AGRICULTURE AND AGRICULTURAL KNOWLEDGE IN BURSA AND MİHALİÇ (KARACABEY) IN THE NINETEENTH CENTURY

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DECLARATION OF ORIGINALITY

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ABSTRACT

Agriculture and Agricultural Knowledge in Bursa and Mihaliç (Karacabey) in the Nineteenth Century

This dissertation analyzes the change in agriculture and agricultural knowledge in Bursa and Mihaliç (Karacabey) throughout the nineteenth century. By conducting this research in the century of change and scrutinizing the factors of land, population, environment, state and schools, this dissertation aims to challenge the understanding of the 'unchanging' and 'backward' peasant knowledge. This study brings into light in what ways the peasants changed agricultural knowledge, crops and practices in response to the changes in these factors. Challenging the notion of 'backward' peasant agriculture knowledge brings the query of its antonym, 'advanced' scientific knowledge, which was presented an imagined dichotomy by state politics. By discussing this imagined dichotomy, this work emphasizes how and why scientific knowledge and peasants' knowledge were intertwined and differentiated from each other.

In Bursa, being one of the trade centers that had been vital for Istanbul, it is possible to observe the impact of particularly domestic but also international trade trends on agricultural production. Additionally, being the only place that has a Silk Institute, Bursa prepares a perfect ground to the politics of scientific knowledge and the relationship between scientific knowledge and peasants' knowledge through this special product. As the first capital city of the empire with dense population and several vakıf villages, studying Bursa reveals unique ways of land use and agricultural production. Mihaliç, being the closest neighbor of Bursa has different characteristics than Bursa, thus it stands as the ideal district to compare different ways of changes.

ÖZET

Ondokuzuncu Yüzyılda Bursa ve Mihaliç'te (Karacabey) Tarım ve Tarımsal Bilgi

Bu tez ondokuzuncu yüzyılda Bursa ve Mihaliç'te (Karacabey) tarım ve tarımsal bilginin değişimini analiz eder. Bu tez, araştırmayı değişim yüzyılında icra ederek ve toprak, nüfus, çevre, devlet ve okul faktörlerini sorgulayarak, 'değişmez've 'geri' köylü bilgisi kavramına itiraz eder. Bu çalışma, köylünün bilgisini, ürünlerini ve metotlarını hangi şekillerde değiştirdiğini ortaya çıkartır.'Geri' kavramına itiraz etmek, onun zıttı ve hayali bir ikilem olarak devlet tarafından sunulan 'ileri' bilimsel bilgiyi sorgulamayı da getirir. Bu tez, bu hayali ikilemi tartışırken, aslında bilimsel bilgi ve köylü bilgisinin ne kadar ve nasıl iç içe geçmiş olduğu ve birbirlerinden nasıl ve neden ayrışmış olduklarını da vurgular.

İstanbul için hayati önemi olan ticaret merkezlerinden olan Bursa, ülke içi ve dış ticaretin tarımsal üretime etkilerin gözlemlemeye olanak verir. Ayrıca İpek Enstitüsü olan tek yer olan Bursa bu ürün üzerinden bilimsel bilgi politikasını ve bilimsel bilgi ile köylü bilgisini çalışmak için harika bir alan sağlar. İmparatorluğun ilk başkenti olan Bursa, yoğun nüfusu ve çeşitli vakıf köyleri ile özgün toprak kullanımı ve tarımsal üretim yollarını ortaya çıkartır. Bursa'nın en yakın komşusu olan Mihaliç ise, Bursa'dan bambaşka özelliklere sahip olduğundan farklı değişim yollarını görmek ve karşılaştırma yapmak için ideal bir kazadır.

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CHAPTER 1

INTRODUCTION

This dissertation analyzes the transformation of agriculture throughout the 19th century by looking at the agricultural knowledge at its core. Although agricultural knowledge and agricultural practices were different issues, in this research they were used interchangeably. In this framework, agricultural knowledge includes the knowledge of the crops, the knowledge and the ability of altering the crops, the knowledge of the ways through which the crops were cultivated, of the soil on which the crops were cultivated, of the socio-economic, geographic and climatic conditions (i.e. the environment) where the crops were cultivated, and of the tools by which the crops were cultivated. This research examines how environment, people, land and state are the main factors that characterized the change in agricultural knowledge. The aim of this dissertation is to challenge the perception that agricultural knowledge held by peasants was 'backward' by discussing how they adjusted to this change through cultivating new crops or following different methods, namely changing agricultural understanding. By questioning the concept of 'backward' which was both embraced and presented in politics, the aim of this dissertation is to remove the agricultural knowledge from the imagined dichotomy domain of 'backward' versus 'advanced'.

This dissertation aims at both challenging the notion that the knowledge held by peasants was 'backward', as well as the 'advancement' of scientific knowledge. This study discusses shifting meanings of scientific knowledge and how it has been institutionalized. In other words, this dissertation also looks into the change in scientific knowledge. In this way, it seeks to understand how scientific

knowledge entered the agenda of agricultural policies which includes discussions on changing policies throughout the 19th century. Hence, this study aims to explore to what extent and the ways in which scientific knowledge and peasants' knowledge intertwined as well as how and why the two are different. It is underlined that essentially these two types of knowledge were not in conflict, instead they were in interaction.

This research argues that the main catalysts driving the shift in the knowledge of peasants included the fluctuating environmental conditions and a change in the land regime as a result, an increase in population, and a transfer of skills. Within this context, this work also discusses market demand and conditions as supplementary factors. These factors are considered in the framework of how they contributed to the knowledge and methods of peasants. The intention is to comprehend the conditions surrounding the need for and adoption of scientific knowledge, the limits of this adoption, the reasons underlying the reactions of peasants.

Mihaliç and Bursa were chosen as the focal areas, because Bursa is an ideal place for the domestic trade of agricultural products due to its close proximity to Istanbul. Hence, we can also observe how trade had an impact on agricultural production. Moreover, Bursa was one of the few places where an agricultural school and institute was established, making it possible to both to analyze the state's agenda and observe the relationship between scientific knowledge and peasants' knowledge. Furthermore, because Bursa has fertile plain, it is the perfect location to see various factors and stimuli that affected agricultural production. The purpose of the comparison with Mihaliç is to uncover the region-specific and general features that led to change in agricultural knowledge. In Mihaliç, the huge flat plain and vast

commons enabled us to observe how the change in use of commons altered agricultural knowledge when the collective use between the çiftliks and small villages changed. Differences in topographic conditions between Mihaliç and Bursa led to different land use. In Mihaliç, the swamps enlarged, and we can observe the gradual seizure of vast commons by sheep throughout the 19th century. This led the small peasants to change the use of land and to change their agricultural practices and knowledge. In Bursa on the other hand, the scarcity of commons created a totally different collective use of commons. The scarcity of commons, land/population ratio and the change in environmental conditions led to more intensive use of land. Throughout the 19th century, the commons were gradually seized mostly by silkworms, sheep and draft animals, while the available arable lands were put into more intensive use by several crops. This led the peasants to cultivate new crops, to change their agricultural practices and knowledge throughout the century. For the purpose of this dissertation, the research period was limited to the 19th century and the first decades of the 20th century.

1.1 Theoretical framework

In his book Alan Mikhail defined agricultural knowledge as the product of the relationship between people and their environment.[1] To him, agricultural knowledge was shaped only by these two factors, centralizing 19th century Ottoman state interrupted this relationship, destroying this knowledge in the process. One of the main aims of this dissertation is to underline that this was a process of negotiation, interaction and mutual change instead of destruction. I will do this by arguing the several factors that led to the change in agricultural knowledge. As Joel Migdal

[1] Mikhail, *Nature and Empire in Ottoman Egypt: An Environmental History*. *Studies in Environment and History*.

mentions “States are not fixed entities, nor are societies […] They are constantly becoming”.[2] In fact, we are not talking about totally separate domains. They are in connection through different social groups and organizations. In fact, the issue is to maintain the control which includes various forms of relationship. Because the peasants’ agricultural knowledge was in constant change as a response to environmental changes[3], the centralizing state cited scientific knowledge and used this to achieve control in this realm. This is the process of mutual ‘becoming’ which included clashes as well as bargaining, negotiation and interaction. In this process different organizations within state and society form one another. Therefore, while the agricultural knowledge of peasants was shifting, so was scientific knowledge.The mutual change occurring on both sides, as well as the combined knowledge tailored to local needs, were essential, as emphasized by Akhil Gupta.[4]

The idea that a strong economy equates to a powerful empire led to the usage of scientific knowledge by the state leaders as an instrument to first increase revenues and to then take control of them. This was done by claiming that scientific knowledge was universal and superior to the knowledge held by peasants.[5] In this way, different centralizing states tried to achieve control by creating standardization.[6] Despite the aim of creating a controllable domain through standardization, this was not an easy task as states were not absolute powers that could enforce anything they wanted. Therefore, this was a two-dimensional process.

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[2] Migdal, *State in Society*. *Studying How States and Societies Transform and Constitute One Another*, 57.

[3]As an important point of view in environmental studies, Sam White sees state organization and developments as the key the way the peasants responded to environmental changes; White, “The Real Little Ice Age”.

[4]Gupta, *Postcolonial Developments: Agriculture in the Making of Modern India*.

[5]To see the discussion on diverse values that scientific knowledge represents see Marglin, “Farmers, Seedsmen, and Scientists: Systems of Agriculture and Systems of Knowledge”.

[6]Scott, *Seeing Like A State: How Certain Schemes to Improve the Human Condition Have Failed*.

In order to justify state control, scientific knowledge needed to be presented as the necessary solution to every problem. It was shown as the way to increase productivity, which was hampered by the 'backwardness' of the peasants; the help of scientific knowledge provided by the state agencies would save the peasants from this 'backwardness'.

In this context, scientific knowledge meant utilizing non-fallow methods, implementing intensive farming by cultivating certain leguminous crops on fallow lands, applying fertilizers, and increasing agricultural production; this enrichment in the economy dominated the historiography as late as the 1960s.[7] This was the period in which the British method of agrarian transformation was regarded as the only acceptable way. However, the emergence of colonial, subaltern studies and works on Russia and micro-level analyses, demonstrated that scientific knowledge encompassed more than non-fallow methods, private property, the abolition of commons, the cultivation of certain leguminous crops, and a specific way of weed cleaning[8]. Instead, scientific knowledge acquired several meanings in concordance with the state's 'becoming' process. As underlined by D'Abadal scientific agriculture became a way of economic management for the state.[9] The state leaders used scientific knowledge in several forms as an instrument to be visible this domain in a time when there was an absence of large private farms, as well as continuation of common rights due to unique power relations among the state, land-holders and peasants. In his book, Alan Mikhail discusses how the centralizing Ottoman state used the plague to discriminate the population into healthy versus unhealthy ones, in

[7]Thompson, "The Second Agricultural Revolution, 1815-1880"; Kerridge, "The Agricultural Revolution Reconsidered*"*; Fussell, "History And Agricultural Science". Believing the superiority of agricultural knowledge Douglas North see the institutionalization of property rights and abolition of commons as the only way; North&Thomas, *The Rise of the Western World: a New Economic History*.
[8]David Moon talks about how local weeds nurtured the soil when the soil was left to be covered with the weeds; Moon,*The Plough that Broke the Steppes: Agriculture and Environment on Russia's Grasslands, 1700-1914.*
[9]D'Abadal, "Agriculture, Agronomy, and political Economy: Some Missing Links".

order to protect every potential producer by isolating the unhealthy ones.[10] Omnia El-Shakry emphasizes a hygiene claim made by Egyptian authorities as a vehicle to control and monitor peasants.[11] James C. Scott discusses how the German state tried to control and to standardize the forests to achieve control over all aspects of production.[12] Etienne Forester explains how the Russian state tried to establish dominance over newly-colonized regions in Asia by enforcing scientific methods in fighting locusts.[13]

Hence, the adoption of scientific knowledge by centralizing states meant not only an increase in agricultural production, but also the agenda to control and standardize to meet the state's goal. However, local studies illustrated how this aim for control turned into 'distinct forms of knowledge'.[14] These distinct forms refer to a relationship in which mutual change and interaction is fundamental.

1.1.1 Ottoman historiography on the perception of agricultural knowledge

In Ottoman historiography scrutinizing agricultural knowledge was quite a new phenomenon. For a long time, agricultural knowledge was characterized by the definitions of scientific knowledge and what that scientific knowledge came to represent; that is intensive farming and crop rotation, fertilizers and machinery. By concentrating on how to achieve agrarian capitalism, both the scientific knowledge and peasants' knowledge were placed in universal definitions, in an attempt to explain the failures or successes. By removing the issue from the concepts of success

[10]Mikhail, *Nature and Egypt*.
[11]El-Shakry, *The Great Social Laboratory: Subjects of Knowledgein Colonial and Post-Colonial Egypt*.
[12]Scott.
[13]Forestier-Peyrat, "Fighting Locusts Together: Pest Control and the Birth off Soviet Development Aid, 1920-1939".
[14]Williams, *Cultivating Empires: Environment, Expertise, and Scientific Agriculture in Late Ottoman and French Mandate Syria*.

or failure, this study highlights how both scientific knowledge and peasants' knowledge were the pieces of the same entity, which interact and change mutually.

The intellectuals in the late Ottoman Empire thought that scientific knowledge (meaning applying fertilizers, intensive crop rotation and cultivating market crops to boost production and revenues) was vital for the survival of the empire.[15] Scientific knowledge was treated as the necessary vehicle to reach the ultimate goal of increasing revenues. The discussions about how scientific knowledge would be implemented revolved around private property, the abolishment of commons and the optimum size of land, namely the land regime.

Similar to how the late Ottoman intellectuals emphasized scientific knowledge and a change in the land regime in implementing new agricultural practices for the survival of the empire, early Republican intellectuals shared the same "development" discourse _ this time for the existence of the nation. To them, scientific knowledge would have to be one of the fundamental principles of the country in propelling the nation forward. For late Ottoman and early Republican historians, scientific knowledge symbolized the 'advancement' and the peasants' knowledge symbolized 'backwardness'. According to them, peasants did not change their agricultural knowledge and methods, thus hindering 'development'. Contemporary historians were preoccupied with finding the suitable conditions that would cause these 'backward' peasants to change, therefore the discussions continued to revolve around the land regime.

Early Republican historians shared their state-centric view to achieve change in agricultural knowledge. For them, a land regime was central in applying agrarian methods supported by scientific knowledge. Furthermore, they saw the state

[15]See Mehmed Cavid Bey, *İktisat İlmi*; Hüseyin Kazım, *Çiftçilik Dersleri*.

as a regulator and benevolent protector that was capable of transformation.[16] These historians concentrated on "how it should be" and less on "how it really is" by underlining state-provided extension services, education, and other facilities. As a result of their devotion to the universal principles promoted by science and scientific knowledge, they perceived peasants as people who needed to be enlightened and saved from the "darkness" of ignorance and backwardness.[17] For them, the state was an authority and had a coercive capacity, thus should do this by disseminating scientific knowledge. They claimed that while the Ottoman Empire neglected the peasants, leaving them in darkness and deprived of the blessings of science, the Republic would try its best to provide enlightenment through science.[18]

As the Republican historians blamed the Ottoman regime for leaving the peasants in darkness, they conducted further research into the Ottoman period to shed light on what went wrong and why agriculture failed to transform. In other words, the historians directed their gazes to the Ottoman period to find the causes that would explain the failure in transformation of agriculture.

The so-called *çiftlik* debate defined the change in the land regime from the classical period to the late Ottoman period and the change in state power as a hindrance to the transformation in Ottoman agriculture.[19] As part of this debate, the approaches that looked at the failure in the capitalist transformation saw the land and

[16]For Barkan, a land regime based on common property rights and open-field system stood as obstacle to the development of scientific agricultural knowledge; Barkan, "Çiftlik" and "Çiftçiyi Topraklandırma Kanunu ve Türkiye'de Zirai Bir Reformun Ana Meseleleri". For Ömer Celal Sarç, the intervention of the central state and elimination of a land regime based on absenteeism was necessary for application of scientific knowledge; Sarç, *Ziraat ve Sanayi Siyaseti [Zirai ve Sınai İktisat]*. For Mirza Gökgöl the regulation of property rights and land regime by the intervention of central state were necessary for application of scientific knowledge; Gökgöl, *Şimali-Şarki Anadolu Yaylasında Ziraat Araştırmaları*.

[17] Kandemir, *Köy Kalkınması Hakkında Rapor*.

[18]For some sample articles in Ülkü newspaper see…

[19] For the dicussions on çiftlik debate see İnalcık, "The Emergance of Big Farms" and "Village, Peasant and Empire"; Veinstein, "On the Çiftlik Debate"; Pamuk, *100 soruda Osmanlı- Türkiye* and Pamuk,*Osmanlı Ekonomisi ve Dünya Kapitalizmi (1820- 1913)*; Keyder, "Introduction"; Stoianovich, "Balkan Peasants and Landlords and The Ottoman State: Familial Economy, Market Economy, and Modernization".

labor regime as an obstacle that held back intensive farming. Accordingly, intensive farming was assumed to be the representation of scientific agricultural knowledge and innovation which was prerequisite to change in production relations and achieving capitalist transformation.[20] In this way, while scientific knowledge was simplified and limited to intensive farming and crop rotation, peasants' agricultural knowledge was presumed as non-changing if these methods had not been adopted. Thus this created and reproduced a binary opposition between 'advanced' scientific knowledge and 'backward' peasants' knowledge.

As part of the discussion of the role played by the central state, the work of İslamoğlu and Faroqhi put forward the idea that a shift in population number influenced the change in agricultural methods, as long as central state remained as the protector over the peasantry.[21] Their work can be criticized for taking the cultivation of leguminous crops and intensive farming methods as an indication that Ottoman peasants were not backward, and thus served the same purpose of the dichotomy of advanced scientific knowledge vs. backward peasants' knowledge. In other words, it consolidates the state-centric point of view. Yet, it is important to note that their research broke new ground with deeper understanding on the impact of the shifts in population. Even though they only addressed the population size as a factor in change, they introduced broader thinking about the population both in quantity and quality, and showed that population appeared as an important factor in influencing local production.

Anthropological research conducted around the 1960s brought new understandings to the field. Their methodology of analyzing contemporary Anatolian

[20]SeeLampe& Jackson, *Balkan Economic History, 1550-1950: From Imperial Borderlands to Developing Nations*.
[21]İslamoğlu, & Faroqhi, "Crop Patterns and Agricultural Production Trends in the Sixteenth Century Anatolia".

peasants altered the methods of analyzing Ottoman peasants in the 19th century. By removing this issue from this unfruitful dichotomy, these works paved the way to discuss the limited impact of the state in the socio-economic and physical environment.[22] These researchers helpfully led us to consider how peasants responded by altering their crops and methods and took us away from the domain of the land regime and the state vs. peasants dichotomy. That said, these researchs could still be criticized for swinging to the other end of the spectrum by underestimating the role of the state and how the state leaders factored into this relationship.

The work done by these anthropologists failed to fully conceptualize the conditions of physical environment and the relationship of the peasants with it.Though anthropologists provided some ideas, it was environmental historians who opened a different door in approaching to peasants' agricultural knowledge. The studies of environmental historians positioned agricultural knowledge in the center and created awareness about small changes. They revealed how peasants shifted their agricultural methods in reacting to changes to the physical landscape; these methods included changing the crops that were cultivated, the season in which they were cultivated, and even shifts in crop rotation.[23] It was these early environmental studies that explicitly challenged the notions of "backward" and that the peasants had remained unchanged in their agricultural techniques.

While environmental studies reapproached the peasants' agricultural knowledge, the role of centralizing state and the ways it claimed power over peasants' agricultural knowledge deserved in-depth research.[24] Scientific agricultural

[22] Kolars, *Tradition, Season and Change in a Turkish Village*; Stirling, *Turkish Village*.
[23]Tabak, *The Waning of the Mediterranean, 1550-1870: a Geohistorical Approach*.
[24]Alan Mikhail addressed the changing relationship between on the one hand the Egyptian peasantry and their knowledge on the other centralizing 19th century Ottoman state. He underlined that centralizing Ottoman state destroyed the peasants' knowledge by imposing scientific knowledge irrelevant to the local needs and environment of the peasants; Mikhail, *Nature and Empire*.

knowledge was instrumental in the state-'becoming' process; it became a vehicle for the centralizing state to restore first the economic capacities and then to control and manipulate the production.[25] The reach of state was not limited to education policies, regulations on production relations or taxation policies. Micro studies revealed that centralizing states used animals, diseases, crops, living conditions, in this respect everything that related to production to control the production.

While the agricultural knowledge of peasants was changing and adapting to environmental conditions, the state leaders tried to manipulate and dominate it. But this was a process of both struggle, as well as interaction and mutual change in which scientific and peasants' knowledge must be re-defined.

1.2 Research questions

This dissertation intends to shed new light on understanding agricultural knowledge in the Ottoman Empire by refraining from defining peasants' agricultural knowledge during the 19th and 20th centuries as "unchanged," "traditional," or "backward." Instead, this piece of literature highlights small shifts in crops and methods.

This dissertation started with the quest of agricultural knowledge which was dominated by a fictive dichotomy of scientific agriculture vs. peasant' agriculture. This dichotomy developed as part of the state-'becoming' process. In order to take the control of production, the state leaders fueled this dichotomy by using scientific knowledge in several ways, mostly through education.

A need existed to examine the factors that contributed to the peasants' agricultural knowledge in order to understand the relationship and the interaction between scientific knowledge and peasants' knowledge, as well as the limits of the

[25] See Charles Tilly to see how 17th century states restored their economic capacities in between wars; Tilly, "War and State Power".

former. It seemed that agricultural knowledge was directly or indirectly shaped by changing land regime, qualitative and quantitative changes in the population and fluctuations in the environment. While peasants' agricultural knowledge had been shapedby these factors, state leaders attempted to restore control in all these spheres in various ways. By far, the most direct intervention was through education. Within this framework, in understanding the changing state mentality, it is crucial to grasp in what ways education created a fictive dichotomy between scientific knowledge and peasants' knowledge. The second question concerns the limits of education and scientific knowledge.

This dissertation focuses on the two neighboring districts, Mihaliç and Bursa. Both were significant for international and domestic trade due to their proximity to the Marmara Sea and Istanbul. By comparing both districts, this study aims to reveal how local features of environment, population dynamics and land regime gave way to change in agricultural knowledge.

Scrutinizing vakıf çiftliks and vakıf villages separately in Bursa and Mihaliç enabled us to understand the organization and management of agricultural production. This further illuminates how power relations impacted and changed agricultural knowledge and production. Nonetheless, power relations and changes in the land regime cannot be isolated from the impact of the environment which paved the way for different changes in agricultural knowledge in Mihaliç and Bursa. Furthermore, both districts attracted refugees from Rumelia and the Caucasus, particularly after the second half of the 19th century. This serves as the perfect groundwork to observe another factor that contributed to shifts in agricultural understanding and practices; looking at how diverse forms of local knowledge

interact in different locales and the adaptability of such knowledge through the transfer of skills from the native population to the refugees.

The land, people and the environment all had a direct impact on shifting agricultural knowledge. In other words, we can say that agricultural knowledge is the product of a relationship between the land, environment and people. As the state tried to insert itself within this relationship, scientific knowledge served as a perfect instrument, mostly through education. Thus, the Silk Institute, which was the earliest practice school on a specific crop in the empire, enabled us to examine under what conditions state and peasants adopted scientific knowledge, how peasants' and scientific knowledge interacted with each other, and how this led to changes in both bodies of knowledge.

1.3 Methodology and primary sources of the study

This study aims at revealing the change in agricultural knowledge in the 19th century, hence a wide range of primary sources were employed to monitor the transformation from roughly the 1800s until the 1920s.

Given that the change in agricultural knowledge was based on land regime, population dynamics, environment and educational policies of state, several documents were utilized in order to reveal the relationship among them. By examining the primary sources in this framework, this study presents the agricultural knowledge of the peasants as something changing, not as something 'backward'. The agricultural knowledge and techniques of the peasants -the crops they cultivate, the methods of cultivation, variety of crops, the use of land- had all undergone changes as a response to changes in the land regime, population shifts (both in quantity and quality), environmental fluctuations, and the educational policies of state. The

primary sources covering a long timespan provides us with the evidence needed to develop an argument on change in agricultural knowledge in the 19th century.

In this context this study was based on various types of primary sources. The majority of this dissertation's primary sources come from the official archives (BOA, *Başbakanlık Osmanlı Arşivleri*[26]). Defters and documents (belge) from the official archives (BOA) supplement each other to show the details of production, methods and how production was managed. Additionally the National Library (*Milli Kütüphane*) and vakıf libraries (*İbrahim Hakkı Konyalı Vakıf Kütüphanesi*) also provided some important documents from their rare collections. The İSAM Library was also utilized for some rare documents. The documents from these archives were supplemented by a wide range of travel accounts and consular reports in building a historical narrative.

As for the consular reports, the reports of Bursa consul Donald Sandison contain detailed observations and findings on the various aspects of agricultural production in Bursa and partly in Mihaliç from 1840 until 1860. Sandison, who was appointed to Bursa as British consul in 1838, wrote several detailed reports, some of which are online and others were stored in the British National Archives.

Provincial yearbooks (Salname) of Hüdavendigar helped when it came to the last decades of the 19th century. Information found in these yearbooks such as geographical features of Bursa and Mihaliç, agricultural production, crops and production methods, and articles on silk production helped paint a picture of production at the end of the 19th century.

Chapter Two focuses on the change in environmental conditions in Bursa and Mihaliç. In order to understand to what extent the environment had an impact on

[26] It was turned to *Cumhurbaşkanlığı Osmanlı Arşivleri,* but in order to maintain academic continuity in footnotes it is decided to preserve the abbreviation of BOA.

change in agricultural knowledge, practices and crops, travel accounts were mostly used to illustrate the geophysical features of the region. Travel accounts ranged from the 17th to the 20th century assisted in forming a fuller picture on environmental changes. Consular reports, yearbooks documents from the Ministry of Trade and Agriculture (classified as T. in the Ottoman archives) supplement this information.

This dissertation examines primary sources separately to differentiate between the environmental effects in Mihaliç and Bursa. Travel accounts, newspapers and Council of State (ŞD) documents shed light on how the onset of floods and marshlands led to the rise of sheep breeding in Mihaliç. Travel accounts, newspapers, yearbooks, maps from different dates and Temettuats reveal environmental change, increase in population and land regime induced revival of rice cultivation. This research makes use of the decrees of Judicial Ordinances (İ. MVL), documents from the Ministry of Trade, Agriculture and Mining (T.), travel accounts, newspapers, the Interior Ministry documents (DH.) and Official Reports of District Council (*Vilayet Meclisi Zabıtnamesi*) to reveal the struggle of peasants against the state in adjusting to their environment. Within the framework of this struggle we can trace the spread of rice cultivation through several sub classifications of the Interior Ministry (DH. H., DH. İD, DH. MUİ) and through the documents in Yıldız Palace, especially the documents on Forests, Mining and Agriculture (Y. PRK.OMZ).Furthermore documents from the Interior Ministry, Judicial Ordinances, Council of State, Sultanic Decrees and Sublime Porte (DH.İD, MVL, A. MKT. MHM, DH. UMVM, ŞD, İ. TNF, BEO)and travel accounts were obtained to elucidate how the state attempted to insert itself, particularly through drainage efforts or water source control (though this differed in Mihaliç and Bursa). By examining such a broad range of documents, this dissertation provides a new understanding of

peasants' and the state's agricultural knowledge; their relationship, negotiation, interaction as well as their struggle in this process.

The Third chapter discusses the change in land regime and covers a long period from the beginning to the end of the 19th century. This thesis makes use of four defters from Grand Vizierate Chief Accounting Office (D.BŞM.) to observe the production in the vakıf çiftliks in detail in the beginning of the 19th century. These defters are a rich source of information on the crops cultivated in the çiftlik and provides clues about the geophysical conditions that determined how the crops were cultivated, labor which differed on the type of the crop, animals in the çiftliks, and to some extent on the power relations between different actors in the çiftliks. In this way, we can detect the relationship between labor, environment, crop cultivation, and animal husbandry.

This thesis also refers to the Temettuat defters in researching the variety of crops while there was a production shift in Mihaliç in the mid-19th century. Furthermore, a special classificiation in the Ottoman archives is used, which was named after the classificator, Cevdet (C.). Documents and defters including the inventory of Sublime Porte (BEO. AYN) are referred to, to observe various crops used and the increasing trend of sheep breeding in close relation to the environment which triggered land disputes. Travel accounts and consular reports further support this narrative. These documents trace the changing control of vakıfs on the çiftliks during the 19th century and accordingly the shifting roles of different actors. In addition to this, these documents shed further light on the formation of new çiftliks and growing boundaries of the çiftliks, and the relationship between sheep breeding and growing swamps in the mid-19th century.

Other primary sources were used to gain insight into the çiftliks in Mihaliç after the 1860s. The land disputes found in the Evkaf defters provide some details on agricultural production, animal breeding and their relationship with the environment. In this way, land dispute cases were examined from a different point of view. Council of State documents, documents from Archives of Sublime Porte (BEO), Scribal department of the Interior Ministry (DH. Mektubi) and defters from Archives of Sublime Porte (BEO. AYN) and the reports of the state officials in Council of State documents enable us to research reasons and claims behind various land disputes, so that we can picture to what extent the Mihaliç plain was partitioned by çiftliks and how much sheep breeding extended on the plain lands at the expense of grain cultivation. To put it differently, these documents allow us to monitor the change in production patterns and how this led to changes in the land regime, which relied on çiftliks and environmental conditions.

This thesis uses Council of State documents to understand the stance held by the local and central state and the conflict among different departments of the state.

In Bursa, agricultural production transformed in another way.There are more available documents for Bursa that shed light on the variation of crops and the transformation in cultivation methods. At the beginning of the 19th century, defters from the Ministry of Religious Foundations (Ev.d) and the list of the villages in these defters show us that there were many small vakıf villages on the plain lands and in the hills. The meadows were few and dispersed. These defters provides us with the information of different crops that were cultivated in the villages. Sub-category of the special Cevdet classification, Religious Foundation in Cevdet (C. Ev.),

documents enable us to observe cultivation methods and the relationship between animal husbandry and crop cultivation in the absence of huge common pastures.

Consular reports and travel accounts reveal more about the cultivation methods and the flourishing silkworm production in Bursa during the mid-19th century. This work uses income registers which were categorized under the Ministry of Finance (Temettuat defters, ML. VRD. TMT.d) to investigate how mulberry gardens were used intensively for vegetable cultivation and animal breeding. From these registers we can also identify the spread of clover lands on the maps. Defters from the Religious Foundation Ministry provide insight into how the land regime based on small vakıf villages led to the unique usage of mulberry gardens and clover lands where there was a need for grazing areas. Documents from the Economics part of Cevdet classification (C. İKTS) show how the power struggles in this vakıf land regime affected production.

The availability of various primary sources at the end of the 19th century provide us with a broader point of view. At the turn of the century, the peasants of the vakıf villages became the de facto owners of the lands they used. We come across the villages in other archival classifications and in newspapers (aside from the Evkaf defters and Evkaf documents) without any mention of vakıfs. The articles in contemporary newspapers barely reveal the unique relationship between animal husbandry, mulberry gardens and clover lands within the existing land regime. The complaints and land disputes in these newspapers bring the growing population to light and further reveal production methods and the limits. In addition to newspapers, travel accounts help us to see the difference in production methods between the plains and hillsides, thus how geographical and environmental conditions led to

different ways of change. Salnames provide us with a great deal of insight on agricultural production, the methods and the way in which they changed.

The fourth chapter focuses on a shorter period, namely the last three decades of the 19th century and the first two decades of the 20th. The focus of the chapter is the immense flow of refugees from the Balkans and Caucasus mostly after the 1870s. Salnames and consular reports provide an accurate picture of the number of refugees in the area at that time. The research makes use of Evkaf defters, defters from the Grand Vizierate Chief Accounting Office, documents from the Interior Ministry Scribal Office to discuss the presence of the refugees within the land and labor regime. Additionally, documents from the Judicial Ordinances and Council of State defters from Sublime Porte (BEO. AYN) provided insight into the state's attitude and perception towardthe refugees as a potential labor source.

In Mihaliç these refugees found themselves in a struggle in the spread of çiftliks- sometimes, they made up part of the labor force in these çiftliks, or at other times, some of the refugees struggled to secure the rights on lands that had been granted to them by the state and sometimes they opened up lands from the swamps. Other documents such as DH. Mektubi from the Interior Ministry Scribal Office, travel accounts, subcategories of general issues (A. MKT. Umumi) and important records under Grand Vizierate (A. MKT. Mühimme), Judicial Ordinances, defters of Sublime Porte, Imperial Decrees (İ. DFE.) and documents from the Interior Ministry (DH. MUİ.) were vital in discussing their existence as labor force within this changing land regime.

In Bursa, we see from newspapers and documents from Grand Vizierate (especially the documents from A.MKT. Mühimme which include crucial matters) that vacant çiftlik plots were sold to refugees. Similar to Mihaliç, these refugees also

found themselves in a fight for land in Bursa, which we can see from Council of State and documents from Scribal Office of Interior Ministry, newspapers and travel accounts.

This research incorporates further documents to understand how the presence of refugees impacted agrarian practices. Newspapers reveal Circassian refugees who provided animals, as well as their overall contribution to the shift in agriculture, which gave way to the adoption of machinery on the çiftliks. Through defters from the Sublime Porte, travel accounts and newspapers we notice the new crops brought by the refugees and how they contributed to the spread or reinvention of old ones. This Chapter also uses Council of State, Sublime Porte and Department of General Issues from the Provinces (DH. UMVM), Scribal Office of Interior Ministry, Yıldız Palace and Ministry of Trade, Mining and Agriculture documents as supplemental documents.

The fifth chapter discusses the agricultural policies of the centralizing state throughout the 19th century. This chapter examines the development of scientific knowledge and how the meaning of this knowledge evolved over time. In this way, Sultanic Decrees on Important Matters (İ.MSM) documents allow us to analyze the mentality of the central state and its perception toward peasants until the 1860s. Ministry of Trade, Mining and Agriculture documents are used to scrutinize the late 19th century. Provincial regulations in Düstur (Ottoman chronicle of the regulations and codes), the Hüdavendigar yearbook, Bursa newspaper and Council of State documents help in understanding the provincial organization, the relationship between the provincial officials and central state, as well as the perception of provincial officials. The central state should not be thought of as an entity that only consisted of central and provincial bureaucratic levels. There were several other

provincial organizations such as the Public Debt Administration, Chamber of Commerce and Agriculture and the Tobacco Regie Administrations served to achieve control over agricultural production through some regulations, sanctions and incentives. This process was traced by looking at documents such as the Hüdavendigar yearbook, Düstur and some Council of State documents. The Ottoman state which tried to achieve control over agricultural production, aimed to redefine the social sphere by eliminating every obstacle to the production. The rest of the chapter is dedicated to locust control and the changing meaning of scientific knowledge, which was closely related to the deficiencies of centralizing state. In scrutinizing these policies, this chapter deciphers various claims of scientific knowledge by referring a book published in 1881, called *Çekirge ve Onu Mahvetmenin Çareleri* by Hazaryan Parsagyan, various documents including Interior Ministry (DH.MKT, DH. MUİ), Sublime Porte documents and Regulation on Extermination of Locusts (*Çekirge İtlafına Dair Kanun ve Talimat*).

The emphasis on scientific agricultural knowledge was stronger in the realm of education, which is the subject of Chapter Six.This chapter references documents that were mainly based on silkworm production in Bursa to elucidate the relationship between scientific agricultural knowledge and its manifestation in education policies, as well as the agricultural knowledge of peasants. This chapter touches upon the educational program of the Agricultural School in Bursa by using a source from the Milli Kütüphane to provide a sense of the general educational policies on agriculture. The sources on silkworms, cocoons, silkworm eggs, and mulberry gardens are the priority, since the focus was on silkworm production. Accordingly travel accounts, Temettuat defters, and consular reports elaborate on the methods of raising silkworms and cultivating mulberry trees during the heydays of silkworm production,

in the first half of the 19th century. In the mid-19th century when the silkworms were infected on a wide scale, travel accounts, defters from Sublime Porte and newspapers reveal the efforts of the state to revive production. Newspapers, travel accounts and the book entitled "*İpek Böceği Beslemek ve İpek Böceği Tohumu İstihsal Etmek ve Kavaidi*" that was taught in Harir Darüttalimi were used in this chapter to observe re-spread of mulberry gardens, as well as the claims of scientific knowledge that were used in getting rid of the disease. The disease helped scientific knowledge to establish its hegemony over peasants' knowledge. The Council of Grand Vizirate (A.DVN), Scribal Office of Interior Ministry, Council of State and Codes of Sultanic Decrees (İ. KAN) documents, newspapers and travel accounts help us to trace precautionary measures against he spread of the disease. Interior Ministry documents (DH. İ. UM. EK, DH. MUİ) Council of State and Sublime Porte documents, travel accounts, memoirs and newspapers reveal to what extent the scientific knowledge of state and peasants' knowledge struggled or interacted, as well as how in general the production methods in raising silkworm and cultivation of mulberry tree changed.

1.4 Chapter outline

Following the introduction chapter, Chapter Two focuses on the relationship between the people and their environment and examines the product of this relationship, i.e. agricultural knowledge. Yet, this product was not only defined and shaped by these two factors. While market conditions affected this to a certain extent, the 19th century modernizing state tried to reconstruct the control in this relationship by using scientific agricultural knowledge as its apparatus and state leaders aimed to manipulate the transformation of agricultural knowledge.

In this framework, the first part of the chapter aims to go over the main characteristics of the topography of the region from the western corner of Bursa district to the western borders of the Manyas Lake. This section elaborates on soil types, different levels of the region, the rivers, the lakes and the mountains of the region. Also underlined in this section is the fluctuation in the region's environment between the 18th century and the 20th century.

The most visible environmental change was the enlarging swamps during the 18th and 19th centuries. In this vein, the second part of the chapter discusses how the peasants responded to this evolving environment. Put differently, this section explores the changing relationship between peasants and their environment. While the swamps were growing larger, an increase in the population pushed people closer to the swamps and forced them to take the advantage of the margins of the swamps.

Due to topography and market conditions, the relationship between peasants and their environment changed differently in Bursa and Mihaliç. In Mihaliç, the onset of floods led to specific production relations between çiftliks and small peasants. While the peasants attempted to save themselves from the damage caused by the floods, they struck agreements with çiftliks to graze the animals and cultivate spring crops in smaller plots during drier periods. However, in Mihaliç, floods created vague borders and favorable conditions and nutritious meadows for grazing when the waters ebbed in the spring. This led to sheep breeding. For that reason, the chance that small peasants would benefit from the margins of the marshlands was very closely tied to the power relations with the çiftlik-holders and the sheep merchants. This is particularly true, at the end of the 19th century, when market demand for sheep came to a head.

In Bursa, floods can be traced back to the 18th century. With a growing population, especially in the second half of the 19th century, these floods and the enlarging marshlands (from the 16th until the 19th century) forced the peasants to benefit from the margins of the swamps in a different way than in Mihaliç.

Instead of sheep breeding, rice cultivation came about as a result of the encroaching swamps. Sheep breeding requires massive grazing areas, however we know that Bursa did not have large pasture areas for a long time. Small plots for cultivating rice were enough to generate a considerable income. Yet, the rise of rice cultivation during the second half of the 19th century was not only due to the relationship between nature and the peasants; it also contains a power struggle against the conflicting policies held by powerful groups and certain land-holders.

By making the state power visible in the peasant-environment relationship, the rulers intended to control and increase the production- as well as its share from this production. Although rice was not new to Bursa in the 19th century, it fell under several prohibitions. Rice cultivation was banned several times throughout the 19th century by connecting it to malaria, which put at risk both the peasant labor force and the silkworms, which were a huge source of state's income from Bursa.Yet, market demand and the environmental conditions favored rice cultivation in Bursa and this led to it spreading quickly in the last decades of the 19thcentury and the beginning of the 20th century. Its fast spread and the income it generated- as well as the opportunity to put the unproductive swamps under cultivation- forced provincial and central power-holders to reverse the policies toward rice cultivation especially at the beginning of the 20th century. Particularly when the policies of draining the marshlands failed due to financial difficulties, control was tried to be achieved in this domain by imposing scientific knowledge on rice cultivators. The central and local

state organization continued to establish control over rice production both through scientific knowledge and as the supplier of water sources.

Within these environmental conditions, diverse land regimes in Bursa and Mihaliç paved in different ways the transformation of agricultural knowledge. Thus Chapter Three places the relationship between land regime and change in agricultural knowledge at the center. There were two distinct agrarian economies in these two neighboring districts. Whereas in Mihaliç the weight of agricultural production shifted from grain production to sheep breeding and water-thirsty crops that could be cultivated on small plots, in Bursa silkworm production, rice cultivation, clover lands and the more intensive use of gardens (which was mainly based on small peasant-production) appeared as remarkable features of agricultural production in the end 19th century. In Mihaliç sheep breeding had established itself on çiftliks and undermined small peasantry. In Bursa small vakıf villages and the peasants' usufruct rights on vakıf lands paved the way for different agricultural methods and production.

This chapter is divided into three periods for both Mihaliç and Bursa. Due to its large common pastures, Mihaliç had been a favorable place for sheep breeding for a long time. The lands were distributed among the small peasant villages and large vakıf çiftliks where grain cultivation, some market crops and sheep breeding was maintained to balance each other out at the beginning of the 19th century. As floods damaged grain agriculture on the plain, small peasants shifted the weight toward silkworm production until the mid-19th century, whereas çiftliks found incentive in growing sheep breeding.

In the mid 19th century the advantage in sheep breeding which was triggered by foreign and domestic demand started to threaten grain cultivation and small

peasant agriculture. Taking advantage of the growing swamps, the existing çiftliks expanded, breaking older agreements with neighboring small-peasantry villages. Small peasantry suffered more with the disease infected the silkworms. Yet like the çiftlik-holders they also tried to benefit from the margins of swamps by growing different the crops, thus changing their agricultural knowledge in the process.

They could sustain cultivating the margins of swamps as long as they could endure the rise in sheep breeding throughout the end of 19th century. Due to the influence of the market and the spreading of the swamps, existing çiftliks, on one hand, encroached commons, seized the margins of swamps, and damaged peasant plots when their sheep ate the crops. On the other hand, new çiftliks were forming on the swamps, or 'waste' lands. Grain loss due to inundations and a loss of land to new or existing çiftliks meant that small peasantry became indebted to the çiftlik-holders. Yet, they were not at a complete loss; by updating their farming practices, they turned towards different crops that were sown on small tracts of land, such as linseed, tobacco or maize. The rulers faced a dilemma here: either sacrifice a considerable amount of income and a source of Istanbul's meat supply from sheep breeding, or to make the small peasantry completely miserable. Even though the abolishment of commons was discussed as one of the main pillars of scientific methods, this part of scientific knowledge was preferred to be ignored by central and local government in order to prevent the emergence of powerful land-holders; when it did not serve the purpose of taking power, scientific knowledge could be overlooked.

Conditions differed in Bursa, however. Compared to Mahaliç, there were fewer common pastures, and peasants cultivated small land in small vakıf villages, which paved the way for distinct agrarian change in Bursa.

Rather than being a grain reserve like Mihaliç, Bursa's agricultural scene hosted a variety of crops at the beginning of the 19th century. Additionally, because it had fewer pasture lands, Bursa peasants commonly used fallow lands for their grazing needs, which signals an intensive use of land. If we look at the region, geophysical conditions did not allow Bursa peasants to have vast common pastures. Instead there were some scattered common pastures that were generally owned by vakıfs and whose usufruct rights were distributed among a couple of villages in return for a considerable income. Although çiftliks existed, they were not so big and numerous.

Through the mid 19th century in the golden age of silkworms when market demand was high, mulberry gardens began to spread to arable land and areas with the potential for grazing. This led to distinct usage; in addition to fallow lands, places called arable mulberry gardens (*sabangir dut bahçesi*) were formed, where peasants grow vegetables and graze animals at the same time. Yet this development was not independent from the land regime; the trees became the subject of power struggles among vakıfs (the owners of land), the tax-farmers and the peasants. Silkworm breeding attracted small peasantry, meaning not only arable lands were reserved for mulberry trees, but also commons began to be planted with these trees.

The spread of trees on commons brought up issues concerning the rights on commons, but also introduced the need for more grazing land for animals (particularly sheep). This led to another solution within the existing land regime; that is the creation of clover lands. The lands that belonged to vakıfs could not be legally turned into private pastures and çiftliks, so the holders found a way of sowing clover on the lands, and selling them on the market. This was a win-win for producers and vakıfs.

The spread of mulberry gardens came to a halt when pebrine disease infected Bursa silkworms. Between the 1860s and the 1880s, there was a dramatic decline in silkworm production, and mulberry gardens began to either be replaced with grain fields or commons left to the animal breeding. Yet at the end of the 19th century, a cure to the disease led to the revival of mulberry gardens, which coincided with an increase in both the human and animal population. This made land scarcer and more valuable. Possible places where farmers could use land outside the strict restrictions of the existing land regime include the margins of swamps for farmers in the plains and forests and bushes for people in the hills. But the fight for land and the claims on commons in Bursa escalated at the turn of the century, when it came to sheep grazing, mulberry gardens and rice cultivation. This combination of struggle, geophysical conditions, the land regime and market demand pushed the peasants alter their agricultural knowledge in using existing lands in unique and intensive ways.

Because population growth directly causes change in agricultural knowledge, the following chapter deals with population dynamics. Both a change in the quality and quantity of the population, had an impact on the transformation of agricultural knowledge.

Chapter Four argues that both the flow and settlement of refugees from the Caucasus and Rumelia in the second half of the 19th century triggered transformation in agricultural knowledge. This is because the land became scarce due to the increase in population number, but this change also occurred as this new population brought in their knowledge new to the area and interacted with native population.

This chapter firstly mentions the numbers of refugees that migrated to Bursa and Mihaliç from roughly 1870s until the 1910s. Due to proximity of Hüdavendigar

province to İstanbul, the refugees who arived İstanbul by ships were mostly sent to Hüdavendigar province. Though we cannot be certain about the numbers due to inconsistent reports when the migrations first started and the possibility of unregistered refugees, the figures still provide us with a sense of the population increase in proportion to land and the new settlement areas.

In the absence of a regular settlement policy of local and central state, some of the refugees were granted lands, and some became sharecroppers or tenants in the çiftliks. Some cleared lands from swamps or forests on their own. Through this integration into the new environment and survival in the ongoing land struggle, their confrontation with the native population was non-peaceful at times. However, at other times it added to the transformation of agriculture in the area.

