nonostante il cacao faticò di più nel suo percorso di integrazione, dal momento che era ritenuto il simbolo dell'aristocrazia – una classe sociale associata alla pigrizia e alla lussuria –, nel XIX secolo anch'esso si diffuse tra le classi inferiori, soprattutto quando le nuove industrie resero possibile il suo consumo nella forma solida della tavoletta di cioccolato. In tutto questo, lo zucchero fu fondamentale: nessuna di queste bevande, naturalmente amare, veniva consumata senza l'aggiunta del dolcificante.

Dopo aver tracciato il contesto storico, il terzo capitolo si concentra specificamente sul rapporto tra caffè, tè, cacao e riscaldamento globale. Oggigiorno, è ampiamente riconosciuto che l'attuale riscaldamento globale è stato causato dall'uomo: per questo, è considerato uno dei tratti distintivi di quella che viene chiamata l'"Antropocene", l'epoca geologica in cui viviamo tutt'ora che iniziò dal momento in cui le attività dell'uomo provocarono i primi (gravi) impatti ambientali, dai tempi della rivoluzione industriale. Le due attività responsabili del riscaldamento globale, e quindi delle emissioni di gas serra nell'atmosfera, sono la combustione di combustibili fossili e la deforestazione: tra i settori più inquinanti troviamo anche l'agricoltura e il settore dell'uso del suolo, cambiamento di uso del suolo e silvicoltura ("Land use, land-use change, and forestry," – LULUCF).

La rivoluzione industriale segnò il passaggio dalla società agraria a quella industriale e accelerò al contempo le dinamiche che portarono verso il consumo di massa. Grazie all'invenzione di nuove macchine, al vapore e al carbone, l'industrializzazione rese possibile la produzione di massa e consentì una rivoluzione dei trasporti, la quale, a sua volta, fu il primo passo verso un mondo profondamente interconnesso. Di conseguenza, la crescita del mercato assunse dimensioni enormi e i prezzi delle merci diminuirono come mai prima. I nuovi mezzi di trasporto, veloci ed efficienti, facilitarono il controllo coloniale e militare: le potenze con accesso all'energia a basso costo, come l'Europa e il Nord America, erano le stesse che si trovavano in una posizione dominante.

La crescente prosperità europea e l'urbanizzazione portarono ad una grande crescita demografica globale, che, a sua volta, necessitava di ulteriore industrializzazione e crescita economica: per sostenere i bisogni degli abitanti di questo pianeta e per rispondere alla crescente domanda del mercato, l'ambiente fu sottoposto ad enorme stress.

I sotto capitoli “Imperialismo” e “Piantagioni e deforestazione” descrivono le dinamiche che hanno portato alla creazione delle piantagioni di caffè, tè e cacao in tutto il mondo. Per entrare in possesso delle terre in cui venivano prodotti i beni essenziali per le proprie economie, i paesi occidentali rimodellarono i paesaggi dell’intero pianeta. Con l’espansione degli imperi terrestri e marittimi avvenuta dal 1870 al 1945, la mappa del mondo cambiò più volte: in particolare, la Francia e l’Inghilterra entrarono in possesso della maggior parte dei territori tropicali adatti alla coltivazione del cacao, del caffè e del tè. Intanto, gli Stati Uniti cominciarono a diventare rilevanti sulla scena mondiale, mentre l’influenza spagnola, portoghese e olandese diminuì. Gli imperi globali di questi paesi andavano di pari passo con l’accumulazione del capitale, l’esplosione della popolazione e l’urbanizzazione, tre fattori che provocarono una profonda trasformazione (e degrado) dei paesaggi mondiali che si manifestò con un ritmo accelerato grazie alla meccanizzazione e a causa della produzione di massa.

Dopo una breve analisi della storia e delle caratteristiche del sistema di piantagioni, una parte del terzo capitolo si concentra sulle conseguenze ambientali delle piantagioni e delle pratiche di deforestazione: tra queste, la massiccia rimozione di foreste per scopi agricoli è responsabile di gran parte delle emissioni di CO2 nell’atmosfera. La monocoltura e l’uso di fertilizzanti hanno contribuito al degrado del suolo: una volta perduta la fertilità, nuove terre arabili sono ricavate attraverso la rimozione di ulteriori fette di foresta. Inoltre, la deforestazione causata dalle piantagioni comprende quella causata dalla costruzione di ferrovie e strade necessarie per il mercato di esportazione. Nonostante l’indipendenza delle ex colonie, la rimozione delle foreste del mondo continua a esistere per soddisfare il mercato.