In Mihaliç, this new population was regarded by the rulers as potential barriers against the spread and formation of çiftliks, though most of the time the refugees became victims of this spread in reality. The central policy was to settle the refugees on the 'non-cultivated lands' of the çiftliks. In doing so, it was aimed on the one hand to bring the waste lands under cultivation, and on the other hand to stop the spread of çiftliks relying on sheep breeding. Thus, this new population was inserted by the rulers in the middle of the land and power struggle. These refugees tried their best to survive amid the power struggles; they sometimes petitioned the government and at times moved to different places, or they opened up new lands from swamps. Yet, the ambiguous category of 'waste' lands and unregistered meadow lands brought about other conflicts with the native population.

In Bursa, the early period the refugee flow coincided with the spread of the disease in silkworms. In response, the trees of the former gardens and sometimes vineyards were cut down, and the lands of these 'empty' lands were given to

refugees against the will of the native population and local governor Ahmet Vefik Paşa. In later periods some new refugee villages were established on the plain and some more on the Uludağ mountain. Another way that land was granted to the newcomers was through the purchase of the former çifltiks' lands in this period. Yet, at the end of the 19th century, the revival of mulberry gardens and the need for more grazing space made unregistered meadows and 'waste lands' more valuable, which mired the refugee population and native population into conflicts. Yet, such a need also stimulated a more intensive usage of mulberry gardens.

The arrival of refugees should not only be viewed as fueling the land struggles, of course. In overcoming these land struggles they brought their knowledge, encouraged the spread of certain crops and introduced some new farming methods. They were not pioneers of change, but they supplemented agricultural knowledge when they found ways to adjust to the environment. While the Circassians destroyed the rice paddies, they were experts in horse breeding and provided stronger breed of horses which were especially in need to make use of agricultural machines mostly used in the çiftliks. Likewise, Rumelian refugees distributed stronger oxens. Some Bulgarian refugees insisted on rose tree cultivation and they were able to reach a decent level of production. In the existing conditons, many of the Rumelian refugees continued to cultivate tobacco, something that spread very quickly among the native population at the end of the 19th century. Some Rumelian immigrants destroyed the mulberry trees to cultivate maize, which was their specialty in their homeland. They circulated their maize seeds and contributed to the spread of maize cultivation. Some applied sulphur to vine shoots, which made melons sweeter and increased the productivity. Some contributed to rice cultivation which was especially promoted by environmental conditions.

As the refugees managed to survive the struggle for land and develop methods that conformed with their new environment, their knowledge became supplementary. Only at this point we can talk about a real change in agricultural knowledge. Otherwise, it would have turned to a destructive struggle between parties.

This fight was not only among the refugees, native peasants, powerful land-holders and small peasants. The state as a central and provincial organization with various agencies aimed to control every aspects of agricultural production through several means, which brought interaction, mutual 'becoming' and clash. Thus, while these aforementioned forces impacted change in agriculture, the centralizing state tried to make itself through imposing scientific knowledge. In this framework, Chapter Five is dedicated to the state policies on agricultural knowledge. The aim is to introduce an explanation other than 'backwardness' of the agricultural knowledge of the peasants and to put forth an explanation for the scientific knowledge other than 'superior'. This chapter argues that this was the part of discourse used by the state rulers in order to control and manipulate agricultural knowledge and production. This discourse encompassed a wide-range of concepts from hygiene to the extermination of locusts; namely aimed at redefining the peasants' environment to achieve control. Hence, the meaning was subject to change depending on the needs and deficiencies of rulers and peasants. Certain confrontations forced the rulers to change the discourse and created the conditions of interaction between these forms of knowledge. Therefore, as well as a struggle, this process was an interaction and mutual change in both types of knowledge, which address a mutual 'becoming'.

Within this framework, the chapter first discusses the formation of the central and provincial bureaucracy in the 19th century and examines how scientific

knowledge gradually came to be an apparatus of the centralizing state in controlling and manipulating agricultural production. In the first half of the 19th century, scientific agricultural knowledge was perceived as something that could serve the purpose of the cultivating market crops. Although peasants were to learn basic scientific knowledge at some point in time, it was seen as an ultimate goal of the far future. The aim of the forming central organization was to gather information and find urgent solutions to the problems that were thwarting agricultural production. With the spread of diseases, scientific knowledge began to take center stage and peasants were expected to learn how to fight these diseases after the 1860s. Beginning from the 1880s, scientific agricultural knowledge was presented as the superior type of knowledge particularly with the extension of the central bureaucracy by European- educated agronomists. Thus, state with the central bureaucracy came to be the holder and the provider of scientific knowledge, which made this organization to enforce the rules in peasants. As the policy of imposing scientific knowledge as the sole way of increasing agricultural production came to the fore, the peasants and their knowledge began to be perceived as the obstacle; they needed to be 'enlightened' through this scientific knowledge. The provincial officials remained somewhere in between applying the central policies and reaching out to the peasants. However at the beginning of the 20th century, even though the content of scientific knowledge might change, it became a central policy to achieve scientific knowledge as a high goal sooner or later. The higher scientific knowledge became, the lower the peasants' knowledge came to be posed. By going over this dichotomy, control aimed to be achieved. Local cooperators of PDA, Regie and Chambers of Commerce and Trade consolidated these policies by insisting on scientific methods and imposing standardizations on the producers.

Achieving control on production brought re-definition and reorganization of the public space to enable penetration. In that manner, everything related to production was included as part of the definition of scientific knowledge. While scientific knowledge as a general discourse served the central policies to restore the control in the public domain, the meaning of scientific knowledge changed over time. Mass mobilization was presented as the most efficient way of fighting against locusts, in the absence of the necessary financial power to import viruses or chemicals. Yet, the control over locusts began to diminish particularly in the eastern provinces during the WWI period, and locusts appeared to be an even more serious danger to production. Furthermore, as labor could not be mobilized due to war conditions, the efficient method of fighting became applying chemicals.

By laying the blame on ignorance of peasants, thereby creating a space to enter, control and shape the domain, most of the rulers' efforts were oriented towards education, which is also defined by struggle, but also by interaction and mutual change.

Chapter six scrutinizes agricultural education in order to shed light on the most direct impact on agricultural knowledge. The first part of the chapter discusses how the agricultural education policies were developed through a comparison among different states in the world.

The second part of the chapter closely looks at all the aspects of silkworm and cocoon production. Before the pebrine disease infected most of the mulberry gardens in the mid-19th century, the central and provincial rulers and peasants were content with the income from silkworms and cocoons. Therefore they did not question the methods and conditions of the silkworms or gardens. It was after the

disease that the methods used by the peasants were questioned. The disease led to the institutionalization of scientific agricultural knowledge.

Travel accounts reveal the details of tending mulberry gardens and silkworm production before the onset of disease roughly from 18thto the mid 19th centuries and establish the ground to argue the new claims to scientific knowledge. Whereas most of the Ottomans saw the pebrine disease as the major cause in the extreme decline in silkworm production, this section of the chapter discusses additional factors in production decline, such as changing world market demands with the emergence of new actors, Japan and China, as cheaper and larger suppliers.

This section then analyzes the institutionalization of scientific knowledge as a result of strong belief that science could eradicate pebrine, the establishment of the Silk Institute and what this means and represents for the state policies.

After this, the chapter looks at what was new in mulberry garden farming at the times. Approximately 25 years after the decline, beginning from the 1880s mulberry gardens began to spread again. Yet during this time, gardens began to be used more intensively due to land scarcity and entered into a struggle against the spread of swamps, floods and rice paddies. But backed with official support, the mulberry gardens, unlike rice, had the state on its side, of course with one condition: the control and management of state-led scientific agricultural knowledge in garden care and silkworm breeding.

Yet, more than garden care, it was silkworm breeding which was in target of change. This imposition went hand-in- hand with hygiene claims. Scientific knowledge dictated that the worms should be kept under hygienic conditions and in organized rooms where the heat was properly regulated. In this way, silkworms that

had once been kept in the bosoms of the women turned into commodities that needed to be kept in proper rooms as the sources of income.

The spread of methods that was taught by the Institute was encouraged through various ways such as competitions, monetary awards and strong regulations on garden care and the production of silkworm eggs. While the formation of mulberry gardens were encouraged by distributing of free saplings, the strict regulations that were based on application of scientific knowledge were imposed and peasants were obliged to apply to the Institute to maintain their gardens.

To some extent, the peasants displayed eagerness to alter their methods in order to get rid of the disease and to avoid losing income. This, however, did not mean that scientific knowledge dominated the world of the peasants, therefore we need to discuss the interaction between scientific knowledge and the peasants' knowledge. Graduates from the Institute went back to their villages and combined scientific knowledge with the know-how of the peasants, producing a hybrid knowledge set which complied best with their environment.

The last part of the chapter discusses that as the scientific knowledge brought about harsher criteria which threatened the production of the eggs, the means and the existence of the peasants in the market (in other words, as scientific knowledge disrupted the harmony between peasants and their environment) the relationship between scientific knowledge and peasants' knowledge turned into a struggle to protect their seeds. The seeds belonged to the peasants and were developed in their environment, thus their means of existence. While, the agricultural knowledge of the peasants was changing, it was resistant to change when the impositions of scientific knowledge brought something that did not fit to their environment and threatens their means of living. In other words, the clash was not

between the peasant knowledge and scientific knowledge, instead it was between on the one hand the rulers who imposed scientific knowledge to be applied in a certain way to control and manipulate the production, on the other hand the peasants who tried to maintain their means of existence.

CHAPTER 2

ENVIRONMENT AND AGRICULTURAL KNOWLEDGE

This chapter is dedicated to the study of the environment in Bursa and Mihaliç, in order to understand the relationship between the peasants and their local environment when developing agricultural knowledge. Peasants in Bursa and Mihaliç developed different ways of utilizing their respective environments. To understand how these alternative approaches evolved, this chapter presents a brief overview of environmental changes in Bursa and Mihaliç between the 18th and 20th centuries. Meanwhile, it also adresses how the relationship between the people and their local environment was affected by these changes and how this contributed to the development of their agricultural knowledge.

In discussing these environmental changes there is a rich discussion about the Little Ice Age and its effects on Anatolia. Tabak said that the Little Ice Age manifested itself in Anatolia in the form of spring floods, the expansion of marshlands[27] and wetter winters. Yet the aim of this study is not to describe Anatolian climatic conditions. Rather, the intention is to emphasize how peasants can respond to changing environmental conditions by adjusting their prevailing farming practices in order to provide a new and more nuanced definition of agricultural knowledge, beyond the concepts of static, backward, and unchanging.

At the beginning of the 19th century most of the peasants in Mihaliç abandoned their villages due to the unpredictable inundations of rivers and lakes, and

[27]Tabak, *Solan Akdeniz 1550-1870: Coğrafi- Tarihsel Bir Yaklaşım*, 27. Sam White crticizes Tabak for assuming wetter conditions in Anatolia, claiming that they do not have enough data on wetter conditions in Anatolia; see White, *Osmanlı'da İsyan İklimi: Erken Modern Dönemde Celali İsyanları*, 386. However, to me summer and spring inundation data supports Tabak's assumption, furthermore we do not have, at least until now, any data on extremely cold winters that have lasted for long years.

they migrated to drier areas.[28] Yet, as the population increased, land became scarcer and unpredictable weather conditions came to be considered normal, they struggled to regain their former lands, most of which had passed into the hands of large land-holders who based their claims on the shifting borders of marshlands.[29]

This was a struggle that eventually taught people to exploit marshlands for their benefit, such as summer crop cultivation and rice fields in Bursa or summer pastures in Mihaliç. Differences between Mihaliç and Bursa stemming from their varying climatic, geographic and market conditions determined the economic activity in the region. This is the story of shifting collaboration between people and nature and how their knowledge and practices altered in time. Yet the changes in knowledge, methods and practices were not simply a two-sided process between population and environment; the rulers also played a role. It was a process of power struggles between central and provincial power-holders in state organization and the people regarding the provisional concerns of rulers including wheat growing vs. sheep breeding in Mihaliç; revenue concerns like mulberry trees vs. rice fields (which included hygienic matters regarding fens, rice cultivation and malaria); or concerns related to obtain more control on production which brought scientific agricultural knowledge more onto the state's agenda. Yet, it was not only a process of struggle, but also interaction and negotiation.

Within this framework, following the discussion on how the historians perceive the change in environment and hence the historiography of environmental history, this chapter examines the geography of Bursa and Mihaliç in detail to reveal

[28]See Miss Pardoe *The City of the Sultan and Domestic Manners of the Turks. Vol. II*; Addison, *Damascus and Palmyra: A Journey to the East. Vol.I*; Burgess, *Greece and The Levant/ Diary of a Summer's Excursion. Vol.II;* Jardine, *Memoirs of Hugh Edwin Strickland.*

[29]As Groove and Rackham say that the return to the lowlnads was the result of both the ebbing of the LIA and also the overpopulation, as the population increased flood-plains began to be cultivated and fens started to be put under cultivation; Groove& Rackham, *The Nature of Meditarennian Europe: An Ecological History*, 82-3.

stark differences in geographical features. This chapter then moves onto certain flooding events in Mihaliç; a discussion then follows looking at how expansion of marshlands, together with market conditions, shaped agricultural production and trends of the region. The next part concentrates on Bursa where marshlands and floods sparked different land usage, particularly the rise of rice cultivation. The last part is dedicated to how the state authority tried to reconstruct the control in this domain in the form of drainage efforts, thereby trying to manipulate the relationship that the people established with their environment.

2.1 Theories on the environmental changes on agricultural production and practices

Discussing environmental changes is impossible without involving the debate on the Little Ice Age. Historians are engaged in an ongoing discussion of its timing, reason behind this change, region-bound character and even whether or not it actually happened. Since historians don't have regular data, and they use proxy data by relying on various sources – like tree circles, travel accounts, appearence and disappearance of glaciers, any indications of cooling-, the Little Ice Age was regarded as something that was imagined by some historians.[30]

In interpreting the LIA and the environmental history more general, the historians focus on the relationship between human and their environment. According to J.R. McNeill there is a destructive relationship between humans and their environment. In focusing on the reasons behind the climatic change, he sees humanization as the major cause. To McNeill (1992) "… nowhere peasants and herders devise systems of human ecology in durable harmony or balance with the

[30]Kelly & O Grada,"Debating the Little Ice Age" and "The Waning of Little Ice Age: Climate Change in Early Modern Europe".

natural world" (p.354).[31] Despite McNeill, Groove and Rackham see volcanic activities in 1810s, solar activity and glacial advances as the reasons behind the climatic changes.[32] They say that humanization cannot be a reason behind climatic shifts, because humanization began 4000 years ago in a climate similar to the present one. In this way, they interpret the relationship between human and the environment as an interactive and adaptive process.

Sam White claimed that LIA lasted roughly between 1350 and 1850 despite regional varieties[33], and attributes important role to states as regulator in the relationship between humans and their environment.[34] According to him LIA was i) a global cooling between1400-1850; ii) fluctuations that destabilized economies (like in Anatolia between 1590 and 1610); iii) a general crisis between 1580 and 1710. [35]

For Faruk Tabak it was the global economic system that brought the change in the relationship between human and nature. Tabak says that ecological change together with world economy trends and hegemony of world system caused a change in agrarian cycle from cereal production to polyculture, tree-crops in the highlands and small livestock breeding[36], though low-lands were not totally abandoned. He specified the conditions in Anatolia such as increased incidences of flooding, the unpredictable undertaking of low-lands for cultivation, and inundations of river beds, thus enlarging marshlands at the expense of former croplands[37] (as we also know from the accounts of MacFarlane about Mihaliç in 1840s)[38]. For Tabak (2010), in

[31]McNeill, *The Mountains of the Meditarennean World: An Environmental History*, 354.
[32] Groove & Rackham, *The Nature*, 138-9.
[33]White, "The Real Little Ice Age"
[34]White, *Osmanlı'da İsyan İklimi*.
[35]White, "The Real Little Ice Age", 348.
[36]Tabak, *Solan Akdeniz*, 23.
[37]Tabak, *The Waning of the Meditarennean*, 17.
[38] "… it was within the memory of men living in Mohalitch, that the mouth of the Rhyndacus was less choked up by sand, that the streams which traverse the plain had once more defined beds, and deeper and clearer courses; that that accumulation of waters they call Kara-dere never rose so high or spread to such a breadth as now; and that many tracts of land were then cultivated with wheat and maize,

some low-lands "The onset of Little Ice Age and the fluvial environment it generated brought about possibilities for growing cultivation of aquatic crops- hence the popularity of rice as a staple- and crops that were in need of irrigation…"(p.29).[39]

In a similar vein with Tabak, Onur İnal sees the economic forces as causing the change in the relationship between humans and nature. He stresses that people responded to environmental and economic changes by changing their agricultural production, including crops, methods and their know-how.[40]

Alan Mikhail interprets the state in a different way. For him, unlike Sam White, the state was the interrupter in the relationship between peasants and their environment.[41] Since it was the peasants who developed the knowledge best fit to the environment, the state irrevocably broke this relationship when it began to interfere with the aim of increasing its share from the products and allocating resources. This was at the beginning of the 19th century, when the changing state mentality replaced the peasant knowledge with experts and technocrats.

In the light of these approaches that question the changing relationship between nature and human, this chapter discusses how peasants revised their agricultural knowledge and developed quick responses to environmental and market conditions. Changes in agricultural production, production trends and knowledge were the result of complex factors.[42] The reconstruction of central and provincial state organization in various forms does not always mean an interruption; this assumption reproduces the paradigm of 'backward peasant knowledge in an isolated world'. Instead, this chapter underlines that the confrontation between rulers and

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which are now swamps in summer and ten feet under water in other seasons"; MacFarlane,*Turkey and Its Destiny: The Result of Journeys made in 1847 and 1848 to Examine Into the State of that Country, vol.I*, 428-9.

[39]Tabak, *Solan Akdeniz*, 29.

[40]İnal, "Environmetal History as an Emerging Field in Ottoman Studies: An Historiographical View", 9

[41]Mikhail, *Nature and Empire*.

[42]Hadjıkyriacou, *Society and Economy on an Ottoman Island: Cyprus in the Eighteenth Century*, 36.

peasants includes a negotiation process in tandem with a struggle, which was not the end of one or another. Therefore, neither peasant knowledge, nor the state's scientific knowledge and impositions remained static, instead they transformed each other through negotiating and struggling.

2.2 Physical geography and soil structure of Bursa and Mihaliç

Although this dissertation mainly focuses on the districts of Mihaliç and Bursa, the scope of the research at times extends towards the Mudanya and Manyas districts based on the available data. Thus, we get a rectangular space: the northern side where Marmara Sea lies; the eastern part that stretches to Gölbaşı Lake; on the southeastern part that goes to Uludağ mountain whose "… height of the range gradually decreases towards the northwest…"[43]; and until Kirmasti on the west, the southern part of which is limited by the southern banks of Ulubat/Apolyont Lake, and the western part of which extends until the eastern banks of Manyas Lake.[44]

The aim of this rough definition above is to provide details on the geography based on observations of travelers and the way this region was depicted in the yearbooks. From the summit of Uludağ mountain, Munro (1897) depicted the surface as "… bounded on the north by the low bare hills, over which shows the wide-expanse of Marmara. To the south the hills are higher and rise abruptly from the flat" (p.151).[45] The Bursa Plain which could be seen from the summit of Uludağ constituted of two basins; the Piedmont and Flood (*Taşma*) Plains.[46] The Piedmont Plain lies widely on the hills of Uludağ which was formed by the alluvial deposits of the rivers run off from Uludağ. The Flood Plain (*Taşma Ovası*), what is known as the

[43]Munro, & Anthony, "Explorations in Mysia (Continued)", 264.
[44] For the maps of Bursa and Mihaliç see Figures B1-B4 in Appendix B.
[45]Munro & Anthony, "Explorations in Mysia",151.
[46]Çölaşan, *Bursa İklimi*,2

central Bursa Plain, slants from the south to the north and from the east to the west. It is a catchment basin that was formed by the alluvial deposits of the rivers run off from Uludağ.[47] Prof. Ardel mentions the borders of the plain as the following; from Uludağ in the south, to the Demirtaş hills in the north; from the village of Gündoğdu in the west and to Gölbaşı Lake in the east.[48] According to Evliya Çelebi's illustration, the Plain lies in front of the Uludağ and stretches to the Marmara Sea and was drained by Nilüfer River which was flooded in spring mostly.[49] The soil structure around Nilüfer River was clayey[50]_ and also alluvial as a result of its formation, thus the structure is ideal for tree cultivation_ and the area was well-cultivated and covered with gardens and mulberry plantations.[51] Mac Farlane depicted the southern part as sandy and said that the sandy structure of soil around Hacı İvaz (which lies on the southern part of the Bursa plain) was favorable for potato cultivation and intensive farming.[52] Not only the southern part, but the soil of the Bursa Plain in general was defined as alluvial and fertile by Ertürk in her analysis.[53] Ertürk says that despite the fertility of the plain, the northeastern part is still apt to forming marshlands as the underground waters were not yet totally absorbed.[54] The northeastern part which she talks about is the region called Kuşkonmaz Bataklığı which was drained in 1936. This will be discussed in detail later in the chapter. Supporting the claims of Ertürk, Ahmet Ardel talked about

[47]Çölaşan, *Bursa İklimi*,2
[48]Ardel, *Bursa Ovası ve Çerçevesi*, 62. See Figure B4 in the Appendices.
[49]Dağlı, & Kahraman, *Günümüz Türkçesiyle Evliya Çelebi Seyahatnamesi: Bursa- Bolu- Trabzon- Erzurum- Azerbaycan- Kafkasya- Kırım- Girit, vol.II*, 6. We can see spring floods as the characteristics of The Little Ice Age in the 17th century. Its impacts continued in the 19th and the beginning of the 20th century, as we will see below. The floods which lasted as long as 200 years caused cloggings of water canals- of course with the help of people by changing the river beds through several ways conciously or uncounciously- hence we see the extension of swamps in Bursa and Mihaliç in the 19th century.
[50]Hamilton, *Researches in Asia Minor, Pontus, and Armenia: With Some Accounts of Their Antiquities and Geology, vol. I*, 70.
[51]Hamilton, *Researches in Asia Minor, vol.1*, 71.
[52]MacFarlane,*Turkey and Its Destiny*, 150.
[53]Ertürk, *Bursa Ovası ve Çevresinin Ziraat Hayatı*, 93.
[54]Ertürk, *Bursa Ovası*, 101.

swamps and reeds in patches in 1946 (after the swamp was drained in 1946) around the village of İğdir[55] which is located on the eastern edge of the swamp.

Besides the soil, the climate of Bursa and how this climate created a certain sort of vegetation was depicted by geographer Stotz (1939) as "[…] with the exception of the mountaintops, which are always moist, the Bursa region experiences a marked summer drought, during which temperatures are high and evaporation is great" (pp.86-87).[56] Stotz (1939) divides vegetations into climatic zones:

> The meadow landscape occupies the upper part of the highlands. Immediately below the snow line, always moist, it is the habitat of grasses, various flowering plants, and a few scattered conifers. It is the ultimate goal of the herders who drive their flocks up the mountainside in summer. Immediately below it is the conifer landscape, source of yellow and white pines and the much-needed charcoal. (p.87)[57]

Down from the mountain, "at the base of Mt. Olympus [Uludağ] […] underlain by clay […] pedalfer soils have formed […] and mulberry trees were seen everywhere."[58] Then, "stretching in a narrow belt from the eastern boundary of the Bursa region, north of the broadleaf landscape, is the steppe"[59] where "grazing sheep and growing of grain are the two chief occupations"[60] by which he means a vast region from the Katırlı Mountains to Manyas Lake.

Concerning the topographic details from Bursa westward, William Jardine described the hills as moving away from Bursa plain toward the west, to Mudanya, and the range of hills which runs parallel to the coast all the wayto Mihaliç,[61] called the Katırlı Mountains. In the 1840s, on the road from Mudanya to Nilüfer (following the southern side of the Katırlı Mountains) while crossing the lands around the village of Balat, Hamilton observes the "… diminution of population, to see villages

[55] Ardel, *Bursa Ovası*, 74.
[56]Stotz, "The Bursa Region of Turkey", 86-7.
[57]Stotz, "The Bursa Region of Turkey", 87.
[58]Stotz, "The Bursa Region of Turkey", 87
[59]Stotz, "The Bursa Region of Turkey", 87.
[60]Stotz, "The Bursa Region of Turkey", 87.
[61]Jardine, *Memoirs of Hugh Edwin Strickland* , Cix.

in ruins and abandoned, and large tracts of land, on which the former marks of plough were visible, now totally neglected, producing in the spring a rich supply of thistles, or affording in the summer a scanty pasture to the flocks of wandering tribes".[62] While the high grounds were left desolated, he came across huge mulberry plantations near Dereköy and Balıklı Köy[63], which were located near Nilüfer on lower ground compared to Balat. Why were the lands near Balat abandoned whereas lands that were on barely lower ground were full of mulberry plantations? It might be that the people found more income-generating economic activities than grain cultivation on the lower lands.

Munro detailed the region around Apolyont Lake. He called the northern shore of the Lake as "bare and featureless"[64] whereas "the southern shore of the lake is bolder. Here the steep hillsides scarcely leave room for the road, and when the water is high there must be some difficulty in passing. The shady slopes are clothed with trees and grass, and the road fringed with luxuriant vegetation of figs, vines, bays, clematis, and other plants".[65] According to the detailed depictions of The Committee of Geography in the Military, the southwestern shores of the lake were covered with so many reeds that one could not discern the real boundaries of shore. Furthermore the boundaries of the shores were changing in every season. The northern and southeastern shores, on the other hand, were more settled.[66] Hamilton said that the hills towards Ağlayan Çınar, as it is referred to today, consist chiefly of decomposed volcanic soil andwere covered with mulberry gardens and vineyards.[67] The same place was observed by Pococke almost 100 years ago as a center of silk

[62]Hamilton, *Researches in Asia Minor, vol.1*, 70.
[63]Hamilton, *Researches in Asia Minor, vol.* 2, 85
[64]Munro, "Explorations in Mysia" [1], 151.
[65]Munro, "Explorations in Mysia" [1], 152.
[66]Birgül & Çanaklı, *Cenubi Marmara Havzası Bursa Vilayeti Coğrafyası*, 27.
[67]Hamilton, *Researches in Asia Minor, vol.* 2, 87.

and wine production.[68] He illustrated the place as an island so close to the land that people can get to it on horseback, and in summer it is nearly dry.[69] In fact this place seems today as a continuation of the land similar to a cape from the land towards the lake. Hamilton does not talk about it as if it is an island. In that case, what can we say about climatic changes from much wetter conditions towards drier but marshy lands?

Evliya Çelebi who traveled around Mihaliç in September 1659 talked about large meadows in Karaağaç on the northern shore of Apolyont Lake.[70] Hamilton who was travelling the region two hundred years after Evliya Çelebi in May talked about extensive marshes with reeds and rushes on the northern shores.[71] In the same period, the Temettuat defter of the village of Karaağaç reveals a çiftlik where a holder owned 410 heads of sheep that must have been in need of pasture. Alongside the pasture wetlands and margins of swamps, the peasants shifted to the cultivating other crops, such as linseed.[72] Sandison also talked about increasing linseed production around Mihaliç and Apolyont Lake. [73]

According to Hamilton these marshy lands were alternated by wheat cultivation and marshy pastures.[74] The flat lands from the eastern shore of Apolyont Lake to Kirmastı were covered with marshlands that stood under water in winter, but were covered with white Iris in summer.[75] Concerning these marshlands on the eastern shore of Apolyont Lake and the Mihaliç Plain, Sandison said that "for the last 7 years the damage from inundations has been spreading over the plain, one of the riches in this part of Asia Minor for corn and the breeding of cattle. […] Many

[68]Pococke,*A Description of the East and Some Other Countries, vol. II*, 118.
[69]Pococke,*A Description of the East and Some Other Countries, vol. II*, 118.
[70]Karateke, *Evliya Çelebi's Journey from Bursa to the Dardanelles and Edirne from the Fifth Book of Seyahatname*, 86.
[71]Hamilton, *Researches in Asia Minor, vol. II*, 91.
[72]BOA, ML. VRD. TMT. D. 8887
[73]FO. 78/441, March 18, 1941, no.8, p. 263.
[74]Hamilton, *Researches in Asia Minor, vol. II*, 92.
[75]Hamilton, *Researches in Asia Minor, vol. II*, 93.

villages are seen abandoned or going to decay…".[76] However, thanks to Temettuats and Sandison's careful observations we can see how sophisticated the peasants were in adjusting to the environmental conditions. He mentioned that melons were cultivated in large quantities on inundated lands when the swamps dried during late spring and summer.[77] In addition to melons, linseed cultivation, silk raising and grapes at higher altitudes compensated the loss from grain cultivation, according to Sandison.[78] In a similar vein, MacFarlane indicated the decay on wheat lands by saying that the lands around Balıklı Çiftlik (on the Mihaliç plain) which used to be maize and wheat lands, became pastures in summer and marshlands in winter.[79] Thus, since the time of Evliya Çelebi the floods lasted for a very long time and certainly led to the expansion of marshlands by clogging the water canals with alluvial deposits, although the people in the surrounding area sometimes found ways to get along with it.

The area westwards of the Mihaliç Plain was bounded by Karadağ mountain range and stretches to Bandırma in the north, Apolyont Lake in the east, Kirmastı district in the south_ though towards south of Kirmastı district, Mihaliç Plain seems to stretch and get narrowing_ and with Manyas Lake in the west. Although some of the historians and travelers tended to depict the Manyas and Mihaliç Plains as separate, from an aerial view they look to be a continuation of each other. In the 1927 Yearbook, the size of Karacabey Plain was estimated to be 704,250 dönüm,

[76]FO. 78/441, March 18, 1841, no.8, p.262.
[77]FO. 78/441, March 18, 1841, no.7, p. 251.
[78]According to the numbers that Sandison gave the total yield of wheat was 63,000 kile 15-20 years ago, whereas it decreased to 18,000 kilo in 1840 and to 13,000 kilo in 1841; FO. 78/490, Februray 19, 1942, p. 255.
[79]MacFarlane, *Turkey and Its Destiny*, 428,9.

although the clogging river mouth of the Karadere caused inundations on the plain, depriving most of the plain from being agriculturally viable.[80]

This plain was watered by Simav, Hanifederesi, Susurluk and Makestos River and Karadere.[81] The Adranos Brook and two other rivers unite on the northern side of the Mihaliç Plain, leading to marshlands due to the moderately sloping land.[82] A state official sent to investigate Çiftlikat-ı Hümayun related the frequent inundation of the Karadere to a mill on the river which was established by the former Head of Finance in Mihaliç.[83] He said that the excessive rain in March 1867 devastated the banks on the sides of the river and flooded to the side of Karayani village. The willows on the river that he planted made the situation even worse by narrowing the river bed. By creating mulberry gardens on the islets and thus changing the river bed, he caused the formation of further marshlands and paved the way to later inundations.[84]

In 1842 Hamilton depicted the shores of Manyas Lake which lies on the western edge of the Mihaliç Plain as "…flat and marshy, and subject to frequent inundations in the winter; the water appears shallow to a great distance"[85], yet the same lands were extremely fertile due to the soil structure, which was granite and rich in feldspar. When decomposed, this structure increases fertility.[86] In 1910, William Hasluck's observations were not much different; he illustrated the shores of Manyas Lake as "muddy [….] dull and flat […] though fertile enough when

[80]Yalazı, *Hüdavendigar Vilayeti Salnamelerinde Karacabey*, 95.
[81]Yalazı, *Hüdavendigar Vilayeti Salnamelerinde Karacabey*, 96.
[82]Yalazı, *Hüdavendigar Vilayeti Salnamelerinde Karacabey*, 96.
[83]BOA, T. 524/53, 23 Ramazan 1288 (Hicri).
[84]"seksen dört senesi martının on ikisinden on altısına kaar havali-i mezkurda tezevvül eden baran değirmen-i mezkur için bağladığı bendden tabii rücat ederek […] tahtalı ve karayani bendlerini tahrip etmiş ve muma ileyhin [previous Head of Finance] bend etrafına söğüd fidanları gars eylemesinden mecrası daralıp alt tarafında teşekkül eden adalara şu ve bu taraftaraflarından dutluklar ihdas edilmiş ve bu tuğyan daimülcereyandan muzab olan kura ahalilerinin…"
[85]Hamilton,*Researches in Asia Minor, vol.II*, 105.
[86]Hamilton,*Researches in Asia Minor, vol.II*,98.

cultivated, is treeless except on the southern side. This southern shore is frequently flooded and affords ranks pasture and water meadows for the herds of buffalo which graze it"[87], though in winter it was depicted as immense marshy plains by John Murray in 1871.[88] In 1911 Ömer Fuat Bey also talked about the marshlands and inundations of the Karadere which ends up destroying grain production.[89]

2.3 Floods, unpredictable temperatures, harsh winters and marshlands

As mentioned at the beginning of this chapter, the impacts of the Little Ice Age continued until the beginning of the 20th century. So far, the intention has been to illustrate some features of the geographical conditions of the region and to relate these conditions with agricultural production, particularly changing crops and production trends mainly in Mihaliç and Bursa.

2.3.1 Mihaliç: floods, marshlands and sheep breeding

As we saw above, at the beginning of the 19th century and before then as well, each traveler spoke about marshlands- which were not standing waterholes as they appeared to be- and the floods that fed these swamps, which had devastating effects on agriculture.

In 1837/38 Ulubat Lake flooded and destroyed the crops in Makri, a village on the eastern shore of the lake, and Ulubat village.[90] In the 1840s (as the banks had not been repaired since eight years) the Apolyont Lake flooded Mihaliç Kirmastı and Manyas Plains, killing approximately 40 sheep and destroying many fields and

[87]Hasluck, *Cyzicus: Being Some Account of the History and Antiquities of That City, And of the District Adjacent to it, With the Towns of Apollonia Ad Ryndacum, Miletupolis, Hadrianutherae, Priapus, Zeleia, Etc*.,41.
[88]Murray, *Handbook for Travellers in Turkey in Asia: Including Constantinople, the Bosphorus, Dardanelles, Brousa and Plain of Troy: with General Hints for Travelers in Turkey Vocabularies, etc*., 343.
[89]Ömer Fuat Bey. "Ömer Fuat Beyin Anadolu Mektupları: Karacabey", 363.
[90]BOA, D.BŞM.1054, 1253 (Hicri).

meadows.[91] Years later, there was another inundation in Manyas that destroyed 80% of the crops.[92] Again at the end of the 19th century, someone wrote in Bursa newspaper about the inundation of Apolyont Lake and the Ulubat River every winter, harming the crops there.[93] At more or less the same time, Ömer Fuat Bey talked about the inundations of the rivers which drained onto the Mihaliç Plain during the winters, destroying the grain production in 70-72 villages on the plain.[94]

As can be seen floods were unpredictable, sudden and destructive. When clashing with the population increase and refugee settlement during that period, land became scarce and cultivation became a problem. Within these circumstances, the destructive impact of these floods could give way to different production relations. According to MacFarlane in the 1840s, the peasants in Kilisan sought ways to make a deal with their neighbor Balıklı Çiftliği on grazing their buffaloes and cattle on the pastures of the çiftlik to get away from their pasture which they knew would have soon been flooded with the waters of Karadere.[95] It seems that during the first years, the holder of Balıklı Çiflik permitted to peasants of Kilisan some sort of payment in return. However, at some point in the 1880s, this production relation broke down as we understand it due the long-standing land disputes in which çiftlik-holder complained about the peasants' attack to pasture and fields of the çiftlik.[96] The tax-farmers, most of whom were sheep merchants did not want the Kilisan peasants to enter the pastures and fields of the çiftlik.

But still, these people would seek other ways to adapt to the changing environment and make use of the marshlands as long as they can endure power and

[91]Yalazı, "Apolyont Gölü'nde Ulaşım", 56.
[92]Hüdavendigar Gazetesi, 33. Sene 14 mart 1317/7 zilhicce 1318, 2.
[93]Bursa Gazetesi 3. sene(135), 15 safer 1311/16 ağustos 1309, 3.
[94]Ömer Fuat Bey, "Ömer Fuat Bey'in Anadolu Mektupları: Karacabey", 363.
[95]MacFarlane, *Turkey and Its Destiny*, vol.I, 494.
[96]BOA, DH. MKT. 304/6, 1310 (Rumi); BOA, DH. MKT. 255/36, 1310 (Rumi); BOA DH. MKT. 2330/30, 1316 (Rumi).

production relations in the region. MacFarlane wrote that peasants in Kilisan sow linseed (a summer crop needed to produce fiber and needs moist conditions and plenty of water) on the grassland when waters abated in summer [97] This is a good illustration of how people made use of marshlands. Yet, the conflicting seasons of linseed and animal grazing must have forced the peasants to seek an agreement with their neighboring çiftlik-holder.Years later we see peasants of Kilisan sowing tobacco(which is best cultivated in alluvial soils and needs plenty of water, and harvested in the spring), a crop that perfectly fits the environmental conditions.[98] Lying on the wetlands, Karaağaç peasants also cultivated linseed. In the same village we also see the çiftilk's 410 heads of sheep which were probably grazing on 1667 dönüm uncultivated lands.[99] Can we say that sheep of the çiftlik and the peasants coexisted peacefully and allocated the wetlands in an equal manner?

As I said above this adaptation to the natural environment was related to how well the small peasants could manage when it came to the region's power relations. The period that MacFarlane referred to was the eve of the increasing sheep breeding activity in the Mihaliç region. In the 1870s according to the official who was sent to prepare a report on the Çiftlikat-ı Hümayun, the constant inundations of the rivers deprived the Mihaliç Plain of agricultural activity.[100] The peasants mostly abandoned the villages and those who remained cultivated a total of 500,000 dönüms of land and due to high demand, they rented another 500,000 dönüm marshlands (which offered rush and reeds) to sheep merchants and butchers.[101] While the figures might have been an overestimation, what he said bears more significance. Can we

[97]MacFarlane, *Turkey and Its Destiny, vol.I*, 494.
[98]Bursa Gazetesi, 3. Sene (143), 12 rebiyyülahir 1311/11 teşrinievvel 1309, 6.
[99]BOA, ML.VRD.TMT.d. 8887, 1264 (Hicri).
[100]BOA, T.524/53, 1288 (Hicri).
[101]BOA, T.524/53, 1288 (Hicri).

say that this is a fair agreement between peasants and sheep merchants who mostly came to be çiftlik-holders?[102]

In 1880, a document claimed that the constant inundation from the Karadere of parts of Mihaliç Plain caused the lands to be turned to pastures.[103] As the flooded water- which was due to the clogging of *Boğaz* on the shore of Marmara Sea- abated, some parts on the plain remained as marshlands due to the slope of the surface. These marshlands weren't conducive to agricultural activity, and under these conditions some villagers abandoned their villages and emigrated. [104] The peasants abstained from cultivating their lands to prevent attacks on their crops by animals, particularly sheep which increasingly being grazed during that period. In this way, these abandoned lands passed into the hands of sheep merchants who then turned them into pastures.[105] The Provincial Administrative Council of Hüdavendigar reported to Sublime Porte that the peasants did not put all of their lands under cultivation fearing that the crops would be attacked by the animals. Therefore, peasants had to rent these uncultivated lands which legally under their usufruct right to the çiftlik-holders and sheep merchants. In that way, the çiftliks extended by appropriating these lands.[106]

Thus, the peasants tried to create a balance between on the one hand exploiting the small tracts of land- which had been left to them- and making it work with the existing environmental conditions by sowing the crops that could survive and on the other trying to endure the power relations and land struggles. Surfaces that sloped less were favorable for the sheep, thus waterlogged plain lands would have been favorable for pastures. Hence, as the next chapter discusses in detail, the

[102]For a discussion in detail on sheep breeding and extension in çiftliks see Chapter 3.
[103]BOA, ŞD.2428/31, 1295 (Hicri)
[104]BOA, ŞD.2428/31, 1295 (Hicri)
[105]BOA, ŞD.2428/31, 1295 (Hicri).
[106]BOA, ŞD.2428/31, 1295 (Hicri).

climate and physical geography greatly contributed to the creation and the extension of çiftliks which were spurred by the market opportunities in sheep breeding. We can interpret this as adaptating to the natural environment, however, this is an example of rich peasants adapting at the expense of financially weak peasants.

Indebtedness and cost of transportation played a major role in why peasants gave in to landholders, which mainly resulted mostly them leaving their lands. Sureiya Faroqhi says that peasants sold most of their harvest to meet grain supply demands in Istanbul or on the black market, which offered below market prices. Thus she says that they were left with a few seeds to be sown for the next year and for subsistence.[107] The state of peasants constantly being in debt supports claims made by Faroqhi which is further supported by Aytekin who revealed rural indebtedness at the beginning of the 19th century.[108] He says that rural indebtedness negatively affected many aspects of rural transformation.[109]According to MacFarlane lands were less cultivated, due to indebtedness of peasants to Armenian moneylenders to buy seeds for the following year.[110] At the end of the 19th century the indebtedness of the peasants remained more or less the same bad condition.[111]

In addition to the indebtedness, the cost of transportation meant that it was favorable for peasants to rent the lands to the sheep merchants. Sandison and others said that the high cost of transporting products to the market could have made renting out land attractive for the peasants. Moreover, some of the refugees who came to this

[107]Faroqhi, "Indebtedness in the Bursa Area 1730-1740", 205.
[108]Aytekin, "Cultivators, Creditors and The State: Rural Indebtedness in the Nineteenth Century Ottoman Empire".
[109]Aytekin, "Cultivators, Creditors and The State: Rural Indebtedness in the Nineteenth Century Ottoman Empire", 308.
[110] MacFarlane,*Turkey and Its Destiny, Vol.I*, 463.
[111] Bursa, 1. Sene (22), 11 nisan 1307/11 ramazan 1308, p.2.

environment- to a place that was foreign to them- might have preferred to benefit from such an opportunity, rather than struggling to adapt to a new environment.[112]

As we have seen, in Mihaliç, floods and the enlargement of the marshlands caused the extension of the çiftliks and formation of new ones, while small peasantry was stuck dealing with power struggles and adjusting to the new environmental conditions. This situation led to new production relations, yet when land became scarcer due to the increase in both human and sheep population, land disputes escalated between the parties. Some peasants were successful in adapting to this new environment and in creating new spaces and agricultural activities for them, as long as they could endure the spread of marshlands and çiftliks. However, some peasants abandoned their land and the space was left to the formation of new çiftliks or sheep grazing on huge uncultivated lands.[113] So, it was economic conditions that manipulated the relationship between human and the environment and the way agricultural knowledge changed.

Floods and marshlands were causing the formation and extension of existing çiftliks, thereby enabling an increase in sheep breeding in Mihaliç. Some peasants were inclined to turn toward wetland crops such as linseed, mulberries, and tobacco, and some surrendered to the expansion of çiftliks. In Bursa the effects of the environment triggered a different agricultural change.

2.3.2 Bursa: marshlands and rice cultivation

In 1886, a writer in the Hüdavendigar newspaper reported that the Nilüfer River in Bursa flooded Acemler and brought alluvial deposit all the way to Çekirge,

[112]BOA, ŞD. 2403/12, 1289 (Hicri).
[113]As Vasil Kınçov observed in 1890s on huge lands of uncultivated lands on Mihaliç plain sheep flocks were grazing; Mevsim, *Bulgar Gözüyle Bursa*, 87.

destroying crops on the Bursa Plain. [114] He associated these floods with rice cultivation and claimed that the cultivators disrupted the river bed of the Nilüfer in order to drain their rice fields. He wrote that nothing went wrong in summer, but in the winter the river found new beds, destroyed crops in the fields and formed new marshlands. The writer complained that whereas the size of marshlands on the Bursa plain had previously been approximately 10000 dönüms, it grew to nearly 50000 dönüms. [115] However, floods were not new in the 1880s, as Pococke talked about the Nilüfer's flooding the city in the winters in 1738.[116] Approximately 100 years later, in 1835 Miss Pardoe observed traces of floods around the Nilüfer River on the Bursa Plain where she was travelling during the hot summer days. In her writing she explained the pebble stones and gravel clogged on the river bed so that it could not withstand the rising water level in winter.[117] This shows that peasants must have faced with floods as early as the 18th century, and most probably before.

At the end of 19th century, in 1892, Nilüfer River flooded again. This time, it damaged the crops in Acemler and Soğanlı village.[118] The writer in the newspaper said that a rumor claimed that villages living on the plain would ride their horses down from the Acemler bridge (and had been streaming the mud) as a way of draining the river and preventing inundations. Because this method had been abandoned, the river bed united with the borders of the plain, causing frequent floods. According to him due to these floods, the marshlands on the plain grew bigger and most of the fertile lands on the plain could not be cultivated.

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[114]Hüdavendigar, 19. Sene (1239). 24 haziran 1303/ 15 Şevval 1304, p. 1. "… geçen sene Ülfer [Nilüfer] deresi Acemlerden taşıp ovaları sele[…] yığınlarla KaramustafaPaşa kaplıcasının kapısına kadar getirmişti…"

[115]Hüdavendigar, 19. Sene (1239). 24 haziran 1303/ 15 Şevval 1304, p. 1. "… evvelleri bataklıklar bildiğimiz meşhur ve kadim göllerden ibaret iken pirinç ekildiği vakitlerde yeni yeni bataklıklar meydan aldı ve on bin dönüm bataklık var ise elli bin bataklık oldu…".

[116]Lowry, *Seyyahların Gözüyle Bursa 1326-1923*, 74.

[117] Günaydın & Kaplanoğlu, "Miss Julia Pardoe", 85.

[118]Bursa, 3. Sene (103), 4 cemazilahir 1310/ 21 kanunıevvel 1308 , p.2

In 1883/4 the Hüdavendigar Yearbook stated that the residents on the plain were responsible for the draining the rivers, but they had not undertaken this responsibility for 30-40 years. Because of this, the river beds were filling with alluvial deposits from the mountain, thereby creating big lakes such as Gölbaşı and İğdir in Bursa and the marshlands on the plain.[119] However we see reed tithe in the 16th century[120], which might indicate some sort of a swamp that turned into a permanent lake in the 19th century. Did all the responsibility belong to the peasants regardless of the climatic changes? Even if the residents were not clearing away the clogs any more, we should still pose another question; why did they stop? The answer is in the same article: there was so much mud that their efforts were not enough.[121]

In the same yearbook, the size of the marshlands was estimated to be almost 30,000 dönüms[122], although in 1935 the size of the marshland on the Bursa Plain was mentioned as 60,000 dönüm.[123] Such a discrepancy is probably due to a miscalculation, this makes for usestimating the exact size of marshlands difficult, though we can still ascertain the borders of the swamp at the end of the 19th century.

We can see the size of the swamp at the end of the 19th century by referring to Kiepert map[124] and other data from yearbooks. According to the map, the marshland covers the a huge area from Izvat and Balatiyunus on the eastern side, continues linearly toward the west through the lands of Panayır, Balıklı, Vakıf, Samanlı villages, Dikencik Çiftlik, Ağaköy, Kazıklı, Hasan köy, Adaköy and

[119]*Saname-i Hüdavendigar*, 1301, 244.
[120]Barkan& Meriçli, *Hüdavendigar Livası Tahrir Defterleri*, 59.
[121]*Saname-i Hüdavendigar*, 1301, 257.
[122]*Saname-i Hüdavendigar*, 1301, 257.
[123] Koyunluoğlu,*Anadoluda Türkler: Eti, Frik, Lid, Bitinya, Iran, Roma, Bizans, Büyük Selçuk, Anadolu Selçuk ve Osman oğulları Zamanında (İznik) ve Bursa Tarihi*, 8.
[124]See Figure B3 in the Appendices.

Cambaz until village of Dudaklı where the surface become steeper.[125] As was stated in the yearbook, the swamp debarred many lands of agriculture, in places such as Dikencik, Panayır, Balıklı (a village close to the northern border of Bursa city center) and Yenice (called Ovayenice now and located close to the eastern border of the city center) villages.[126] These are the villages in which we see rice cultivation throughout to the end of 19th century.

In tracing the existence of the swamp back tot the 16th century, reed and pasture tithe was collected on the same line; Kazıklı, Adaköy, Vakıf and İğdir villages, and grain tithe was not collected from these villages.[127] The reed tithe indicates that there was a marshland and the peasants had been making their living from the reeds.[128] In a similar vein, because the sowing period of grain falls in the winter, rather than cultivating grain, the peasants might have rearranged their agricultural activities according to the dry season. Again in the 16th century reed and clover tithes were collected from Balıklı village.[129]

Raif Kaplanoğlu claims that because the lands around today's Gürsu were swamps, farmers had been cultivating rice, fruits and vegetables, instead of grain since the 15th century.[130] However, when we reach the 19th century, in 1844 Temettuat defters, show grain cultivation in the villages of Vakıf, Ada and İğdir.[131]

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[125]Appendix, Kiepert map; Ahmet Ardel also included a map in his article, where he shows Kazıklı marshland smaller than the one in Kiepert map. In the Ardel's map the swamp did not strech until Panayır and Izvat villages. It begins from İsmetiye (Kelesen at that period) and spread until Narlıdere village; Ardel, *Bursa Ovası ve Çerçevesi*, 64, see Appendix.Thus we can see the result of partial drainage and canal on Nilüfer River in 1915, as I will talk about in awhile; the eastern part of the swamp has been drained.

[126]*Saname-i Hüdavendigar*, 1301, 244.

[127]Barkan & Meriçli, *Hüdavendigar Livası Tahrir Defterleri*, 12; 15; 41; 59

[128]In fact in İğdir village, the old peasants claim that they used to make their living from *hasırcılık* which started to die in the mid-20th century; Delil & Kavaklı, *Bir Oğuz Köyü İğdir*.

[129]Barkan & Meriçli, *Hüdavendigar Livası Tahrir Defterleri*, 12.

[130]Kaplanoğlu, *Bursanın Bereketi Gürsu*, 189.

[131]BOA, ML.VRD.TMT.d. 7385 Vakıf; 7507 Ada; 7545 İğdir and seeDelil &Kavaklı, *Bir Oğuz Köyü İğdir*, pp. 62, 67

The collecting of reed tithe only continued in the village of İğdir.[132] In Balıklı most of the lands were covered by swamps. Here maize cultivation whose sowing season is during spring when the swamps began to dry spread during the mid 19th century.[133] Then, although, we certainly know that there had been a swamp on Bursa plain since the 16th century, as indicated by Şihabeddin El Ömeri[134], both its borders and the way in which people benefited from it changed over time.

Rice was not something new in Bursa as we can ascertain from the documents. In the 16th century rice cultivation was common in the villages located in the plain.[135] However, İnalcık pointed out a decline in rice cultivation after the 17th century with the deterioration in the land and labor regime and with the decreasing state authority as a regulator which had been necessary to undertake the required works in the rice fields.[136] This timing more or less falls in line with what Tabak claimed as withdrawal from the plains, which had been taken over by the swamps after 16th century.[137] To explain the revival of rice cultivation, Tabak referred to market opportunities and environmental conditions. He said that with wetter conditions and the spread of marshlands there was no more need for state support in rice cultivation; peasants had the conditions necessary for production.[138] In the first half of the 19th century, though there is no information about rice cultivation in the Temettuat or other defters, there is however not enough data for us to say that rice

[132]Delil &Kavaklı, *Bir Oğuz Köyü İğdir*, 62.
[133]BOA, ML.VRD.TMT.d. 7494.
[134]Günaydın & Kaplanoğlu, "Şihabeddin El-Ömeri", 22.
[135] In Barkan and Meriç's leading work Hüdavendigar Livası Tahir Defterleri in the 16th century there were rice fields in Serme, Kestel, Ada, Panayır, Vakıf, Çeltikçi, Samanlı, Dikencik; Barkan, & Meriçli, Hüdavendigar Livası Tahrir Defterleri, respectively pp.12, 10, 15, 23, 28, 41, 54 and in there was rice field in Ahi village; İnalcık, "Osmanlı İdari, Sosyal ve Ekonomik Tarihiyle İlgili Belgeler: Bursa Kadı Sicillerinden Seçmeler", 155.
[136] He says that for rice cultivation had immense works such as clearing, repairing and maintaining the water canals, readying the fields for planting, irrigation and weeding, state needed to ensure the forced and bounded labor there; and he even relates the creating of land regime to rice cultivation; İnalcık, "Rice Cultivation and Çeltukçi- Re'aya System in the Otoman Empire", 83.
[137]Tabak, *The Waning of the Mediterannean*,29.
[138]Tabak, *The Waning of the Mediterannean*, 26.

cultivation was totally abandoned by Bursa peasants. What we can say for certain is that it regained popularity in the last quarter of the 19th century which corresponds to Tabak's claim on the revival of rice cultivation in the Mediterranean. He said that when climatic conditions began to normalize, marshlands were gradually put under cultivation in the second half of the 19th century.[139] This was due to normalization of climatic conditions, as well as the increase in population as Groove and Rackham stressed. Inclined by market conditions and pressured by the population growth, Bursa peasants found ways of making use of swamps and their environment, yet they were not free from power struggles.

Tabak said that the swamps (which had previously been used as summer pastures for animal breeding) turned into rice fields in the 19th century.[140] In Bursa pasture land had always been scarce as it is argued in detail in the next chapter, and the sheep and animals were grazed on the hills of Uludağ Mountain[141] and on the fallow lands based on agreements between the holders of the fallow lands and the shepherds and herdsmen. As mulberry gardens reached their peak in the 19th century, mulberry gardens and vineyards became the grasslands for the animals. And the marshlands dried up in summer months and were used as summer pastures.[142] After the 1880s, the spread of rice cultivation, increase in clover lands and the revival of mulberry gardens combined with the need for grasslands in Bursa led to conflict. In 1912, the deputy of Karahisar-ı Sahip, Rıza Paşa, claims in his Parliament speech that the Bursa people complained that a malaria outbreak was due the ambition of powerful and rich people who wanted to control the lands where Dağıstan and

[139]Tabak, *Solan Akdeniz*, 235.
[140]Tabak, Solan Akdeniz, 236.
[141]Günaydın & Kaplanoğlu, "Evliya Çelebi", 48.
[142] Yet, as the possible grasslands were used as mulberry gardens and vineyards and probably because the fallow lands were not enough to feed the animals, when the winter was so severe and all the lands were covered with snow, the sheep came to starve; MacFarlane tells such a case in 1832-3 winter, MacFarlane, *Turkey and Its Destiny, vol I*, 372-3.

Rumeli refugees were settled and were producing rice.[143] While this can be regarded as speculation, this doesn't seem to be completely fiction given the land conflict. To Rıza Paşa there were over 50,000 dönüms of marshland on the Bursa Plain. Of that, only 150 dönüm was reserved for rice cultivation which didn't have a stable water source but one that ran through the Uludağ Mountain. There was malaria in Bursa, but malaria spread 90% more in Mihaliç and Mudanya where rice was not cultivated.[144]

As discussed in detail in the fourth chapter, at the end of the 19th century the growing population that placed a pressure on the land_accelerating land disputes in particular_paved the way for an increase in clover lands and a mixeduse of mulberry gardens as grasslands for grazing. The rice fields could not be used as grasslands. As they were cultivated in the spring during the maturation period, these fields could not be used for grazing. Aside from the threat of malaria, this might be another reason as to why sheep herders would be against rice paddies. Secondly and more important than that are the central policies to combat malaria, which symbolized a change in state mentality. Alan Mikhail talks about the changing attitude of the Ottoman state toward the plague, something that had previously been considered normal.[145] According to him, due to the growing emphasis on productivity, the state mentality regarding diseases shifted; the modernizing state began espousing the notions of scientific knowledge and assumed it to be superior to the knowledge, hygiene practices, and public order of peasants. The rulers then, attempted to restructure the society and eliminate any challenges to productivity. The rulers had responded to malaria the same way, but it had another implication for Bursa; mulberry gardens vs.

[143]Akagündüz, "II. Meşrutiyet Döneminde Toplumsal Bir Sorun Olarak Sıtma ve Sıtmadan Korunma Çareleri", 110.
[144]Akagündüz, 110.
[145] Mikhail, *Nature and Empire.*

rice fields. Especially at the end of the 19th century, when land became scarcer and silkworm raising was revived, the rulers spent their efforts in increasing the mulberry gardens, since it was the most profit-generating production. By the rulers, rice cultivation which was still related to growing swamps and to producing air that was damaging for humans and silkworms alike, thus it needed to be banned. For that reason, the rice cultivation repeatedly tried to be prohibited, in trying to create productive spaces. Alan Mikhail interpreted this process as state's disregard of peasants' knowledge on the environment and thus destruction of peasants' knowledge. As we will see below, this was not the end of peasant knowledge and the victory of state authority, because the latter was not something almighty, and it was not a battle in which one side won and the other side lost. Instead, both forms of knowledge were in a process of negotiation, interaction and 'becoming'.

As we can see from the archives, the several decrees were issued to prohibit rice cultivation around the city, in fighting against both malaria and the harmful effects of marshlands. Firstly, in May 1842 the Hüdavendigar governor wrote to the center about banning rice cultivation.[146] He said that rice cultivation began to spread along the Bursa Plain, causing poor air quality and malaria in the surrounding villages of Bursa. Hüseyin Paşa, the çiftlik-holder of Ahi, and former Vidin governor, somehow obtained permission to cultivate rice in his çiftlik, which then slowly spread among the peasants of Ahi village and the surrounding villages. The governor's most important claim was that rice cultivation was damaging mulberry gardens and caused a reduction in tithe from silk in Bursa which had been the greatest source of income. In responding to all these concerns, rice cultivation was completely banned on the Bursa Plain.[147] Yet, during the same period in which there

[146]BOA, İ.MVL. 38/702, 7/4/1258 (Hicri).
[147]BOA, İ.MVL. 38/702, 7/4/1258 (Hicri).

were complaints about the ban on rice cultivation, MacFarlane narrated what he learned from John, a çiftlik-holder in the village of Hacı İvaz, that they "… grew great quantities of rice. Some Frenchmen told the government at Stamboul that this rice cultivation was highly injurious to the air and productive of the malaria fevers which afflict a part of the city and nearly all the plain. The government ordered that no more rice should be grown [….] We have lost our rice, but our swamps and bogs remain".[148] On the other hand, Karl Abuis Bernard wrote in 1842 that malaria had been increasing for 10 years in Bursa due to rice fields around Bursa. According to him, fortunately rice fields were partially prevented and drained, thereby preventing malaria from becoming an epidemic as in the previous year.[149]

In Februray 1878, a decree was issued banning the cultivation of rice only on those lands that were two hours far from city center.[150] Though a complete ban on rice cultivation was not wished – which would have cut off an important source of income – the ban was based on the complaints of people in the Hüdavendigar neighborhood and a report written by the municipality physician. The community had complained that the water from the rice paddies flooded the neighboring land in which grain was being produced, devastating the crops and resulting in malaria in the neighborhood.[151] Confirming the prohibition, in the 1880s, Marie de Launay said that Bursa rice used to be quite famous until the cultivation ban on lands that were close to the city center. Yet, during that period, cultivation began again on the lands little ways from the city center.[152] However, this struggle did not end as Henry Barkley pointed out; some Europeans who came to cultivate rice in Bursa, diverted the canals

[148]MacFarlane,*Turkey and Its Destiny, vol. I*, 154.
[149]Günaydın & Kaplanoğlu, "Karl Aubuis Bernard", 111.
[150]BOA, T.525/90, 1293 (Hicri).
[151]BOA, T.525/90, 1293 (Hicri).
[152]Günaydın & Kaplanoğlu, "Marie de Launay", 160.

for irrigation, made threshing-floors and had successful yields.[153] But some people in the surrounding area applied to the District Council for the rice fields to be banned, claiming that they were causing malaria outbreaks and fever. Barkley said that in fact the swamp was between the rice field and town and the authorities preferred to prevent rice cultivation instead of draining the swamp at a small expense for reclaiming and cultivating it.

Yet, rice cultivation had already started to spread, leading to several complaints. Another complaint came from a local peasant who wrote in the Hüdavendigar newspaper about how their walnut trees became dry due to rice cultivation. This person also claimed that the land where rice was grown broke down the structure of the soil – including that of the lands around it – meaning that it could not be later seeded with wheat or barley.[154] Therefore, rice cultivation was regarded partially responsible for harming walnut trees. But it was more of the constant run-off of rivers that brought alluvial deposits to the plain. It was not much rice that broke down the soil type, because there were two types of rice paddies according to Kalfayan; the first type rice is cultivated permanently, and the second type is sown successively with wheat or maize.[155] In other words, the first type did not allow for the cultivation of other crops. The first type can be sown perennially only on the fields that were always humid, whereas it can be sown temporarily on sandy soils.[156] In Bursa as we will see rice cultivation mostly spread along the line of the

[153]Barkley,*A Ride Through Asia Minor and Armenia: Giving a Sketch of the Characters, Manners and Customs of Both the Mussulman, and Christian Inhabitants*, 44-5.
[154]Hüdavendigar Gazetesi, 19. Sene (1239), 24 haziran 1303, p.1.
[155]Kalfayan, *Pirinç Ziraati*, 7
[156]Kalfayan, *Pirinç Ziraati*.In the 16th century, rice was cultivated successively. For instance in Adaköy, (located on the northeastern side of today's Gürsu) which had been surrounded by swamps and reeds, rice was put in four years rotation; Barkan, *Hüdavendigar Livası Tahrir Defterleri*, 15, also İnalcık, "Rice Cultivation and Çeltükçi Reaya", 117. In the 19th century, though it can be varied according to the place; BOA, İ.MVL.38/702, 1258, generally certain fields were allocated to rice cultivation and the remaining fields were sown with grain and other crops in order to escape from failures; BOA, DH.MUİ. 103-2/12, 1325 (Rumi).

marshlands, meaning that rice must have been cultivated on humid soils. But, due to constant floods, the alluvial deposits could have clogged the water canals, causing the enlargement of marshlands and indirectly the spread of the rice fields. Thus it seems that rice fields were more likely the results rather than the causes, though it was perceived that rice cultivation caused marshlands to grow bigger or to form new ones.[157] This was the way which some peasants responded to the environmental conditions by taking market opportunities. Here, as I show below the refugee population also played a vital role.

Another regulation was issued in 1894 with a more details on the permitted areas.[158] According to the regulation rice fields should be at a 1000 meters from the last house of a town or village whose population was 500 or less; 3000 meters from the town or village whose population was between 500 and 2000; and 5000 meters away from the town or village with a population of more than 2000 people; finally they should be at least 20 meters from the lands where different crops were sown and 4 meters away from the public roads.[159] However, this time there was an exception; if there had already been marshlands, rice fields could be created based on the demands of the local people and the permission of the local government.[160] For this to happen the field-holders had to apply to the local government to get the necessary permission.[161] Here we see that the c-rulers were in favor of benefiting from the marshlands that had previously been unproductive, and did not want to cut the treasury off from a source of income in this way. Regarding the permission it was underlined that trees must be planted along the banks of rivers to prevent the

[157]Hüdavendigar, 19. Sene (1239), 24 haziran 1303, p. 1.
[158]BOA, DH.MUİ. 103-2/12, 1325 (Rumi) the regulation of 1310 was added.
[159]BOA, DH.MUİ. 103-2/12, 1325 (Rumi), article 2.
[160]BOA, DH.MUİ. 103-2/12, 1325 (Rumi).
[161]Ibid, article 3.

flooding.[162] Sixteen years later, another regulation specified that the trees should be planted on the sides of the canals must be eucalyptus and willows.[163] This points to an emphasis on scientific knowledge by the rulers to control and manage rice cultivation. The government obliged the rice producers to drain the marshlands by applying scientific knowledge, that is by planting eucalyptus and willow trees, as the government failed to complete drainage projects. Through this scientific knowledge, the rulers found a way to benefit the central treasury from the income generated by rice cultivation. Scientific knowledge changed from a total ban on rice cultivation (which was something that was strongly advised by the municipality physician), to 'right' and necessary ways of cultivation.

At this point we should underline that even though scientific knowledge was regarded an instrument to be visible in this domain and to appropriate the income for the central treasury, we do not certainly know whether the producers adhered this obligation of planting eucalyptus and willow tree or not. In other words, it is important to highlight a change in state policies, though it may not have worked to make the state visible. This is important to note in questioning the limits of state power and policies.

Throughout these years, the central organization and local organization of state was not in compromise, which addresses the different concerns and presence of groups in central and provincial state organization at that period. Whereas the central state trying to hold on to an important source of income (probably also due to some power relations as most of the rice cultivators were çiftlik holders[164]), the local state tried to control and limit rice cultivation as much as it could. In 1910, the Hüdavendigar governor petitioned the central state reminding the former ban on rice

[162]BOA, DH.MUİ. 103-2/12, 1325 (Rumi), article 5.
[163]BOA, T.534/18, 6 may 1326 (Rumi).
[164]BOA, DH. MUİ. 103-2/12, 1325.

cultivation in Bursa.[165] However, rice cultivation in Bursa was permitted with some regulations during that period to make use of the marshlands, and the provincial rulers came to the same point at last.

In 1913, accounts of the District Council show how marshlands were utilized to spur agricultural production. Rice cultivation was allowed on the Bursa Plain and in the city, as long as the cultivators followed the rules. The concern was that a total ban on rice cultivation would both deprive the swamps from agriculture and harm the peasants and treasury.[166] We can see the continuation of rice cultivation in Dikencik Çiftlik in 1926, for instance which was very close to the city center.[167]

As previously mentioned, rice production spread very rapidly during the last quarter of the 19th century. At a relatively earlier date we know that in the village of Ahi, Hüseyin Paşa was cultivating rice in his çiftlik which required plenty of water. The water source was shared half between the village of Kazıklı and half with the çiftlik.[168] However, Hüseyin Paşa complained that peasants in Kazıklı turned the river bed to their village, harming the rice peddies. In response to this, the Kazıklı villagers claimed that their production was mostly based on maize and garden products which also required a good deal of water. Furthermore they said that they got sick due to the poor air quality as a result of rice cultivation. In the end, the State Council decided to continue with the older agreement regarding the water source and its distribution between Kazıklı and Çiftlik. The same Kazıklı village demanded permission for their rice cultivation on 800 dönüms of land about 70 years later, in

[165]BOA, BEO. 3693/276920, 13 mart 1328 (Rumi)
[166]*Hüdavendigar Vilayeti 1329 Senesi Meclis-i Umumi Zabıtname ve Mukarreratı*, pp. 56-7 and 71-2.
[167]*Ticari ve İktisadi Bursa Rehberi*, 16
[168]BOA, C.İKTS. 20/1309, 22 r 1256 (Hicri).

1907.[169] Here it is important to point out that these villages lie on opposite sides of a marshland called the Kuşkonmaz Bataklığı which was drained as late as 1936.[170]

As close neighbors to Ahi, peasants from Hasan village were also cultivating rice which had been banned by the local council. They complained about the ban by claiming that they were outside the boundaries defined by the regulation.[171] When we come to the beginning of the 20th century, the complaints from the rice cultivators gained momentum. In 1905, located along the marshlands, the villages of Balıklı, Yenice, Izvat, Vakıf, as well as Dikencik and Hacı İvaz Çiftliks complained about the officials uprooting their paddies.[172] They claimed that because that year was extremely wet, they did not harvest enough wheat and cocoon, and they were desperate as their peddies were uprooted. This shows us how the peasants adapted themselves to the changing environment and attempted to employ the lands as much as possible. More importantly, people found ways to continue silkworm-raising and rice cultivation to benefit more from the market opportunities, unlike the complaints in the newspapers. In 1913, the çiftlik-holder in Balatiyunus which lies on the side of the marshland was cultivating rice, but his water source was cut off by officials for not adhering to the rules. [173] Close to Balatiyunus and Bursa city center, the village-headmen of Arabayatağı complained about rice cultivation, which shows us how far rice production spread on the Bursa Plain nearly 80 years since the first ban in 1842. In 1924, it reached 10,000 dönüms only in Bursa district, from this the total yield was 1,5 million kilogram.[174]

[169]BOA, DH.İD.99/8, 1327 (Rumi).
[170]Kazıklı, "Kazıklı Köyü", 57.
[171]BOA, ŞD.1546/23, mayıs 1303 (Rumi).
[172]BOA, DH.MUİ. 103-2/12, 1325 (Rumi).
[173]BOA, DH.H. 67/44, april 1329 (Rumi).
[174]Birgül & Çanaklı, *Cenubi Marmara Havzası Bursa Vilayeti Coğrafyası*, 209.

Both native peasants and the refugees had an impact in the spread of rice cultivation as previously mentioned. The Dağıstan refugees demanded permission to cultivate rice on their fields[175], and according to Hasan Hüsnü, the deputy of the Agriculture, Forestry and Mining Ministry, (*Orman, Maden ve Ziraat Nezareti Muavini*) the refugee migration increased rice cultivation in the Hüdavendigar region.[176] Of course rich entrepreneurs played a part in rice cultivation, as we see in the village of Zirafte, where a merchant put the peasants to work in cultivating rice.[177] Although we do not know the details of their agreement, we can speculate that the merchant supplied the seeds and received some amount of the harvest in return. Again, another Italian entrepreneur named Fernandon aimed to establish a rice paddy factory which caught the attention of the state in permitting rice cultivation throughout the empire.[178]

Of course, it must be said that rice cultivation was not the only way in which people made use of the marshlands. After the water abated, the grasslands were used as pastures or used for cultivating summer crops.[179] Growing summer crops such as maize and sesame was also a way of using the environment accordingly, though unexpected hot weather (similar to unexpected flooding) could harm the crops. Agaton Efendi, agricultural director in the Karesi District spoke about the agricultural situation in June 1883 by stating that the drought between March and June prevented sesame crops from maturing enough. This prevented

[175]Hüdavendigar Gazetesi, 19. Sene, (1239), 24 haziran 1303, 1
[176]BOA, Y.PRK.OMZ.2/35, 5 ağustos 1315 (Rumi).
[177]BOA, DH.MUİ.87-2/23, 1326 (Rumi).
[178]Umur-ı Nafia Gazetesi, 7. Sene (21), 1 zilkade 1309, 646.
[179]BOA, A.MKT.MHM. 529/18, 1322 (Rumi).

peasants from sowing the lands second time,[180] whereas favorable weather conditions increased sesame yields in Bursa in September 1893.[181]

As mentioned before, modernizing states that placed more emphasis on increasing productivity tried to control and shape the landscape and people. The Ottoman state had the agenda of providing and controlling all the productive elements. This included controlling marshlands and water sources to turn them into productive units. However, things did not go as planned, causing new dilemmas for the central state.

2.4 Marshlands and the state: endless projects

Martin Reuss posits that water projects are a process of the "reconciliation of western knowledge and indigenous cultural values".[182] In the case of Ottoman Egypt, Alan Mikhail argues that the modernizing Ottoman state of the 19th century led to an end of peasant knowledge in order to achieve control on the supply through canal projects[183], despite the fact that before the 19th century "… state devolved authority in the realm of irrigation to the Egyptian peasants and other villagers because they knew the local environments of Egypt…" (p. 579).[184] In order to control production and not to leave the floor completely to powerful people, the rulers even manipulated water sources. It was a way to interfere in the production process, as well as in the relationship between peasants and their environment. As a controller and supplier of water, they had the power to cut off the water sources if the local state officials

[180]Umur-ı Nafia ve Ziraat Mecmuası, 4. Sene (4), haziran 1303, pp. 110-113.
[181]Bursa Gazetesi, 3. Sene (141), 27 eylül 1309, p. 4.
[182]Reuss, "Introduction: Seeing Like an Engineer: Water Projects and the Mediation of the Incommensurable", 532.
[183]Mikhail, *Nature and Empire*.
[184]Mikhail, "An Irrigated Empire: The View from Ottoman Fayyum", 579.

determined that the rice fields did not adhere to the rules.[185] In this way, they attempted to impose regulations on the cultivators, and clashed in some sort of power struggle with producers. In David Gilmartin's inspiring work, he examines the establishment of colonial rule over irrigation works[186], and in Bursa we also see the local state's efforts to control production. In this process local government was the implementor; it employed and imposed scientific knowledge which designates the way in which rice should be cultivated. Planting eucalyptus and willow trees around the rice fields became obligatory.[187] This is especially important as it is the scientific way of draining marshlands. Yet, this did not prove that state could actually control production, as we have already seen above from the struggles on rice cultivation.

In the same framework of controlling production, the marshlands were on the agenda and the means was controlling malaria.[188] In doing this, prohibiting rice cultivation was seen as the only way. If we look at the reports from the 1920s and -30s, we see the continuation of this concern among the intelligentsia; rice cultivation was seen as the major cause of malaria.[189] In 1930s Stotz said that "The government has now built canals to drain much of the swampland and has also prohibited the cultivation of rice except by special permit, which is rarely given, and malaria has

[185]BOA, DH.İD.99/8, 1327 (Rumi).Kazıklı villagers who opposed the cut of water source; BOA, DH.H. 67/44, 1329 (Rumi), Russian merchant objects to the local government for cutting the water source.
[186]Gilmartin, "Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin".
[187]BOA, T.534/18, 6 may 1326 (Rumi).
[188]Of course Ottoman state was not unique in the world; Groove and Oliver mention that at the beginning of the 20th century, the Italian and Albanian states attempted to drain marshlands with an expectation of destroying malaria, as a strong incentive. They say that despite the governments naive expectation that mosquitos would not breed in drained fenlands, this was not the case; Groove and Oliver, *The Nature of Meditarennian Europe, An Ecological History*, 55. What needed to be done had also been discussed in the National Assembly; for details look at Akagündüz, "II. Meşrutiyet Döneminde Toplumsal Bir Sorun Olarak Sıtma ve Sıtmadan Korunma Çareleri".
[189]Evered, "Draining an Anatolian Desert: Overcoming Water, Wetlands and Malaria in early Republican Ankara", 485. Here in 1925 we see the report of Municipality scientist, Dr. Müslihittin Safved, in which he closely associates the presence of the marshlands and rice cultivation with the spread of malaria, and also Stotz, "The Bursa Region of Turkey", 92. Here it can be read for perfect point of view developed by Sam White who is taking into account the entire Meditarenian climatic, economic and political factors in interpreting the spread and fighting against the diseases White, "Rethinking Disease in Ottoman History".

been all but eliminated". [190] Thus, the struggles of rice cultivators continued, as we can ascertain from the above mentioned documents. The 1950s, saw a little more tolerance to rice cultivation, and Kratz and Bridges imply that while the prohibition of rice cultivation matters, it does not not completely solve the problem of malaria, as long as the irrigation of other crops was not controlled. Yet, they thought positively that prohibiting the existence of rice paddies less than three kilometers from a village would prevent malaria outbreaks.[191]

Yet, the local and central policies on marshlands and drainage projects in Ottoman Bursa were dominated by a dilemma; on the one side imposing scientific knowledge to control production, and on the other the mentality of "… those who benefit are also those who pay…"[192] due to financial difficulties.

Although the demand to drain the marshlands and construct water canals to prevent floods came from the peasants and farmers, the way of doing this was determined by the rulers which reveals how the rulers interfered in and tried to change the relationship between man and nature. Certainly, the persistent efforts in draining the marshlands equally reflect the aim of controlling and guaranteeing grain production which was under a constant threat of floods, but not at the expense of losing the lands to peasants or foreigners in order to control the production within the existing land regime. The controlling efforts and financial difficulties produced nothing but dead-end policies for Ottoman state throughout the 19th and 20th centuries.

Charles MacFarlane (1848) stated that "to embank the upper part of the Lufar [Nilüfer] […] to prevent its overflowing [….] the populousness of this district in remote ages is a proof that it must all have been well drained and

[190]Stotz, "The Bursa Region of Turkey", 92.
[191]Kratz & Bridges, "Malaria Control in Turkey", 411.
[192]Reuss, "Introduction: Seeing Like an Engineer", 533.

canalized…"(p.166).[193] He said that a rich farmer in Dudaklı, İbrahim "… was full of the project of draining". [194] According to McFarlane (1848):

> By enlarging the mouth of the river and deepening its bed, and cutting few trenches, the lake might not only be kept to a level, but that level might be brought lower than it now was (before the heavy rains had set in) and many acres of fertile soil would be recovered; the unhealthy marshes in front of the village would be dried, and many more acres of good land secured for the tillage ort pasturage.(p.383) [195]

The villagers had one condition; one half of the reclaimed land would be theirs[196], but this was not accepted by the local government. This marshland about which İbrahim had plans was the one around which the villagers would cultivate rice approximately 50-60 years later.

İbrahim was not the only one who had plans of draining projects. Ahmet Vefik Paşa, the famous governor of Bursa sent a report to Istanbul on the necessity of draining the marshlands. In fact he was successful in draining some parts of the plain by building "… small channelling dams and walls […] along the steep ravines […]. A new system of lead water pipes carried potable water a number of kilometers across the city to the citadel."[197] Through these canals it had drawn off "… the excess water that descended in streams and run off from the mountain above".[198] Despite these efforts to save the city from floods, the draining project of the entire Bursa Plain, though it was accepted first[199], could not be realized during that period. [200]

[193]MacFarlane, *Turkey and Its Destiny, vol. I*, 166.
[194]MacFarlane, *Turkey and Its Destiny, vol. I*,, 382.
[195]MacFarlane, *Turkey and Its Destiny, vol. I*,, 383.
[196]MacFarlane, *Turkey and Its Destiny, vol. I*,.
[197]Erder, *The Making of Industrial Bursa: Economic Activity and Population in a Turkish City 1835-1975*, 262.
[198]Erder, *The Making of Industrial Bursa: Economic Activity and Population in a Turkish City 1835-1975*, 262.
[199]BOA, MVL.667/48, 1279 (Hicri). Here Ahmet Vefik Paşa underlines the necessity of the drainage of Nilüfer river and drain the marshlands. He says that the drainage of the river depends on the clearance of reeds on Aksu river to which the nearby peasants were willing. Yet he offers that some of the lands which would be reclaimed should be left to the nearby peasants. On this issue, Murat Öntuğ

Almost 20 years later, in the 1880s, the problem of draining the marshland tried to be solved by giving concessions. According to the concession agreement between Mösyö Corceu and the Ministry of Public Affairs, the government was to leave the usufruct rights of the reclaimed lands- if there were no owners. Yet this agreement was also never realized.[201]

In 1891 the Ministry of Interior authorized an engineer, Mösyö Radotti to prepare a detailed report on the marshlands on the Bursa Plain and to specify the necessary amount for drainage. [202] According to his report, 22,500 piastres were needed to drain almost 20,000 dönüms of marshlands. The intention was to open up lands for the refugees, because no more land was left for refugee settlement, and to put fertile lands of Bursa plain under cultivation, which laid dormant for many years.[203] The major concern of the government was to not undertake this expense and not devote taxes for this project. Instead they left the drainage efforts to nearby peasants, in return for leaving some of the reclaimed lands in their ownership, but this did not mobilize all of the peasants. The offer of the Hüdavendigar governor to finance the drainage by diverting some amount of the taxes to this work received objections from the Porte, Şura-yı Devlet and the Ministry of Agriculture. Offers from foreign companies were also met with suspicion, because the rulers did not want to leave part of reclaimed lands in their management. In that way, the drainage

says that Ahmet Vefik paşa opened the beds of the river and united them, thereby reclaimed the lands which were deprived of agriculture; Öntuğ, *Ahmet Vefik Paşa'nın Anadolu Sağ Kol Müfettişliği*, p. 152. In fact the drainage efforts lasted much longer, Ahmet Vefik Paşa could drain only a part of marshlands on the northern side of the plain; Günaydın & Kaplanoğlu, "Mr. Sandison", 136.

[200]Kurt, "2. Abdülhamid Dönemi Nafia Çalışmalarına Bir Örnek: Nilüfer Nehri'nin Islahı ve Bursa Ovası Bataklıklarının Kurutulması Projesi", 523.

[201] Kurt, "2. Abdülhamid Dönemi Nafia Çalışmalarına Bir Örnek: Nilüfer Nehri'nin Islahı ve Bursa Ovası Bataklıklarının Kurutulması Projesi", 523

[202]BOA, A.MKT.MHM. 529/18, 1322 (Rumi).

[203]BOA, A.MKT.MHM. 529/18, 1322 (Rumi)..

projects of the Bursa Plain remained unsolved for years; refugees were left on their own and dealt with land disputes[204], something that is discussed in the fourth chapter.

In 1915, draining the marshlands on the Bursa Plain was again on agenda of both local and central governors. The mayor of Bursa tried to finance the drainage again and finally part of the drainage on the Bursa Plain and a canal on Nilüfer River started when the Ministry of Public Works sent 50,000 piastres.[205] Yet, the Kuşkonmaz Marshland (which lies on the southwestern side of the Bursa Plain before the villages of Kazıklı, Ahi, Hasanand stretched until Dudaklı) was left undrained due to financing difficulties. Collecting money from the nearby peasants was not allowed, and it had been made clear that if the municipality of the city was eager to carry out this project, they had to finance the drainage from their own coffers. [206] In this way, Kuşkonmaz Marshland had to wait until 1936.[207]

At the end of the day, due to financial problems of Ottoman government at both the local and central levels, they were unable to be the main actors in these drainage works. Yet they tried to achieve some sort of control on production. As 1910 regulation showed that by imposing planting eucalyptus tree on the borders of rice fields (thus the employment of scientific knowledge for draining the marshlands), by controlling and cutting water source and by uprooting the rice peddies of those who did not comply with the conditions of regulation, central and local government both tried to control rice cultivation and do something to drain marshlands.

In Mihaliç the drainage of the marshlands was related to the land regime. The presence of marshlands and their vague borders of them gave way to the

[204]Kurt, "2. Abdülhamid Dönemi Nafia Çalışmalarına Bir Örnek", 527-8.
[205]BOA, DH.UMVM.73/19, nisan 1331 (Rumi).
[206]BOA, DH.UMVM.73/19, nisan 1331 (Rumi).
[207]Kazıklı, "Kazıklı Köyü", 57.

formation of new çiftliks and the extension of the present ones. Sheep breeding became the main agricultural activity at the expense of grain cultivation on these areas.[208] The unexpected inundations and the changing borders of marshlands made grain cultivation impossible which led to more sheep breeding. What matters for the government here was both taxing the income from sheep breeding and not giving up grain production. As it is argued in the next chapter, this was the dilemma in Mihaliç; on the one hand allowing for new and extension of çiftliks to get tax from sheep breeding, on the other not giving up grain production.

A state official inspecting Mihaliç, Kirmastı and part of the Karesi claimed that approximately 15,000 dönüms of lands on the Mihaliç Plain were drained in 1880 and 150,000 dönüm lands were waiting to be drained.[209] But still, the Ministry of Interior Affairs was cautious, and asked the Hüdavendigar governor based on what kind of an agreement they had drained the marshlands and what their interest was.[210]

In 1893 merhcant Yanko Kalkapolos asked the Ministry of Public Affairs to drain the marshlands on the Mihaliç, Manyas and Kirmastı Plains.[211] The Minister, then, wrote to the Porte asking whether this was appropriate or not. While the governor of Hüdavendigar asked for a response from the Porte, he underlined the importance of the drainage and how people had previously appealed to the government for drainage of the marshlands complaining floods and destruction of their crops. Thereupon, Mösyö Rive was sent to the location to ascertain how much it would cost.[212]

It seems that no steps had been taken, as we see in 1907 when the Kirmastı governor wrote to the Porte that because the rivers had not been drained,

[208]BOA, ŞD. 2428/31, 1295 (Rumi).
[209]BOA, ŞD. 1540/9, 1296 (Rumi).
[210]BOA, ŞD. 1540/9, 1296 (Rumi).
[211]BOA, BEO.274/20538, 1309 (Rumi).
[212]BOA, İ.TNF. 3/4, 1309 (Rumi).

complaining that the peasants around Kirmastı were constantly exposed to the floods and their crops consequently destroyed. He complained that the drainage work was contracted out to Rauf Bey, son of Dilaver Paşa, but he had done nothing until then.[213] Three years later, in 1910, from Şura-yı Devlet, we see that the same Rauf Bey had still failed to take steps to drain the Mihaliç Plain.[214]

Thus, the dead-end policies on drainage were shaped by the financing needed for such projects, the attempt to take the land under state possession, increasing pressure to distribute land to refugees, the need to control the formation and spread of çiftliks and sheep breeding, damage to crops caused by floods, as well as the battle with malaria. In this way, the issue of draining the marshlands remained unsolved problem until the Republican era.

Finally it should also be noted that, draining was not the ultimate solution for putting the lands under cultivation. According to the report of state official, some part of the reclaimed lands on the Mihaliç Plain could not be put under cultivation due to the lack of seeds.[215] The peasants were in constant indebtedness, suffered from the usurers[216] and struggled to save their crops from sheep in nearby çiftliks. All of this means that they would not have been able to cultivate the lands even if protected from the floods.

2.5 Conclusion

In his book, J.R. McNeill takes the perspective of nature and tells the story of the Mediterranean environment and how it had been changed by population pressure,

[213]BOA, BEO. 3204/240297, 1323 (Rumi).
[214]BOA, BEO. 3704/277733, 1325 (Rumi).
[215]BOA, ŞD. 1540/9, 1296 (Rumi).
[216]Bursa Gazetesi, 1. Sene (22), 11 nisan 1307, p.2.

over-grazing and deforestation.[217] For him, the relationship between humans and nature was a destructive one for nature. This chapter, though, underlines that it was an interactive process, not a destructive one, as far as 19th century was concerned. The interactive relationship between humans and nature gave agricultural knowledge a dynamic character. Without a doubt, the way the agricultural production and knowledge changed would not be the same without the impact of market conditions. For all these reasons, even the neighboring regions of Mihaliç and Bursa underwent different agrarian changes.

The Mihaliç Plain is bounded by Manyas Lake in the west and Ulubat Lake in the east and seems like a flat terrain which was watered by Mihaliç and Ulubat Rivers and their tributaries. A view from the top makes this plain like a continuation of the Bursa Plain, but in fact it was divided by the Katırlı Mountain, which lies parallel to the coast. The Bursa Plain is narrowed by this Katırlı Mountain range and famous Uludağ Montain, and this narrow fertile plain was watered by Nilüfer river and its tributaries.

Regarding the climate of the region Stotz (1939) wrote the following:

> Most of the Bursa region has a Mediterranean climate [in which] a long summer drought, during which skies are clear and temperatures high. The winter is rainy, with cloudy skies and low temperatures. Snow is by no means unknown [….] The average February and August temperatures of the city of Bursa are 4.80 C. and 23.70 C. respectively. Bursa […] receives more rain than do the stations to the east and west. The average annual rainfall of Bursa is 23 inches, of which only 0.3 inch falls in the months of June, July, and August. (p.86) [218]

Several crops had been harvested in this geography and climate in this geography and climate. Grain was the major staple crop in Mihaliç at the beginning of the 19th century. Yet, as the marshlands began to spread throughout the Mihaliç Plain, it became more difficult for the peasants to deal with the floods. Wealthy land-owners

[217]McNeill,*The Mountains of the Meditarennean World: An Environmental History*.
[218]Stotz, "The Bursa Region of Turkey", 86.

turned the expanding marshlands into opportunity to form new çiftliks or enlarge the existing ones. The motive behind this was the growing need for sheep breeding, though this was not something new for Mihaliç. As far back as 16th century, villages on the plan raised buffalo and sheep.[219]As it is discussed in the following chapter, the formation of large lands on the Mihaliç Plain gained momentum after the middle of the 19th century, which was driven by the increase in domestic and foreign demand and also by the opportunity that was presented after the water abated when grasslands were rich in nutrition. Some small peasants left their lands behind and emigrated due to this increase in animal husbandry, whereas those who remained developed ways of adjusting to their environment and struggled to graze and sow – at times, this was at odds with the refugees and, at other times, it was with their help. For instance, tobacco cultivation increased with the flow of refugees. This crop requires plenty of water and could be sown on smaller plots. In this way, peasants were able to adjust to their new environment and at the same time make a living.

Things were different in Bursa. There had not been as many massive waste flatlands for a long period of time. Evliya Çelebi wrote about huge grasslands found only on the eastern end of Bursa in Kite.[220] There were small grasslands in Bursa probably during the 16th century as we can understand from of meadow tithe.[221] During the period when mulberry gardens were on the rise, the mulberry gardens were probably extended to be used as grazing areas, which meant that peasants had to graze the animals on these gardens and vineyards (in addition to the fallow lands) in earlier times. As the incidents of floods increased in the 19th century and before, this resulted in marshlands and the loss of fertile soils in the plains. As the population increased the people were pushed closer to the marshlands which were poised to

[219]Barkan & Meriçli, *Hüdavendigar Livası Tahrir Defterleri*.
[220]Karateke, *Evliya Çelebi's Journey from Bursa to the Dardanelles*, 21.
[221]Barkan&Meriçli, *Hüdavendigar Livası Tahrir Defterleri* and BOA, Ev.d.10147, 1251 (Hicri).

expand due to the years of clogged alluvial deposits. Faruk Tabak sees deforestation as the cause behind the frequent floods and enlarging marshlands[222], though Sam White has his doubts about deforestation in Anatolia.[223] Being certain about deforestation in Anatolia, McNeill claims that "upland erosion and coastal deposition created marshes ideal for malarial mosquitoes".[224] He relates 'the changing mountain ecology' with "…floods that that destroyed crops, animals, bridges, and buildings…" and with "formation and expansion of swamps…" which sufficed for 'the past two hundred years'.[225] There was more devastation after the mid-19th century, when refugees and peasants used slash and burn method to open lands in the hills for cultivation, which is a topic mentioned in Chapter Four. Georges Perrot wrote about the deforestation of the hills for firewood for the growing number of silk factories in the 1860s.[226] In 1880, Marie de Launay showed his concern on the devastation of the forests on the hills of Uludağ Mountain for sheep grazing.[227] In 1945, on a trip to Uludağ, Dr. Selahattin İnal observed the damage of the forest on the hills of Uludağ, which was caused by the uncontrolled grazing of nomads and peasants.[228] We know that the hills of Uludağ had been left for grazing to the nomads for a long time.[229] As a result of granting the refugee settlement with these former pastures[230], the damage and uncontrolled grazing might have increased in time. While the forest was already being destroyed, increased need for grazing and land, as well as the growing population sped up the process of devastation. The destruction of the forest caused constant floods and ever-extending marshlands. In spite of this, we should note there

[222]Tabak, *The Wanning of The Mediterannean*, 18.
[223]White, *Osmanlı'da İsyan İklimi*, 389.
[224]McNeill, *The Mountainsof the Meditarennean*, 312.
[225]McNeill, *The Mountainsof the Meditarennean*, 325.
[226]Günaydın & Kaplanoğlu, "Georges Perrot", 147.
[227]Günaydın & Kaplanoğlu, "Marie deLaunay", 162.
[228]İnal, *Yeşil Bursa Denizinde İnci Uludağ*, 16-7.
[229]BOA, Ev.d.12346, 1261 (Hicri).
[230]Bursa, 3. Sene (129), 2 muharrem 1311/ 5 temmuz 1309, p.3.

was not a total loss of the forests in the hills Uludağ.[231] Although McNeill claims that "nowhere peasants and herders devise systems of human ecology in durable harmony or balance with the natural world"[232], in my point of view, in fact it resembles more like a symbiotic change between nature and human as well as human knowledge benefiting from the former; each promotes the change of the other.

More than ever, people were drawn closer to marshlands which were used either by grasslands or by cultivating summer crops. Those who were much closer to marshlands also began cultivating rice on the marshlands. Encouraged by the growing demand of rice by merchants, entrepreneurs and çiftlik-holders turned to rice cultivation, this was complemented by refugees who also knew how to grow rice. Of course it was not only çiftlik-holders and capital-ownerswho profited, small peasants were able to make a living from rice cultivation.

While the peasants were adjusting to the conditions, collaborating with nature and revising their knowledge on agriculture, the rulers tried to impose their form of knowledge. And through draining the marshlands, it is aimed to control the nature and make more lands available for grain cultivation. The government suffered from financial difficulties but was reluctant to hand over the lands to peasants or companies in return for draining marshlands. This was not the death of the peasant knowledge. The mentality of the modernizing state in the 19th century was to reconstrsuct the economic capacities, thus to make itself in human-nature relationship to control and profit from production. The main instrument came to be scientific knowledge when drainage efforts failed. Mikhail sees this interference as

[231]The Directorate of Forestry even claims that they maintained the forestry reserve since 1880s; their claim based on a map drawn at the end of the 19th century; based on personal interview with Director of Forest Museum in 26/06/2016 in Bursa. Even though I find such a claim a little exxagerated, when I saw the map it is clear that we cannot talk about a huge loss, despite the abovementioned devastations.

[232]McNeill, *The Mountainsof the Meditarennean*, 354.

the destruction of peasants' knowledge. This chapter highlights that peasant knowledge was not completely at odds with scientific knowledge and vice versa.[233] Peasants did not hesitate in partially embracing scientific knowledge and state regulations, as long as they fit their needs. In this way, they were in interaction and mutual 'becoming'. Yet, it becomes conflicting when the scientific knowledge imposed by the rulers is divorced from local conditions and needs.

As this chapter strongly emphasized, the needs of the peasants were not independent from the changes in land regime and power relations. Furthermore, scientific knowledge was designed as an instrument to enable the rulers to control not only the production but also the power relations within land regime. In that framework, the next chapter deals with the land regime, land use, power relations, how these power relations placed in state organization and determined policies, and how these impacted agricultural knowledge.

[233]As Karl Appuhn criticizes Mikhail; he says that what Mikhail's point of view on canal construction and public health gives such a sense; Appuhn, "The Nature of Ottoman History", 305.