L’ultima parte del capitolo affronta il tema delle piantagioni di caffè, tè e cacao; ad ognuno di essi è stata attribuita una regione del mondo, rispettivamente l’America Latina, l’Asia e l’Africa. La produzione delle tre colture tropicali ha molte caratteristiche in comune. In primo luogo, la creazione delle piantagioni è stata responsabile di massicce pratiche di deforestazione che hanno contribuito alla riduzione della copertura forestale globale e, quindi, ad un considerevole rilascio di CO2 nell’atmosfera. In secondo luogo, i tre beni globali fanno parte di un sistema di piantagioni le cui pratiche di agricoltura intensiva hanno portato all’erosione del suolo, alla perdita di fertilità e di biodiversità di una parte importante dei paesaggi del pianeta. Quello che viene chiamato il sistema “shadeless” (“senza ombra”) aggrava ancor di più questi fenomeni: infatti, la quasi totale assenza di ombra nelle piantagioni di cacao, tè e caffè non garantisce la protezione delle piante dagli eventi climatici, né garantisce l’equilibrio ecologico e la biodiversità del territorio, senza citare il fatto che la rimozione degli alberi da ombra causa anch’essa emissioni di CO2. Per concludere, la lavorazione

di caffè, tè e cacao all'interno delle rispettive industrie richiede un notevole consumo di energia, con conseguenti impatti ambientali.

Il consumo di zucchero è legato in gran parte ai nostri prodotti tropicali perché la maggior parte del caffè, tè e cioccolato/cacao consumati in tutto il mondo contiene una percentuale di zucchero. Di conseguenza, gli impatti della produzione di zucchero sull'ambiente, e quindi sul clima, sono indirettamente collegati a quelli dei tre prodotti tropicali. La produzione di zucchero è famosa per il drastico rimodellamento ambientale che ha comportato sin dai tempi delle prime piantagioni a Madeira e nelle Azzorre nel XV secolo. Oltre alle emissioni rilasciate dagli zuccherifici e all'uso di pesticidi e fertilizzanti, un gran numero di sostanze chimiche viene utilizzato per estrarre il saccarosio dalla pianta: queste si trasformano in acque reflue, che possono contaminare l'ambiente marino quando gli effluenti industriali entrano nei corpi idrici.

Per concludere, le attività alla base della produzione di caffè, tè, cacao e zucchero sono responsabili delle pratiche di deforestazione, della produzione e dell'uso di fertilizzanti, nonché dell'uso di energia richiesto nelle aziende agricole – comprendendo le fasi di confezionamento e distribuzione. Secondo il Rapporto speciale dell'IPCC (2019), solo il settore dell'agricoltura, della silvicoltura e dell'uso del suolo (AFOLU) rappresenta circa il 25 per cento di tutte le emissioni di gas serra, una parte delle quali è emessa dal sistema alimentare.[428]

Nella parte finale di questo testo, concludo sottolineando che tra le attività volte a combattere il cambiamento climatico, l'uso di pratiche agricole sostenibili, come le cosiddette "climate-smart agriculture practices" (CSA), è più che mai urgente; tra quelle relative al sistema delle piantagioni, per esempio, figurano l'integrazione di alberi da ombra e la creazione di semi più resistenti ai cambiamenti climatici. Allo stesso tempo, i cinque beni globali analizzati nel testo sono visti da una prospettiva diversa: quella di vittime del riscaldamento globale. Infatti, oltre ai ruoli che hanno rivestito come colture alternative, nel caso della patata e del mais durante la piccola era glaciale, o come concause del riscaldamento globale, i cinque i prodotti – così come molti altri – possono dirsi minacciati dall'attuale aumento delle temperature. Per questo motivo, un sistema che dia priorità alla sostenibilità diventa essenziale per evitare di rinunciare a molti alimenti che formano una parte consistente della dieta globale – tra cui, appunto, il caffè, il tè, il cioccolato, le patate e il mais.

[428] FAO and CAAS, *Carbon neutral tea,* vii.