CHAPTER 3

LAND USE AND AGRICULTURAL KNOWLEDGE

The previous chapter has shown how environmental features and changes had an impact on land regime and paved the way for various land usage in Mihaliç and Bursa. In addition to the climatic and natural changes, topographical features of the region also created a diverse formation and changes in the land regime.Change in the land regime and power dynamics led to certain land usages. Taking environmental shifts into consideration enables us to develop an understanding of the way the agricultural knowledge and practices changed within this context. The small peasants, peasants of vakıf villages, sharecroppers and large land-holders found alternative ways of using the available lands; they were not in separate worlds, but it was their interactions with each other that led to a certain change in agricultural knowledge.

In this framework this chapter aims to develop a holistic understanding of environmental changes, transformation in land regime, power and production relations and how this impacted agricultural knowledge. In trying to understand the relationship among these factors, this chapter will also highlight that the change would not have been the same without market demand. In Mihaliç, the changing use of commons that was reiterated by the enlarging swamps affected agricultural knowledge and practices of peasants. But in Bursa change in land regime led to a more intensive use of land.

3.1 Relationship between the land regime and agricultural knowledge

At the beginning of the 20th century the discussion on change in agricultural knowledge was within the discussion of capitalist transformation. With a retrospective view, the British way was the aspired model with its large estates, encroachment of commons, parliamentary enclosures, crop rotations and the introduction of new crops.[234] Change in agricultural knowledge was analyzed as part and parcel of the transition to capitalism and as an essential instrument for it. This produces a notion that agricultural knowledge did not change and remained in the same 'backward' state, if it did not lead to capitalism.

Nevertheless after the 1970s, when various ways of changes started to be analyzed (in the French, Japanese, Chinese, German, Scandinavian and Russian contexts among others), some of these institutions, i.e. large estates, parliamentary enclosures, encroachment of commons, were called into question. Alongside these institutions a more general way of looking at agrarian change began to predominate the discussions.[235]

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[234]For the historians who discussed Agricultural Revolution see for instance Thompson, "The Second Agricultural Revolution, 1815-1880"; Kerridge, "The Agricultural Revolution Reconsidered*"*; Fussell, "History And Agricultural Science". For the historians whose main concern was the birth of capitalism and British way of agricultural change in their mind see for instancePirenne, *Economic and Social History of Medieval Europe*; Dobb. *Studies in the Development of Capitalism*;North &Thomas, *The Rise of the Western World : a New Economic History*.

[235] Historians come up with different theories as they confronted different paths; see Boserup who underlines population increase for agrarian change,*The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure*. Gregory Clark developed this theory and emphasized the increase in middle class population, Clark, *A Farewell to Alms: A Brief Economic History of the World*. Subaltern studies brought different approaches to the field. Gupta discussed the role of colonial and then the national state in India in agrarian change and the intermediaries of state by highlighting the agricultural knowledge and practices, Gupta, *Postcolonial Developments*. From different point of view Scott discussed the role and intermediaries of centralizing state in different countries by emphasizing the institutionalization of scientific knowledge by state, Scott, *Seeing Like A State*. Pomeranz tried to understand at what point the economic developments differentiated by highlighting geographical discoveries and natural wealth of different countries, Pomeranz, *The Great Divergence: China, Europe and the Making of the World Economy*. Mazoyer and Roudart tried to put together diverse factors in different regions of Europe by sketching a very long period in understanding the agrarian changes, Mazoyer and Roudart, *A History of World Agriculture: From Neolithic Age to Current Crisis*.

Still, the role of common pastures retained its importance in this debate, as the usage of the common lands cannot be comprehended completely and in detail. Especially in French historiography the change in agricultural knowledge has been associated with rights on commons.[236] Marc Bloch regarded the wide-spread presence of commons and the agricultural methods that were based on commons as "backward", an explanation which relied on his definition of the agricultural revolution (which is the disappearance of fallow methods).[237] According to Bloch, the presence of commons enabled the peasants to separate their grazing areas from their cultivation zone, thus stood as obstacle in the more intensive use of land. Almost 40 years later, Jessene and Vivier presented the history of agricultural transformation in France as the history of struggle over the rights on commons.[238] Mauro Ambrossoli sees the presence and domination of commons over private property as something that makes agricultural innovations impossible.[239] But recent research shows that we have much to learn on the usage of the commons and the rights of communities on these lands.[240]

3.1.1 Ottoman historiography: commons and agricultural change

In Ottoman historiography, the issue of commons also occupies a great place in discussing change in Ottoman agriculture. Ottoman intellectuals at the end of the 19th century called the land regime and the ideal size in this land regime into question.[241]

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[236] Bloch, *French Rural History*: *An Essay on Its Basic Characteristics*; and Root, *Peasants and King in Burgundy*: *Agrarian Foundations of French Absolutism*; Jessene & Vivier, "Norhern France, 1750-2000".
[237] Bloch, *French Rural History*.
[238] Jessene & Vivier, "Norhern France, 1750-2000".
[239] Ambrosoli, *The Wild and the Sown: Botany and Agriculture in Western Europe, 1350-1850*.
[240] Curtis, "Did the Commons Make Medieval and Early Modern Rural Soceties More Equitable? A Survey of Evidence from across Western Europe, 1300-1800" .
[241] Şerif Mardin, "Tanzimattan Cumhuriyet' İktisadi Düşüncenin Gelişmesi (1838-1918)" briefly discusses the late 19th century Ottoman economists; and also Zafer Toprak, "II. Meşrutiyet Döneminde İktisadi Düşünce". For further discussion on this issue see Chapter 5.

For them, the development in agriculture was mechanization, crop rotation, the introduction of certain crops, application of fertilizer, and abolishing common rights on pastures in order to encourage the peasants to take initiative of their "own lands".[242] Their main concern was finding the quickest way of the transition to capitalism. Although some of the intellectuals advocated giving the weight to industrialism by state initiation, most of the contemporary intellectuals supported the agricultural development as the basis of capitalist transformation. The main concern of the intellectuals at that period was providing the conditions necessary to save the empire and match the economic level of the other empires. Feeling this urgency, imitating other countries dominated the thoughts of the intelligentsia.

In the 1930s the emphasis continued to be on the land regime and the absence of private property which hindered any change in agricultural knowledge.[243] According to the contemporary intellectuals, the transformation of agricultural knowledge was necessary for the transition to capitalism, in which government had to intervene into the rural sphere. However, they differed from their predecessors, as they used an awareness of local trajectories in their works. They invited government intervention in order to eradicate any disadvantageous groups and conditions at the local level. Yet, they continued to underline the abolishment of common rights and the introduction of private property.

In the 1960s and 70s, the failure in transition to capitalism led the historians to refer back to the Ottoman land regime and how it changed. They sought the roots of the failure in Ottoman economic history. Such an understanding was supported by cross-analysis of other countries and opened up long-lasting, so-called, çiftlik debate,

[242] For instance see Kazım. *Çiftçilik Dersleri*.
[243]Sarç,*Ziraat ve Sanayi Siyaseti;* Tökin,*Türkiye Köy İktisadiyatı*;Gökgöl,*Şimali-Şarki Anadolu Yaylasında*.

something which produced rich literature.[244] Was it the çiftliks that were obliged to undertake this transition to capitalism with capitalist labor relations and change in agricultural knowledge[245] , or was it small peasants under state protection as the initiator of change in agricultural knowledge?[246]

As Silier underlined in her book, rather than two separate worlds, the rural world used to consist of the relationships between small peasants, vakıf peasants, large land-holders and sharecroppers, all together. They were in a mutual relationship in several ways.[247] Agricultural knowledge was formed by how the land was used within this relationship. The use and the availability of commons, as we will see, is very central to this relationship. Thus change in the use of commons is an inseparable part of change in land regime and in agricultural knowledge. This change took different forms in Mihaliç and Bursa, as we will see.

3.2 Mihaliç: formation of çiftliks, contraction of commons, growing marshlands, increasing animal husbandry

Lying to the west of Bursa, Mihaliç has distinct geographical characteristics compared to Bursa, as we discovered in the previous chapter. Situated on a rough terrain, settlements were dispersed and located far from one another; most of them

[244]It is a long lasting debate among the historians and it is beyond the scope of this thesis, but in order to understand the fundamentals of the debate some good examples can be İnalcık, "The Emergance of Big Farms" and "Village, Peasant and Empire"; Veinstein, "On the ciftlik debate"; Pamuk, *100 soruda Osmanlı- Türkiye* and *Osmanlı Ekonomisi ve Dünya Kapitalizmi (1820- 1913)*; Keyder, "Introduction"; Stoianovich, "Balkan Peasants and Landlords and The Ottoman State: Familial Economy, Market Economy, and Modernization.".

[245] It has been debated here the role of landlord for details see Stoianovich, "Balkan Peasants and Landlords and The Ottoman State: Familial Economy, Market Economy, and Modernization."; Todorov, "Social Structures in the Balkans During the Eighteenth and Nineteenth Centuries"; Lampe & Jackson, *Balkan Economic History* ; Keyder, "Introduction".

[246]See İnalcık, "The Emergance of Big Farms" and "Village, Peasant and Empire"; and see İslamoğlu-İnan. "State and Peasants in the Ottoman Empire: A Study of Peasant Economy in North-Central Anatolia During The Sixteenth Century".

[247] Conflicts and seizures should be considered as confrontation and mutualisation. Silier in her work also addresses indebtedness relations and labor relations between çiftliks and small peasants; Silier, *Türkiye'de Tarımsal Yapının Gelişimi* (1923-1938). Throughout this chapter I also tried to show various aspects of relationships.

were sparsely populated. Between these settlements there were massive common pastures and arable land plots. There were 596,880 dönüms of arable lands and 132,850 dönüms of pasture, and the main items of trade were grain and sheep.[248]As Bursa was the first capital city of the Ottoman Empire, the district's lands were partitioned by several vakıfs. Most of the vakıfs had been established by earlier Sultans and ruling elites, though the eagerness of the dynasty to partition the lands in the countryside of the district continued until the 18th and 19th century. There was a considerable number of large vakıf çiftliks, a few independent ones, as well as a few small villages in the Mihaliç countryside, among which mutual relationships were maintained in several ways.

At the beginning of the 19th century Mihaliç was regarded as the empire's grain reserve. Sandison, the British ambassador in Bursa, talked about a total collapse of the large estates in Mihaliç due to a grain crisis during the 1840s which was caused by the consecutive inundations beginning from 1830s.[249] He mentioned a transformation of agrarian regime from large estate grain producers towards small peasant who engaged in silk raising during the 1840s. Indeed, due to inundations on the plain there was a decline in overall grain production lands lying on the plain. Though silk production and mulberry plantations had probably increased, I prefer to approach the issue in a more comprehensive way. Firstly, the çiftliks were not only grain producing units. Instead animal breeding, grain production and production of

[248]*Salname-i Hüdavendigar*, 1302, 394. See the table in the Appendix to compare the arable lands and pastures with Bursa. Though the numbers belonged to the last decades of 19th century, they were given to concretize the ratio between pastures and arables. The travelers were talking about huge pastures at different times in 19th century; Addison, *Damascus and Palmyra*; MacFarlane, *Turkey and Its Destinyvol.I*; Magmumi, *Bir Osmanlı Doktorunun Anıları: Yüzyıl Önce Anadolu ve Suriye*; Hızlı, "Ömer Fuat Bey'in Anadolu Mektupları". The pasture area of Mihaliç was 4 times bigger than Bursa district. *Dönüm* as a unit of measurement differs from region to region, but in order to standardize the units in the 19th century it was set as 2500 square meter; but before then it was paced out and was equal to approximately 1100 square meter; http://www.islamansiklopedisi.info/. In this dissertation dönüm was compared and contrasted within its own historical period, thereby a possible difference between the numbers in different times could be overcome.
[249]See FO 78/441, 243.

market crops were sustained simultaneously. Large estates were not usually based on a single economic activity, if a crisis ensued concerning the grain fields, it would not cause the collapse of the çiftliks. Furthermore, wheat production was not cultivated only in the plains, but by cultivating summer wheat the hilly lands were also used for wheat production. Secondly, the vakıf structure somehow protected the çiftliks from collapse by forcing the supply of grain to certain places and sharing seeds or harvest among the çiftliks in case of need. Thirdly the relationship of çiftliks with surrounding villages provided their sustainability in different ways. For these reasons, we can say that while the plains which remained under water and swamps made grain cultivation impossible, the grain cultivation shifted from the plains to the hilly lands, though with a decline in the total amount produced. Such a contraction in grain fields affected small peasantry, however some of them found an opportunity to meet their grain needs through the agreements between the çiftliks and the surrounding villages. [250] As a quick response to market demand, peasants began making a living from mulberry plantations and silk production, which proved to be in harmony with their environment. However, beginning from the 1860s small peasants were in crisis. The spread of Pebrine which was infecting silkworms and an increase in sheep demand posed a threat to the older agreements made with the çiftliks. On the whole this negatively affected the collective usage of commons on behalf of the çifltik-holders. In addition to Sandison's claim, the çiftliks were not actually for sale in the way that he perceived, it is possible that he could have misinterpreted lease-outs as sales. The çiftliks were leased to different people as we will see below, though the vakıf remained the owner of the land.

[250]For instance we know some agreements between Doğa village and Tepecik Çiftlik, where the peasants pay land rent in wheat, oat or barley; BOA, D.BŞM.d.9852, 1246 (Hicri); in a similar vein Çaylıca and Çeşingir villages were cultivating the lands of Arap Çifltiği for a rent in kind; BOA, D.BŞM. 10504, 1253 (Hicri).

As mentioned above, animal breeding and crop cultivation were done simultaneously in the çiftliks. From the late 19th century onwards however, when sheep breeding became more favorable, the marshy lands which had long been uncultivated provided entrepreneurs with the opportunity to form new çiftliks or extend the existing ones.

Within this framework, there are three periods in which the agricultural production and spread of çiftliks underwent changes. As we will see the formation of çiftliks gained a momentum after the 1880s. The first decades of the 19th century, mid-19th century; and late 19th century are the main time spans on which I ground my analyses. In the first decades of the 19th century, most of the çiftliks in the region were vakıf çiftliks and voyvodas were managing them directly or indirectly on behalf of the vakıfs. After they lost their power, in the 1850s the vakıfs increasingly started to sublease the çiftliks. After the 1880s, individual owners became more prominent.

3.2.1 First decades of 19th century

At the beginning of the 19th century we see large vakıf çiftliks and vakıf villages in Mihaliç, some of which belonged to the dynasty and others to ruling elites. In addition to this, there were also independent villages in the Mihaliç countryside. The çiftliks were either entrusted to kahyas or to voyvodas[251] to cultivate the lands, accordingly there were various forms of labor arrangements.[252]

[251] After ayanlık was abolished in Mihaliç, voyvodas filled the power vacuum in cooperation with the center. For instance, Beyhan Sultan (the sister of Mustafa the 3rd) to whom Mihaliç region as a whole was granted as mukataa had the power of appointing and dismissing voyvodas; BOA, HAT.1227/47920-D, 1227 (Hicri); HAT,1227/47920-E, 1227 (Hicri); HAT. 1227/47920-A, 1227 (Hicri). She took her lead even in power struggles among the voyvodas of the region; BOA, HAT.1227/47920-D, 1227 (Hicri); HAT,1227/47920-E. In order to see a more detailed discussion on the power of vakıf- holders and Sultans as absentee landlords and the change of their power in Thessaly, see Oncel Yusufoğlu, *AgrarianRelations and Estate (Çiftlik) Agriculture in Ottoman Thessaly (c.1780-1880)*. Being local power holders, voyvodas seized çiftliks in the Mihaliç countryside; but they could not escape from confiscation which then passed onto the members of dynasty or central ruling elites. For instance, voyvoda Haseki Ahmed Ağa's Canbaz Çiftlik was

During this time there were large vakıf çiftliks in Mihaliç. Balıklı, Tepecik, Vasil and Akhisar Çiftliks were granted to Mihrişah Valide Sultan[253] and Arap Çiftliği on the northern shore was granted to Beyhan Sultan.[254] Through analyzing the Muhasebe defters of the vakıfs we can trace the production in Balıklı, Vasil, Tepecik and Akhisar Çiftliks for four consecutive years in 1830, 1831, 1832 and 1833. [255]

In 1830, as we see from the first defter, the vakıf entrusted four çiftliks to bailiffs. Their lands were split up for animal breeding and agricultural production.[256] Hills and plain lands in Balıklı were reserved for grain cultivation. On the hilly lands summer wheat was cultivated as this crop could more easily tolerate the lack of water. Winter wheat was sown on the available plain lands. In 1833, 100 kile winter wheat and 25 kile summer wheat was sown in Balıklı Çiftlik.[257] All the grain crops were cultivated by seasonal wage laborers. The total wheat yield from the çiftliks

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confiscated in 1805, and the lands which he usurped from the neighboring Muradiye village turned back to the peasants;BOA, A.DFE.d. 786/48, 1219 (Hicri).

[252] In addition to wage laborers, we see agreements with surrounding villagers. The peasants of the independant villages were cultivating the plots in the çifltik in return for rent in kind, thereby land-holders put the arable lands under cultivation; we have accounts for Balıklı Çifltiği BOA, D.BŞM.9852, 1246; and more specifically between Tepecik Çiftlik of Mihrişah Valide Sultan Vakıf and Doğa village, BOA, D.BŞM.d. 9852 1246 (Hicri), and agreements between Arap Çiftliği and surrounding Çeşingir and Çaylıca villages; BOA, D.BŞM. 10504, H. 1253 (Hicri).

[253] Balıklı Çiftlik was under the management by Mihaliç voyvoda Pankodozoğlu Haşim before 19th century. After he had been accused of tax abuses and all of his possessions had been confiscated in 1793; BOA, C.ML.219/9076, 1207 (Hicri). Çiftlik was annexed by Emlak-ı Hümayun . Then sometime around 1795 the income from this çiflik (together with neighbouring 3 other çiftlik) was granted to Mihrişah Valide Sultan; BOA, D.6484/1, 1226 (Hicri). Mihrişah Valide Sultan died at 1805 and though we do not know the exact date, she established a vakıf and the income of these çiftliks were endowed to this vakıf. A paper was presented in a conference Ioannina discussing these çiftliks in detail, called Küçükceran, "Agrarian Change, Production and Labor Regime in 19th Centuey Bursa: Balıklı Çiftliği in Mihaliç".

[254] The income of the çiftlik was endowed to the needs of a school that Beyhan Sultan built in Istanbul. In this way, Arap Çiftliği, or also called Süle, became the vakıf çifltik of Beyhan Sultan vakıf in 1801. Living in İstanbul, Beyhan Sultan leased out the çiftlik to the Mihaliç voyvodas. I presented a detailed paper on this çiftlik in CIEPO-22, Küçükceran, "Production in a Vakıf Çiftlik: A Case From Mihaliç, Hüdavendigar".

[255] See Figure B5 in the Appendix B for a sample page from the Defter.

[256]BOA, D.BŞM.d. 9449 (1245); 9852 (1246); 9916 (1247); 9970 (1248).

[257]BOA, D.BŞM.d. 9970, 1248 (Hicri). As a unit of measurement kile was not a standart in whole of the empire. There can be small differences between İstanbul kilesi and Mısır kilesi. Bursa kilesi is equal to İstanbul kilesi. In the 16th century 1 İstanbul kilesi is 20 okka and 25,65 kg , in the 19th century in order to standardize the units of measurement it is regulated as follows: 1 kile= 100 litre; http://www.islamansiklopedisi.info/.

was 4148 kile in 1830[258], 2516.5 kile in 1831[259] and 1102 kile in 1833.[260] Some of the grain harvest was reserved for the sharecroppers of these four çiftliks and recorded as debt, while some was given to wage laborers and shepherds. All the amounts had been made clear in the agreement made between the parties involved. Furthermore, the grain harvest of the lands that had been rented to the peasants of surrounding villages was also added to the total yield of the four çiftliks. If need arose, the seeds that were reserved for the next year were to be shared by the producers of the four çiftliks and sent to the producers in Tepecik, Akhisar or Vasil Çiftlik.[261]

The plots on the riverside were mostly reserved for market garden crops (tobacco, onions and garlic) and broad beans due to the amount of water they require and they were cultivated by sharecroppers.[262] Market garden crops required another labor organization due to type of agricultural work it necessitated and the sowing period in April or May which falls outside the grain sowing season. However, the riverside plots were under the constant threat of inundation particularly in early spring and fall. For that reason, sharecroppers probably reserved their plots only for market garden crops which were sown in April or May when most of the waters ebbed and left fertile soil for cultivation. In these circumstances, the sharecroppers must have exchanged the harvest of market garden crops with grain. Unexpected floods could also work to the benefit of land-holders as it would mean that the sharecroppers would be in debt and bound to the land in an environment that already had a scarce labor force.

[258]BOA, D. BŞM.d. 9649, 1245 (Hicri).
[259]BOA, D.BŞM.d. 9852, 1246 (Hicri).
[260]BOA, D. BŞM.d. 9970, 1248 (Hicri).
[261]BOA, D. BŞM. 9852, 1246 (Hicri).
[262]Anıl Aşkın showed in his study on Mihaliç Çiftlikat-ı Hümayunu that the same division of labor was arranged depending on the crop type; Aşkın, *Institutions, Economy and Environment in the Nineteenth Century Ottoman Empire: The Case of Imperial Landed Estates (Çiftlikât-ı Hümayun) of Mihaliç, 1840-1850*, 63.

The riverside lands were not only for the cultivation of market garden crops and broad bean, but it was also suitable land for grazing livestock. The sheep of the four çiftliks (Balıklı, Tepecik, Vasil and Akhisar, among which the biggest one was the Balıklı) were entrusted to Bulgarian shepherd bailiffs from November until May.[263] Whereas there was a decline in grain production, each year new sheep were purchased either by middlemen (called *çorbacı*) who established necessary links with the market, thus acted as merchant, or by the shepherd bailiffs. Therefore, rather than a collapse of the çiftliks we might talk about how çiftliks shifted their economic activities.

The increase in the number of sheep in the 1830s was the first signs of a growing trend in sheep breeding before the 1840s.[264] This was supported both by domestic and foreign markets.[265] Due to the demand for meat in Istanbul, this increase in sheep breeding activity was backed by government. Due to its proximity to Istanbul, Mihaliç was the perfect location as it ony took a few days to send something from the Mihaliç port. Furthermore, as seen in the previous chapter and at the beginning of this chapter, the inundations that greatly hindered grain cultivation but created perfect pastures for animal grazing after the waters ebbed, provided the right motivation for the rise in sheep breeding. In this case, sheep breeding was better than labor-intensive crop cultivation which required that landholders had to organize laborers on a massive scale. However, the question arises as to whether or not the pastures were large enough for growing number of sheep and the heightened

[263]BOA, D.BŞM.d. 9852, 1246 (Hicri).
[264] Erdem Kabadayı intreprets this growing trend in sheep breeding as one of the incentives behind the establishment of Çiftlikat-I Hümayun in Mihaliç, he underlines the state's efforts and several encouragements in sheep breeding; Kabadayı, "Introduction of Merino Sheep Breeding in the Ottoman Empire, Its Success and Failures in Implementation". To me Mihaliç was selected purposefully as a place where both domestic- especially transport to İstanbul- and external trade could be maintained in Mihaliç port.
[265] Sandison, "Turkey (Brussa): Report of Mr. Consul Sansdison, on the Trade in the District of Brussa for the Year 1854", 133

enthusiasms of merchants to benefit from sheep breeding. From 1850s onwards, we can see new pastures as the encroachment of commons began to take place.

3.2.2 1840s-50s

Balıklı Çiftlik was leased out to Antonaki, a Greek merchant, sometime around 1840-41. Antonaki introduced new crops in the çiftlik such as potatoes, melons, flax, cotton, madder and squash. He also brought two English iron ploughs, scarifiers and harrows to the çiftlik.[266] He had sharecroppers in order to sustain agricultural work in the çiftlik. The more plausible explanation for this is that cultivating these crops required such intense agricultural work that it wasn't enough to just have seasonal agricultural workers. In 1844, while the çiftlik was run by Antonaki, Balıklı Çiftlik was producing 310 kile of wheat and 30 kile of barley from 170 dönüms of sown land,[267] whereas this had been 1,945 kile in 1811.[268] In other words, the overall grain harvest was far less than it had been in previous years; in a bit more than forty years, there was a serious decline in grain production as was claimed by Sandison at the beginning of the chapter. According to Sandison's numbers overall wheat production in Mihaliç was 63,000 kilo (approximately 1,5 million kile) during the 1820s, sinking down to 13,000 kilo- 325,000 kile- in 1842.[269] It may be conceivable to interpret the seemingly collapse of the çiftliks as a failure of the direct managementof vakıfs and the emergence of powerful individuals.

During the same period Charles McFarlane talked about immense swamps when he first entered into the Antonaki's çiftlik.[270] One explanation for this could be that grain lands might have been contracted due to inundations and swamps.

[266]MacFarlane, *Turkey and Its Destiny*, *vol.I*., 439.
[267]BOA, ML.VRD.TMT.d. 8927, 1264 (Hicri).
[268]BOA, D. 6484/1, 1226 (Hicri).
[269]FO. 78/490, Februray 19, 1942, p. 255.
[270]MacFarlane, *Turkey and Its Destiny*, *vol.I*., 429-30.

However, the cultivation of various crops is not mentioned in the defter. As in the previous years, hilly lands may have been reserved for grain cultivation, which must have been rotated with potatoes in order to increase the yields. Other crops such as melons, flax and cotton require water, so they must have been sown on the riverside plots, together with onion and garlic. Squash, which requires water but does not grow on sandy soil, must have been cultivated between the riverside and hilly lands. Interestingly, tobacco which had been previously cultivated was mentioned neither in the Temettuat, nor in the McFarlane's accounts which might indicate that no more tobacco was cultivated in the Çiftlik.

Alongside agricultural production, sheep breeding also continued in the çiftlik. Disputes on pasture began to occur between neighboring places. Income generated from sheep breeding put more strain on pastures. Extending marshlands due to constant inundations blurred the borders of the çiftlik. This made it easier to gradually incorporate some parts of pastures to the çiftlik. Furthermore, the need for larger pastures for more livestock threatened the previously made agreements on common rights.

An example of this is the 1841 dispute between Balıklı Çiftlik and village of Göbel about common rights on the pasture Karaçayır. This dispute perfectly illustrates how the extension of borders and the encroachment of the commons took place.[271] The extension of a border is not always necessarily vertical or horizontal. Instead, acquiring grazing or cultivation rights on some distant plots created dispersed yet larger çiftliks, which of course was brought on by geographical conditions.

[271]BOA, C.EV.402/20362, 1257 (Hicri).

During the dispute in 1841, Antonaki was like a trustee and manager of the Balıklı çiftlik, entrusted by his wife Alinko, the tax-farmer. Antonaki, put the sheep into the pasture, called Karaçayır, but peasants of Göbel village opposed and stated that this pasture belonged to them. Göbel village was on the southern side of Balıklı Çiftlik and there were four or five villages between them. The Karaçayır pasture was watered by surrounding brooks which also created a reed field. Probably the place was like marshland, where the peasants could cultivate occasionally when the level of water allowed them to do so. In these circumstances, Antonaki claimed that this place was the age-old lands of the vakıf, thus the peasants were cultivating these lands unlawfully. After investigating the title deeds, it became apparent that Pankodozoğlu, a former manager of Balıklı Çiftlik, had made an agreement with the peasants. According to this agreement Pankodozoğlu had the right to graze his sheep on this land. Because the Karaçayır pasture was a marshy land, in all likelihood, the peasants probably did not prefer to cultivate the land. In summer when the waters ebbed, this land would become pasture for sheep. It was under those circumstances the peasants preferred to give the field to Pankodozoğlu. Since çiftlik-holder Antonaki had a need for more pastures and because the peasants wanted to use the land again, the legal rights on the Karaçayır pasture became vague. It was finally decided that the lands did not belonged to Balıklı Çiftlik, since the lands of Göbel belonged to Hüdavendigar vakıf and because the çiftlik and village were so far away from each other. However, 30 years later, at the end of the 1860s, the Balıklı Çiftliği somehow acquired the Karaçayır pasture and registered its grazing rights on the pasture.[272]

[272]BOA, BEO.AYN.d. 878, 1285 (Hicri).

Charles MacFarlane provided another example that indicates how environmental conditions impacted the land regime. He wrote about how desperate the peasants of Kilisan village (the eastern neighbor of Balıklı village) were, when the Karadere flooded. [273] The village headman cried out that if the holder of Balıklı Çiftlik did not allow their animals to graze on their pasture, then they and their animals would not be able to make it to the following year. For this reason, geographical conditions forged some sort of relations between Kilisan and Balıklı. Such relationships placed pressure on usage of the land, either as pasture or arable land. When the waters ebbed, the vague borders of lands and rights on the land were up for dispute. This was due to not only the desperation of neighboring villagers, but also due to the eagerness of merchants (in fact Antonaki was one of them) to engage in sheep trade. These merchants rented pastures even at the expense of decreasing grain cultivation to meet domestic meat consumption needs and international demand for sheep.[274] This situation was enabled by the growing marshlands during the 19th century, what Sam White argues in his book.[275]

While floods and swamps were causing a decline in available grain fields, cultivation of wheat was continued on the hilly lands albeit less so than before. In order to make their living, in addition to grain, the peasants turned to different crops such as linseed, melons, silk raising and planting mulberry gardens that aligned with

[273]McFarlane, *Turkey and Its Destiny, vol. I*, 494.
[274]Sandison, "Turkey (Brussa): Report of Mr. Consul Sansdison, on the Trade in the District of Brussa for the Year 1854", 133; 4000-5000 sheep were demanded only by the French army. Yet, not only foreign demand the bulk of the trade consisted of domestic demand especially from Constantinople; 120,000 sheep and lambs were sent to Constantinople from the Bandırma port in 1861; Sandison, "Report by Mr. Consul Sandison on the Trade &c. Of Brussa for the year 1861", 347. In 1880/81 totally 56, 025 sheep were raised only in Mihaliç; Yalazı,*Salnamelerde Karacabey*, 23. In 1891 the number of sheep increased to 60,016, Yalazı,*Salnamelerde Karacabey*, 38. In May 1894, 30,190 sheep were sent to Constantinople; Hüdavendigar, 26. Sene (1598), 6Temmuz 1310, p. 2.
[275]Sam White talks in his book on the growing marshlands at the end of 18th century and the beginning of 19th. He claims that growing marshlands with a recovery in population caused different use of arable lands; he calls this a transition from grain-cultivating plain lands to diverse crop cultivation in hilly lands; White, *Osmanlı'da İsyan İklimi*.

a changing environment and spring sowing. The increasing demand for sheep breeding made the margins of the swamps attractive for the large-land holders, as was seen in Antonaki's case when he insisted on his grazing rights on Karaçayır. He had further justified his need for pastures by claiming that because the land was marshland, it was not ideal for grain cultivation but should be used for grazing. In this respect, these environmental and market conditions lay the foundations for expanding çiftliks to be sites for sheep breeding. Advantage in sheep breeding did not only help the existing çifltiks to compensate the decline in grain cultivation, but also it initiated the formation of the new çiftliks. As we have seen, not only the margins of the swamps, but also the commons were encroached, which gained a momentum after the 1860s. Many previously made agreements on commons were broken by çiftlik-holders. It was in this manner, by encroaching the commons, sheep breeding predominated the agrarian economy of the çiftliks. Peasants on the other hand tried to benefit from their lands in different ways when they could not maintain their rights on commons.

3.2.3 1860s and after

The dispute between Çamandıra Çiftlik and Çamandıra village serves as an example for the extension of the çiftlik for sheep breeding and how climatic conditions and legal processes paved the way for it. The village had a common pasture on which the village community and the çiftlik holder had shared equal rights, according to an old oral agreement between the two parties.[276] It seems that based on this agreement the çiftlik-holder entrusted his sheep to be grazed by *perakende* shepherds to be grazed on the common pasture.[277] In addition to sharing the common, the peasants of the

[276]BOA, Ev.d.23066, 1286 (Hicri).
[277]BOA, ML. VRD. TMT.d. 8958, 1264 (Hicri).

village and the çiftlik had various other interactions with each other. The peasants worked either as servants, chief farmer or *odacı*, none of whom owned any land.[278] For instance a certain servant chief farmer (*hizmetkar baş çiftçi*) named Ali did not own any land, but he might have worked on various lands of the çiftlik as the head of other farmers within the framework of some kind of an agreement. However, in the 1860s the agreements and these relationships started to become unstable.

As the number of sheep increased and as swamps made enlargement of the ownable land possible for those in power, the older agreements turned into disputes. These disputes between the parties mostly resulted in the dispossession of the peasants. In this case the legal status of the land as meadow (*çayır*) or pasture (*mera*) played a vital role in the encroachment of the land. The holder of Çamandıra Çiftlik, due to his relationships with the government, was able to register the land as waste land of the vakıf, but it was used as meadow which would otherwise been subjected to tithe.[279] However, the peasants objected that by saying that they long had grazing right on this land and that they were victims of a mistake (or more of an illegality) in its registration. They accused the çiftlik-holder, Celil Ağa, of this illegality. As they continued their claim on this land, a committee from the Provincial Council came and investigated the situation. At the time the land was recognized as a common pasture between çiftlik and village on which no one else's animals were allowed to be grazed.[280] However, the officials in Provincial Council were not satisfied with the problematic legal status of the land and passed the case on to the District Administrative Council (*Kaza İdare Meclisi*) to further investigation. The peasants claimed that they had reached an oral agreement with the çiftlik-holder to share the land to graze their animals. The Director of Evkaf Bookkeeping (*Evkaf*

[278]BOA, ML. VRD. TMT.d. 8958, 1264 (Hicri).
[279]BOA, Ev.d. 23066, p.5,1289 (Hicri) and p.43, 106, 1290 (Hicri)
[280]BOA, Ev.d. 23006, p.43, 106, 1290 (Hicri).

Muhasebecisi) supported the claims of peasants and claimed that the land was the common pasture of the çiftlik and village. Having lasted for more than one year, the dispute ended with a compromise; of the disputed 5000 dönüms of land, Celil Ağa surrendered 2000 dönüms of the land to the peasants. However, the dispute was not over.

A few years later, in 1876, documents show that Celil Ağa used the disputed land for sheep breeding.[281] He had between 2500-3000 of his sheep, graze on the land, claiming that the land was only suitable for grazing, not cultivation. According to him the reason was that the land had turned into something of reed land due to previous floods. In this respect, the legal status, environmental conditions and the motivation provided by the market conditions led to the land disputes and encroachment of commons.

This particular dispute between the village community and çiftlik-holder lasted for forty years. The peasants completely lost their rights on the common at the beginning of the 1870s and could not reclaim their rights. The çiftlik continued to expand not just through the commons of the village, but also towards other pastures of various çiftliks.[282] According to the peasants' claim especially the çiftlik-holder Galip Paşa, who had been provincial governor three times (1873, 1875, 1878), had extended the pasture of the çiftlik from 1700 dönüms to 10,000 dönüms where he tax-farmed to sheep merchants.[283]

The Çamandıra çiftlik was of course not the only case in this respect. In 1870, the official who came to investigate the situation in Çiftlikat-ı Hümayun wrote about general conditions in Mihaliç. He urged the government to encourage the drainage efforts for reclaiming approximately 500,000 dönüms of land which had

[281]BOA, ŞD.1537/18, 1293 (Hicri).
[282]Such as towards its southern neighbour Çeribaşı Çiftlik; BOA, ŞD.1612/2, 1327 (Rumi).
[283] BOA, DH. MUİ. 6/3, 1325 (Rumi)

become marshlands and covered with reeds.[284] In a similar nature, an official who came to Mihaliç to conduct a survey on the marshlands established a direct relation between the floods, marshlands and increase in the formation of çiftliks.[285] He said that floods destroyed the grain fields of the peasants and they found themselves indebted to the çiftlik-holders. These çiftlik-holders either seized the lands due to this indebtedness or by convincing the peasants that they could not cultivate those lands anymore and thus bought the lands willingly from the peasants. They compulsorily leased out to sheep merchants. Some çiftlik-holders seized the mezraa plots which were under the usage of peasants to their çiftliks thanks to the blurred borders by the floods.

The intertwined relationship between çiftlik-holders and sheep merchants prevailed sheep breeding economy in Mihaliç. Some of the sheep merchants were the sub-contractors of the tax-farmers of çiftliks, while some of them- richer ones- found more profitable to form their new çiftliks rather than leasing-out. In this way, in addition to the extension of the older ones, new çiftliks emerged to be used only as summer meadows.[286] Furthermore, the merchants who rented the çiftliks and the animals belonging to the çiftlik-holders constantly ate the crops of the peasants which in turn made the cultivation impossible for the peasants and forced them either to sell their lands or rent their lands to the çiftlik-holders or merchants.[287] For

[284]BOA, T.524/53, 1288 (Hicri).
[285]BOA, ŞD. 2428/31, 1295 (Hicri).
[286]BOA, ŞD. 2428/31, 1295 (Hicri).
[287]BOA, ŞD. 2403/12, 1289 (Hicri); ŞD. 2428/31, 1295.There are cases like this in which peasants petitioned for being eaten their crops by the animals of the müstecirs. For instance between Balıklı Çiftlik and Akhisar and Kilisan Çiftliks which lasted again approximately 20 years; BOA, BEO.983/73662, 1315 (Rumi); BEO.1056/79132, 1315 (Rumi); DH.MKT. 255/36, 1310 (Rumi); DH.MKT.304/6, 1310 (Rumi); DH.MKT.333/41, 1310 (Rumi); DH.MKT.2330/30, 1316 (Rumi). Especially with maize cultivation which conflicts with the period of animal breeding, the tension between the peasants and animal breeding increased. For instance Gemrenid villagers in Mihaliç in their dispute with a çiftlik about grazing rights claim that they reserved some of their lands for maize cultivation which was seized by İlyas Bey for animal grazing, thereby hindered their maize cultivation; BOA, DH.H. 30 /7, 1325 (Rumi).

instance maize crops of the Rünkuş peasants were constantly eaten by the sheep of İlyas Bey, the çiftlik holder, whose tax-farmer Bekir Ağa sub-contracted the pasture to sheep mercants.[288] Also, the dispute between Balıklı Çiftlik and Kilisan and Akhisar Çiftlik addressed the sheep merchants who were sub-contractors of the Balıklı Çiftlik.[289]

Most of the time, the peasants were forced to sell their lands, because their plots were not big enough to feed large number of livestock. [290] However, at times, some peasants willingly preferred to rent their lands to sheep merchants, though illegally, to get an income without any endeavor.[291]

With the arrival of the refugees in vast numbers from Caucasus and Rumelia, particularly after the 1880s, this situation became more complex as land became even scarcer. Some of the refugees – who had just arrived in an unknown foreign environment- chose to rent out or sell their lands.[292] In this way, by amalgamating small plots, çiftlik-holders created larger çiftliks for sheep breeding. When they did not sell their plots, the refugees would get involved in land disputes either with small peasants or with çiftlik-holders.[293]

When natural conditions did not help çiftlik-holders in enlarging their areas, they began turning their arable lands into meadows to be rented out to sheep merchants.[294] The rise in population numbers and the increasing number of sheep created tension and caused land disputes. The subject of a dispute between the village of Gemrenid and İlyas Bey, the holder of Haydar Çiftliği, were the common

[288]BOA, DH.H. 30 /7, 1325 (Rumi)
[289]BOA, BEO.983/73662, 1315 (Rumi); BEO.1056/79132, 1315 (Rumi); DH.MKT. 255/36, 1310 (Rumi); DH.MKT.304/6, 1310 (Rumi); DH.MKT.333/41, 1310 (Rumi); DH.MKT.2330/30, 1316 (Rumi)
[290]BOA, ŞD. 2403/12, 1289 (Hicri).
[291]BOA, ŞD. 2428/31, 1295
[292]BOA, ŞD. 2403/12, 1290 (Hicri).
[293] See Chapter 4 for the details on the relationship among refugees, native population and the land regime.
[294]As the state discussed the situation; BOA, ŞD.2402/29, 1289 (Hicri) and ŞD. 2419/6, 1295 (Hicri).

pasture which had once been used equally between the two parties, and the lands reclaimed by the Gemrenid peasants. The peasants reclaimed a total of 515 dönüm of land and took the necessary title deed. They were using part of this land to grow grain and leaving other parts lie fallow to sow with maize.[295] This is important to show how the peasants used the plots as well as the agricultural methods. In other words, the peasants were sowing grain on the available lands and cultivating maize on fallow lands. But the availability of common meadows had not forced them to use fallow lands for intensively harvesting maize. Despite these small bits of information, unfortunately we do not have enough details on how the Mihaliç peasants used land; information we do have only point to how they used fallow lands and how they rotated the crops on the plots.

Nonetheless we know that the peasants continued to claim their right on the commons. The peasants from Rünkuş village said that their reclaimed lands and parts of the common were seized by İlyas Bey and tax-farmers (most of whom were sheep merchants) through an unlawful deed. Some peasants sold their lands to İlyas Bey which extended the borders of the çiftlik. The peasants said that when İlyas Bey bought the çiftlik around 1900, the common pasture on which both parties had equal rights began to be gradually seized by Bekir Ağa, the tax-farmer of İlyas Bey. Around 1000 sheep were grazing on the common (including the sheep of the çiftlik and also sheep of some sub-contractors) thus no more space was left for the animals of the peasants. Peasants claimed that İlyas Bey extended the animal grazing area by seizing the lands of the refugees when they were driven out from the lands. In this way, land for the çiftlik was mostly reserved for sheep grazing, the cultivated lands of the peasants were threatened by animal attacks. The peasants claimed that they

[295]BOA, DH.H. 30/7, 1325 (Rumi).

were even forced to pay a pasture fee to graze their animals on the commons which had once been theirs.[296] It was decided finally that only grazing on the commons could be fixed according to the Land Code, but the tax-farmers could not be precluded from sheep grazing within their land.

In some cases, the tax-farmers in the çiftlik who were responsible for all these illegalities, were accused. The çiftlik-holder claimed that he was an absentee land-holder and therefore was not informed of these illegalities. In the case of Germekir village, the çiftlik-holder Mustafa Paşa leased out his çiftlik to a certain İbrahim, who subleased it to sheep merchants who then seized the commons between the village and the çiftlik.[297] The villagers opposed this and one peasant was killed in the dispute. Mustafa Paşa claimed that he was not informed of such an illegal move and ordered İbrahim to remove the sheep merchant immediately. However, the case continued as İbrahim claimed that it was the peasants – not the sheep merchant – who attempted to seize lands from the pasture of çiftlik and had harmed the sheep belonging to the çiftlik.[298] He petitioned for the peasants to be precluded from attacking their pastures.

It was not only sheep merchants who held çiftliks. With the increasing need for horses herdsmen also began to hold çiftliks in the Mihaliç region, as underlined by the Agricultural Inspectorate of Karesi Province.[299] He mentioned that Albanian herdsmen were holding çiftliks in the region where they were both raising sheep and breeding Albanian horses[300] which were perfect for harnessing the new English iron plough. For this reason, the çiftlik-holders of the region bought these horses in great

[296]BOA, ŞD.1606/35, 1325 (Rumi).
[297]BOA, BEO. AYN.d. 881/256, 1289 (Hicri).
[298]BOA, BEO. AYN.d. 881/268, 1291 (Hicri).
[299]Umur-ı Nafia, 4. Sene (4), haziran 1303, p.123.
[300]Şaban Yalazı tells in his article how the Rumelian refugees, like these Albanian herdsmen, brought sheep flocks from Macedonia and rented large pastures in order to graze them. These sheep flocks were solt in the local market; Yalazı, "Karacabey'in Eski-Eskimeyen Yüzleri", 27.

quantity. With the introduction of iron ploughs, horses were more in demand than the ox, for the former was quicker and could work longer than the latter.[301] In this respect, animal husbandry became more specialized in the çiftliks. The introduction of these new agricultural implements, such as the iron plough, went hand in hand with formations of çiftliks.

At the end of the 19th century, due to these circumstances, grain production in the region continued to be at a low level compared to the previous years.[302] Thus the state found itself in a dilemma. On the one hand cutting the source of income from sheep breeding, and on the other hand increasing grain production by preventing the arable lands from being turned into meadows, by putting the lands that had not been cultivated for more than three years up for sale.

3.2.4 A dilemma in policy: taxing sheep merchants or increasing grain cultivation?

The extension and the formation of new çiftliks, as well as expansion of meadows at the expense of arable lands caught the attention of central government. It was at this time that they were at a critical stage of losing a most important grain supplier. Beginning from the1870s the trend of turning arable lands into meadows within the framework of the Land Code began to be discussed among various departments of government.[303]

Local governments were motivated to petition the central government when they saw that arable lands were not being cultivated and that, instead, they were being turned into meadows, which were then rented out to sheep merchants. The

[301]Mazoyer& Roudart,*Dünya Tarım Tarihi: Neolitik Çağdan Günümüzdeki Krize*, 311.
[302]BOA, ŞD.2419/6, 1294 (Hicri); BOA, ŞD.2428/31, 1295 (Hicri); the region was from among the grain exporters to Constantinople through Bandırma port during 1860s; Sandison, "Report by Mr. Consul Sandison on the Trade &c. Of Brussa for the year 1861", 349
[303]BOA, ŞD.2398/25, 1288 (Hicri); ŞD.2402/13, 1288 (Hicri); ŞD.2402/29, 1289 (Hicri); İ. KAN.1/10, 1308 (Hicri).

issue revolved around what to do with the arable lands within the boundaries of the çiftlik.[304] The issue was debated among the *Meşihat*, *Defter-i Hakani*, Finance Ministry and Council of State (*Şura-yı Devlet*). These institutions continued the discussion framed by the dilemma of maintaining grain production, the issue of çiftliks and their legal status (i.e. private property or not, thus to what extent could the government interfere with the economic activity on these lands), and not cutting the income from sheep breeding for Istanbul (which was in need for meat which supplied mostly from the Balkans and from Mihaliç). On January 9th 1879, the Finance Ministry sent a sample of the report to Şura-yı Devlet and underlined that such a shift from grain cultivation to sheep breeding was because the land-holders where generating more profit from sheep breeding than grain cultivation.[305] It seems as though the thinking at that time would be to not to cut off this source of income, but to find some ways to tax this income, which would in turn benefit the treasury. Taxing this income meant that while central treasury would benefit from this business and Istanbul would be provisioned by sheep supply, at the same time there would be achieved a sort of control over the land-holders through taxing. But the dilemma derived from that the rulers could not totally side with landholders at the expense of small peasantry, which would cause landholders to stiffen their power more than it was desired. Thus, the dilemma of rulers who stood in between the landholders and small peasants continued throughout the 19th century and so directed the central policies.[306]

A case in Mihaliç serves as an example within the bounds of this discussion. The previously discussed case between Germekir village and Mustafa Paşa's çiftlik

[304]BOA, ŞD.2398/25, 1288 (Hicri); ŞD.2402/13, 1288 (Hicri); ŞD.2402/29, 1289 (Hicri).
[305]BOA, ŞD. 2419/6, 1296 (Hicri).
[306] The policies on refugees which is discussed in Chapter 4 is also part of dilemma; see Chapter 4 for detailed discussion.

was reference point in this debate. Some arable lands of the çiftlik belonging to Mustafa and Hasib Paşa in Mihaliç had been rented as meadows to sheep merchants. The discussion began when the Bursa governor petitioned the Ministry of Interior asking whether this land was open to resale (*müstehakk-ı tapu)* as the land rented out remained non-cultivated for more than three years. As a result of discussions among Meşihat, Ministry of Interior and Ministry of Finance, it was decided that the grass on these lands would be taxed annually when the local governor claimed that it was an excellent source of income for Mihaliç and that he didn't want to cause harm to both the landholders and the treasury.[307]

In this way, though the grain cultivation was in a state of decline and sheep breeding was increasing, the Ministry of Finance seemed to legitimize this economy and found a way to benefit. As the central treasury began to benefit more from this business, the government started becoming increasingly preoccupied with the living conditions of the animals, as well as the animals' diseases. The Sublime Porte interfered into this realm through applying scientific knowledge. In this case, this was through veterinarians.[308] It was aimed to eliminate animal diseases and to enhance the conditions of animals as income generating units. The intention was to ensure, to control and to increase the income through veterinarians and scientific knowledge.[309] But of course, this does not mean that veterinarians could achieve total control on the conditions of animals. At the beginning of the 20th century, according to claims of a military official, improvement in animal living conditions was not known even to the çiftlik-holders who were raising considerable number of sheep.[310]

[307]BOA, ŞD. 2419/6, 1296 (Hicri)
[308]BOA, BEO. 216/16175, 1309 (Rumi).
[309]For a detailed discussion on the ways of using scientific knowledge as part of central agricultural policy see chapter 5.
[310]Birgül & Çanaklı, *Cenubi Marmara Havzası*,186.

In Mihaliç, the appearance of larger and new çiftliks to host larger sheep flocks was brought about by shifts in geographical conditions and the climatic features of the 19th century. Because of all these factors, the scale tipped toward sheep breeding over grain production. During the middle of the century, large estate holders pushed the limits in order to create suitable places for sheep breeding. The small peasants, who had lost their rights on commons, used their agricultural knowledge and took advantage of silk-raising, linseed growing, or melon cultivation. By changing their agricultural knowledge and practices, the peasants tried to recreate a balance to the environmental and market conditions. However, the struggle for land and the indebtedness of the peasants caused their subsequent dispossession. Nevertheless the çiftliks, with the availability of agricultural machines, could produce more grain with less labor force. For instance in 1902 Balıklı Çiftliği produced more grain than it did in the 1850s thanks to the availability of agricultural machines and increased number of horses for these machines.[311]

While such a change was taking place in Mihaliç, the situation had been entirely different in Bursa since the beginning of the 19th century. The geographical conditions, climate (more suitable for mulberry gardens), land/labor ratio and market conditions gave different shape to land regime and agricultural knowledge in Bursa.

3.3 Bursa: crop diversification, intensification and increase in cloverlands

Bursa did not have as much pasture lands[312] as Mihaliç. This difference in geographical conditions created a different organization between animal husbandry and crop cultivation. In the 16th century nearly every village had pasture lands,

[311]BOA, Y.MTV. 227/06, 1318 (Rumi).
[312]There were some small and scattered pastures that I encountered in the several documents; in the plain in Karaman, Hamidler and Baladiyunus there were pastures which were controlled and managed by different vakıfs; BOA, Ev.d. 10147, 1251 (Hicri).

though at the beginning of the 19th century the pastures fell short of meeting the need for grazing animals. The possible reasons for this included a decrease in the amount of pastures due to environmental changes (such as expanding swamps) or a growing demand in animal grazing, the extension of mulberry plantations, changing crop cultivation and the population increase. In the absence of vast common pastures, peasants used the fallow lands more intensively and benefited from manure. In addition to the fallow lands, the existence and an increase in clover lands through the mid-19th century point to another way in which grazing needs were met. Instead of non-fallow practices, these methods represent the response of land-holders to the need of animal grazing, which has the potential of evolving to non-fallow systems. Furthermore, although sheep breeding was an important branch of production in Bursa, silkraising took the precedence especially in the 19th century. Mulberry gardens spread throughout the Bursa Plain as witnessed by several travelers.[313] The gardens were also put into intensive usage as arable lands where peasants would cultivate some crops and graze animals. In this environment of production, the çiftliks in Bursa were not as widespread as in Mihaliç. Environmental and market conditions did not trigger formations of large çiftliks in Bursa like they did in Mihaliç. By adapting to their natural environment, small peasantry developed and benefited from a combination of animal breeding, summer crop cultivation, extending mulberry plantations and rice cultivation. At the end of the 19th century, unlike in Mihaliç, the çiftliks were in the minority and small peasantry was in majority in Bursa.

[313]For detailed information on mulberry gardens and silkworm raising look at Chapter 6.

3.3.1 From 16th until the mid- 19th century

In the 16th century, most of the villages were paying meadow tax and sometimes an additional pasture tax.[314] It would seem that they had enough grazing areas, alongside crop cultivation. In the 17th century Evliya Çelebi also talked about green meadows in Bursa, when referring to the Kite region which was famous for its green meadows.[315] However, at the beginning of the 19th century, complaints arose about insufficient pastures and meadows that had been supported through the intensive usages of fallow lands as grazing areas.

At the beginning of the 19th century, two new crops were introduced in Bursa; broad bean (*bakla*) and maize which were not yet existent in the 16th century.[316] Broad bean increases productivity of the land, when it is rotated with grain crops.[317] However, it seems that it was cultivated as a winter crop, which indicates that it was not put into rotation with wheat. Yet, wheat - which is a nutritious crop for both human and livestock – is equally important for animal

[314]Barkan& Meriçli, *Hüdavendigar Livası Tahrir Defterleri*; pp.1-80, and İnalcık, "Osmanlı İdari, Sosyal ve Ekonomik Tarihiyle İlgili Belgeler: Bursa Kadı Sicillerinden Seçmeler", pp.151-2.
[315] Karateke, *Evliya Çelebi's Journey from Bursa to the Dardanells*, 11.
[316]BOA, Ev.d. 10675, 1254 (Hicri) and Ev.d. 10263, 1254 (Hicri). Huricihan İslamoğlu and Sureiya Faroqhi follows the cultivation of broad bean back into the 16th century as a way of intensive use of land in response to population increase; İslamoğlu& Faroqhi, "Crop Patterns and Agricultural Production Trends in the Sixteenth Century Anatolia". I did not see broad bean in the 16th century in the Barkan's book, yet even if I assume that it was introduced sometime between the end of 16th and the 19th century, I have doubts to intrepret the cultivation of broad bean as legiminous crop in the sense that it was used in non-fallow systems. Initiated with the teachings of advanced methods and the presence of some crops İslamoğlu and Faroqhi might have overlooked the local use of the legiminous crops. Their presence does not necessarily mean that they used for intensive rotation as it did in non-fallow systems. I should thank to Socrates Petmezas for reminding me that in order to assume that they are used in intensive crop rotation we should look at the amount of harvest of the legiminous crops. Similarly as I will show below, the presence of clover does not indicate a non-fallow intensive use of lands.
[317]Mazoyer discusses how the increase in broad bean cultivation replaced the fallow systems, and enabled the introduction of non-fallow systems by increasing productivity of the grain. And as a nutritious crops for animals it also increased the power of the draught animals and enabled the cultivation of larger lands; Mazoyer &Roudart, *Dünya Tarım Tarihi*, 369. In our case, I do not have any signs for non-fallow systems, yet we can interpret the situation as a strong potential to turn into non-fallow systems.

breeding.[318] In the absence of grazing areas the peasants might have given more weight to cultivating broad bean on the available lands to feed their animals.

In addition to broad beans, maize was also cultivated at the beginning of the 19th century. It is a spring crop which needs large amount of water during its ripening period. We can see consecutive maize cultivation in 1835/6, 1837/8 and 1838/9 alongside the watered area on the plains.[319] Using the fallow lands and its weeds for grazing purposes, they benefited from the wetlands as maize cultivating plots.[320] This was necessary for the peasants in small villages, whereas the çiftliks could still reserve some amount of land for grazing.[321] Paşa Çiftliği which was within the borders of Çekirge Nahiye, was no longer a de facto çiftlik in the 19th century.[322] Some out of 17 plots of miri lands were left to fallow, and the peasants grazed their sheep on the fallow lands.[323] Located on the wetland, there were cultivated grain crops (wheat, barley, millet, rye, tare), chickpea, broad bean and maize in addition to market garden.[324]

A similar usage of fallow lands can be seen in another document in which a certain Mehmed Emin Efendi filed suits against tax-farmer Mustafa Efendi in 1802 in Bursa. [325] In the case, Mehmed Emin Efendi said that he rented the usage rights of the 'gelembe' (weed grown on the fallow land and was grazed by the herds) of his

[318]For instance in Balıklı Çifltik, the animals were fed with vetch when bitter vetch fell short of feding them; BOA, D.BŞM.d. 9970, 1248 (Hicri).
[319]BOA, Ev.d.10147, 1251 (Hicri); Ev.d.10675, 1253 (Hicri) and Ev.d.10273, 1254 (Hicri). In Imrod, Paşa Çiftliği, Izvat and Çeltik villages we see maize cultivation in 1251 and 1254. In neighboring Baladiyunus village maize was not cultivated in 1251, while there was maize harvest in 1254.
[320]Mazoyer and Roudart say in their book that fallow lands were not abandoned lands; instead they were non-cultivated lands during some months or years-depending on the cultivation method- for the purpose of grazing. Fallow begins with the harvest in the mid-summer and lasts until the next sowing season. Yet, it was not left on its own; it was tilled with plough regularly and used as ley; Mazoyer &Roudart, *Dünya Tarım Tarihi*, 271.
[321]For instance in Derviş Paşa's çiftlik in Panayır village, it was cultivated maize and apart from that some meadow lands was reserved for grazing; BOA, Ev.d. 10675, 1253 (Hicri).
[322] Probably it used to be a çiftlik in the past, but at that period, it became like a village that was cultivated by small peasants.
[323]BOA, C.EV.377/19136, 1226 (Hicri).
[324]BOA, EV.d. 10273, 1254 (Hicri).
[325]BOA, C.EV.62/3082, 1216 (Hicri).

çiftlik and of the nearby lands in Dudaklı village, and the lands belonging to Gülruc Sultan Vakıf. He said that he gained this right from the beginning of ruz-ı kasım of the year 1801 until the ruz-ı hızır of 1802. The sheep were able to graze the weeds and drink the water on the land from approximately November until June. This case in particular provides us with clues as how the land was used. If Mehmet Efendi had the right to use the gelembe from November until June, the peasants must have been leaving one plot to fallow at least in one agricultural year.

Concerning the methods used, we can posit here that in the absence of common pastures, bushes and non-arable land remained insufficient to meet the grazing needs; during the year, fallow lands were used for animal grazing. Then when the time for cultivating spring crops had arrived, the animals might have moved to other plots to graze on the stubble of grain harvest. In this way, the fallow lands were manured with animal dung. The details of the methods at that point are unclear, however what is certain is that the unavailability of permanent pastures had forced the peasants to use fallow lands as animal grazing areas. An increase in mulberry gardens especially at the beginning of the 19th century, brought about further usages of these mulberry gardens; arable mulberry gardens were used to cultivate other various crops and graze animals.

Michael Palairet establishes a relationship between fallow lands and animal breeding in Serbia, which perpetuated an agrarian method based on fallow land, until more proper methods were found to graze animal flocks.[326] As for Bursa, in the absence of common large pastures, fallow lands and later the arable mulberry gardens were used for grazing purposes. The collective mechanisms in the villages should also be considered as collective harvest and cultivation might have prevented

[326]Palairet, *The Balkan Economies c. 1800-1914: Evolution without Development*.

the introduction of a crop that had a later harvest season. In such cases, grazing the animals on the stubble prevented the cultivation of maize on the fallow land and harvest in some cases which might have directed the peasants to benefit from the lands in different ways.[327]

3.3.2 The middle of the 19th century

In the middle of the 19th century there was an increasing demand for silk worms, different uses of mulberry gardens, a slow spread of clover lands and an increasing need for grazing area.

In the mid-19th century, when sheep breeding encouraged the use of large land tracts and usurped the commons in Mihaliç, there is a different change taking place in Bursa. The usage of fallow lands as grazing places continued through to the middle of the 19th century, as pointed out by Charles McFarlane. Yet, he mentioned that the peasants did not know proper rotation. As fields contracted due to spreading marshlands, he depicted the agricultural method of the peasants on the Bursa plain as sowing the land "one year with Indian corn [wheat], or with melons, gourds and etc. if the field can be watered, or lies in low damp ground, and if the ground is dry and cannot be easily watered, they sow lentils and sesame; next year they sow the field with winter wheat; the third year they sow it with rye or oats and the fourth they leave it to fallow".[328] On hilly lands, the peasants harvest wheat from one field and then left it to fallow for one or two years.[329] It is interesting that maize is not part of

[327]Ziraat Gazetesi, 2. Sene (7), 29 zilkade 1299, 79, it is claimed that because in some villages the animals were grazed on the harvest lands, the peasants of the village could not attempt to cultivate maize or potato, as it conflicted with the grazing periods. In a similar vein, in a monography on Nilüfer village in Bursa plain, the peasants talk about the collective harvest and cultivation which was organized by village steward; Kaplanoğlu, *Bursa Osmangazi İlçesiÇağlayan ve Nilüfer Köyleri*, 217. In such circumstances, if maize was cultivated using fallow lands for animal grazing appeared as a need in the borders of wetlands on Bursa plain.
[328]McFarlane, *Turkey and Its Destiny, vol. I*, 369-70.
[329]McFarlane, *Turkey and Its Destiny, vol. I*, 370.

this cycle, which was a widespread crop on the plain during that period.[330] Even though MacFarlane mentioned that Bursa peasants did not know proper rotation, it is apparent that they knew rotation, but being biased, he was probably searching for a non-fallow rotation with fodder crops such as lucerne, sainfoin or clover like in Britain during that period. The peasants, however, used fallow lands for grazing purposes. The basic intention behind the non-fallow systems was to increase the grain yields, but as McFarlane mentioned due to the high cost of transportation, small peasants were not eager to use their land intensively, instead they were engaging in subsistence farming.[331]

For that reason, according to Charles McFarlane, it was the çiftlik-holders who were the motors of agrarian change, not the small farmers who were burdened either by heavy taxes or by heavy carriage expenses. One of these çiftlik-holders was John, Sandison's brother in-law, and he was the holder of the çiftlik in Hacı İvaz village. He began to cultivate turnips and potatoes, alongside maize and melon. He brought two English ploughs to the çiftlik[332] and tried to spread potato cultivation throughout the Bursa plain as its sandy soil was perfect for potato cultivation. In spreading potato cultivation John became relatively successful, but turnips did not attract much attention from the Bursa peasants. [333]

However, in the Bursa countryside, due to the local environmental and market conditions agricultural methods and practices changed differently from the intensive crop rotation with non-fallow systems like in Britain. It was not only John who cultivated maize - nearly all of the plain villagers on the wetlands were sowing

[330]BOA,Ev.d. 10263, 1254 (Hicri).
[331] MacFarlane and in a similar vein Sandison talking about the rugged roads making the transportation of wheat from interior villages hard and expensive; Farley, *The Resources of Turkey*, 110.
[332]McFarlane, *Turkey and Its Destiny, vol. I*, 150,152.
[333]Even at the end of the 19th century potato and turnip were still mentioned ascrops for domestic consumption and claimed that their use as legminous crops for non-fallow methods were not much spread, *Salname-i Hüdavendigar*, 1325, 302.

maize. The çiftlik-holders generously left larger fields to fallow, compared to small peasantry who had far smaller plots to cultivate. Additionally, for the Bursa countryside, agricultural methods are always seen in combination with the grazing needs of livestock. Grazing needs were met by using fallow lands, mulberry gardens, clover lands, swamps and also private meadows.[334]

The middle of the 19th century was the climax of both domestic and foreign silkworm demand. It was not the sheep that seized the vast common pastures like in Mihaliç[335], but it was silkworms that spread through common pastures and narrowed space for animals, as witnessed by Vassaf. [336] In Temettuat defters, it is apparent that in every village each peasant had either big or small mulberry gardens. The increase in mulberry gardens and the scarcity of grazing areas brought about an original use of gardens. The demand for sheep breeding attracted the attention of butchers and drove them to feed relatively smaller flocks to the best of the geographical conditions of Bursa. The peasants certainly needed some grazing areas for their draft animals. These conditions created an arrangement between mulberry gardens and grazing places driven by the existing land regime.

In Dikencik village, there were arable mulberry gardens where both multiple crops were cultivated and animals were grazed.[337] A certain Salih Efendi who was a resident in Bursa city center and from among çiftlik-holders (meaning he was an absentee land-holder) had thirty dönüms arable (*sabangir*) mulberry garden, from which he also had an income from herdsmen. As resident in Bursa, Salih Efendi

[334]In Balıklı village a certain şeyh refet efendi son of bahaeddin has 600 dönüm of private meadow. Out of the meadow he had 300 kuruş income. Interestingly a certain küçük Mustafa son of ahmed had 200 kuruş income from his 4 dönüm of clover land; BOA, ML. VRD. TMT.d. 7494, 1263 (Hicri). What creates such a big difference remains a question though. To speculate, the reason might be that clover was more valuable in the market than letting the sheep graze in the weeds of the meadow.
[335]Charles Addison talks about huge uncultivated and desolated spaces in the eastern part of Mihaliç, which were used as pastures in his journey from Bursa to Mihaliç; Addison, *Damascus and Palmyra*, 169,70.
[336]Mulberry trees on Atıcılar pasture which was spreading at that time, Vassaf, *Bursa Hatırası*, 104.
[337]BOA, ML.VRD.TMT.d. 7493, 1263 (Hicri).

turned his entire arable land into mulberry garden. As an absentee landlord, he reserved all of his lands into income generating economic activities. Dikencik village belonged to the Koca Mustafa Paşa Vakıf. While the land was owned by this vakıf, the trees were property (*mülk*) of the holder, according to the Land Code. Faruk Tabak said that such a usage of the land was due to the holder's expectation to gain the right of property.[338] The lands could be used as de facto private property, since vakıfs were the owners. However, the lands could not be turned into de jure private property. For that reason, this was rather a solution within the existing land and property regime in Bursa where there was not much opportunity for extending the arable area.[339] This solution was widespread in the Bursa countryside in response to increasing silkworm demand and the need for grazing areas (further driven by increasing sheep demand). In this way, the vakıf also benefited from the income in the form of taxes, therefore it was a win-win scenario in ideal conditions.

Dikencik village was not the only village where we see arable mulberry gardens, there were also arable mulberry gardens in Hacı İvaz [340] and Balıklı village.[341] These gardens were put into multiple crop cultivation which differed according to the needs of the village. In Balıklı for instance a certain Şahinzade Salih son of İsmail cultivated twenty dönüm vegetables within forty dönüms of arable mulberry gardens.[342]

[338]Tabak, *Solan Akdeniz*, 316.
[339]Of course there were lots of cases for opening new lands; BOA, Ev.d. 10147, 1251 (Hicri); Ev.d. 13220, 1263 (Hicri); Ev.d. 21475, 1286 (Hicri); Ev.d. 23217, 1290 (Hicri). But stil, the opened lands did not exceed maximum 500 dönüm lands (there was only one case like this in Çeltik village by Mollazade brothers; Ev.d. 10147, 1251 (Hicri), other cases did not exceed maximum 100 dönüm). Furthermore, because those lands were registered as arable lands, they cannot be used for grazing. Thus, the vakıf property regime also induced such an organization between arable mulberry gardens and animal breeding.
[340]BOA, ML.VRD.TMT.d. 7437, 1263 (Hicri).
[341] This is a village lying at the middle of the plain, certainly different from Balıklı Çifltik in Mihaliç; BOA, ML. VRD. TMT.d. 7494, 1263 (Hicri).
[342]BOA, ML. VRD. TMT.d. 7494, 1263 (Hicri).

In addition to arable mulberry gardens, clover gardens were also important for the land regime and how the lands were used. In Dikencik village, as mentioned previously, Salih held eighteen dönüms of clover land.[343] In the same village a certain Osman also held one dönüm clover land. We should mention that clover lands in Dikencik village were not new to the 19th century but existed in the 16th century.[344] Since in the 19th century, however, they began to spread to other villages, to Izvat, Soğanlı, Samanlı, Hacı İvaz and Balıklı which did not have clover lands in the 16th century.[345] In Balıklı village for instance household number one, household number sixteen and number eighteen had clover lands ranging from two to four dönüms, from which they were able to get an income.[346] The clovers were either sold at the market, or the land was completely reserved for grazing livestock, mostly sheep.[347] Yet, according to Charles McFarlane, the sheep were in a miserable state, and most of them would die in the coming winter.[348]

The creation of clover lands had another importance for the land regime in Bursa. These arable lands were not permitted to be turned into pastures.[349] Clover lands constituted as a transitional category in which the holders would benefit from animal husbandry without changing the legal status of land.[350] Still whatever the

[343]Vasıta-I Servet, vol. 2(7), 1 mayıs 304, p. 112. It is claimed that large flocks of sheep and lambs were sent to clover lands in april or may. In the Temettuat defter, we see this Salih Efendi had income from his clover land in 1260 and 1261; he might have rented the land for directly grazing or he might have sold the clovers in the market as we see cases in newspaper; Bursa Gazetesi 1. sene (26), 16 mayıs 1307, p.2.
[344]Barkan & Meriçli, *Hüdavendigar Livası Tahrir Defterleri*, 54.
[345]As we see in Temettuat Defters, BOA, ML.VRD.TMT.d.7549 (Izvat); 7437 (Hacı İvaz); 7437 (Samanlı); 7433 (Soğanlı), 7494 (Balıklı)
[346]BOA, ML. VRD. TMT.d. 7494, 1232 (Hicri).
[347] The period of grazing on the clover is april or may, because grazing must be just before the reaping when the clover gets dry on the soil. Fresh clover was an over-nutrious fodder for the animals, and was harmful for the animals to feed. Thus, usually it is preferred to feed them with the reaped clover or with dry clovers just before reaping.
[348]MacFarlane, *Turkey and Its Destiny, vol.I*, 372.
[349]Bursa Gazetesi, 1. Sene (20), 1 nisan 1307, p.4.
[350]In Bursa newspaper, this issue of legal status of lands was also discussed; Bursa Gazetesi, 1. Sene (20), 1 nisan 1307, p.4.

holders would sow on the land was not free from power struggles among tax-farmers, vakıf land-holders and peasant cultivators.

In a different case in Fildar village, the tax-farmer would have the peasants plant mulberry trees on the lands.[351] Lands in Fildar village belonged to Orhangazi vakıf and it had been stated that tax-farmers were not authorized to give this permission to plant the trees; the peasants could not plant anything without the permission of the *sahib-i arz*. It was then ordered by the vakıf that, if the trees did not bear fruit, they had to be uprooted, and if they did bear fruit, the tithe of the fruits had to be collected as tax. As the experts arrived at the village, they reported that trees were planted only on small parcel of land- 22.5 dönüms out of 142 dönüms- and these did not bear fruit. On the remaining 119.5 dönüms of land the peasants continued their cultivation. The final decision was to uproot the trees which did not yet bear fruit, after the peasants promised not to plant trees on the vakıf lands. Here it seems that the vakıf did not give permission to plant trees that were planted by the tax-farmer to prevent any claim on the land. Yet, any permission from ordinary peasants could be approved. For instance, in 1174, in Su Sığırlık village (the land of which belonged to Vani Mehmet Efendi vakıf) a certain Rüstem oğlu was unable to receive harvest from his land, and he asked for permission to plant mulberry trees on his own property on the vakıf land.[352] In cases where no powerful group existed vakıfs would allow for someone to plant trees. In the former case, the tax-farmer might have claimed all of the village land, but in the latter case, it was only one peasant, and not the whole village.

[351]BOA, C.İKTS.20/981, 1255 (Hicri).
[352]Vakıflar Genel Müdürlüğü, İbrahim Hakkı Konyalı Kütüphanesi, no. 3516, 15 ra 1174 (Hicri).

The 1860s were the heydays of silkworm production, which unfortunately ended with a world-wide disease.[353] Beginning from the 1860s peasants began to cut down the mulberry trees and turn their gardens into arable lands.[354] There were approximately twenty years of crisis in silkworm production, but Bursa recovered in the middle of 1870s.[355]This coincided with a greater need for land for food cultivation due to the increase in population.

3.3.3 End of the 19th century: spread of clover lands, tenser relationship between animal husbandry and agriculture

The yearbook mentioned that the fallow lands in Bursa had been used as grazing fields for a long time, because there were not enough pasture lands.[356] The rotation was depicted as follows: each year, one-third of the arable field was left to fallow, because the land in Bursa Plain and Kite region was scarce compared to the population.[357] The provincial Yearbook (*Salname*) of Hüdavendigar depicted the general trend in production methods and how the land was used as the following: the entire arable field was divided into two; the first part was sown with winter crops like wheat, barley, rye, oat or broad bean; the second part was sown with summer crops like market garden (*bostan*), maize or sesame which were all called fallow (*nadas*). The remaining third part of meadows and non-arable lands such as bushes had been left alone for animal grazing back then. Refik Ziya clarified the rotation between fallow and summer crops by observing the land usage in Keles village in 1930s: "The lands were left to fallow once in two years in two different ways; one way was

[353]To get more information on silkworm production see Chapter 6.
[354]*Salname-i Hüdavendigar*, 1325, 260. for instance the villages in Atranos, whose coccoons were once famous as "*dağ kozası*", turned almost into grain cultivation and cacoon production came nearly to an end, BTSO, *Bursa Ticaret Odası İlk Karar Defteri (1884-1890)*, 137.
[355]BOA, BEO. AYN.d. 878, 1286 (Hicri).
[356]*Salnamei Hüdavendigar*, 1301, 254.
[357]*Salnamei Hüdavendigar*, 1301, 254.

tilling the *sole* [plot] that lies far from the village with plough and leaving it to fallow, the other was sowing the *sole* that was located close to the village center with maize, chickpea, aniseed or bitter vetch and turn the *sole* into fallow land after the harvest."[358] What should be underlined here is that the tracts of lands close to the village were used in a more intensive way, while the *sole* far from the village was put into a simpler rotation. The plots were left to fallow either after harvesting spring crops or without sowing any spring crop.

While the population was growing particularly with the refugees from around the Balkans and Caucasus, the bushes (*çalılık*) and margins of forests began to be put under cultivation.[359] The government encouraged reclaiming the bushes where livestock had been grazed for the formation of mostly mulberry gardens.[360] This was of course not free from land disputes.[361] The increase in both population and demand for sheep went hand in hand with a recovery of silkworm production, cocoon production, and a re-spreading of mulberry gardens. The peasants around Bursa were concerned again with silkworms[362], so 30,000,000 mulberry trees were planted in Bursa and surrounding districts between 1890 and 1894.[363] By that time they even began to seek quicker ways of harvesting the mulberry gardens.[364] In these circumstances when the land was under direct pressure from mulberry gardens, the

[358]Ziya, "Bursa'nın Keles Köyü", 237.
[359]*Salname-i Hüdavendigar*, 1301, 255. For detailed knowledge on how the forest lands were turned into fields look at Chapter 4.
[360]*Salname-i Hüdavendigar*, 1301, 255
[361] Land clearances and the extension of the newly formed villages brought about several disputes on lands, Hüseyin Ortaç talks about the struggles on land between Fehim Paşa and Fethiye villagers who opened up lands from forests; Ortaç, *Bursa Köyleri*, 39. For detailed information in land disputes and opening up lands from forests in Bursa look at Chapter 4.
[362]Vassaf, *Bursa Hatırası,*103.
[363]Günaydın & Kaplanoğlu, "Paul Lindau", 212. It was not just the number for Bursa, surrounding Gemlik, İzmit, Bilecik districts were also famous for silkworm production.
[364]The çiftlik-holders in Bursa began to adopt such new machines which were drafted by horses at the middle of the 1860s, BOA, MVL.646/84, 1279 (Hicri); and in the recovery period it seems that rich çiftlik-holders were obtaining such implements in an increasing degree; Magmumi, *Bir Osmanlı Doktorunun Anıları*, 87. But the problem is it was impossible to repair the broken machines, and when the machines broke harvest remain outside and rot, thus most of the çiftlik-holders continued to hire laborers;Magmumi, *Bir Osmanlı Doktorunun Anıları*, 89.

population increase and sheep grazing, the newspapers were full of complaints of sheep eating the crops and mulberry leaves.[365] There were more complaints than before about grazing livestock in gardens, which was an age-old custom in Bursa. The farmers were asking the local government to employ keepers (*korucu*) to watch and to control the shepherds who were accused of ignoring the animals' attacks on the crops and leaves in the gardens. In ideal cases, sheep and other stock animals were entrusted to the shepherds and herdsmen, thereby preventing an attack on the fields, narrated by the Greek teacher of Görükle village.[366] He said that it was forbidden to graze sheep separately; all of the animals needed to have been entrusted to the shepherd who was hired by al the flock-holders in the village. Generally until the mid-december sheep were being grazed on the pastures and on the fields of those who previously had made deals with shepherds.

As mentioned before, in addition to arable mulberry gardens where animals were grazed, there were also clover lands which were also created as part of this need for grazing areas. In the report in the provincial yearbook of 1908, Torkomyan claimed that clover lands had been increasing for the last few years especially on plain lands where water was available.[367] He mentioned these clover lands were artificial meadows (*suni çayır*). Clover lands were not new to Bursa due to the needs for grazing livestock, and it is in this respect it is doubtful to call them artificial meadows. In his report, Torkomyan searched for something resembling the non-fallow systems in which artificial meadows were sown with fodder crops and put into crop rotation. Yet, artificial meadows were needed mostly in places where watering

[365]Bursa, 1. Sene(15), 21 şubat 1306/24 receb 1308, p.1 and no.18, 14 mart 1306/ 16 şaban 1308, p. 1; in March butchers let the sheep grazing on gardens; it was complained that although grazing the sheep on gardens was an age-old custom in Bursa, now they were eating mulberry leaves and harm mulberry trees and also other crops, which were ignored by the shepherds.
[366]Kılıç& Ulutaş, *Bir Mübadele Köyü Görükleve Nilüfer Belediyesi Mübadele Evi*, 36.
[367]*Salname-i Hüdavendigar*, 1325, 299, 305. Water was necessary for cultivating gren clover seed; Umur-ı Nafia ve Ticaret Mecmuası, 4. Sene (4), haziran 1303, p. 128.

was not possible. On the contrary, in Bursa, these lands were formed on the wetland, as he claimed. Furthermore, it is doubtful that the peasants put clover lands into crop rotation. There are more reasons to think that clover fields were separate fields that were reserved permanently for grazing, rather than being part of non-fallow systems. The only difference from the past might indeed be an increase in their numbers due to the growing need for grazing livestock. Thus, biased with the non-fallow systems he was familiar with, Torkomyan might have overlooked the local usage of these lands. Meanwhile, the growing demand for silkworms and grazing areas pushed some land-holders to create mulberry gardens and clover lands on the same land, which might have indicated kind of intensive use of land, but not the same kind of use in non-fallow systems like in Britain. In the Hüdavendigar newspaper, due to the holder's debts a sequestrated land in Epçeler village was mentioned as being used both as mulberry garden and clover land.[368] Mulberry trees require water, so do the clover lands. It seems that landowners engaged in animal breeding and other agricultural activity on wetlands to take advantage of opportunities in the market.

Peasants also found different ways of using the marshlands aside from utilizing clover lands and arable mulberry gardens as grazing areas. Although they did not put much effort in draining the marshlands, they developed some other methods. MacFarlane said that because drainage was expensive for the ordinary peasants, only rich farmers attempted any drainage efforts. However, the existing land regime stood as a barrier for both the wealthy farmers and peasants.[369] The main obstacle for the ordinary peasants was the legal dues which they had to pay after draining the marshlands in order to register the land in their name. In other words,

[368]Hüdavendigar, 26. Sene (1629), 8 şubat 1310/15 şevval 1312, p. 4.
[369]Previously a çiftlik-holder in Dudaklı village, İbrahim, made such attempt claiming the half of the reclaimed land, which was rejeceted by the state for not leaving half of the land to him; MacFarlane, *Turkey and Its Destiny, vol. I*, 382. For that reason, the peasants might have not much enthusiastic to drain the swamps, though they found ways to benefit from it.

when they drained the land, they had to get a title deed for which they had to pay a certain amount of money. There always a danger that the government could claim these drained lands. Hence, the most probable explanation is that the peasants opted not to drain the marshlands, yet they still attempted to develop methods to benefit from them. The peasants on the Bursa Plain utilized the marshlands either as meadows or as plots for summer crop cultivation when waters abated, and for rice cultivation on the lands that were submerged underwater. This was also done by çiftlik-holders, particularly around Deliçay that caused marshlands on the eastern side of Bursa city center.[370] As land became much scarcer at the end of the 19th century, the central and local governments attempted carrying out the drainage projects.[371]

While the villages on the plain were struggling to get more fields and seek different ways in using their available plots, the villages on the hills were benefiting from the woodyards to meet their cultivation and grazing needs. Peasants in Gözdere/Gözede village (which was located on the riverside of Nilüfer river on the southern hills of Uludağ) cultivated grain crops, had mulberry gardens, chestnut gardens (*kestane bahçesi*)[372], and their own woodyard (*koruluk*) from which they earned their living by transporting wood. However, as land became scarce they set the woodyards on fire to claim lands.[373] After 9,000 dönüm woodyard was totally devastated, the agricultural officers in Bursa registered these lands as the arable lands of the Gözede villagers. At the end of the 19th century when woodyards were still available, the slash and burn method was widespread among the peasants. This was a method of reclamation of fertile lands that were used for rotating between crops

[370]BOA, A.MKT.MHM.529/18, 1322 (Rumi). For more details on rice cultivation see Chapter 2.
[371]To see the discussion o drainage efforts see Chapter 2.
[372]BOA, MVL. VRD.TMT.d. 7558, 1263 (Hicri).
[373]Bursa, 1. sene (39), 15 ağustos 1307/23 muharrem 1309, p. 2.

cultivation and animal grazing.[374] In 1890 Şerafettin Magmumi claimed that the same method for land reclamation on the lands of the villages lying on the hills of Uludağ.[375] He mentioned that the peasants opened up some lands by burning forest lands in every two year. Because the burned land would lose its fertility within two or three years, re-slashing and re-burning some land appeared to be a necessity. However, several decrees were issued to prohibit reclaiming lands by setting forests on fire, as these forests served as an excellent wood supplier for Istanbul.[376] To what extent the Ottoman government could prevent such a use of forest reclamation is uncertain, but in any event the forests had their natural limits. Whether they had reached such limits or not, the Gözdere peasants developed more intensive methods for their lands at the beginning of the 20th century.[377] They are recorded to have sown three kile seeds per dönüm and had acquired fifteen to twenty kile per dönüm in the harvest. Their major products were barley and maize, which were rotated between each other. They irrigated some parts of their lands and on the lands that were not irrigated they sowed 2.5 kile of barley or one şinik of maize per dönüm. Recognizing the significance of manure, they fertilized lands with the manure of water buffalos or goats. They cultivated the same land every year. Although beans, lentils and broad bean were also cultivated, this harvest was not enough to meet the needs of the peasants.

In 1930 with regards to the whole region Stotz said that "the rich alluvial soils, the abundant irrigation water, and the long growing season enable the peasant to obtain as many as four crops annually. Intertillage is common, and in many places

[374]Look at Mazoyer and Roudart for a perfect criculation between reclaimed lands from woodyards by slash and burn methods and how they used for cultivation and grazing areas in rotation; Mazoyer & Roudart, Dünya Tarım Tarihi,258. Such a usage attarcted the attention of Selahattin İnal in his trip to Uludağ; İnal, *Yeşil Bursa Denizinde İnci Uludağ*, 17-18.
[375]Magmumi, *Bir Osmanlı Doktorunun Anıları*, 73.
[376]For a later document see; BOA, T.533/13, 1326 (Rumi).
[377] Şevki, *Bursa ve Uludağ: Seyyahlara Rehber*.

one finds three or four crops on the land at the same time, in different stages of maturity…"[378]. This is a different picture than MacFarlane depicted in the middle of the century.

In other parts of the Hüdavendigar province, the local governor of Hüdavendigar was still complaining about the inadequate cultivation of some lands and therefore was offering the collective cultivation (*imece*) of the uncultivated lands in villages at the beginning of the 20th century.[379] However, the Finance Ministry did not accept this, because they said that they could not prevent the tax-farmers from claiming tithe from these collectively cultivated lands during the harvest. In this document, it is mentioned that because those lands did not belong to one peasant in the village but to the entire village, the taxfarmer had the right to claim tithe from the harvest.

Several factors including the absence of common pastures, the demand for silkworm and sheep, the need for grain for the increasing population and the scarcity of land pushed the peasants to develop a relationship between animal husbandry and mulberry gardens at the end of the 19th century. Due to the growing demand for silkworm, few common pasture areas in Bursa, began to be occupied by mulberry trees.[380] A tense relationship between animal husbandry and mulberry gardens was inevitable. On the hilly lands of Uludağ, the rich forests were under the threat of slash and burn methods due to the same reason. The availability of the forests enabled the peasants on the hilly lands to continue slash and burn methods. The peasants near the marshlands found ways to benefit from marshlands, either by cultivating rice or organizing usage between animal grazing and summer crops. All

[378]Stotz, "The Bursa Region of Turkey", 93.
[379]BOA, DH.İD. 181/15, 1329 (Rumi).
[380]For instance in Atıcılar lying at the northern side of city, Vassaf who was visiting the city in 1890s says that on the pasture mulberry tres began to be planted; Vassaf, *Bursa Hatırası*, 104.

these various usages were motivated by trying to benefit optimally from the land within the limits of existing land and tax regime, which acquired unique features thanks to the geographical conditions of Bursa.

3.4 Conclusion

This chapter shows how change in both land regime and agricultural knowledge went hand in hand throughout the 19th century. This process was more obvious in Mihaliç than it was in Bursa. There, both the quantity and size of çiftliks increased. At the end of the 19th century economic gains from sheep breeding generated more income than the intensification in agriculture. This stimulated enclosures for sheep breeding even at the expense of declining grain production. Çiftlik-holders encroached upon the commons and the lands of small peasants by allowing animals to eat the crops and through indebtedness (as powerful local people, they also took their part in credit relations[381] and forced the peasants surrender their lands). Marshlands and floods made the lives of çiftlik-holders easier by blurring boundaries, forcing the peasants to make some deals with the çiftlik-holders. In this framework, different departments in the government took various positions. The Finance Ministry, for instance did not care much about the encroachment of commons, and it did not sacrifice the income from sheep breeding which filled the central treasury. The çiftlik-holders were among the power-holders most of whom had power relations with the ruling elites. They must have used their power to take care of these issues. Alongside the marshlands, the geographical features of Mihaliç laid the groundwork for such

[381]BOA, BEO.AYN.d. 881/202, 1290 (Hicri); BEO.AYN.d. 879/1290 (Hicri); BEO.AYN.d. 881/207, 1290 (Hicri). In these documents it is apparent that how local subcontractors kept the peasants in debt and how they established a system within the state; the famous Galip Paşa, holder of Çamandıra Çiftlik, became governor of Hüdavendigar province several times; 1289,1291, 1294, http://bgc.org.tr ; also at a later date we see complaints on murabahacı and creditors, Bursa Gazetesi, 1. Sene (22), 11 nisan 1307/ 14 ramazan 1308, p.2.

change. Huge pasture lands on the Mihaliç Plain were favorable for animal breeding. Furthermore, as the next chapter will discuss, the land/population ratio worked to the benefit of sustaining this land regime. Under these circumstances, small peasantry, either continued to cultivate grain or left their lands to animal grazing either by their own will or by force, or found ways to benefit from the swamps and to live on the margins of the swamps.

Within this land and labor regime, agricultural knowledge and practices changed from grain cultivation to keeping livestock, particularly sheep breeding. As the sheep breeding began to dominate the agrarian economy, the health conditions of sheep began to gain importance. The veterinarians and the scientific knowledge appeared as a perfect instrument to achieve a sort of control on sheep breeding with the claim of preventing animal disease.[382] Of course, the urgency was not just for sheep, the need also included draft animals, but because sheep were imported and exported, an animal quarantine (*tahfizhane*) was established in Mihaliç.[383] In this respect, the need of the local government and the intention of central government overlapped. By claiming to control disease, scientific agricultural knowledge established as the legitimate way to keep the animals in the region.[384]

In the same manner, understanding the land regime in Bursa would help us in comprehending why agricultural knowledge specialized in Mihaliç on animal breeding, whereas in Bursa agricultural knowledge was specified in silkworm and cocoon production. In Bursa things took on a different shape throughout the 19th century. There was no observable formation of large çiftliks, and almost no contraction of commons due to animal grazing, because large common pastures did

[382]BOA, BEO. 216/16175, 1309 (Rumi).
[383] BOA, BEO. 216/16175, 1309 (Rumi).
[384] For the details on the establishment of veterinarians school see Cengiz et al. *120 Yıllık Eğitim Çınarı Halkalı Ziraat Mekteb-i Alisi*. For a detailed discussion on the establisment of scientific knowledge see Chapter 5.

not exist like this in Mihaliç. The custom of using gardens and yards as animal grazing areas (due to the lack of common pastures) gave Bursa agriculture a different character. It was silkworm production not sheep breeding that dominated the Bursa agrarian economy. Since the 17th century, silkworm production had begun to be a significant economic activity for peasants, yet it began spreading all over the countryside at the end of the 18th and the beginning of the 19th century.[385] As the demand for silk increased, mulberry gardens extended all over the Bursa countryside. In these circumstances, the gardens needed to be used as grazing areas more so than before. Because almost all the lands in the Bursa villages were portioned by several vakıfs, and there were not many waste lands, most of the mulberry gardens were created by reserving some parts of arable plots for which water was available, of course with permission from the vakıf based on the property regime. The population/land ratio did not allow for huge land extensions unlike in Mihaliç. The boost in silkworm raising coincided also with the demand for sheep breeding. Although the demand for sheep was mostly met by Mihaliç, butchers in Bursa did not want to lose the opportunity of this income generating economic activity. Clover lands began to be dispersed wherever they were possible for animal grazing. In this way, clover lands and arable mulberry gardens were formed as a way for benefiting from the market conditions within the existing land regime in Bursa. As an additional benefit, manure from sheep droppings was used on these lands, which might have led to increased productivity. In his book, Mauro Ambrossoli claims that change in agricultural knowledge was not by the introduction of new crops in France, but by the introduction of a new usage of already- known *Lucerne*.[386] He mentions that the French peasants knew about Lucerne before, but common grazing rights did not bear

[385]For the history of silkworm production see Dalsar, *Türk Sanayi ve Ticaret Tarihinde İpekçilik*. For adetailed discussion on silkworm production see Chapter 6.
[386]Ambrossoli, *The Wild and the Sown*, 186.

a need for its usage. In a similar manner, clover was not new in Bursa, but separate clover lands for animal grazing were new to the area. Clover was probably not used in rotation at the end of the 19th century Bursa; that is to say it was not put into rotation as a leguminous crop. Ambrossoli claims that in these circumstances, we should look at how, by whom, and in what kind of connection agricultural knowledge was produced.[387]

Increasing arable mulberry gardens and clover lands were not the only responses of Bursa peasants to increase production at the end of the 19th century. While the peasants closer to the plain were seeking ways of utilizing their lands in various manners, the peasants of the villages on the Uludağ hills were using the rich forest reserves of Uludağ through slash and burn methods. Yet the contraction of forests attracted the attention of local and central governments, leading to the issuance of several decrees on the use rights on forests.[388] While continuing to clear lands from forests through burning, it seems that in the meantime they were developing intensive methods on land use; rotating crops and using manure at the end of the 19th century.

Whereas the marshlands were preparing the grounds for the formation of çiftliks in Mihaliç, in Bursa they created the perfect conditions for rice cultivation. Rice cultivation diffused very quickly along the same marshland route, though it turned into a struggle between peasants and government, this relationship was never free from power struggles.[389] Similarly, summer crop cultivation and animal breeding were put into more regular arrangements by peasants on the marshlands. As the eagerness for land grew, a fight against the marshlands by central and provincial

[387] Ambrossoli, *The Wild and the Sown*, 325.
[388] Even until 1910/11 the decrees continued; BOA, T.533/13, 1326 (Rumi).
[389] In 1912, Karahisar-ı Sahip deputy, Rıza Paşa, claims how rice became the subject of a struggle to control lands; Akagündüz, "II. Meşrutiyet Döneminde Toplumsal Bir Sorun Olarak Sıtma ve Sıtmadan Korunma Çareleri", 110. For a detailed discussion on this issue see Chapter 2.

governments was started in order to win land back, something that lasted for a long time right up until the first decades of the Republican period.[390]

Turning back to the first issue mentioned at the beginning of this chapter, the presence of commons is very important in determining the agricultural methods, as underlined by Marc Bloch and later French historians. As seen in Mihaliç with the contraction of commons, the agrarian economy and agricultural knowledge began to be dominated more by sheep breeding. In Bursa, on the other hand, clover lands and arable mulberry gardens were used as unique ways of exploiting existing lands. While the peasants were struggling for their rights on commons, portioning these rights accelerated the use of existing lands in multiple ways. The question that arise that whether or not the Bursa peasants could develop intensive ways of using existing lands, and if the common rights on pastures were eradicated, why would Ottoman peasants still seem "backward"? This leads us to argue the notion of labeling the agricultural knowledge of peasants as 'backward' something that is discussed in Chapter 5.

A thorough understanding of how agricultural knowledge was shaped by market conditions, geographical features, the land regime and population dynamics is necessary to understand the agricultural knowledge itself. This chapter reveals how agricultural knowledge as a whole was shaped in relation to land regime. Without population dynamics the analysis would be incomplete, the next chapter deals with how change in agricultural knowledge was related to population dynamics.

[390]For a detailed work on the history of draining the Nilüfer marshlands see; Kurt, "2. Abdülhamid Dönemi Nafia Çalışmalarına Bir Örnek".

CHAPTER 4
POPULATION DYNAMICS AND AGRICULTURAL KNOWLEDGE

At the end of the 19th century, as we have seen in the last chapter, encroachment of commons and struggles for land intensified with the increase in population. The inflow of refugees brought with it land disputes that revolved around the undefined and contested borders of the çiftliks, pastures and fields particularly after the second half of the 19th century.[391] Beyond igniting the land struggle; in trying to survive within this struggle, the refugees left their imprint in agricultural change. Their settlement became a process of adjustment which is defined by disputes as well as by interaction. In Bursa and Mihaliç, refugees from the Balkans and Caucasus transferred their agricultural knowledge and their agricultural implements to the region. In this way, on the one hand they contributed a great deal to already-changing agricultural knowledge; on the other hand while trying to adjust to living in a foreign place, they somehow got involvd in the existing land regime. In any case, it was more than just their sheer numbers that had an impact on agricultural knowledge; together with other factors, they were agents of change in agricultural knowledge through various ways.

This chapter first discusses theories that examine the role played by changing demographics (i.e. an increase in the population) in shaping agricultural knowledge. Then, the chapter goes onto argue how this population increase paved the way for distinctive trajectories in Bursa and Mihaliç. In both places, the

[391] Yücel Terzibaşoğlu discusses in his article that how land became a subject of a struggle among peasants, nomads, landlords and refugees. He looks the refugee settlement at the end of the 19th century from the perspective of how the land disputes turned into national struggles among the communities; Terzibaşoğlu, "Land- Disputes and Ethno- Politics: Nortwestern Anatolia, 1877-1912", pp.176-7. In his other article, he discusses how land struggle revolved around various actors as was mentioned in the title; nomads, refugees, landlords and state; Terzibaşoğlu, "Landlords, Refugees And Nomads: Struggles for Land Around Late-Nineteenth Century Ayvalık". I would like to look the issue from another point of view in this chapter; how they became agents of change in agricultural knowledge and practices.

migration of refugees (beginning in the mid-19th century) and the population exchange (*mübadele*, in 1924) changed the demographics. We should not interpret the population increase just as a growth of population which created pressure on land, but refugees and exchange population brought their different agricultural practices and knowledge with them. Thus, a thorough analysis of this population mix and how they adjusted to the region provides a good idea of how agricultural knowledge transformed as well. Hence, by observing the population dynamics in Bursa and Mihaliç, I argued what the population theories lack. Within this framework, the aim of the chapter is to draw attention to how population dynamics played a major role in change in agricultural knowledge. Refugees, as opposed to those in the population exchange, are at the center of this discussion, because their migration was spread out over a longer period of time. More importantly, their migration was not based on central politics and plans, thus most of the time, they struggled to find land for themselves. The local and central governments sometimes regarded them as an ordinary labor force and the native population viewed them as intruders or destroyers. In other words, refugees were not always welcomed. Yet they became the agents of change. Thus, I refer to the shift in population as population dynamics and discuss it among the factors that altered the agricultural knowledge. Additionally, as mentioned in the previous chapter the patterns of change differed in Bursa and Mihaliç due to several factors such as the market, geographic, climatic and land /labor ratio conditions.

4.1 Discussion on population dynamics and agricultural knowledge

Taking the change in agricultural knowledge only as intensive farming, Ester Boserup perceived population as numbers. To her, population meant additional labor

force which "... is likely to be used as a means to undertake a radical change of the system of cultivation in part of the area [...] With further increases of population more and more of the area may pass to the more intensive system of land use and production".[392]

In trying to understand agricultural revolutions since the beginning of the humankind, Mazoyer and Roudart reject the dominance of population over other factors. Instead, they say that without the combination of diverse factors in agrarian change (market, geography, political regime, land and labor regime, education), a population increase would cause over-population, ecological imbalance, famine, diseases and eventually deaths.[393] In explaining the Middle Age Agricultural Revolution, they reserve a significant spot for population growth; population growth encouraged more production, but without a new set of tools and limitations of agricultural methods the rate of productivity remained behind the rate of population growth.[394] Turmoil grew in several places and the population fell again during the 14th century.[395] In this way, they reject that a growing population automatically responds through intensive methods.

Recently Gregory Clark adds another dimension to these theories on population increase. He says that it is the increase of the middle-class population – not the entire population – that matters for agrarian change, which is essentially based on social transformation.[396] According to him, without the increase of middle-

[392] Boserup, *The Conditions of Agricultural Growth*, 26.
[393]Mazoyer & Roudart, *Dünya Tarım Tarihi*, 361.
[394]Mazoyer & Roudart, *Dünya Tarım Tarihi*, 351.
[395]Mazoyer & Roudart, *Dünya Tarım Tarihi*, 356.
[396] Clark, *A Farewell to Alms*.

class increase that could achieve social transformation, the society would not be able to break Malthusian cycle.[397]

As for the Ottoman Empire, the tendency was to analyze the population solely as numbers with the presupposition of peasants' agricultural knowledge as 'backward'. According to some historians, the low population density in comparison to land was regarded as one of the most important factors that caused extensive use of land, (as opposed to intensive use) hence one of the factors which kept agricultural knowledge in 'backwardness'.

For Tevfik Güran, it was the availability of further lands which made the peasants indifferent to developing new methods and to instead use land more intensively.[398] To him, the main characteristics of the 19th century Ottoman agriculture was underpopulation, an abundance of arable lands, lack of labor and capital, small subsistence peasantry and high transportation costs, which all together caused the continuation of 'traditional' production methods. Traditional is perceived as 'backward' in the absence of the thorough analysis of agricultural knowledge. Like Güran, Quataert also underlined the population density in Anatolia as the reason behind extensive use of land[399], and extensive use of land equated directly to 'backward' methods.

Analyzing the relationship between agricultural knowledge and population dynamics in the 16th century, İslamoğlu and Faroqhi claim in their article that population growth, especially urban growth, and the market demand (in both Istanbul and European markets) in the 16th century stimulated agricultural production and an intensification of agriculture which is indicated by introduction of leguminous

[397] In order to understand Malthusian cycle and the critiques see; Behar, "Malthus and The Development of Demographic Analysis".
[398] Güran, *1840-1910 Osmanlı Tarım Ekonomisine Giriş: Yapısal Sorunlar, Tarımsal Kredi*.
[399] Quataert, "Agricultural Trends and Government Policy in Ottoman Anatolia 1800-1914".

crops.[400] It seems that if one can see leguminous crops, the agricultural methods should be deemed as advanced as opposed to backward.

Şevket Pamuk also sees population density as an important factor behind the predomination of extensive use of land. Yet he is reluctant to see that the extension of land relied on the will of the peasants due to indebtedness and expensive land prices.[401] In an environment of indebtedness and expensive land prices, he underlines that not the settled peasants, but refugee peasants brought new lands under cultivation.[402] There is an indication that refugees who had state support could reclaim lands as they were free of local power relations and debt. Reşat Kasaba says that most of them were granted lands for their settlement.[403] In this way they perpetuated small peasantry agriculture. However, as we will see market demands dominating the region, local power relations, the land regime and geography bring out different results in diverse places when it comes to refugees reclaiming land.

Refugees had an impact on agriculture – not just by shifting the land/labor ratio and increasing population density – by influencing agricultural knowledge itself through various ways. Pamuk says that the refugees outside the Anatolia introduced new crops in the Western Anatolia within the conditions enabled by market demand.[404] In conformity with Pamuk, Donald Quataert gave Muslim refugees a leading role in changing methods and tools in Anatolia. He said that Circassian

[400]İslamoğlu & Faroqhi, "Crop Patterns and Agricultural Production Trends in Sixteenth Century Anatolia"; İslamoğlu-İnan. "State and Peasants in the Ottoman Empire: A Study of Peasant Economy in North-Central Anatolia During The Sixteenth Century".
[401] Pamuk, "Commodity Production for Export and Relations of Production in Ottoman Agriculture, 1840-1913".
[402] Pamuk, "Commodity Production for Export and Relations of Production in Ottoman Agriculture, 1840-1913".
[403] Kasaba, "Batı Anadolu'da Göçmen Emeği (1750-1850)", pp.122,3.
[404]Pamuk, "Türkiye'de Tarım ve İktisadi Gelişme1880-2000", p. 68.

refugees "were famed for their advanced skills and techniques"[405] and they introduced some agricultural tools to settled peasants.[406]

The population increase in Bursa and Mihaliç is two-fold. On the one side, the population increased by the flow of refugees who were regarded as an additional labor force, but on the other they could act as an additional labor force, as long as they could adapt to the local environment. Thus, rather than referring them as "advanced skills" in agriculture, this chapter underlines the extent to which they could adapt their knowledge to local conditions. While the refugees were meant as an additional labor force for enhancing agricultural production, their ability to adjust to the local environment (meaning both natural conditions and tenure relations) determined how the agricultural knowledge changed. At times, they had a lot to learn from the native population during the settling process, at times, they greatly contributed to the change in agricultural knowledge.

4.2 Numbers on population growth and arrival of refugees in Bursa and Mihaliç

There were 360,000 dönüms of empty lands available for refugee settlement in the entire province of Hüdavendigar in 1878. [407] Below, we will discuss to what extent this land could be considered as "empty" based on the useage claims of the settled peasants and refugees. With the migrations from the Balkans and Caucasus, the population in Hüdavendigar province was varied.[408] Although numbers provided by the historians were contradictory, Ferhat Berber gives us a number of 107,130 refugees migrating to Hüdavendigar province after Crimean War, between the years

[405] Quataert, "Main Problems of the Economy During the Tanzimat Period"
[406]Quataert, "Osmanlı İmparatotluğu'nda Tarımsal Gelişme".
[407] Terzibaşoğlu, ""Land- Disputes and Ethno- Politics: Nortwestern Anatolia, 1877-1912", 167.
[408]*Salname-I Hüdavendigar*, 1303, pp.89-90; there were 7 categories of refugees discriminated according to their ethnicities.

1876 and 1884 based on achival documents.[409] The overall number of refugees from the Balkans and Caucasus to the Ottoman Empire was estimated to be 1,000,000 between 1877 and 1891.[410] Nedim İpek mentions seven new villages in Bursa and one new village in Mihaliç were established during this period.[411] Though we can be certain about the new villages which can be also confirmed from the Hüdavendigar Yearbooks[412], we should be hesitant in estimating an exact number of migrants from Balkans and Caucasus, as there have also been unregistered migrants. Furthermore, as Meyer brings to our attention some Circassians preferred to return to Russia, and some refused to break their ties with their "homeland" and spent some part of their lives in Russia and some in Ottoman Empire.[413]

In 1861 Sandison said the population of Bursa was around 31,000.[414] The dramatic increase in population in Bursa was at the beginning of the 1880s, especially with the refugees who migrated there after Crimean War.[415] In 1883/4 native Mihaliç population was estimated to be 16,117 and the refugee population who had migrated there up to that point was recorded as 12,682 and Bursa population was estimated 382,623.[416] In 1885/6, with an increasing refugee population settled in Mihaliç, the refugee population in the countryside was counted as 13,310 and those who were settled in Bursa were estimated to be 19,383. [417] According to the 1888 yearbook population was 132,157 in Bursa and 31,921 in Mihaliç.[418] For 1894, according to Vital Cuinet the population was 132,047 in Bursa and 63,842 in

[409]Berber, "19.Yüzyılda Kafkasya'dan Anadolu'ya Yapılan Göçler", 42.
[410]İpek, "Kafkaslar'dan Anadolu'ya Göçler (1877-1900)", 133.
[411]İpek, "Kafkaslar'dan Anadolu'ya Göçler (1877-1900)", 125.
[412]*Salname-i Hüdavendigar*, 1314, 305 for instance in central Bursa district fourteen new mahalle and villages had been established for the refugee settlers.
[413] Meyer, "Im Migration, Return, and The Politics of Citizenship: Russian Muslims in the Ottoman Empire, 1860-1914".
[414] Sandison, "Report by Mr. Consul Sandison on the Trade &c. Of Brussa for the year 1861", 355.
[415] Kaplanoğlu, *Bursa'nın Göç Tarihi*, 16.
[416]*Salname-i Hüdavendigar*, 1302, 394, 362.
[417]*Salname-i Hüdavendigar*, 1303, p. 82,79.
[418]*Salname-i Hüdavendigar*, 1306/7, 101, 106, 119.

Mihaliç. This seems a mistake in calculation for it is not consistent with the previous and following years.[419] In the 1900/1 yearbook 133,232 people registered in Bursa and 30,188 people in Mihaliç. [420] In 1907 the population in Bursa was 137,653and 35,239 in Mihaliç.[421] Table 1 shows the population numbers in Bursa and Mihaliç for the relevant years.

As Raif Kaplanoğlu shows, population in Bursa and Mihaliç continued to increase with the influx of Balkan refugees on the eve of and after the Balkan Wars.[422]

Citing Justin McCarthy, he says that 14,993 people came from the Balkans between 1912 and 1915.[423]

The settlement of refugees appeared to be an issue for governors of Hüdavendigar – which was close to Istanbul and was still considered as having wastelands – making it a favorable place to send refugees. After providing for the refugees' sustenance which was the most urgent problem, their settlement on proper lands began to be chaotic as their numbers increased. At the beginning of the 20th century, local governors complained that so many refugees were settled in Bursa that no land remained for refugee settlement. That is unless the marshlands on Bursa plain were not drained. [424] As the population grew and land became scarce, marshlands began to attract the attention of the governors more than before. Yet, the issue and problems in draining the marshlands were inherited to Turkish Republic, as we have seen in the second chapter.

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[419] Cuinet, *La Turquie d'Asie Geographie, Administrative Statistique Descriptive et Raisonnée de Chaque Province de l'Asie-Mineure*, 113.
[420]*Salname-i Hüdavendigar*, 1318, 338.
[421]*Salname-i Hüdavendigar*, 1324, 195.
[422]Kaplanoğlu, "Bursa'da Balkan Göçmenleri", https://www.academia.edu/5413112/BURSADA_BALKAN_G%C3%96%C3%87MENLER%C4%B0.
[423]https://www.academia.edu/5413112/BURSADA_BALKAN_G%C3%96%C3%87MENLER%C4%B0.
[424]BOA, DH.MKT.1077/25, 1322 (Rumi) and also BOA, A.MKT.MHM.528/18, 1322 (Rumi).

Table 1. Population numbers in Bursa and Mihaliç[425]

	BURSA		MİHALİÇ	
	TOTAL POP.	REFUGEE POP.	TOTAL POP.	REFUGEE POP.
1861	31000*	-	-	-
1883/4	382623**	-	16117	12682
1885/6	118635	34635	-	16627
1888	132157***	27312	31921	16128
1894	132047	-	63842****	-
1898/9	129828	-	28781	-
1900/1	133232	-	30188	-
1906/7	137653	-	35239	-

In this environment, we should not think that the central or local governors could achieve a regular settlement policy for the refugees. The establishment of refugee commissions in Bursa, Mihaliç, İnegöl and other surrounding districts was not effective in setting regular settlement policies.[426] Some of the refugees had to take matters into their own hands by being sharecroppers in çiftliks and even in small peasants' lands, by occupying apparent waste lands which was mostly followed by several land disputes, and by draining lands using their own methods. Those who

[425] The table derived from *Salname-i Hüdavendigar*, 1302, 394, 362; *Salname-i Hüdavendigar*, 1303, p. 78, 79, 81, 82; *Salname-i Hüdavendigar*, 1307, 101, 119, 236; Cuinet, *La Turquie d'Asie Geographie*,113; *Salname-i Hüdavendigar,* 1316, 285; *Salname-i Hüdavendigar*, 1318, 338, 339; *Salname-i Hüdavendigar*, 1324, 195. The data is not totally consistent through the years, especially the refugee numbers but it still can give a general idea about the population numbers in Bursa and Mihaliç.
* The number is probably the total number of population of the Bursa city center.
** There should be a mistake in this number compared to the following years.
*** This is the sum of Bursa city population and rural population calculated by the author of this thesis. (ZK)
**** The number must be wrong, it looks like too much when it is compared to the following years.
[426] 1888 in Bursa, 1899 in Mihaliç and in 1903 in İnegöl; Raif Kaplanoğlu, "Güneydoğu Marmara Bölgesinde Bulunan Kafkas Göçmeni Köyler", http://www.circassiancenter.com/cc-turkiye/arastirma/0176_guneydogumarmara.htm

were fortunate were granted lands (but this did not prevent land disputes as we will explore further in the chapter). The absence of an efficient land register sometimes worked for the benefit of the refugees, and sometimes caused their expulsion from the lands. Furthermore, adjusting to the local conditions was always a problem for the refugees when the neighbors did not welcome them. Besides some were not farmers, although that was the assumption of local and central governors. Sometimes they had to take initiation to control their lives, but sometimes they had to submit to local authority. Under all these conditions, they were involved in land and labor regime in differing ways in Bursa and Mihaliç.

4.3 Refugees and land and the labor regime

As outsiders who were taking shelter in the Ottoman Empire, both the central and local govenors had to urgently deal with their settlements and sustenance. These refugees were seen as a potential labor force which would put non-cultivated lands under cultivation. The tax collected from the *mezraa* (an arable field located outside a village) in Bursa district indicates that the lands around the villages were used either for animal grazing or for cultivation.[427] The flow of refugees led to a confrontation between the settled population and refugees. For instance as we will go into detail later in the chapter a dispute occurred between refugees and the settled population in Çağrışan village over the right on mezraa.[428] The settled peasants probably did not want to surrender their use of the mezraa- either for cultivation of

[427]BOA, Ev.d.12346, 1261 (Hicri). For the 16th century J.M. Wagstaff talks about how with the sedentarisation of nomads, new lands some of which used to be winter pastures brought under cultivation; Wagstaff, *Geographical Studies on Modern Turkey and Ottoman Empire*, 70. Yet I cannot be sure whether these lands were put under cultivation or used just for grazing needs. In the defters we can only see the amount that were collected from the village or mezra. And what led us think that these lands could also be used as pastures are the data on Mihaliç. From the mezraa an amount collected from perakende addresses a use by the shepherds and herdsmen; BOA. D.BŞM. 10504, 1253 (Hicri).

[428]BOA, Ev.d.12346, 1261 (Hicri) and Bursa Gazetesi, 3.Sene (108), 27 Receb 1310/25 Kanunısani 1308, p. 2 and BOA, DH.MKT.1475/94, 1305 (Hicri).

grazing animals- which was probably regarded as waste lands by the local government.

At times, the refugees became the counterforce of policies on formation of the çiftliks and increasing sheep breeding in the çiftliks, by settling the refugees on çiftlik-lands that had not been cultivated for more than 3 years. Yet, the policies did not match with reality; first the refugees were not homogenous groups of farmers; secondly local power-holders were overlooked and the vague category of waste and meadow lands most of the time worked against the refugees.

In January 1853, the Hüdavendigar governor argued that rather than granting land to 47 Circassian refugees in a foreign environment in which they could have difficult time adjusting to, they could instead be sharecroppers in the çiftliks and villages whose lands had been left non-cultivated due to scarcity of labor.[429] Disregarding that these refugees might not have been farmers, he focused on placing them on land that would force them to engage in agriculture. It was during the same period when Antonaki stated his difficulties in finding labor force for his çiftlik.[430] Like in the Antonaki's çiftlik, they were also thought to be settled in Çiftlikat-ı Hümayun where there also was a need for labor force.[431]

Nonetheless throughout the 19th century, neither the local nor the central governors landed on a regular settlement policy for the refugees. This issue of settlement came to be problematic as the numbers increased; were they to be granted lands, were they to be sharecroppers, were they to be employed somehow in the city centers?[432] Sometimes the refugees were provided sustenance and the necessary raw materials to farm the lands such as seeds and draft animals. For instance in Kirmastı,

[429]BOA, MVL.254/84, 1269 (Hicri).
[430] See Chapter 3.
[431]BOA, Y.PRK.AZJ.4/18, 1296 (Hicri); Y.MTV.85/108, 1309 (Rumi).
[432]BOA, MVL.254/84, 1269 (Hicri).

when the draft animals of the refugees died from disease, the Hüdavendigar governor ordered for the supply of draft animals to prevent their alienation from agriculture.[433] In contrast, some refugees filed petitions to complain that they had become sharecroppers on the peasants' lands, because they were not granted lands and animals.[434] In some cases the supply of seed and draft animals became problematic and local governors addressed the native peasants to help the refugees.[435] Moreover, it was not easy for the new comers to adjust to the conditions of a new environment even if they were granted land, they could lose it to the local power-holders, especially to sheep merchants in Mihaliç at the end of the 19th century.[436]

At the peak of formation of çiftliks in Mihaliç, refugee settlement also reflects a tide of state policies on the spread of çiftliks and sheep breeding; refugees were regarded as a way to limit their formation and spread. However, while powerful merchants were removing the refugees from their land, in the Council of State (*Şura-yı Devlet*) it had been discussing the settlement of newcomers on the fields of çiftliks that had not been cultivated for more than three years.[437] Thus, in a way, refugees were regarded as a way to limit the spread and formation of new çifliks, though in reality they became victims of this spread. Taking the lands from the power-holders and offering them to refugees, as discussed amid Council of State, the Ministry of Interior, *Meşihat* and the Ministry of Finance,[438] was easier said than done. At the local level the refugees could even be removed from the waste lands that they had reclaimed.[439]

[433]BOA, MVL.711/62, 1282 (Hicri).
[434]BOA, MVL.525/87, 1283 (Hicri); and BEO.AYN.d. 881/261, 1291 (Hicri).
[435]BOA, BEO.AYN.d. 884/24, 1295 (Hicri).
[436]BOA, ŞD.2403/2, 1289 (Hicri).
[437]BOA, ŞD.2398/25, 1288 (Hicri).
[438] BOA, ŞD. 2419/6, 1296 (Hicri)
[439]For instance in a document, local governor of Kırmasti says that waste lands were at the hands of local notables (*müteneffizan*); BOA, DH.MKT.1436/106, 1303 (Rumi). However, pertaining the land was also a difficult matter, even if the refugees were granted the land.

In Bursa, there were established new villages for settling the refugees, but again this did not prevent land disputes among the surrounding villages. As mentioned in Chapter Three, as the population grew, the vineyards and gardens of Bursa plain began to be used as animal grazing areas more so than before, leading to more land disputes between the villages. Yet, we should say that the disputes somewhat prompted the intensive use of gardens and vineyards and the interaction between the communities, which had an important effect on agricultural knowledge.

As seen above, the land and labor regime in Mihaliç and Bursa were structured differently. In this framework, the effect of refugees on the land and labor regime, and vice versa, also differed in Mihaliç and Bursa.

4.3.1 Mihaliç: struggle on land and refugees

The increase in flow of refugees coincides with the spread of çiftliks and land in a struggle period in Mihaliç after 1870s, which was examined in Chapter Three. Yet some disputes occurred before that date. As mentioned before, there was not a comprehensive and regular local and state policy on settlement. Charles MacFarlane, talked about Circassian refugees who came in 1845 and disrupted the quiet environment around Ulubat Lake. [440] He said that Sultan gave them 70,000 kuruş and sent them to find a proper place to settle, thus leaving them on their own.

MacFarlane said that although the Circassians had the chance to reclaim the untilled and unoccupied wheat and pasture lands, they preferred to seize gardens and cultivated lands of the Christian villagers in Ulubat. He said that in exchange for a Circassian slave girl, the Bursa governor ignored several petitions made by the

[440] MacFarlane, *Turkey and Its Destiny*, *vol.I*, 413.

Christian villagers to 'remove the intruders', and so the Circassians possessed everything in Ulubat village. [441]

The disputes between the refugees and native peasants did not always end up with the suffering of the natives and the "invasion" of the refugees, especially when it came to the çiftlik-holders. After the second half of the 19th century, to benefit from the massive pastures, the older agreements between animal-breeding refugees and çiftlik-holders were thrown out. The refugees who could not adjust to agricultural work or the environment left their land or rented it out to sheep merchants, which worked in the favor of spreading çiftliks. This issue of course revolved around waste and common lands.

A case between Kazak refugees and Akdoğan Çiftlik-holder indicates how older agreements were set aside to take advantage of new possibilities. Sometime before the 1860s, the Kazak community and the çiftlik-holder of Akdoğan made an agreement on grazing the animals on 150 dönüms of lands in the çiftlik.[442] This Kazak community did not engage in agriculture, but did fishery and animal breeding. Because of this, they asked for a place to graze their animals, and the then-çiftlik-holder, Ahmet Paşa, and the Kazak community agreed on grazing rights on this particular size of land. In addition to this agreement, the çiftlik-holder then, renounced 600 dönüms of land to the community to mow weeds, graze their animals and cultivate if they pleased. However, such an agreement was not recognized by the next holder, Raşid Paşa. When the local government officials conducted an in-situ survey, they claimed that Raşid Paşa had to accept the agreement that was made regarding the 150 dönüms of land, but he did not have to recognize the community's right on the other 600 dönüm of land, because it had not been documented. Claiming

[441]MacFarlane, *Turkey and Its Destiny*, *vol.I*, 414.
[442]BOA, A.MKT.UM.395/3, 1276 (Hicri).

that the 150 dönüm was insufficient for the community due to increase in their population, they asked for more lands to graze their animals. However, it seems that the new-holder decided to consolidate the boundaries of the çiftlik and make use of all of his lands. In the end, the community gained nothing but retaining their rights on 150 dönüms of land.

Conflicting claims on land due to growth of çiftliks was not only for animal breeding, but also for arable lands. The earlier case of Akdoğan Çiftliği matters more when interpreted with other cases in the region. In Manyas region, the Circassian refugees of Ilıca village claimed that sheep merchant Şemsi Ağa prevented their cultivation, even though they had made use of the land for 17 years.[443] The Circassians claimed that because they did not get the title deeds of the lands that they cultivated, Şemsi Ağa tried to enlarge the area for grazing. Here it seems that the absence of land registration worked for the benefit of sheep merchants in seizing the lands. Even if land registration took place, refugees could prefer -or be compelled- to rent their lands out to sheep merchants. They would have done this because they weren't able to adjust to the region or they were unable to push back against the pressure of sheep merchants.[444]

In addition to enabling formation of çiftliks, the presence and ambiguous definition of waste lands and the lack of land registration caused disputes between settled peasants and the refugees. In a response from Hüdavendigar Council to Meclis-i Vala we can see that refugees were driven from the lands which were granted them by the local government. The native peasants claimed that the lands belonged to them.[445]

[443]BOA, A.MKT.MHM.503/25, 1314 (Rumi).
[444]BOA, ŞD.2403/12, 1289 (Hicri).
[445]BOA, MVL.735/54, 1283 (Hicri).

Both the ambiguous definition of waste lands and undefined meadows, prepared the groundwork for disputes. A village community near Manyas claimed that the land that was granted to the refugees was not waste land, but it was their long-held meadow land where they grazed their animals.[446] Another dispute between Rünkuş village and refugees ended up with the displacement of the latter to nearby Üçler village.[447] Again a similar case occurred between the Nogay refugees of Bey village and native peasants of Göbel village. Nuruz Bey, who was among the refugees, petitioned the Hüdavendigar government to prevent non-Muslim Göbel peasants from harming their crops.[448] The Nogay refugees must have been settled on so-called "waste lands", and because the Göbel peasants kept quiet during the settlement, any claim after the settlement was regarded as unacceptable. Yet, because "waste lands" was still an ambiguous and not a well defined category, many groups used this to their advantage. This means that the disputes and claims were inevitable.

It is also important to look into how the land was considered as a wasteland and how this in turn led to complex cases. Faik, the director of the Defter-i Hakani in Hüdavendigar, wrote a report to the Hüdavendigar Council on his visit to Siği Çiftlik in the Mudanya district.[449] In this çiftlik, approximately 25 dönüms of land was cultivated, and over 800 dönüms of land was left non-cultivated. There were 25 dönüms of mulberry gardens and 5000 dönüms of brush (*çalılık*) and *pırnallık* lands, part of which was used by the peasants from the Siği village to graze their animals. Faik said that normally, the lands that had been left non-cultivated for more than three years should be re-sold to their owners or if they were not interested in these lands, they should be auctioned. However, as he continued by showing their related

[446]BOA, DH.MKT.2788/59, 1325 (Rumi).
[447]*Bursa*, 3.Sene (108), 29 Receb 1310/25 kanunısani 1308, p.2.
[448]BOA, BEO.AYN.d. 881/123, 1289 (Hicri).
[449]BOA, DH.MUİ.142/76, 1326 (Rumi).

documents, the peasants claimed that nothing could be cultivated on the plots unless they were left uncultivated for two or three years. That year, there were plots that had not been cultivated for two or three years. Faik wrote that there were no official records showing the possession of 5000 dönüms of brush land by the çiftlik-holder. What he meant by this was that the çiftlik should normally contain 700-800 dönüms of lands, but the tahrir records and Defter-i Hakani records were inconsistent with each other due to an illegality. Thus, these brush lands should be regarded as waste miri lands. Due to what he found, it was decided that the land that was not registered was to be auctioned. While the *Muhacirin Komisyonu* in İstanbul aimed to settle refugees there, there were also eager buyers in İstanbul. [450]Although we don't know how it ended, it was inevitable that there would be a dispute between the Siği peasants and the newly settled refugees. Furthermore, we can see how the land became subject of power struggle between the power-holders in Istanbul.

The refugees who came at later dates could work for the benefit of the earlier refugees sometimes, particularly when it came to the recognition of land. The Balkan refugees who settled near Manyas Lake drained some lands from the marshlands of the lake and cultivated them for more than 12 years. [451] However, with the migration of Circassian they heard that these lands would be granted to Circassian refugees. Balkan refugees claimed that they opened these lands from the lake- which had been marshlands before- and put then under cultivation; they had been cultivating the lands for 12 years. Although they did not get the title deeds, and had not registered the lands, they had usufruct right on these lands by cultivating them for more than 10 years.[452] After some correspondence between Şura-yı Devlet,

[450]BOA, DH.MUİ. 142/76, 1326 (Rumi)..
[451]BOA, İ.DFE.15/30, 1319 (Rumi).
[452] According to the Land Code, this is called hakk-ı karar: a land holder who cultivated a land more than 10 years acquired the usufruct right of the land.

Defter-I Hakani and Grand Vizierate, the lands that were cleared by Balkan refugees were registered, and they obtained their title deeds.[453]

The refugees who could not open up land, were not granted land, or were driven from the granted "waste" lands, became sharecroppers in the çiftliks or on the lands of small peasants.[454] For instance, in 1893 the refugees were settled in Doğancı Çiftlik near Kirmastı.[455] The Hüdavendigar governor asked the Evkaf Ministry for the Circassian refugees who started to settle down in Imperial Çiftliks to be evicted and instead to be settled in the Arap Çiftliği. Beginning from the 1880s they were settled there on the basis of tenancy relationship.[456] Again, Bosnian refugees were settled in Kızıllar Çiftliği in January 1900.[457]

As we have seen the refugees coming to Mihaliç found themselves mired in land disputes, revolving around waste and common lands. Thus, they placed pressure on the land due to their numbers. However, we should refrain from thinking of these refugees only within the chaotic world of struggle for land; as specialists in animal breeding (refugees who were both both farmer and non-farmer), they contributed in obtaining new agricultural implements for çiftliks, particularly iron ploughs, as we will see below.

In the Bursa district, where land was scarcer than in Mihaliç, land disputes were again inevitable between refugees and native Bursa peasants. New villages and waste lands that had been now settled by refugees applied increasing pressure on land. However in Bursa, it was the spread of mulberry gardens, rise of rice

[453]BOA, DH.MKT.883/38, 1321 (Rumi).
[454]BOA, BEO.AYN.d.884/88, 1296 (Hicri).
[455]Bursa, 3.Sene (145), 27 rebiyülahir 1310/ 25 teşrinievvel 1309, p. 7.
[456] BOA, Y.MTV.9/59, 1298 (Hicri); BOA, ŞD.113/19,1304 (Hicri) and BOA, ŞD. 1592/18,1320 (Rumi).
[457]BOA, A.MKT.MHM.503/9, 1315 (Rumi).

cultivation and other economic activities- not the formation of çiftliks- that induced different developments in their settlement.

4.3.2 Bursa: denser population and intensification

In 1864, Ahmet Vefik Paşa, the famous Hüdavendigar governor (1879-1882), during his tenure at Evkaf Müdürlüğü in Bursa (?-1864), wrote to Meclis-i Vala claiming the necessity of draining Nilüfer River which led to flooding of the Aksu stream and expanding marshlands in Bursa plain.[458] He said that instead of destroying the gardens and vineyards in Bursa to build villages for refugee settlement- which would harm the balance of land use in Bursa- draining the river and marshlands would generate more lands both for refugee settlement and native peasants.

We know that Bursa was famous for its mulberry gardens and vineyards. Yet, 1864 was the period when disease in silkworms began to spread in the Bursa district. We know during that period, peasants tended to turn their gardens into arable fields, though governors and officials had sought to find ways to revive silkworm and cocoon production.[459] Within these efforts, the idea of establishing villages for refugees on these gardens and vineyards was rejected, probably because this would undermine efforts of reviving production. Besides, draining the marshlands and reclaiming lands has always been a project since the middle of the 19th century, a good reason for this would be refugee settlement.

As the refugee flow increased especially after 1880s, finding places to settle the new-comers became problematic for the governors, and land disputes became the

[458]BOA, MVL.667/48, 1279 (Rumi).
[459] To see the details of the efforts in reviving the silkworm production see chapter 6. In his report Torkomyan told how the peasants turned their lands into arable fields; Salname-i Hüdavendigar, 1325, pp.259-267.

norm. Eighteen new villages were established in the Bursa district.[460] Nilüfer village was among the few villages established on the plain in 1881 by the Bulgarian refugees.[461] It was among three villages which were established on the Bursa plain, the others were Balat and Geçit villages.[462] For Nilüfer village to be established, the Refugee Commission in Bursa distributed the lands of Haraççızade Çiftliği without the permission of the holder.[463] Thereupon the çiftlik-holders wanted to displace the refugees and there arose a land dispute between the native peasants of Çağrışan who had the before rights to use the lands of the çiftlik and the refugees.[464] The governor of Bursa stepped in and offered to sell the refugees these çiftlik lands. Finally, nearly 3,000 dönüm land was sold to the refugees for 50 kuruş per dönüm.[465]

The purchase of the çiftlik lands to distribute to the refugees became a widespread solution after 1880s. In this vein, another example was Balat Çiftliği in the same region. The çiftlik became vacant after the death of its holder, the wife of Rüstem Paşa.[466] Because the lands of Yalakçayırı near Çağrışan village settled by refugees were not enough, there arose land dispute between the peasants of Çağrışan and the refugees near Yalakçayırı. To this aim, the head of general Refugee Commission (*Umum Muhacirin Komisyonu Reisi*) petitioned for the cancellation of the auction of the Balat Çiftliği and asked for its purchase, so it could be distributed among the refugees. Finally the refugees were settled on 800 dönüm of the çiftlik,

[460] Raif Kaplanoğlu, "Güneydoğu Marmara Bölgesinde Bulunan Kafkas Göçmeni Köyler", http://www.circassiancenter.com/cc-turkiye/arastirma/0176_guneydogumarmara.html.
[461]Kaplanoğlu, *Bursa Osmangazi İlçesi Çağlayan ve Nilüfer Köyleri*, 161.
[462]Kaplanoğlu,*Bursa Osmangazi İlçesi Çağlayan ve Nilüfer Köyleri*, 161.
[463]Kaplanoğlu,*Bursa Osmangazi İlçesi Çağlayan ve Nilüfer Köyleri*, 181.
[464]Bursa Gazetesi, 3.Sene (108), 27 Receb 1310/25 Kanunısani 1308, p. 2 and BOA, DH.MKT.1475/94, 1305 Hicri).
[465]Bursa Gazetesi, 3. Sene (108), 27 Receb 1310/25 Kanunısani 1308, p. 2.
[466]BOA, A.MKT.MHM.495/75, 1305 (Rumi).

but this did not solve the problems. In fact, it led to new ones as the population of the Circassian refugees increased from 5 to 75 households.[467]

Not only the lands of çiftliks, but also the "waste lands" in the villages were regarded as proper places to settle refugees, which provoked disputes by limiting the peasants from using these spaces as they used to do. In November 1890, a dispute among Samanlı and Vakıf villages and refugees tells us a lot about partitioning the meadow and waste lands and refugee settlement.[468] Lying on the east of Samanlı village and north of Vakıf village, both villages had claims on an area, called Kumlukalanı. However, after the officials conducted an in-situ investigation, it turned into a problematic and a complex case. According to the report, peasants of Vakıf opened up lands in Kumlukalanı (which was officially a pasture land and thus banned from being cultivated) and illegally obtained title deeds. Some lands close to Kumlukalanı were cultivated, even though they were registered as waste lands (and prevented from cultivation) as area of residence for groups (*kafile ikametgahı*). Close to these lands there was a çiftlik that consisted of 36 plots of lands, and during the registration of the çiftlik in the name of Nesib Efendi, the lands were registered as part of Kumlukalanı by mistake (or probably more by an illegality) by an official of *Defter-I Hakani*. After the investigation, it became apparent that peasants of Vakıf village did not need this place, they had another meadow land. They were cultivating half of Kumlukalanı meadow land, and were even renting these lands to others. The other half belonged to Samanlı peasants who renounced their right to refugees by their will, based on title deeds. In this case, it was decided that Vakıf village did not have right on the part that Samanlı peasants had left to the refugees, and the Defter-i Hakani official in registration was going to be charged by these illegalities. Based on

[467]BOA, DH.MKT.1494/118, 1304 (Rumi); BOA, DH.MKT.1534/10, 1304 (Rumi).
[468]BOA, DH.MKT.1782/61, 1306 (Rumi).

this, half of the meadow lands in Kumlukalanı were left to the refugees. But the dispute continued for another ten years [469], when the Samanlı Çiftliği was bought by Samanlı peasants. The pressure of Vakıf villagers and two other villages continued to be placed on some part of the lands of the çifltik, which was claimed to be obtained illegally.

The situation was made even worse by illegalities and vague definitions of the borders of the çiftliks, the claims of vakıfs and complex relationship concerning the land regime. Near Dikencik Çiftlik whose lands belonged to Koca Mehmet Paşa vakıf, the refugees from Batum were settled in the region called, Araba Yatağı. They were reported for destroying the trees of the Bursa Lodge (*Mevlevihane*) by the *postnişin* of the lodge. [470] The trees were endowed to the Lodge, whereas the land belonged to Koca Mustafa Paşa Vakıf. The *postnişin* of the Lodge asked for the relocation of the refugees to another place or to grant three plots of meadow lands in Karahisar *sancak* to the Lodge to prevent the lodge's loss of income from the devastation of the trees. However, the notion of relocating of the refugees was rejected in order not to cause disorder among them. [471] Furthermore, it is claimed that not all of the trees were felled; some refugees were making use of the trees and contributing income to the treasury. Granting three plots of meadow lands in Karahisar was also rejected for concern for retaining the income from these meadows by renting them for 17,000 kuruş for a year.[472] But the *postnişin* of the Lodge continued to ask for a new place to retain their income.

The Çağrışan, Dikencik, Nilüfer, Balat Çiftliks were all on the Bursa Plain where the land had already been partitioned.The common lands had been used since

[469]BOA, DH.MKT. 2455/18, 1316 (Rumi).
[470]BOA, ŞD.1570/29, 1314 (Rumi).
[471]BOA, ŞD.1575/1, 1315 (Rumi).
[472]BOA, ŞD.1575/1, 1315 (Rumi).

a long time between the native peasants and çiftlik-holders. As mentioned in the third Chapter, Bursa was the place for the silkworm and cocoon production for which the peasants reserved some of their arable lands for mulberry gardens. Hamilton depicts the left part of the Nilüfer river as "highly cultivated lands, sloping gently to the north, partly meadow and arable, partly covered with vineyards and mulberry-plantations…".[473] At the middle of the 19th century, nearly each household had mulberry gardens, even if they did not have 1 dönüm arable land.[474] After the disease had infected silkworms and cocoons, the peasants turned their mulberry gardens into arable lands again. Yet, after 20 years of unproductive period, the end of 1870s saw the revival of the cocoon and silkworm production. The meadows began to be covered with mulberry gardens again. [475] Furthermore, the settlement of refugees on the meadow lands and the resulting conflicting claims on them forced the peasants to use lands more intensively than before. In this environment, the lands on the plain were of great value, and the land disputes were inevitable especially after the 1880s when the increase in refugee flow and re-spread of mulberry gardens coincided.

As the lands on the plain became scarcer, the refugees were also settled on the hills of Uludağ by clearing lands from the forest by burning them. Based on the geographic characteristics and the habits of the refugees back in their homeland -(whereas the peasants coming near Manyas were draining the marshlands)-, the refugees coming to Uludağ used the slash and burn method. [476] In support of this, in the Bursa newspaper, it is claimed that 9,000 dönüms of land were burned near Gözede and Osmaniye villages and the reclaimed lands were registered as arable

[473]Hamilton,*Researches in Asia Minor, vol.II*, 78
[474] Kaplanoğlu, *Bursa Osmangazi İlçesi Çağlayan ve Nilüfer Köyleri*, 46; and also we can observe such things in Temettuats; BOA, ML.VRD.TMT.d. 7549 (Izvat); 7542 (Mashara hasan); 7385 (Vakıf); 7433 (Soğanlı) can be regarding examples.
[475] Vassaf, *Bursa Hatırası*, 104.
[476]Bursa Gazetesi, 1.Sene (38), 8 ağustos 1307/16 muharrem 1309, p. 2.

lands.[477] Based on the studies of Kaplanoğlu we learn that new settlements were established around 1887, 1893 and 1899.[478] In more or less the same period in 1881, refugees from Tırnova formed Fethiye village by 'clearing' the forest land and opening up lands.[479] Of course clearing land was not always done by burning forests – the pasture lands in Uludağ (the income from the land belonged to Emlak-ı Hümayun) were permitted for the settlement of refugees - [480] which of course caused more devastation of the forest lands in Uludağ in time.[481]

At the same time, there were still nomadic tribes who were grazing their animals on the pastures on the Uludağ hills during the summer and were turning to the plain lands in winter.[482] In 1903, the writer of *Musavver Rehber-i Seyyahin* still referred to the nomads who were using the pastures in Uludağ in the summers.[483] As Kaplanoğlu narrated from Erol Demircan, Demircan's nomad forefathers were going to the plain in winter, mostly from October. They were grazing their sheep and goats from Gölbaşı village to İsmetiye (Kelesen, at that period) on the pastures near these plains which were rented from the villages. Mostly in May they went back again towards the hills.[484] Under these conditions, as the refugees began to settle on the hills of Uludağ, (also while the huge lands used by the villages contracted with these new-comers[485]) the nomads probably took their animals to the forests. Although we do not have any information about the confrontation of the nomads with the settlers or disputes among them, some must have occurred, and the nomads might have led

[477]Bursa Gazetesi, 1. Sene (39), 15 ağustos 1307/ 23 muharrem 1309, p.2
[478] Kaplanoğlu, *Bursa'nın Doğu Kapısı Kestel*, pp. 88-9.
[479] Ortaç, *Bursa Köyleri*, 39.
[480]Bursa Gazetesi, 3.Sene (129), 2 muharrem 1311/ 5 Temmuz 1309, p. 3.
[481]İnal, *Yeşil Bursa Denizinde İnci Uludağ*, pp.16-7, 28.
[482]Günaydın & Kaplanoğlu, "Marie de Launay", pp.152-163, 156. She talks about the nomads in his diary which was covering a period of 1880-1 during her residence in Bursa.
[483]*Musavver Rehber-i Seyyahin: Bursa ve Civarı*, 36.
[484] Kaplanoğlu, *Bursa'nın Bereketi Gürsu*, 30.
[485] Kaplanoğlu, *Bursa'nın Doğu Kapısı Kestel*, 89; he says that although the lands of Değirmenlikızık village was huge previously, two new villages were established on the lands of Değirmenlikızık; Saitabat and Burhaniye.

their animals to the forests. Considering this alongisde the slash and burn methods[486] devastation of the forests became inevitable. As the pastures began to contract and as the animals could not be fed nutritiously from the pastures, they look like to be in a poor state. [487]

As the pasture lands were left to the refugee settlement and as the former meadows began to be covered by mulberry gardens, although far from sufficient to meet the grazing needs, intensive use of existing lands for animal grazing increased in Bursa. In other words, as the arable and former meadow lands began contracting due to refugee settlement while there was revival of mulberry gardens and silkworm production, mulberry gardens and vineyards began to be used more intensively than they had been before. In that case, the refugees had an indirect impact on the change in agricultural knowledge concerning the use of land. More than before, there was a need for gardens and vineyards to be used for grazing. In this case, the newspapers were full of complaints about animals attacking the crops in vineyards and gardens.The newspapers consistently framed the need to arrange grazing needs and crop cultivated on a regular basis. [488]

In addition to being settled on land, some refugees also worked on çiftliks as wage laborers or as sharecroppers if they weren't able to deal with the environment or if they had lost their lands to power-holders. Those who wanted to farm as a

[486] In fact, it was not something new for the peasants, in 1830s Richard Burgess talks in detail how the copses were burned to open new lands; Burgess, *Greece and The Levant*, 112. Mazoyer and Roudart explore a great scheme on the relationship between salthus, forests and arabla lands; Mazoyer & Roudart, *Dünya Tarım Tarihi*, 258. In their scheme salthus and arable lands alternate each other, so that forest lands never devastated. Yet, when the population reached to the level in which this circle could not produce as much product to feed the population the forest lands began to contract.
[487] *Musavver Rehber-i Seyyahin: Bursa ve Civarı*, 77-8.
[488] See for instance Bursa, 1. Sene (18) 14 mart 1307/16 şaban 1308, p. 1; Ziraat Gazetesi 2.Sene (7), 29 zilkade 1299/1 teşrinievvel 1298, pp. 78-9.

means of living worked in the çiftliks of Bursa.[489] For instance, the sharecroppers in Soğanlı Çiftlik consisted of refugees.[490]

As we have seen the refugees entered the land and labor regime in Ottoman Bursa at the end of the 19th century during the period of transformation. Yet, they were not simply occupiers of land, causing land scarcity. They also left their stamp of change in contemporary agricultural knowledge by importing their agricultural knowledge with them. Their relationship with the native peasants was not limited with disputes, but also involved some productive interactions.

4.4 Refugees and change in agricultural knowledge

As I mentioned before, diverse groups of refugees migrated to the Ottoman Empire; though most of them were farmers, there were also animal breeders, artisans and others. Even the farmers were not a homogeneous group. The crop they specialized on back in their homeland determined how they adjusted to the new environment of Bursa and Mihaliç. Those who knew how to grow rice, rose trees, maize, and tobacco contributed to the changing agricultural knowledge. In a foreign environment these refugees attempted to continue their economic and cultural habits. In some cases they could not adapt and tried to return home, as James Meyer underlined in his article.[491] However, others were able to combine their habits, knowledge and culture with those of their neighbors and create a sort of relationship that led to a mutual interaction. In some cases they were formed according to the local conditions.

[489]Şen, "Bursa Çiftliklerinde Yeni Kurulan Mahalleler", 40.
[490]Bursa Gazetesi, 3. Sene (131), 17 muharrem 1311/19 temmuz 1309, p. 5
[491] Meyer, "Im Migration, Return, and The Politics of Citizenship: Russian Muslims in the Ottoman Empire, 1860-1914".

4.4.1 Animal provider refugees

Agaton Efendi, The Agricultural Inspector in Karesi District, sent a report to the newspaper Umur-ı Nafia and Ziraat Newspaper, informing them about the *Manyas koşu panayırı* (Manyas Bazaar of draft animals) which lasted for four days.[492] He said that the Circassians brought their colts from Caucasus during their migration and mixed them with the native mares, developing stronger and fast horses.[493] Although the natives had not yet preferred these horses, they were sold wholesale by merchants. They were more expensive than the other horses: 20, 25, 30 lira per head. It was not just the Circassians' horses that were brought to the fair but also the oxen of the Balkan refugees. The inspector indicated that the oxen were in better condition than the native ones, which could not be grazed on pastures the previous year due to the drought. On the contrary, the refugees' oxen which were either brought in during their migration or raised by their breeding, these oxen were strong, though slow.[494]

The Circassian and Balkan refugees as well as other groups that were not engaged in agriculture continued their animal-breeding economic activities after arriving in the region. They provided horses and oxen to the farmers. The same reporter said that the oxen from the refugees were in greatest demand in this fair.[495] A couple of oxen that had been raised by the refugees were 6 kuruş more expensive than the native oxen.

Almost 40 years before this observation made by the Inspector, MacFarlane talked about a Kazak community who migrated from Russia.They were not engaged in agriculture but were good animal breeders.[496] According to him, they engaged in fishery and cattle breeding that were grazing on pastures. They provided for their

[492]Umur-ı Nafia ve Ziraat Mecmuası, 4.Sene (4), haziran 1303, pp.122-127.
[493]Umur-ı Nafia ve Ziraat Mecmuası, 4.Sene (4), haziran 1303, p. 123.
[494]Umur-ı Nafia ve Ziraat Mecmuası, 4.Sene (4), haziran 1303, p. 126.
[495]Umur-ı Nafia ve Ziraat Mecmuası, 4. Sene (4), haziran 1303, p.126.
[496] MacFarlane, *Turkey and Its Destiny, vol.I*, 486.

cattle by having "…good sense to make hay for their cattle during the winter."[497] While he praised their sense to make hay, he said that the native Bursa peasants knew nothing on keeping hay for the winter [498] and leaving their animals stuck to the natural conditions.

Can we still say that the peasants in Bursa remained that indifferent to their plough animals towards the end of 19th century? Both the refugees and native people increased their supply of horses to operate new agricultural machines, as the inspector witnessed.[499] In Balıklı Çiftlik, for instance, the introduction of the threshing and maize machine went hand-in-hand with the increase in the number of horses.[500] Although it was not uncommon for peasants in Bursa and Mihaliç to own a horse,[501] they probably continued to use oxen as draft animals, because they were stronger in tough climatic conditions and could better maneuver the wooden plough[502] – and, of course, they were cheaper than horses.[503] Under these circumstances and with such a demand for draft animals, refugees must have made some sort of contribution to native peasants in Bursa and Mihaliç in animal breeding. Enhanced efforts in fighting against animal diseases and work of veterinarians reflect a two-sided change. On the one side, it indicates the central policies of efforts in achieving control over breeds by standardizing the breeds and then then to increase

[497] MacFarlane, *Turkey and Its Destiny, vol.I*, 486. We also know them from their relationship with Akdoğan Çiftliği who were trying to find grazing places for their cattle which were increasing in number; BOA, A.MKT.UM.595/3, 1276 (Hicri).
[498] MacFarlane, *Turkey and Its Destiny, vol.I*, 371.
[499] Umur-ı Nafia ve Ziraat Mecmuası, 4.Sene (4), haziran 1303, p 123.
[500] In 1811 we see totally 40 head of horses in the çiftlik; BOA, D.6484/01, 1226, but it has tripled to 123 in nearly 80 years; BOA, Y.MTV. 227/96, 1318 (Rumi)
[501] See for instance BOA, ML. VRD. TMT.d. 7494, BOA, ML. VRD. TMT.d. 7406; BOA, ML. VRD.TMT.d. 7512; BOA, ML. VRD.TMT.d. 7493; BOA, ML. VRD.TMT.d. 7558.
[502] As the Inspector underlined oxen were more proper for wooden plough; Umur-ı Nafia ve Ziraat Mecmuası, 4. Sene (4), haziran 1303, 127. And as Bayram Akıncı told, they continued to use wooden plough until almost late 1920s, which they could produce and repair by themselves. One of these wooden ploughs is displayed in Mübadil Evi in Görükle.
[503] As we understand from the prices of the Inspector gives; one couple of oxen costs 10-12 lira or the refugees' oxen were 16-18 lira in the fair, whereas the price of one horse could exceed to 25-30 lira in the fair; Umur-ı Nafia ve Ziraat Mecmuası, 4. Sene (4), haziran 1303, 123.

productivity, on the other side, the needs of peasant to be concerned with the condition of the plough animals.[504]

4.4.2 Introduction of new crops and spread of older ones

Changes in crop cultivation and the methods in production in the region cannot be thought of as independent from the adjustment of the refugees and exchange population. Sometimes the natural conditions pushed the refugees to adapt into the agricultural methods in the region, and sometimes they stimulated the spread of an already existing crop.

Refugees from Bulgaria who came to Bursa, tended to plant rose trees on their lands to produce rose oil, which is a practice they carried with them from Bulgaria.[505] According to Mrs. Walker "The greater number of the refugees of the last war are from the districts most celebrated for the rose perfumes; they find the climate and soil around Broussa in every respect suitable to this sort of cultivation, and in consequence several thousand rose-trees have been planted within the past two years."[506] At the same period the provincial yearbook pointed out that with the government incentives of distributing rose tree saplings, the refugees around Panayır, Kilisan and Soğanlı villages produced rose oil from these trees.[507] In the 1890s, traveler İbnülcemal Ahmet Tevfik noted that the peasants in Aksu village were cultivating rose trees whose qualities were equal to ones that were produced in Kızanlık, Bulgaria.[508] However, while some were continuing rose-tree cultivation,

[504] For a detailed discussion on the ways of intervention of state and the needs of peasants see chapter 5 and to see a case study on silkworms see chapter 6.
[505]BOA, BEO.AYN.d. 1071/74, 1309.
[506]Walker, *Eastern Life and Scenery, With Excursions in Asia Minor, Mytilene, Crete, and Roumania*, 108.
[507]*Salname-i Hüdavendigar*, 1301, 270.
[508] İbnülcemal Ahmet Tevfik, *Velosipet İle Bir Cevelan: 1900' e Doğru İstanbul'da Bursa'ya Bisikletli Bir Gezi*, 60.

some of them turned the rose tree gardens into mulberry garden. Why did they turn to mulberry gardens?

Planting rose trees was regarded as very important, as we can understand from a document that showed the Prime Minister asking the Hüdavendigar governor to report on why the refugees resorted to mulberry gardens and emphasized the importance of encouraging the refugees and natives to cultivate rose trees.[509] During more or less the same period, in 1886/7 Cemal Bey, the Agricultural Inspector of Hüdavendigar, penned a report to the center on the precautions to be taken in order to achieve agriculture in the Hüdavendigar province.[510] He said that he sought ways to achieve and spread rose tree cultivation among the peasants within the province - even providing tithe exemption for those who were forming rose tree gardens.[511] Almost 20 years later, in the report on general situation of agriculture in Hüdavendigar, we see that in Bursa only 61 dönüm rose tree garden was created. [512] We should not take this figure at face value; it is not clear if this was the overall size created by farmers or if it was created by local government as a model garden. In later periods, efforts to spread and achieve rose tree and rose oil production was continued to be discussed in the yearly provincial report concerning the agricultural matters.[513] Two years later, a report stated that rose tree cultivation began to spread slowly among the peasants, yet it was still insufficient.[514]

Although the Hüdavendigar governors and the Prime Minister underlined the importance of rose tree cultivation and the spread of its cultivation among the peasants, why did refugees from Bulgaria turn towards planting mulberry trees? Why

[509]BOA, BEO.AYN.d. 1071/74, 1309(Hicri).
[510]BOA, ŞD.1560/5, 1304 (Hicri).
[511]BOA, BEO.1224/91752, 1316 (Hicri).
[512]BOA, DH.UMVM.83/13, 1332 (Rumi).
[513]BOA, DH.UMVM.83/14, 1333 (Rumi).
[514]BOA, DH.UMVM.140/70, 1335 (Rumi).

did they not continue with the expertise they brought from Bulgaria? Was it because of natural conditions? The model farm in Bursa was offered for rose tree cultivation, but again it was thought to be an experiment in which experts could try their best within the existent opportunities.[515] Yet, for the ordinary peasants, a clear income-generating economic activity of mulberry gardens and cocoon raising which had a huge market in Bursa could be preferable, rather than putting so much effort in raising rose tree. Moreover, after the 1890s, the Public Debt Administration encouraged creating and the spread of mulberry gardens, while the Ottoman government distributed free mulberry seeds to the peasants and kept the mulberry gardens free from tithe for a while. [516]

At other times, the newcomers continued the practices they brought from their homelands. The exchange population was more persistent in continuing their agricultural knowledge learned in Salonica, and they cut the mulberry trees in Görükle and began maize, grain and tobacco cultivation.[517] Kemal Arı also agrees that the exchange population from the Balkans generally cultivated maize and tobacco to which they were familiar with back in their homeland.[518] They brought their maize seeds from Salonica and preferred to engage in works that they were familiar with and avoided what they did not know. They were even proud that they did not mix their seeds with native ones, which were seen as inferior to theirs. In the process, they retained their original maize seeds. According to Bayram Akıncı, they were felling mulberry trees, thinking that they would not reside there permanently.[519] They thought that they would return to Salonica one day. As they began to indigenize Görükle and this environment, they became more involved in the agricultural trends

[515]BOA, DH.UMVM.140/70, 1335 (Rumi).
[516]Kağıtçıbaşı &Yaşar, *Bursa'nın Ekonomik Tarihi (1326-1900)*, 263.
[517]Personal Interview with Bayram Akıncı, Görükle Mübadil Evi, 29/06/2016.
[518]Arı, "Tarihsel Süreçte Mübadele ve Bursa", 169.
[519]Arı, "Tarihsel Süreçte Mübadele ve Bursa", 169.

of that region. Bayram Akıncı said that they observed their neighbors and began to plant mulberry trees after the 1950s.

Before the exchange population, tobacco cultivation had already been increasing with the refugee flow from the Balkans and Crimea. Hüsnü Ortaç said that tobacco was first cultivated in Kestel by two refugees from Crimea, Osman and his brother Hasan in 1904, while refugees from Bulgaria hastened the production of tobacco cultivation in the village in 1908.[520] In other places tobacco cultivation can be traced back earlier than the 1900s.[521] Because Bursa peasants were familiar with tobacco, tobacco cultivation spread very quickly. The peasants of Su Sığırlık, Hasanağa, Ova yenicesi, Demirtaş, Çağrışan, Akçalar, Değirmenlıkızık, Baladiyunus, Dürdane, Kelesen, Fildar and İnkaya were among the villages where tobacco was grown. [522] The cultivation continued as late as 1967, when Demirtaş, Alişar, İsmetiye (Kelesen), Baladiyunus and Hamitler were also well known for their tobacco cultivation.[523]

Selma Akay Ertürk indicates that the conducive natural and climatic conditions of the Bursa plain for tobacco cultivation laid the groundwork for the refugees to continue this pratice, and after their arrival tobacco cultivation spread throughout the Bursa Plain, until as recently as 1970. [524] According to her, tobacco is alternated by wheat, watermelon and melon. The grain crops sown in October were reaped in July and the stubble was left on the soil to allow animals to graze. It was

[520] Ortaç, *Bursa Köyleri*, 9.
[521]Bursa Gazetesi, 3.Sene (150) 2 cemazilahir 1311/29 teşrinisani 1309, p. 6. In December 1893 we learn that some refugees in Bursa district were caught in harvesting tobacco which was not registered and permitted by Tobacco Regie in Bursa. With the establishment of Regie, the knowledge and methods of tobacco production tried to be taken under standardization, which caused several mumors against Regie and increase in smuggled tobacco. For a detailed discussion on the standardization of Regie see chapter five.
[522]Bursa Gazetesi, 3.Sene (140), 22 rebiyyülevvel 1311/20 eylül 1309, p.3; Bursa Gazetesi, 3. Sene (143), 12 rebiyyülahir 1311/11 teşrinievvel 1309, p.6;Bursa Gazetesi, 3. Sene (150), 2 cemazilahir 1311/29 teşrinisani 1309, pp.5-6.
[523] Tolun Denker, "Bursa Ovasında Bugünkü Ziraat", 107.
[524]Ertürk, *Bursa Ovası Ziraat Hayatı*, 291.

then tilled and left to fallow until the spring. In spring the soil was tilled again to sow with tobacco or melon or watermelon or maize. It was harvested in fall and in October it was tilled again to sow grain crops again.[525] Denker pointed to a similar cycle in tobacco, grain and watermelon/melon cultivation. Illustrating the method in Alişar she said that grain (wheat, barley or oat) was harvested in October and harvested in July. The fields were left to stubble until September for the animals graze on it. Then the fields were tilled and left to fallow until spring. In spring it was tilled for the second time and then tobacco was cultivated.[526] She said that in some villages, such as Demirtaş, the fields could be tilled five times depending on the means of the peasant to afford the expense (tilling one dönüm land costs 10-15 lira at that time).[527]

Supportively, in the monograph on Nilüfer village it was stated that the Bulgarian refugees were cultivating tobacco on their land and alternated it with grain on the basis of two-field rotation.[528] Furthermore, we learn from the later monographs on the villages that the peasants of nearby villages were also alternating tobacco with wheat.[529] Is it a coincidence that (as we can learn from Bursa newspapers) the peasants of nearby Çağrışan village were producing tobacco at that same period whereas there was no sign of cultivation in the mid-19th century?[530] Thus, we can say that the refugees certainly made a contribution in spreading tobacco cultivation, especially given that the environment and climate were conducive for producing this crop.

[525] Ertürk, *Bursa Ovası Ziraat Hayatı*, 291.
[526]Tolun Denker, "Bursa Ovasında Bugünkü Ziraat", 108.
[527]Tolun Denker, "Bursa Ovasında Bugünkü Ziraat", 108.
[528]Kaplanoğlu, *Bursa Osmangazi İlçesi Çağlayan ve Nilüfer Köyleri*, 217.
[529] Çatal, *Minareliçavuş Köyü Monografyası*, 12.
[530]Bursa Gazetesi, 3.Sene (140), 22 rebiyyülevvel 1311/20 eylül 1309, p.3; Bursa Gazetesi, 3. Sene (143), 12 rebiyyülahir 1311/11 teşrinievvel 1309, p.6;Bursa Gazetesi, 3. Sene (150), 2 cemazilahir 1311/29 teşrinisani 1309, pp.5-6; and BOA, ML. VRD.TMT.d. 7396, 1262 (Hicri)

Like in tobacco cultivation, the knowledge of the refugees from their homeland opened up new windows for cultivation. In his monograph on Kumkadı Köyü, near Ulubat Lake, Hasan Turyan revealed how one of the Bulgarian refugees changed agricultural knowledge on cultivation.[531] He says that knowing how to prevent a disease called *hava vurması* in vine shoots by applying sulphur, he managed to prevent the same disease in melon strips by again applying sulphur.[532] In this way, the peasants noticed that the melons became sweeter than before with sulphur, and he organized the cultivation of melons in linear strips. He made cultivation easier by using a plough, instead of a hoe on these stripes.[533]

Yet, we should not fall into the trap of attributing refugees with an innovative role and as "enlighteners" of the "backward" native peasants. Instead of thinking that the knowledge and methods brought by the refugees were simply accepted by the native population, we should think of this more as hybrid knowledge and a process of mutual change and interaction adjusted to the local conditions. [534] However, at some cases, the refugees and exchange populations overestimate their knowledge which caused a gap between native population and refugee population.[535] At times, new crops that were introduced by the native peasants or çiftlik-holders could also be rejected by refugees. If the new crop harmed their conditions, or interrupted the way they oriented themselves to the environment, they did not hesitate to destroy it. Yet, this was a process of adaptation which included gaps, struggles and interaction that began when the refugees and exchange population began to indigenize.

[531] Turyan, "Kumkadı Köyü", 55.
[532]Turyan, "Kumkadı Köyü", 55.
[533]Turyan, "Kumkadı Köyü", 55.
[534] For the definiton of and discussion on hybrid knowledge, look at Chapter 5 and Chapter 6.
[535] Bayram Akıncı proudly shows off the situation of their village by highlighting their difference with the neighboring native village. He feels the proud their way of doing things; Personal Interview with Bayram Akıncı, Görükle Mübadil Evi, 29/06/2016.

4.4.3 Rice cultivation, prohibitions, struggles and refugees

Rice cultivation was not something new for Bursa peasants. In his great book of Hüdavendigar Livası Tahrir Defteri, Barkan mentioned the "*çeltikçi*" villages and the tax collected from the rice in the 16th and 17th century.[536] As discussed in detail in Chapter Two, coming to the end of the 19th century, we witness the increase in rice cultivation, both in the çiftliks and in small peasantry villages, despite the constant bans throughout the 19th century.[537] If there was a need for extra labor force for rice cultivation, as İnalcık indicated in his article,[538] did the refugees constitute additional labor force in rice cultivation, and was their impact limited to additional labor force?

In August 1899, Hasan Hüsnü, the Agriculture, Forestry and Minery Deputy Minister, (*Orman, Maden ve Ziraat Nezareti Muavini*) wrote that the refugees from Bulgaria who migrated to Bursa were competent in rice cultivation.[539] He said that in their migration to Bursa some of them immediately started to cultivate rice in which they were best back in Bulgaria.[540] According to him, however, due to fallacies, especially regarding health, most of the rice peddies were uprooted, except some in the far corners.

Limiting the increase in rice cultivation only with refugee settlement would be exaggerating their role in the spread, yet we should talk about some interactions, or at least make some speculations on these possible interactions. First of all, we

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[536]Barkan& Meriçli, *Hüdavendigar Livası Tahrir Defterleri.*

[537]Eliza Schneider talks about the prohibition of rice cultivation at the beginning of 1840s; Schneider, *Letters from Broosa, Asia Minor*, 48.Then Mac Farlane also mentiones the ban on rice cultivation; MacFarlane, *Turkey and Its Destiny, vol.I*. In Februray 1878 the cultivation of rice was permitted on the lands which were 2 hours far from city center, BOA, T.525/90, 1293 (Hicri)andGünaydın& Kaplanoğlu, "Marie de Launay", 160. Despite the bans there were consistent insistence by the Agricultural Officials and peasants on the cultivation of rice regarding probably its market value; on the report of Agricultural Official BOA, Y.PRK. OMZ.2/35, 1315 (Rumi); and some expamples on peasants' insistence BOA, ŞD.1546/23, 1303 (Hicri), BOA, DH.MKT.1752/13, 1306 (Hicri). In 1910s, state which could not be unconcerned about the insistence and spread of rice cultivation tried to regulate its cultivation on a scientific basis; BOA, T. 534/18, 1326 (Rumi).

[538]Inalcık, "Rice Cultivation and Çeltükçi Reaya", 93-4.

[539]BOA, Y.PRK.OMZ.2/35, 1315 (Rumi).

[540] Especially there are some documents addressing the cultivation of rice in Yenişehir by the refugees; BOA, BEO.3296/247176, 1324 (Rumi).

know that with the refugee flow the labor force increased, this was certainly a need for rice cultivation, especially in the çiftliks. Following İnalcık's argument on investments and the labor force and Hasan Hüsnü's claims on the quality of labor force, it was not surprising that there was rice cultivation on the Dikencik Çiftlik in Bursa, Çamandıra Çiftlik and Dombe Çiftlik in Mihaliç, the çiftlik inside the Ahi village, and Hacı İvaz Çiftlik in Bursa where wage labors or sharecroppers were employed. In addition to this in the same region, at more or less the same period, in Kazıklı, Izvat, Vakıf, Balatiyunus, Zırafte and Hasan villages the peasants were cultivating rice with or without permission. As expected, all of them were on the riverside. More important than that Vakıf, Izvat, Balatiyunus, Hasan, Kazıklı, Ahi and Hacı İvaz were located around the same marshland near Gölbaşı, close to Kumlukalanı where refugees from Bulgaria, (particularly from Karlovo) were settled, as mentioned above. The settlement of refugees on Kumlukalanı and the struggles to cultivate rice started around the same period. One document stated that Vakıf peasants began to cultivate some lands from Kumlukalanı which was supposed to be a pastureland.[541] The same document also stated that the refugees immediately started to cultivate the land, which caused land dispute with Vakıf and Samanlı villagers. Because some of their lands was covered by marshlands, the peasants of Vakıf village might have turned to rice cultivation on the marshland sides and cleared some lands from Kumlukalanı for grain cultivation. Or they had not yet started rice cultivation, but because some of their lands covered by marshlands, they opened up some lands from Kumlukalanı which is what led to their confrontation with refugees. After some time they might have learned how to benefit from

[541]BOA, DH.MKT.1782/61, 1306 (Rumi).

marshlands by cultivating rice, perhaps from refugees or perhaps from the surrounding peasants.

Here the aim is not say that settlement of refugees from Bulgaria, particularly from Karlovo and Plovdiv, initiated the rice cultivation in Bursa. Yet, they might have supplied the demand in labor force; secondly they might have served as a model to the surrounding peasants who had already realized the increase in market demand for rice cultivation. The intention here is to say that the natural and geographical features, the market conditions, the availability of extra labor and refugees' knowledge on rice cultivation combined the influence the spread of rice cultivation in Bursa.

Of course there are also opposite cases depending on the diversity of the refugee groups. The Circassian peasants who did not know rice cultivation, but were experts on animal breeding, were grazing their animals on rice peddies of Dombe Çiftliği in Manyas district.[542] The tax-farmers in the çiftlik were cultivating rice without permission, and the Circassian refugees were reporting this to the Hüdavendigar government in order to halt production. In response, the tax-farmers of the çifltik were petitioning that the Circassian refugees were grazing their animals on the rice peddies. The rice seeds were sown between March and May [543] which coincided with the beginning of grazing livestock on pasture lands. In this way, the fact that these refugees were not familiar with rice cultivation could have frustrated the efforts of the çiftlik-holders.

[542]BOA, BEO.AYN.d.881/261, 1291 (Hicri); BOA, DH.MKT.1562/10, 1304 (Hicri), BOA, DH.MKT.1728/55, 1304 (Hicri), BOA, DH.MKT.1748/29, 1306 (Hicri), BOA, DH.MKT.1752/13, 1308 (Hicri).
[543] Kalfayan, *Pirinç Ziraati*, *Cild 5*, 9.

4.5 Conclusion

As Hunt and Pam claim in their work, "Migration might transfer skills, as well as labor, bringing advantage to the host economy…"[544]. They question that the impact of Scottish migrant farmers had on the Essex locals, whereby they imply that it was not a matter of one type of knowledge vs. the other. The article gives the sense that the knowledge of the Scots could not be considered pioneering or transformative, unless taking into account the local environment and market conditions. Then their know-how and knowledge began to acquire a supplementary nature. It is at this point that we can discuss interactions.

In Bursa and Mihaliç the settlement of refugees was a complex process of land disputes and communal interaction concerning the agricultural methods and know-how. On the one hand, in trying to find places to live, the refugees found themselves in an environment of ongoing land disputes initiated by conflicting interests related to market conditions. While non-cultivated lands in the çiftlik made the çiftliks favorable settlement areas[545], the age-old usage rights of native peasants or the çiftlik-holders (who realized new opportunities of unused lands of the çiftlik) inevitably caused land disputes which mostly revolved around the status of waste or common land. In this way, the refugees could not escape from engaging in land disputes. On the other hand, this did not restrain their communal interactions regarding the agricultural methods and experiences. The refugee flow and their settlement became an important factor of change in agricultural knowledge in Bursa and Mihaliç. For that reason, rather than looking at the overall increase in population

[544] Hunt & Pam, "Agricultural Depression in England, 1873-96: Skills Transfer and 'Redeeming Scots", 81.

[545] The vakıf çiftliks and the non-cultivated areas in the çiftliks tried to be flourished by settlement of refugees as labor force; BOA, ŞD.113/19, 1304 (Hicri) mentioned the settlement of refugees on Arap Çiftliği in Mihaliç; BOA, A.MKT.MHM.495/75, 1305 (Hicri) on settlement on Balat Çiftliği in Bursa;BOA, A.MKT.MHM. 503/9, 1315(Hicri) on the settlement of Kızıllar Çiftliği in Mihaliç.

number, and thus the rate between the land and population, we should look at how the population increased.

In Mihaliç, the farmer refugees found land to sustain themselves through various means: claiming land from the marshlands, settling on land that appeared to be wasteland, or settling on land given by the governors. However, the formation of new çiftliks (which mostly came out of the need to graze sheep, as was mentioned in detail in Chapter 3) made retaining the land difficult for the refugees. They either became sharecroppers in the çiftliks or rented their land to animal breeders. Refugees who bred livestock could to some extent earn their living as long as they could preserve their grazing rights.

In Bursa, where the land was scarcer than Mihaliç, their settlement increased the land disputes, which centered around the grazing rights on the waste or common meadow lands. In Bursa again the non-cultivated çifltik lands was seen as a solution for refugee settlement. Their settlement coincided with a re-increase in mulberry gardens which were spreading throughout the waste or unused lands, and we see conflicting claims on these lands. In these circumstances, there are many complaints about animal attacks on the crops and gardens. As a result of need for more land, the refugees were settled on hilly lands of Uludağ Mountains where they claimed lands through slash-and- burn method. In this way, by putting more land under cultivation, the refugees served for the intensive use of gardens and vineyards as animal grazing areas, more so than before.

David Moon in his brilliant book on Russia indicates how settlers and native population in the Black Steppes of Russia looked differently at their environment, which determined their use of the lands and resources.[546] He says that whereas

[546] Moon, *The Plough that Broke the Steppes*, 165.

indigenous people developed practices suitable to the conditions of the steppe, the settlers from central Russia wasted the scarce resources of the steppe region and; "they ignored local agricultural practices".[547] He highlights that the settlers brought their knowledge with them and used that to try to cultivate the region, although this knowledge was contrary to the regional conditions. There was real improvement at the point when this knowledge began to interact with local knowledge. Otherwise it would have turned into something that would have harmed and destroyed the environment, as he underlines.

In cases of Bursa and Mihaliç, as the refugees and exchange population realized that they would in fact be permanent residents in Bursa, they began to observe the socio-economic conditions and tried to adapt their knowledge to the natural and socio-economic conditions of the region. They learned how to use the resources of the region and how to use their knowledge, sparking the interaction. The oxen of the refugees helped the çiftlik-holders to obtain iron plough. The Bulgarian refugee used his knowledge on applying sulphur in melon and water-melon and vineshoots which made them tastier and more robust to deal with the weather conditions. While some Bulgarian rose tree cultivators continued to plant rose trees, some abandoned it and turned to mulberry tree cultivation which is similar to rose tree cultivation but at the time generated more income in Bursa.

Under suitable natural and economic conditions tobacco cultivation spread among Bursa villages with the stimulus of refugees. Alongside tobacco, the presence of marshlands and market opportunities created perfect conditions for the spread of rice cultivation. Beyond a doubt, refugees who knew how to cultivate rice had an

[547]Moon, *The Plough that Broke the Steppes.*

impact. Was it a coincidence that rice cultivation was mostly seen in Yenişehir district, an area that was mostly settled by Bulgarian refugees?

Thus through this interaction agricultural knowledge of the peasants underwent a change to the extent that it fit to their needs, the local environment and in general to social, natural and economic conditions of the peasants. Thus, this chapter underlined that peasants' knowledge was not 'unchanging'. This, leads us to raise the question as to where such a label came from and why the knowledge of the peasants came to be perceived as 'unchanging' and 'backward'. These points made lead us nicely to the next chapter which aims to redefine peasants' knowledge within the framework of its relationship to another force; the state and its scientific agricultural knowledge.

CHAPTER 5

STATE AND SCIENTIFIC KNOWLEDGE

Previous chapters dealt with the environment, land and population as the main components of change in agricultural knowledge. We have seen that agricultural knowledge was the product of the relationship between environment and the people, but we have also seen that this relationship was not independent from state dominance. Even though the modern state posed itself as an ultimate authority, in reality it was something constantly 'becoming' with various relationships with social groups, as Migdal mentions.[548] Scientific knowledge became the means in this relationship, first to make authority concretely visible to reconstruct the economc capacities and then to control this relationship. Therefore, scientific agricultural knowledge was also 'becoming' in this relationship throughout the 19th century reflecting different phases of state agricultural policies.

In this framework, this chapter aims to argue the stance of 19th century modernizing state which tried to reconstruct the economic capacities to appropriate the greatest share of product surplus. As Alan Mikhail mentions "… [E]nvironments shape humans, humans then reshape environments, these new environments offer a new set of limits for humans, and so on and so forth"[549], 19th century centralizing states believed in scientific agricultural knowledge to maximize the product of this ever- shaping relationship.

In the Ottoman case, scientific knowledge enabled the government to control the agricultural production, but the meaning of scientific knowledge changed during the 19th century, as did the agricultural policies. At the beginning of the 19th

[548] Migdal, *State in Society*. *Studying How States and Societies Transform and Constitute One Another,* 270.
[549]Mikhail, *Under Osman's Tree: The Ottoman Empire, Egypt, and Environmental History*, 107.

century, the main concern was boosting production, and scientific knowledge meant only encouraging the peasants to cultivate high-demand crops such as cotton and preventing some factors that hindered the peasants from cultivation. In the middle of the century, scientific knowledge was regarded as necessary in fighting against diseases. At the end of the century, this knowledge was associated with productivity, 'development', hygiene, standardization and control, while peasants' agricultural knowledge came to mean 'backward', dirty and unorganized. The bureaucratic organization in the Ottoman Empire grew parallel with this change. At the beginning of the 19th century, a central and small bureaucratic organization was established with the aim of gathering information from the provinces. During this period, the central organization was content with assigning some extra agricultural works to provincial authorities. As the intentions of applying scientific agricultural knowledge grew, so did bureaucracy both at the central and the provincial levels.

The imagined dichotomy between scientific and peasants' knowledge ruled the agricultural policies throughout the last decades of the 19th century; yet despite these general claims, the meaning was bended due to the financial or other limits. By examining the fight against locusts, the aim is to show how the discourse and reality differed from one another and the meaning of scientific knowledge was changed accordingly. Hence, what scientific knowledge meant during the mid-19thcentury was not the same as in the late 19th and early 20th century.

First part of this chapter is dedicated to the discussion on the formation of 19th and 20th century centralizing states and how scientific knowledge came to be embraced by these states. The second part concentrates on the 19th century Ottoman Empire and how an agricultural bureaucracy was formed as the pioneers and advocates of scientific agriculture and what scientific knowledge ought to be

according to them. The third part of the chapter discusses the inconsistencies in politics through looking at the fight against locusts.

5.1 Centralizing states and scientific agricultural knowledge

Scientific agricultural knowledge meant not only to say something about "crop techniques, but the arts of economic management" says Louis Argemi D'Abadal.[550] It embraces economic and political thought, as well as the agricultural techniques at the same time. According to her, the French state had an agenda to maximize the surplus and turned this towards policy of economic management by employing scientific agricultural knowledge. For her, technical changes had already begun and agronomy (that is scientific agricultural knowledge) helped to formalize these changes in the spread of capitalism. According to Fox-Genovese, the physiocratic thought sees agriculture as the prosperity of states, thus capitalist agricultural development was vital for the survival and the development of the monarchy, for which agronomy had been used to determine the most suitable way. [551] Yet, this was not a linear process until the 20th century according to Nadine Vivier. She separates the state policies into three periods concerning the penetration of state into agriculture and the way in which agronomy was institutionalized.[552]

The American government relied on agronomy in 1862 with the establishment of the Department of Agriculture whose center focus was on 'the collection and dissemination of germplasm' to feed the vast population located in the federal states.[553] After several long years of struggle among different state

[550] D'Abadal, "Agriculture, Agronomy, and political Economy: Some Missing Links", 450.
[551] Fox- Genovese, *The Origins of Physiocracy: Economic Revolution and Social Order in Eighteenth-Century France.*
[552]Vivier, "The Interventions of the French State in Rural Society: The Major Concerns of the State, Mid-18th Mid 20th Century".
[553]Kloppenburg, *First the Seed: The Political Economy of Plant Bio-Technology 1492-2000*, 59.

institutions, the centralization in 1914 enabled an organized penetration and focus on agricultural production. In the 1910s and 1920s, it was common in the works of American writers on agricultural production that agricultural production should be maximized to feed the population and should produce enough surplus in order to save the nation. In 1927, Eugene Davenport wrote that "… no nation can endure unless it owns or controls sufficient fertile soil to ensure an abundant food supply".[554] He regarded scientific agricultural knowledge as a most efficient way of managing farms in order to maintain national independence and power. According to Edward Owen Dean the success of agriculture depends on to what extent scientific knowledge is applied in agriculture.[555] The government was invited to provide extension services so the scientific agricultural knowledge could be transmitted to the peasants, and the provider of this knowledge via education. Yet, it was in the 1930s when "…science became an important and transformative productive force in agriculture".[556] This was also when the seed failed to reproduce itself and when peasants became dependant on the market for the supply of seeds and the supplement of scientific knowledge in order to use the seed.[557]

In Russia, though the scientific agriculture goes back to the 18th century at universities, the government did not embrace it until around the 1880s, and particularly after the establishment of the Department of Agriculture in 1894. This Department mainly focused on investing in experiments and sending experts to rural Russia for further in-situ research.[558] The increasing reliance on agricultural science in Russia ran parallel with the process of ending serfdom, with a concern in increasing productivity, an idea that gained traction particularly after 1906 with the

[554]Davenport, *The Farm*, 407.
[555]Dean, *Opportunities in Farming*, 1919, p. 72.
[556] Kloppenburg, *First The Seed: The Political Economy of Plant Bio-Technology 1492-2000*, 35.
[557]Kloppenburg, *First The Seed: The Political Economy of Plant Bio-Technology 1492-2000*, 35.
[558]Leonard, *Agrarian Reform in Russia: The Road from Serfdom*, pp.197-8.

abolishment of serfdom by Stolypin.[559] Pallot says that "… 'the communal system' was held to be backward because of its traditional association with extensive rotations, simple technologies and subsistence production […] individualized farming' was held to be progressive because of its association with intensive rotations, modern technologies and commercially oriented production." [560] Yet, in his brilliant work David Moon indicates the changing understanding of scientific agriculture, in concordance with the change in natural conditions.[561] According to him, in the 19th century scientific knowledge was derivative of Western Europe, though it began to turn into an understanding of local conditions and environment at the end of the 20th century. To him, by then the real adoption of agronomy had begun,[562] which was triggered by the failure to meet grain and wood demand due to environmental problems and disregarding local knowledge.[563]

The subaltern studies show how scientific agriculture was used by the colonizers to suppress the local population and then how the discourse changed which has an important role in the discussion. Joseph Morgan Hodge tells how the agrarian policy of Britain changed from the 19th towards the 20th century. He says that Frederick Lagard, the director of British Mandate Commission underlined appropriate native policy, instead of the Western model, in order to develop both British and Indian agriculture.[564] In the 1920s, the researchers from Cambridge School of Agriculture attached importance to local environmental conditions and local methods in order to improve yields and quality. [565] Ajay Skaria discusses the continuity of this developmentalist discourse, in which agronomy was used to change

[559]Macey, *Agricultural Reform and Political Change: The Case of Stolypin*, 187.
[560]Pallot, *Land Reform in Russia 1906-1917*, 4 and for a good work on the limits of this reforms look at Kerans, *Mind and Labor on the Farm in the Black- Earth Russia (1861-1914*).
[561]Moon, *The Plough That Broke The Steppes*.
[562]Moon, *The Plough That Broke The Steppes*, 244.
[563]Moon, *The Plough That Broke The Steppes*, 274.
[564]Hodge, *The Triumph of the Expert*, 118.
[565]Hodge, *The Triumph of the Expert*, 149.

the ‘natural’ character of the peasants at the very beginning of the new-nation state. He says the discourse from ‘natural’ into ‘developmental’ was shared by the nation state to represent the notions of growth, development and modernization.[566] Akhil Gupta says that developmentalist discourses were mainly based on the policies “-to move- ‘out of agriculture”, as quickly as possible and to be modern.[567] This process was to be enabled with the development of agriculture with sufficient investment on capital, technology and science. Thus, agronomy became a significant part of nation-state politics. And certainly, it carried the agenda of standardization and disciplining to constitute a nation.[568]

Thus agronomy served states in achieving control of the resources to save the nation, to constitute a nation or to subjugate a nation. Whatever the cause, controlling and manipulating agricultural production was strongly associated with agronomy and scientific agricultural knowledge, because as James C. Scott claims in the formation of the modern state, in order to control every possible source of taxes, they needed to be monitored and standardized. [569] As Mauro and Hardison say peasant knowledge relied on collective and customary rights, thus it stood against the mentality of modern state, because customs are varied, oral and could not be centrally controlled.[570] Therefore agronomy, and thus scientific agriculture, was meant as a way of controlling agricultural production, and not only the end products, so the whole process of production entered into the agenda of centralizing states.

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[566] Skaria, “ Cateching The Natural”, pp.269, 73
[567]Gupta, *Postcolonial Developments.*
[568]Agrawal &Sivaramakrishnan, “Introduction”.
[569]Scott, *Seeing Like a State*
[570]Mauro & Hardison, “Traditional Knowledge of Indigenous and Local Communities: International Debate and Policy Initiatives”.

What do we mean by state if not a wide-spread bureaucracy with central and provincial organizations? Are these organizations stagnant or ever-changing? Instead of referring to state as an abstract notion, this chapter examines various meanings that agricultural knowledge acquired in different periods both to concretize the state as an organization, body of institutions, officials and relationships with various social groups, and to show the change in this organization. The first step is to shed light on the formation of central and provincial bureaucracy in the 19th century. Later, contrary to strong tendency in Ottoman historiography, PDA (Public Debt Adiministration/*Duyun-ı Umumiye İdaresi*), the Tobacco Regie and Chamber of Trade and Agriculture worked as provincial cooperators of central government in monitoring, registering and increasing the agricultural production; they did this by imposing and enforcing scientific agricultural knowledge. In the last section, this chapter examines the fight against locusts to show what scientific knowledge meant in reality and how this meaning changed over time.

5.2 Science, central and provincial agricultural organization in the Ottoman Empire

5.2.1 Central agricultural organization

In the early 19th century the motto was 'a rich treasury means a more powerful empire'.[571] Therefore, efforts were undertaken to enrich the treasury. Science and scientific agricultural knowledge had not yet become organized and systematic endeavors at that time. Berrak Burçak says that in the early 19th century the debate around science and scientific knowledge "was centered on the issue of the survival of

[571]Kılınçoğlu, *The Political Economy of Ottoman Modernity: Ottoman Economic Thought During the Reign of Abdülhamid II (1876-1909)*, 26.

the Ottoman state".[572] To that aim, during the early period of the 19th century, the first thing to do was to gather information.

Therefore, organizations established early on, concentrated on gathering information at the provincial level. The enforcement of science as the only legitimate way of increasing production, as the way of controlling, monitoring and standardization reared its head in the late 19th century when the state administration transformed into an instrument to shape the society, from that of an information gathering apparatus back in the early 19th century, according to Deniz Kılınçoğlu.[573] Yet, as we will see below, despite discourses and the intention to control society through science, the conditions that were needed for scientific knowledge to bring about the desired results were still under discussion at the late 19th century. At this point, it is important to separate the intellectual environment from the state policies. The establishment of private property and abolishing commons were on the agenda among the intellectuals.[574] However, for the Ottoman rulers small peasantry and the presence of commons were supported as checks and balances to the emergence of powerful land-holders, which is something we have discussed in previous chapters.[575] For that reason, the application of scientific knowledge turned to an instrument for the central state to pose itself as the ultimate authority to cover the financial deficiencies and to show its strength in the form of mass mobilization, as in the locusts example that will be discussed later in this chapter. Scientific knowledge was also a vehicle to control the realm of production when the central and provincial government failed to drain swamps, as well as to prevent disease and then to enforce

[572]Burçak, "Modernization, Science and Engineeringin the Early Nineteenth Century Ottoman Empire", 80.
[573]Kılınçoğlu, *The Political Economy of Ottoman Modernity*, 31.
[574]For the discussion on this issues see Chapter 3.
[575]Look at Chapter 3 for the discussions about the state policies on commons and chapter 2 on the swamps and large land-holdings.

standardization through education such as in silkworm production as we will discuss in the next chapter.

5.2.1.1 Changing meaning of scientific knowledge from the 1830s until the 1910s

During the early periods of agricultural organization in the 1840s, scientific agricultural knowledge was regarded as an instrument to respond to the increasing foreign demand on agricultural products, which had enabled producing a surplus and enriching the treasury with more taxes. As a matter of fact, the first Agricultural School was established in Istanbul to meet the foreign cotton demand and to teach scientific ways for encouraging and enhancing cotton production in Ottoman lands. The graduates of the school were to encourage the peasants to cultivate cotton all around the empire, but the school was closed after three years before the graduates could complete the program. The attitude of the time was that the peasants would eventually need scientific knowledge for the prosperity of the empire, but it was actually regarded as the last chain of public works.[576] The first thing to be done was to eliminate the obstacles that stood in the way of agricultural production. There was more to do to lead peasants into embracing scientific knowledge. The measures to be taken were designed like a development plan. Firstly, organizations centered on what the government could do for the public good.

The first central organization concerned with the agricultural development was the Council of Public Affairs (*Meclis-i Umur-ı Nafia*, 1838), whose duties included taking care of the development of agriculture in the Ottoman Empire. Claiming that the issues discussed in the Council related to public good, the aim of

[576]BOA, İ.MSM. 3/36, 1260 (Hicri).

the Council was set as discussing and finding ways to revive trade, agriculture and industry.[577]

In 1843, the first Council of Agriculture (*Meclis-i Ziraat*) was established to serve as a separate institution and was charged with taking care of the agricultural matters, and conducting investigations for increasing the agricultural productivity.[578]

During this early period, the organization seemed to be the central decision making mechanism that was based on provincial information in order to set a long-term development plan. In June 1843, surveys were prepared and sent to the provinces to gather information concerning the crops that were cultivated, the way the crops were cultivated, the agricultural implements used in cultivating the crops, the amount of lands under cultivation, the proximity of the lands to ports, the problems for which the cultivators asked for help and the state of manufacturing.[579] Meanwhile, first the Agricultural Directors were appointed to provinces and districts, while Deputy Directors were sent to subdistricts and larger villages.[580] As part of information gathering and bringing the provinces under the control of the center, the Directors and Deputy Directors were tasked with preparing reports on the state of agriculture in their locality. Their task was to encourage peasants to cultivate not only grain, but also cash crops, depending on foreign demand.[581] The Directors were also needed to regulate the timing of tithe collection so as to not interrupt the peasants during the harvest season.

While the Agricultural Directors were sent to the provinces, local notables were summoned in Istanbul with the aim of gathering information from the

[577]Birinci Köy ve Ziraat Kalkınma Kongresi, *Türk Ziraat Tarihine Bir Bakış*, 77.
[578]Güran, "Zirai Politika ve Ziraatte Gelişmeler, 1839-1976", 49. The Council was under the supervision of Finance Ministry which shows us that agricultural matters were perceived as part of financial matters, but in 1850 the Council was taken under the supervision of Ministry of Trade and Public Affairs and remained there until 1860; *Türk Ziraat Tarihine Bir Bakış*, 198.
[579]*Türk Ziraat Tarihine Bir Bakış*, 82.
[580]*Türk Ziraat Tarihine Bir Bakış*, 83.
[581]*Türk Ziraat Tarihine Bir Bakış*, 84.

provinces. Upon receving the information, in May 1845, councils of public works were established and sent to the provinces in order to make in situ examinations and prepare reports concerning the necessary measures to be taken.[582] What was underlined most in the reports was the burden of taxes, the inequality of taxes varying from region to region, the timing of the taxes which hindered the peasants from doing their agricultural work and the way the taxes were collected which most of the time led to oppression. The reports also focused on the need for drainage and improvement of transportation facilities.[583] These reports also portrayed the peasants as suffering from ignorance, and that they needed to be enlightened and led by the scientific principles in order to achieve maximum productivity. Enlightening ignorant peasants through science was seen as the essence of the empire's prosperity. But solving the above mentioned problems was presented as being the prerequisite for peasants to embrace scientific knowledge and increase production.

Developments in the 1850s and 1860s led scientific knowledge to acquire new meanings. During this period agricultural matters were under the authority of either Agricultural Directorate or the Councils that were under the supervision of the Ministry of Trade and Public Affairs.

Beginning from the 1870s both scientific knowledge and the central agricultural organization acquired new meanings. Science began to gain another meaning as a necessary instrument to fight against diseases. Pebrine (a certain kind of disease infecting silkworms), Phylloxera (a disease that harmed the viticulture), and other animal diseases that disrupted the agricultural production at certain intervals stood as obstacles in maximizing the production. As part of controlling all elements of production, the central government needed to eradicate these diseases;

[582] *Türk Ziraat Tarihine Bir Bakış*, 85.
[583] BOA, İ.MSM.3/36, 1260 (Hicri) and Güran, "Zirai Politika ve Ziraatte Gelişmeler, 1839-1976", 52-55.

and implementing scientific knowledge was the perfect instrument to execute this. Alongside eradicating diseases, scientific agricultural knowledge had more to do with agricultural production.

The Council of Trade and Agriculture that was established in 1876 received assignments concerning scientific agricultural knowledge.[584] Scientific knowledge came to entail fighting against the spread of diseases; improvement in seeds and animal species, and having the knowledge of using new agricultural implements; applying new methods of intensive crop rotation and as part of that introducing new and high-demand crops such as sugar beet.[585]

The Agricultural Directors in the provinces and other provincial officials were assigned to describe the benefits of intensive rotation to the peasants and to encourage them to cultivate accordingly. However, a total deduction and imitation of the Western model did not fit well into the local environment. A writer from Hüdavendigar explained that sugar beet was not in high demand by the peasants, because there were huge and sufficient meadows in the Hüdavendigar province, so they did not need to do intensive crop rotation by cultivating sugar beet. Furthermore because they did not have sugar mills, what would the peasants do with sugar beet.[586] Why would the peasants abruptly change the way they cultivate?

This report in the Hüdavendigar Yearbook has further importance for reflecting that the state was not a uniform and absolute organization and the policies could not be applied unquestioningly. The officials in the government- both in central and provincial levels- had different attitudes and stances. This report is like a memo to the central government about the applicability of the policies. In this way, it

[584]To see the Regulation in full length see *Türk Ziraat Tarihine Bir Bakış*, 198-9.
[585]*Türk Ziraat Tarihine Bir Bakış*, 198.
[586]*Salname-i Hüdavendigar*, 1301, "Vilayet Dahilindeki Arazi ve Hububatın Envaı ve Ziraatin Malumatıyla Bunlara Nazaran Muktezi Görünen Islahatı", Hüdavendigar Vilayeti Salnamesi, 256.

opens up a window to question the limits of these policies and the way in which these policies might have applied.

The Ministry of Trade saw that they needed to have experts in the web of the provincial organization in order to reach the peasants and get them to change their methods.[587] For Donald Quataert, the way in which agricultural politics were shaped was the result of the bureaucrats who came into the government after the 1870s.[588] To him, this period began with Krikor Ağaton Efendi who was Agricultural Director under the supervision of the Ministry of Trade and Public Affairs at the beginning of the 1870s. As a graduate from the Grignon Agricultural School in France, Ağaton Efendi published articles on the need for scientific agriculture and the methods in France.[589] His successor Amasyan Efendi who was appointed in 1879 as Agricultural Director was deemed by Quataert as the real pioneer of change in agricultural politics. To Quataert, the increase in the number of the experts in government that started with Ağaton Efendi induced a shift in the perception of scientific knowledge. As he claimed the perception on the significance of scientific knowledge shifted from a temporal interest toward a permanent instrument for agricultural reforms beginning from the 1880s onwards.[590] In her dissertation Elizabeth Williams writes that late Ottoman imperial officials increasingly asserted "… their capacity to use science and technology to shape and manage nature and the environment as a justification and explanation of their dominance".[591] For Yalçınkaya science was associated with a way of creating good subjects and citizens,

[587]BOA, T. 526/584, 1296 (Hicri).
[588]Quataert, *Anadoluda Osmanlı Reformu ve Tarım 1876-1908*, 88-92.
[589]Akpınar, "Bir Tanzimat Bürokratının Portresi: Krikor Ağaton Efendi (1823-1868)"
[590]Quataert, *Anadolu'da Osmanlı Reformu*, 90.
[591]Williams, *Cultivating Empires*, 2.

and thus boosting productivity, standardizing all subjects of the empire regardless of the religion, though Islam became fundamental during the Hamidian era.[592]

What I propose in this dissertation is that even though the officials used scientific knowledge to justify the dominance and authority, the meaning of science in this context changed based on the deficiencies of the central and provincial state. Additionally standardization as a means to consolidate control, was a phenomenon seen only at the beginning of the 20th century.

During the Hamidian era, roughly the era between 1880s and 1908, the policy of increasing agricultural production continued, though the policy included concepts of increasing control and standardization particularly at the beginning of the 20th century. For Donald Quataert agricultural schools and model farms were established during this period, even though they did not induce real change.[593] The next chapter will dive deeper into a discussion about these schools and what Quataert meant by change. Another important development during this time, according to him, was the establishment of the Agricultural Bank. The main intention behind this was to regulate the credit mechanisms to save the peasants from the oppression of local powerful people, however the newspapers were full of land that was for sale so the peasants could pay their debts.[594] As part of what scientific agricultural knowledge meant during that period, the government exempted agricultural machinery from import duty in 1890.[595] However, it was still difficult for the ordinary peasants to obtain even the basic iron plough, let alone other agricultural machines.[596] Among all

[592]Yalçınkaya, '*Their Science, Our Values: Science, State and Society in the 19th Century Ottoman Empire*, 22.
[593]Quataert,*Anadolu'da Osmanlı Reformu*.
[594]See all the issues in *Hüdavendigar*, last pages were reserved to the announcements.
[595]Quataert, *Anadolu'da Osmanlı Reformu*, 143.
[596]Murat Baskıcı says in his article that even the price of an iron plough was beyond the means of an ordinary peasants; The machines were even far away for the purchasing power of the peasants, Baskıcı "Machine Prices and Mechanizationof Ottoman Agriculture, 1860-1914"; Moreover as Magmumi states for there was not a possibility to repair the machines locally and it was hard to send

these efforts in the Hamidian era, because of several limits, most of the efforts had been put into education. While scientific knowledge was associated with European methods of cultivation without fallow and commons, abolishing commons was discussed and avoided by several departments in the government in order control the expansion of çiftliks.[597] Additionallly, as we will see in this chapter in fighting against the locusts, scientific methods were presented as mass mobilization in collecting eggs, so it was avoided from spending extra financial resources from the treasury.

Thus, due to several limits in enforcement scientific knowledge entered more and more into the domain of state education through the beginning of 20th century. During that period scientific knowledge included all the concepts of controlling, manipulating, standardizing and shaping the people and production. The meaning of science was consolidated by the dichotomy of 'advanced' as opposed to 'backward'. 'Traditional' came to be associated with 'backward'. 'Advanced' continued to mean resembling the 'European' model. In that way, while science was presented as the sole way of development; the peasants' knowledge became something that needed to be developed with the aid of science. This reflects the perception that scientific knowledge was a universal truth independent from local conditions, thereby reproducing the perception of the superiority of scientific agricultural knowledge over peasants' agricultural knowledge. According to Kloppenburg, such a point of view on peasants and the absence of local nuances could not be transformative in agriculture until the peasants' dependance on foreign

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them always to Istanbul, even the relatively rich landholders were reluctant to buy machines, Magmumi,*Bir Osmanlı Doktorunun Anıları*, 88. Even as late as 1916, the provincial agricultural official in Bursa asked for an annual budget for next year from the central state, to pass the machines from one village to another for the peasants to see and experience the machines in situ; BOA, DH. UMVM. 83/13, 1331 (Rumi).

[597]For a detailed discussion see Chapter 3.

seeds. Until that happened and without negotiation and mutual change, scientific knowledge did not induce all the changes that were aimed. The following chapter will therefore examine the relationship between education, scientific knowledge, and the knowledge of the peasants.

To return to the subject at hand, at the beginning of the 1880s, the Ministry of Trade and Public Affairs turned into the Ministry of Trade and Agriculture.[598] With the establishment of the Agricultural Inspectorate (1881), Chambers of Agriculture (1884), Veterinary Inspectorate (1885), Directorate of Agricultural Schools (1892), and the Commission of Scientific Agriculture (1894) under the management of the Ministry, the spread of science and scientific knowledge through several commissions and directorates was aimed. [599] The number of graduates from agricultural schools across Europe continued to increase as the central and provincial bureaucratic organizations diversified.

5.2.2 Provincial organization

As part of the growing interest in agricultural matters, Agricultural Directors were sent to the provinces in 1843. Before their duties were set out separately in a regulation, other officials were charged with taking care of agricultural matters. In a regulation issued in 1857, the provincial civil officials and *mal memuru* were tasked with gathering and sending information about the lands, çiftliks, vineyards, overall amount of products from these units, the amount of meadows and in what ways they were used (i.e. collectively or rented out or the grass of the meadow sold) in order to improve agricultural productivity which was the empire's essence of prosperity.

[598] *Türk Ziraat Tarihine Bir Bakış*, 201. Although Agriculture remained in the name of the Ministry, the name of the Ministry had changed to Ministry of Forest, Mining, Trade and Agriculture in 1893 and remained so until the Republican era.
[599] *Türk Ziraat Tarihine Bir Bakış*, pp.201-202.

After they sent the information to the central government, they were tasked with preparing a report on how to increase and improve production. The Agricultural Directors were to help and support them. [600]

In February 1864, the duties of the agricultural directors were made clear.[601] The first article starts with underlining why agriculture is extremely important for the empire: agriculture was the essence of the prosperity of a country.[602] While the directors were to be appointed to provinces and subprovinces, deputy directors were to be appointed to districts, subdistricts and large villages. One important condition for the deputies was they should come from the local population to ensure they would work hard for their homeland and use their local knowledge. The most important duty of the Agricultural Directors was set as serving to improve agriculture. Without mentioning science and scientific methods, agricultural improvement was defined as encouraging peasants to cultivate grain, and lead them to cultivate cash crops such as cotton, madder or silkworm depending on the local environment. Cotton was separately highlighted in the regulation in order to meet foreign demand. The directors were tasked with describing the methods of cotton cultivation and encouraging the peasants to grow cotton. Both the directors and deputy directors were charged with eliminating and regulating every kind of obstacle to agricultural production, which included regulating the relationship between animal breeding and harvest, preventing distraining the last draft animals and agricultural implements because of indebtedness, preventing land disputes to protect production and regulating the timing of tithe not to disrupt harvest. The directors had to report all the details about production, the crop and animal diseases, the amount of production to the provincial director or to the provincial governor. Based on these

[600]Düstur, Seri 1, vol.1, pp.555-558.
[601]Düstur, Seri 1, vol.1, pp-593-595.
[602]Düstur, Seri 1, vol.1, 593.

articles we can probably assume that in this period, the urgent task was encouraging and ensuring production as well as gathering information about the provinces.

In this early period, we can see that the major aim was to establish a link between the center and the provinces, based on efficient information from the provinces.The first step in controlling and boosting agricultural productivity was getting efficient and sustainable information. Most probably, the officials were not graduates from Agricultural Schools, thus it isdifficult to determine if there was a presence of experts. Especially, the deputies must have been from among the prominent farmers. Hence, regulating different pillars of agricultural production seemed to be a reasonable way of boosting production; educating the ignorant peasants to consolidate its dominance seemed to be the last steps of the development plan, as it previously mentioned above.

Nearly twenty years later, we see Cemal Bey, the Consultant of Agriculture and Public Affairs (*Ziraat ve Nafia Müşaviri*) in Hüdavendigar province.[603] As the graduates from agricultural schools around Europe came back to the Empire and scientific knowledge became prominent in agricultural development, the graduates started to be dispatched to the provinces with several responsibilities. With the emphasis in science and scientific knowledge, a dichotomy between the peasants' knowledge and scientific knowledge came to the fore. What was expected from these experts was pioneering agricultural improvement which was conditioned to the introduction of scientific knowledge and covers seed improvement; non-fallow agricultural methods; new agricultural implements; eradication of all kind of diseases, thus protecting the productive forces and controlling all phases of production; having the peasants produce a rich variety of products, especially those

[603]BOA, ŞD.1560/5, 1309 (Hicri).

in high demand; and as a prerequisite to all of these saving the peasants from ignorance.

To meet these goals, agricultural inspectors were appointed to provinces starting from the 1880s. These inspectors were the graduates of the famous agricultural schools of Europe. However, not all the provinces enjoyed the presence of the Inspectors. As Quataert mentioned only two Inspectors were appointed to Adana and Aydın.[604] Even though the area under inspection was extended to Ankara, Sivas, Trabzon and Erzurum, most of the provinces were under the supervision of Consultant of Agriculture and Public Affairs. Among one of them, Hüdavendigar was under the supervision of a Consultant from 1888 until 1906, and from 1888 to 1896 Cemal Bey was the Consultant.[605]

Cemal Bey was a graduate from the Agricultural School in France, entered into state service in 1883[606] and was appointed as Consultant of Agriculture and Public Affairs of Hüdavendigar in 1888. [607] He undertook several responsibilities concerning public works and agricultural matters in the province such as credit issues, the indebtedness of the peasants and what to do to ease the burden; the state of the swamps, possible ways to drain the swamps, the benefit of draining swamps to agricultural production; floods and the damages caused; silkworm and cocoon production; being a member in the exam committee for graduates of the Silk Institute; locating and identifying animal and plant diseases, finding ways to fight the diseases and comunicating these to the peasants; protecting the forests and implementing necessary regulations; settling the relationship between Regie and the tobacco producing peasants; supervising every stage in the establishment of the

[604]Quataert, *Anadolu'da Osmanlı Reformu*, 91.
[605]*Salname-i Hüdavendigar*, 1306 and 1314; and Quataert, *Anadolu'da Osmanlı Reformu*, pp.92-3.
[606]From his own account, BOA, ŞD.1560/5, 1309 (Hicri).
[607]*Salname-i Hüdavendigar*, 1306.

Agricultural Practice School in Bursa ranging from financial issues to preparing the curriculum of the school.[608] He said that in order to be efficient in performing all of these duties he established a Scientific Committee in Bursa which consisted of the chief engineer of public works, the provincial veterinarian and other related officials in the province. But still, he complained that although his position was a consultant, the Ministry treated him like Agricultural Inspector. He could not handle all the tasks that were assigned to him, so he asked for an agricultural inspector to be appointed to the province, which took another ten years. [609]

No matter what the name of the position was, Cemal Bey was over-burdened with several tasks, and was unable to establish a connection with the peasants. He attempted to find sustainable solutions to the local environment, but still he remained somewhere in between reaching the peasants and implementing decisions from the center. In 1893 he wrote to the Ministry that foreign grain seeds would ultimately annihilate local seeds and damage local production. For that reason, instead of foreign grain seeds he asked for a provision of local seeds to distribute to the peasants in need.[610] Yet, the Ministry still sent foreign seeds and wanted him to inform the peasants, to distribute these seeds and to send a report of the harvest results. The only thing Cemal Bey could do was to write to the Ministry that the seeds were distributed equally among the peasants in need. In that case what can we say about the provincial officials and their relationship with the peasants and with the Ministry? And what can we say about the actual policy of scientific agricultural knowledge?

With the establishment of agricultural schools, lower-ranking officials were able to get through to the peasants. In 1893, the Village Administrative Council

[608]BOA, ŞD. 1560/5, 1309 (Hicri).
[609]Quatatert, *Anadolu'da Osmanlı Reformu ve Tarım*, 91.
[610]BOA, ŞD. 1560/5, 1309 (Hicri).

decided to task the graduates from agricultural schools and from the Civil Service School to provide the peasants with information on scientific methods and knowledge all around the countryside, similar to extension services. However, because this could not be carried out, the Council decided to open this up to the public through teaching scientific methods and knowledge in agriculture in high schools.[611]

In 1900, with a regulation of the Provincial Agricultural Inspectors and Instructors of Agricultural Schools (*Taşra Ziraat Müfettiş ve Muallimleri Hakkında Nizamname*), the agricutural instructors were tasked with not only teaching courses in the school, but also acting as experts and extension services. The instructors were to improve the seeds, to encourage the use of the new agricultural implements, to improve the animal species, to demonstrate to peasants how to treat plant and animal diseases, to organize collective courses for the peasants and to open model farm on the lands of local peasants who demanded it.[612] The Inspectors were there to supervise the instructors, report anything they deemed necessary to the higher authority in the province and manage the model farms and agricultural schools. While Inspectors became like supervisors, the instructors were expected to act as the officials of extension services in their locality.

In this complex environment of provincial agricultural directors, inspectors, instructors and experts, in the first decades of the 20th century, scientific agricultural knowledge was completely embraced as a higher knowledge to which the peasants had to comply, and it was enforced to peasants accordingly. Even though the content of scientific knowledge will change in the case of fighting against locusts, the claim of scientific knowledge as a high goal that needed to be reached sooner or later

[611]Bursa, 3. Sene (111), 1 şaban 1310/15 şubat 1308, p.4.
[612]Düstur, seri1, vol.7, pp.398-400.

became state policy. The higher scientific knowledge became, the lower the peasants' knowledge was presented. This sharpened dichotomy meant that the peasants' ignorance was regarded as the major obstacle to agricultural improvement, which could only be achieved through applying scientific knowledge. Agriculture could not be improved so much because new implements were not as widespread as expected, and this was seen the result of the ignorance of the people.[613] Animal and plant diseases could not be eradicated, because according to the government officials, the ignorant peasants did not comply with the scientific measures.[614] Rice cultivation in Bursa done by adhering to the scientific principles produced good returns, but the major obstacle to rice cultivation was assumed to be the peasants' ignorance and false-reasoning between swamps and rice cultivation.[615] Thus, the application of science was associated with control, standardization and overcoming environmental deficiencies which would give way to improvement of agriculture. Again what stood in the way of science was the ignorance of peasants. This reflects how the dichotomy was established in politics; science as something advanced and the solution to all, on the contrary peasants' knowledge was something backward. In that way, educating the backward and inferior peasants by using the superior and advanced scientific knowledge which was in the domain of state services, it was created as a space to enter, control and shape by the state which was posed as the ultimate authority. To be the ultimate authority control should be achieved, particularly a control on production and producers. Thus, most of government efforts were oriented towards education. But in reality, the policies were not able to be imposed, because the relationship between the state in the form the implementors in the local level (such as

[613]BOA, DH. İD. 80/45, 1330 (Rumi).
[614]BOA, DH. UMVM. 83/13, 1331 (Rumi).
[615]BOA, DH. UMVM. 83/13, 1331 (Rumi).

teachers, imams, elders, local prominent people and other social groups[616]) and the peasants was not one-dimensonal. As we will see in the next chapter, it was two-dimensional process where scientific knowledge and peasants' knowledge shaped each other according to the local environmental features and necessities.

5.2.2.1 Local cooperators of central state: PDA, Tobacco Regie and Chambers of Trade and Agriculture

The Public Debt Administration (PDA) was established in 1881 in Istanbul after the issuance of the Muharrem Decree.[617] Later, attached directorates were established in some provinces. In Bursa this was established in 1884/5.[618] This administration undertook several responsibilities in agricultural production in Bursa. As we see in the provincial yearbook, its structure consisted of both foreign and local people, and thus had a sort of local connection.[619] The main focus of PDA was to maximize production and control the maximized production in order to collect the debts. To that aim, production needed to be regularized and standardized; and scientific agricultural knowledge was the perfect instrument for this. In this vein, the major development was the establishment of the Silk Institute under the supervision of the PDA. [620] To achieve control the PDA brought about some regulations for cocoons sold in the market. Cocoons without certificate could not be sold on the market; this was an important step taking control of all aspects of production, but to what extent control could be achieved is discussed in detail in the next chapter. The PDA financed competitions and exhibitions to encourage the spread of scientific methods,

[616] For a discussion in detail on education policies in the Hamidian era see Küçükceran, *The Agrarian Economy and Primary Education.*
[617]Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 908.
[618]*Salname-i Hüdavendigar*, 1302, 485.
[619]*Salname-i Hüdavendigar*, 1302, 485.The first Administor of Bursa Duyun-I Umumiye Administration was Refet Bey, and the first Inspector of PDA was Mösyö Karaben.
[620]For detailed discussion on the role of PDA in he establishment of Silk Institute see Chapter 6.

to control and to bring production under standardization, and of course increase productivity. It also financed free distribution of seeds when the central didn't have enough funds.

The Tobacco Regie was established in 1883.[621] Like the PDA, the Regie Administration also aimed to bring control and standardization in tobacco production. In Bursa the Regie was established in 1888/9 including an Agricultural Department and an office of Agricultural Improvement- which shows the intention of the Administration.[622]

According to the regulation issued in December 1886 all tobacco producers were to obtain permission from local Regie Administrations. The permissions were conditioned to the necessary regulations and 'improvements' on the plots where tobacco would be cultivated. Products without permission could not be sold on the market. However, several peasants objected to these regulations, claiming that the conditions were too difficult to put to use.[623] Agricultural directors tried to find a compromise between the Regie and peasants.[624] But still, it is hard to say that the Regie achieved full control on production based on the news in the newspapers about the increased smuggling in tobacco.[625]

Another cooperator was the Chamber of Commerce and Agriculture established in Bursa in 1889. This Chamber constituted of the wealthiest in the locality (i.e. çiftlik-holders, rich merchants alike) and discussed agricultural production and commercial issues such as the market price of the products or the

[621]"Zürraın Rejiye ve Rejinin Zürraa Karşı olan Hukuk ve Vezaifine ve Ahkam-I Cezaiyeye Dair Nizamname", Düstur, seri 1. Vol.5
[622]*Salname-i Hüdavendigar*, 1306, 68.
[623]For the details see Chapter 3.
[624] Cemal Bey wrote the Ministry that he tried to find a mid-way between Regie and peasants; BOA, ŞD. 1560/5, 1309 (Hicri).
[625]See Chapter 3.

import facilities.[626] The discussions were not meant to apply to the decisions, but to find possible ways to solve the problems, and prepare reports accordingly, which would be then be sent to the related provincial authorities. Even the land disputes were discussed and the possible ways to resolve these conflicts were submitted to provincial governor. Additionally, the chamber sometimes financed the distribution of free seeds or free plants to encourage production. In May 1912, the duties of the chamber were set as organizing exhibitions and competitions, improvement in seeds and livestock, forming model farms, opening agricultural schools, supplying credits to the peasants for the new agricultural implements, financing the works for draining swamps, fighting against the diseases and the agricultural pests and applying the rules in rice production.[627]

Differing from the PDA and Regie, the Chambers were attributed more in undertaking the financial burden of agricultural works. While the PDA and Regie acted to consolidate the claim of the central state on the necessity of scientific knowledge and the policies aimed by using scientific knowledge, the Chambers were charged with financial matters.

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As part of increasing aims of control and shape at the turn of the 19th century, every factor that made peasants uncontrollable became the target; dirtiness was on the agenda. Omnia El-Shakry says that the 'natural' unhealthy conditions of the peasants were associated to their ignorance and they needed some form of monitoring[628], and of course education to teach them the correct hygienic practices. To her the concern and strong emphasis on hygiene was part of 'generating a productive and vital

[626]BTSO, *Bursa Ticaret ve Sanayi Odası İlk Karar Defteri 1889-1904*.
[627]Düstur, seri 2, vol.4.
[628]El-Shakry, *The Great Social Laboratory*, 138.

population'.[629] Generating productive population would mean that control and standardization had been achieved. In a similar way, Alan Mikhail says that even though the plague had been part of the Egyptian society for centuries-long, in the 19th century the plague acquired an 'anormal' meaning for the centralizing state as an obstacle to the productive forces.[630] Science became an instrument to eradicate the disease and help to overcome anything that posed as an obstacle to productivity.

Cem Doğan says in his article that hygiene is important for society because it makes social life organized, simple and controllable; thus it symbolizes establishing control.[631] In that way, he revisits the new meaning of rats in the city and agricultural life in the 19th century. Socially rats had been relocated to the domain of 'dirt' and needed to be exterminated. In the agricultural domain, rats were seen as an obstacle to achieving maximum yield. At this very point central government got involved into the issue through obligations to hunt rats and mice in the fields.[632] Similarly, locusts attracted the attention of the centralizing state in the late 19th century. Again, the claim was that it was necessary to use science and scientific methods to fight against locusts in this domain to justify its control and dominance over production. However, what science and scientific knowledge came to mean was mass mobilization, when the government's financial situation hindered it from importing special viruses or chemicals. When locusts control started to be fail, chemicals came to the fore as state policies. In other words, when the rulers didn't have the means to implement something, they extended the domain of scientific knowledge; in this case, with chemicals and viruses.

[629]El-Shakry, *The Great Social Laboratory*, 140.
[630]Mikhail, *Nature and Egypt*, 200.
[631]Doğan, "20. Yüzyılın Başında Galata Limanında Hijyen, Veba ve Farelerle Mücadele", 331.
[632]Doğan, "20. Yüzyılın Başında Galata Limanında Hijyen, Veba ve Farelerle Mücadele", 334.

5.3 The meaning of scientific knowledge when science placed an extra-burden on the treasury- the case of fighting against locusts

Jacob Tropp says that in Africa colonial state used fighting against the locusts to establish its authority. However, they "… intruded into the […] local ritual and environmental knowledge".[633] From that point onwards fighting against locusts turned into a power struggle between local and colonial authorities. He says that a deeper understanding of meanings in local environmental knowledge offers new insights to understand relationship between the state and the peasants.[634] Geoffrey Evans explained in his article in 1947 how colonial mentality worked to establish control on the Middle East. Through the methods that they produced in London they tried to exterminate the locusts, regardless of the local conditions with the conviction that science was universal and used to subjugate the nature. [635]

Etienne Forestier-Peyrat looks at fighting against the locusts from another point of view; claiming locusts were a common enemy this enabled the Soviet State to establish itself on the same side with the population in the newly colonized regions.[636] He says that the state represented itself as the only authority which was able to fight against this common enemy through the scientific methods. In this way it is aimed both to be the sole authority in subjugating the nature and in encouraging agricultural progress. By enforcing scientific methods as the only way in fighting against the locusts (all other local ways were forbidden), it is aimed to eliminate the power struggles and to establish the single authority as the provider of science.

[633]Tropp, "Locust Invasions and Tensions over Environmental and Bodily Health in the Colonial Transkei", 115.
[634]Tropp, "Locust Invasions and Tensions over Environmental and Bodily Health in the Colonial Transkei", 123.
[635] For the scientific methods and the discussions see Evans, "Scientific Locust Control".
[636]Forestier-Peyrat, "Fighting Locusts Together: Pest Control and the Birth off Soviet Development Aid, 1920-1939", 537.

For centralizing Ottoman State in the 19th century for which also increasing and controlling the agricultural production was on the agenda as central policies, locusts stood on the uncontrollable side. In the way of controlling this domain through the discourse of scientific knowledge, locusts needed to be exterminated, though what scientific knowledge meant could change over time. The controllable side included putting every possible labor force into agricultural work, including semi-nomadic and unruly population. Particularly for the population in Aleppo, Urfa, and Diyarbakır region the obligation to collect locust eggs turned into a way of controlling the local population there. For the local population it became a stand against the obligations that were enforced by the state.[637] Thus, locusts became the realm of power struggle. From the perspective of semi-nomadic people, the fight against locusts was meaningless, because they could always have gone to other lands where they could graze their sheep.[638] Even for the settled peasants, the state's mandate to collect locust eggs meant not being able to engage in agricultural works in April and May, which was the season when they tended to their trees. [639]

Locusts were not new to the Ottoman Empire, but what was new was the vigourous interest of central government and the insistence on using scientific methods and knowledge to eliminate them. What was this scientific knowledge and methods? In 1881, Parsagyan published a book about how to exterminate the locusts.[640] At the beginning Parsagyan explained why locusts are deemed harmful; they harmed agricultural products and caused famines.[641] Different from other insects, locusts belonged to the 'other' side which needed and deserved to be

[637]Yıldırım, "Birinci Dünya Savaşı Yıllarında Osmanlı Devletinin Beşinci Düşmanı: Çekirgeler", 1032.
[638]For this information, I appreciate Yener Koç who work on nomads and semi-nomads in Eastern Anatolia region.
[639]Erler, "Kıbrıs'ta Çekirge İstilası", 199.
[640]Parsagyan, *Çekirge ve Onu Mahvetmenin Çareleri*.
[641]Parsagyan, *Çekirge ve Onu Mahvetmenin Çareleri*,3.

exterminated. He went onto describing the life cycles of locusts and the conditions under which the insect lives; according to him, knowing how locusts live makes it easier to exterminate them. According to him, the most efficient method was to first follow the locusts to find where they left their eggs, then till the soil in the fall and spring to unearth the eggs, and lastly crack the eggs or collect them to be buried. If the eggs hatched, the larva needed to be gathered and buried before it turned into flying locusts. This method of perfect timing in collecting the eggs and larva was embraced as scientific methods and scientific measures by the central government at that period. What was different from the old methods was following the locusts and predicting the possible regions where locusts could leave their eggs, other than that the ways of exterminating the eggs were the same.[642]

In February 1891, based on the above mentioned principles the first general regulation for fighting against locusts was issued.[643] Until then, the local governments tried to take precautions against the locusts in consultation with the central government. However, in 1891, through this regulation a standard way of fighting against locusts was introduced. According to the regulation each village headmen and village council of elders were required to follow the locusts and locate where these locusts left their eggs, if they see locusts in their locality. Once they locate the field, they were obligated to inform someone at the higher administrative level. Upon receving this information, higher level authorities, be a subdistrict director or district governor, were to move to the region and confirm the field. Then the directors and district governors had to inform the higher administrative authorities. Under the supervision of directors or district governors, there had to be a

[642]BOA, A.DVNS.MHM.d. 24/628, 982 (Hicri), in this document the qadi of Yenişehir was commended to burying the locust eggs and larvas into a deep hole.
[643]Yıldırım, "XIX. Yüzyılın Sonlarından İtibaren Halep Vilayetinde Çekirge İstilalarına Dair Notlar", pp.541-2.

commission consisting of five or six local people from the region where locusts were located. This commission had to mobilize the local people to collect eggs, assign the minimum amount of eggs that each person is obliged to collect, prevent the abuses accordingly, supervise burying and extermination of the eggs in the holes.[644]

After hearing about the locust outbreak in İzmit, Pazarköy and in surrounding region in 1893, Cemal Bey, the Agricultural Consultant of Hüdavendigar headed to the region and wrote a report about what had been done and what could be done for the coming year.[645] By using an age-old method, some people in Karamürsel district stretched out a massive piece of American fabric to direct the flying locusts to fall into a large hole so they can be burried. However, for that year, not much could be done because most of the locusts became flying insects. One possible reason behind the failure to exterminate the locusts on time when they were still larva was the low population/land ratio in some places such as Balova. Another reason, according to him, was that in some villages, the village headmen misinformed the subdistrict directors on the number of larva. After the local communities collected a certain amount of eggs, they stated there were so few larva left that it was unnecessary to continue collecting them. But due to this information, the larva left behind turned into flying locusts and spread throughout the surrounding regions.

For the next year, the precautions would first following the flying locusts and locating the fields where they left their eggs. Those who located these fields could receive a monetary award as reinforcement, and those who did not inform the authorities about the location were to be subjected to punishment. Secondly after the fields were located the local district people people – people in the surrounding

[644]Yıldırım, "XIX. Yüzyılın Sonlarından İtibaren Halep Vilayetinde Çekirge İstilalarına Dair Notlar", pp.541-2.
[645]BOA, DH. MKT.110/39, 1309 (Hicri).

districts if necessary – should be mobilized to collect the eggs, or if the eggs hatched, to collect the larva. Thirdly the commissions that were set in these regulations needed to be supervised by the district governor or *mutasarrıf* himself, and the collected eggs and larva were given to the authorized official under their supervision.

What Cemal Bey had done was nothing more than underlining the mass mobilization in collecting the eggs and larva in time. For Cemal Bey, as the highest scientific authority in the province, at that period of time, the scientific method was burying the eggs and larva into large deep holes and covering the upper layer of the holes with lime, just as how Parsagyan described in his book.

In the spring of 1896, after hearing about the locust outbreaks in the provinces, the Minister of Forest, Mining and Agriculture asked the Grand Vizierate to send a sample of the chemicals they had used in Algeria to successfully exterminate locusts.[646] But the response from the Grand Vizierate was that the chemicals and other scientific measures could not be financed – meaning that the only scientific method that could be applied in the Ottoman Empire was collecting the eggs and larva at the appropriate time. Therefore, it was up to the local governors to carry out mass mobilization at the perfect time, and they would be severely punished for not doing this. Thus, this came to be known as the scientific methods to go by due to financial difficulties. By using this discourse of scientific methods it was aimed to establish control and to make itself in this realm by authorizing agricultural directors, agricultural consultants, agricultural officials and agricultural inspectors in supervising egg collection.

Collecting and burying the eggs or larva and the mass mobilization with perfect timing was seen as the sole scientific methodto be used in preventing the

[646]BOA, BEO.780/58474, 1312 (Hicri).

outbreaks in the coming year which continued to be stressed until the first decades of the 20th century.[647] However, as the outbreaks of locusts continued, some people began questioning the method.[648]As mass mobilization was not effective, some local governors who sought other scientific methods such as viruses or chemicals invited some experts from foreign countries.[649]

In November 1912 another regulation in fighting against the locusts was issued. [650] This regulation contained more details about the procedures in exterminating locusts. Differing from the previous one, the peasants who located the locust pods were to be awarded with some money. [651] Additionally how the eggs should be collected was also elaborated. The peasants were to till the soil with their own agricultural implements if there weren't enough inhabitants in a particular location, the population in the surrounding area (which could be three hours away) had to help with their own machines to collect eggs or larva. The regulations also established two commissions one in the central province or subprovince and the other in the subprovince and district where the locusts were located. The head of the first commission was to be provincial governor or *mutasarrıf,* and the members were to consist of one official from Provincial Administrative Council, one from municipality, one from Chamber of Commerce and Agriculture, The Agricultural Cadaster Technician (*Ziraat Fen Memuru*) and one from Provincial Accounting Office. In the second commission the head was to be the highest administrative authority, and members had to be an official from the administrative council, one from the municipality, one from the Chamber or Commerce and Agriculture, Agricultural Cadaster Technician and one official from the Department of Finance. If

[647]BOA, DH. MUİ. 100/19, 1328 (Hicri).
[648]BOA, BEO, 3560/266953, 1325 (Rumi)
[649]Gökmen, "Batı Anadolu'da Çekirge Felaketi", 156.
[650]*Çekirgenin İtlafına Dair Kanun ve Talimat*
[651]*Çekirgenin İtlafına Dair Kanun ve Talimat,* 2.

the Chamber of Commerce and Agriculture and Agricultural Technician did not exist, two peasants from the region were to be members.[652] The central commission was to prepare a list of expenditures, while the provincial commission was to set the amount of eggs and larva that each person in the locality had to collect and the size of the land that the peasants had to till to uncover the eggs.[653] The regulation detailed the ways of exterminating the locusts; large holes far away from the villages were to be made and the eggs and larva were to be buried as the official supervised. Then the holes were to be covered with lime and then with soil.

In this regulation the presence of agricultural officials and local cooperators of government turned the fight against locusts into a more organized struggle. It was assumed that these officials could insert more control in this struggle. In this manner, scientific knowledge still meant the same thing; more organized, standardized and controlled way of exterminating the eggs. Thus the claim of scientific methods in the form of mass mobilization was consolidated by this regulation, this time with an increased involvement of state embodied in officials and local cooperators.

However, the inadequacy of mass mobilization in preventing the outbreaks of locusts, led the rulers to extend the meaning of scientific methods from mass mobilization to using chemicals. In 1916, huge zinc sheets were imported to fight against the locusts especially in Aleppo. Additionally uranium and arsenic were imported and brought to the region. Far more locust eggs and larva were exterminated via these methods than the previous year.[654] At the same period, foreign specialists were invited to the Empire to advise on scientific solutions to the extermination. A German specialist named Mr. Bücher was invited to exterminate

[652] *Çekirgenin İtlafına Dair Kanun ve Talimat*, 8-9.
[653] *Çekirgenin İtlafına Dair Kanun ve Talimat*, 10.
[654] Yıldırım, "XIX. Yüzyılın Sonlarından İtibaren Halep Vilayetinde Çekirge İstilalarına Dair Notlar", 552.

the locusts, especially in Aleppo and Urfa, he was later honored by the Ottoman state.[655]

In this way, the meaning of science and scientific knowledge extended to using some chemicals- inspite of the financial cost- alongside mass mobilization, only when it proved to be fruitless, thus did not enable the government to control the nature and production. What led the central state to extend this meaning of scientific methods to encompass the usage of chemicals, something that had been previously avoided due to financial difficulties? One possible answer might be that if using scientific methods as a discourse was desired to be continued and its superiority to be enforced on the people, science needed to create some sort of superiority in overcoming these problems. For this reason, when mass mobilization and collecting the eggs did not work after some time, the meaning of science needed to be changed. If scientific knowledge and discourse could not offer solutions to the peasants, there would be no way to establish another interaction between the peasants and state. Why did the state ship these chemicals particularly to the Southeastern Anatolia and Northern Syria, but not to other regions? In looking at the specific date it is possible to think that when the masses could not be mobilized due to the World War 1 and the separatist movements, by directing its financial sources to the chemicals, the authority tried to be invented as a power which can subjugate the nature by the help of science. Furthermore, the famine in Syria at that period made the visibility of state and fighting against locusts more urgent than before. Likewise, the invitation of a German specialist, Mr. Bücher, addresses the German impact in Syria and nearby regions.

[655]BOA, HR. İD. 1339/24, 1915 and BOA, İ. DUİT. 70/33, 1335 (Hicri).

5.4 Conclusion

At the beginning of the 19th century, the intention of a centralizing Ottoman state was to increase and to establish control over the increasing resources with the motto that economic power meant political power. Because economy was mainly agrarian, the main target was to increase and appropriate agricultural revenues. In order to do this, what needed to be done was to encouraging the production of crops in high-demand, particularly cotton to benefit from the rise in cotton demand. Then, the interest on scientific knowledge oriented towards a particular field; cotton production. For that purpose a high-level education, the Ayamama Agricultural School in Istanbul was established, though it was short-lived. Scientific agricultural knowledge had been, then, in a specific realm.

A central bureaucracy was then formed during that period to find possible ways to encourage development in agriculture. At the beginning of the 19th century, the commissions tried to carry out certain duties related to this matter, however, this proved to be insufficient for agricultural works. During the same period, the policy was to gather information from the provinces in order to create a development plan. The major problems that transmitted from the provinces were inequality, tyranny and bad-timing in tax collecting, problems of credit relations and swamps, all of these were seen as the major obstacles to boosting production. Though educating the peasants was discussed as part of a developmental plan, it was not deemed as an urgent problem for production, and could be delayed until the later stages of the development plan. The provincial officials were charged with encouraging the peasants to cultivate high-demand crops, preventing the abuses of tax-collectors both in the amount of tax and in timing and precluding land disputes as a hindrance to agricultural production. Part of their duty was to inform the Ministry on the condition

of agricultural production such as the amount of çiftliks and small-peasantry farms, the crops that were cultivated, the methods of cultivation, the state of swamps and possible solutions to them.

Beginning from the 1860s as the diseases appeared to cause a diminish in agricultural production, especially in cocoon production- which was one of the cultivation activities that generated the most income in the Ottoman Empire- science began to take on other means and meaning. In addition to an instrument of meeting the demand for market demand, scientific knowledge appeared to be in an urgent need in order to fight against the diseases. In the 1870s, scientific knowledge meant improvement in seeds and animals, having the knowledge of using new agricultural implements, applying new cultivation methods- particularly western type of cultivation without fallow methods- and cultivating various high-demand market crops. Scientific knowledge began to enter into all spheres of agricultural production.

This needed to be embraced by the peasants. The ignorance of the peasants however, appeared to be a challenge to further developing agriculture. To that aim, agricultural inspectors and agricultural consultants were appointed to the provinces in order to get the peasants to embrace scientific knowledge in their agricultural production and lead agricultural development. As all the policies failed which included encouraging new machines, regulating credit mechanisms through the Agricultural Bank and fighting against the diseases failed, scientific knowledge was seen as a vehicle to control and it acquired a ‘higher’ meaning to that of the peasant knowledge.

In this manner, scientific agricultural knowledge shifted more and more to the domain of state education which at the same time served creating more standardized and controllable subjects. In this vein, in order to achieve control, the

meaning of scientific method and knowledge was subjected to change. While rice cultivation had not been allowed before due to the unsanitary conditions it had caused, it was allowed with the condition of planting willow or eucalyptus trees (scientifically proven way of draining the swamps) on the borders of rice fields. The non-fallow methods and the recognition of private property- which was accepted as 'advanced' farming method- were ignored by both the provincial and central authorities. They allowed the common usage of meadows in order to create a balance between the spread of çiftliks and small peasantry. In fighting against locusts scientific methods were presented as mobilizing the masses at the right time in collecting the eggs. This was the preferred method as other methods such as using chemicals or viruses were too expensive for the treasury. However, when there occurred a direct need to consolidate the dominance of state over its subjects and nature, scientific methods began to encapsulate chemicals for efficient fighting against these pests and exterminating the eggs. In the locust case, the main aim was to eliminate all the preventions in front of the production. At the same time it was aimed to make the state's authority visible, to create an alliance with the producers against a common enemy which harmed production. Here the means was scientific knowledge which was presented as something new and vital in fighting against this enemy. The owner of this knowledge was the government. The meaning of scientific knowledge was mobilizing the producers at the beginning, because financing the viruses and chemicals was an extra-burden. When the mobilization failed, the meaning of scientific knowledge transformed into the effective use of viruses and chemicals in order to maintain the presence of government and achieve control.

In justifying the control and authority through scientific knowledge, public space was redefined; all the uncontrollable realms were associated with ignorance

and presented as things to be eliminated. Dirtiness, as well as various local-based methods and knowledge were associated with backwardness and ignorance, while hygiene and universal science was associated with development and education. Whose eggs were worth to be saved and whose eggs needed to be exterminated was defined by scientific knowledge; the eggs of locusts had to be exterminated, while the eggs of silkworms needed to be protected by scientific methods.

CHAPTER 6

EDUCATION AND SCIENTIFIC AGRICULTURAL KNOWLEDGE: A CASE STUDY: SILK PRODUCTION AND SILK INSTITUTE IN BURSA

In the previous chapter, it is discussed how scientific knowledge came to be the main instrument of the centralizing Ottoman state's agricultural policies. Firstly to reconstruct the economic capacities, secondly to control revenue generating agricultural production, and then thirdly to standardize it to enhance control and manipulate the production accordingly. Concordantly, the meaning of scientific knowledge changed from being the instrument of the combating the diseases in 1860s to the way of standardizing the 'backward' peasants at the end of the 19th and beginning of the 20th century. This is why and how scientific knowledge entered onto the agenda of education, as it was the most direct way of intervening into the peasants' world.[656]

In this chapter, the aim is to discuss the development of agricultural education in concordance with the agricultural policies, thus to underline that agricultural education and scientific agricultural knowledge did not have an unchanging meaning from the mid-19th century until the beginning of the 20th century. The aim was to increase the revenues and therefore eliminate diseases, and this turned into a way of standardizing the production along the universal principles to achieve the maximum control.

Whereas this was the intention of the state, this was a process of both negotiation and struggle between scientific agricultural knowledge and peasants' agricultural knowledge and needs. Thus thorough analysis of this process shows us

[656] For a detailed discussion on the development of education and the limits of the spread of education movement in Hamidian era see Küçükceran, *The Agrarian Economy and Primary Education in the Salonican Countryside in the Hamidian Period (1876-1908).*

how state and society were 'becoming', which helps us also to observe the agencies in this relationship and to concretize the notion of 'state' and society. Studying silkworm and cocoon production in Bursa enabled us to observe the changing educaton policies and changing meaning of scientific knowledge through the Silk Institute, and the role of experts and teachers in transmitting the knowledge, as well. By looking into the rich information on silk production this chapter examines the claims of scientific knowledge, where the negotiation started and where it turned into struggle.

6.1 Agricultural education and Ottoman state

Nadine Vivier and Socrates Petmezas say that it was economic policy of central state that determined the character of agricultural education in France,[657] while in Britain educational policy was mostly led by landlords in the 19th century, based on the production relations[658] and the way agriculture changed. In Italy it started through private initiatives but came under the domination of state after the first couple of decades in the 20th century.[659] In Belgium, this domain of private endeavors turned into a struggle between the private sphere and central state for the sake of centrally-planned agricultural policies.[660]

In the Ottoman Empire agricultural education appeared as state initiative. The reason behind this was that as it is argued in the last chapter, scientific agricultural knowledge was used by the state in order to position itself in the realm of agricultural production to achieve control over agricultural production. In this

[657] Vivier & Petmezas, "The State and Rural Societies", 28.
[658] Brassley, "Agricultural Education, Training and Advice in the UK, 1850-2000", 260.
[659] Pazzogli, "From Private Initiative to State Intervention: The Origins of Agricultural Education in Italy".
[660] Diser, "Laboratory versus Farm: The Triumph of Laboratory Science in Belgian Agriculture at the End of the Nineteenth Century".

manner, agricultural education was one of the ways of applying scientific agricultural knowledge. Donald Quataert relates the efforts for agricultural education to the expansion of western-educated bureaucracy in agriculture, especially after the 1870s.[661] If we exclude the short-lived first attempt of Aya Mama training school in 1847 (closed in 1851), a more comprehensive agricultural education movement was on the agenda of the centralizing state beginning from the 1880s. As discussed in the last chapter, it was during this period when scientific knowledge was associated with increasing productivity and it came to be the major instrument to bring the state closer in society for achieving control and standardization.[662] It appeared a way for the centralizing state to dominate, to control and to standardize the production.

Donald Quataert saw the agricultural education movement as part of a general reform movement which ended in failure.[663] In this way, he is reproducing the claim of the centralizing state of changing the peasants through scientific agricultural knowledge. If the peasants did not change accordingly, they were deemed as unchanged and therefore the efforts as a failure. However, this chapter interprets agricultural education and how this education has reached to the peasants through the concepts of negotiation and mutual change, as well as struggle.

Palairet sees agricultural education and scientific agricultural knowledge as part of a reform program of the state.[664] By interpreting the change of peasants within the definition of scientific knowledge, like Quataert, he sees the education movement as a failure in the Balkans. In that way, he is reproducing the agenda of the central state: advanced scientific knowledge vs. backward peasants' knowledge. Such a

[661] Quataert, *Anadolu'da Osmanlı Reformu*.
[662] See Chapter 5 for the details about this discussion.
[663] Quataert, *Anadolu'da Osmanlı Reformu*.
[664] Palairet, *Balkan Economies*.

definition inevitably led to interpreting the relationship as a victory or failure, regardless of the interaction and hybridity.

6.1.2 Agricultural education, agricultural colleges and agricultural practice schools

The first attempt of agricultural education was Aya Mama Agricultural School established in 1847.[665] Though short-lived (it closed in 1851) this school should be considered as the first attempt of scientific agricultural education. Krikor Agaton, a graduate of the French Agricultural School Grignon, was charged with establishing the first Agricultural School and teaching there. Another famous graduate of the Agricultural School Ion Ionescu de la Brad gave lectures in the school.[666] The school was supervised by the Ministry of Public Affairs.[667] The courses given included mathematics, geography, physics, construction of roads and bridges (*yol ve köprücülük*), anatomy, animal diseases, biology, botanic, *tertib-i arazi*, gardening, viticulture, field agriculture, *şekercilik*, sericulture, zootechnics and hands-on practice for all these courses.[668] The students were to be instructed on ploughing, hoeing, sowing, harvesting, diking, cheese and buttermaking, raising silkworms with hands-on training.

After two and a half years, the school was closed claiming that even if the students graduated the school with a proficiency in the knowledge of scientific agriculture, there was no lands on which they could apply their knowledge, so there

[665] For the establishment of the school see Yıldırım, "Osmanlı'da İlk Çağdaş Zirai Eğitim Kurumu: Ziraat Mektebi (1847-1851)". And for detailed information see Cengiz et al. *120 Yıllık Eğitim Çınarı*, pp.201-216.
[666] Kaya. "Ion Ionescu De La Brad: XIX. Yüzyıl Ortasında Osmanlı Tarım Ekonomisi ve Politik Ekonomi".
[667] Cengiz et al. *120 Yıllık Eğitim Çınarı*, 201.
[668] Cengiz et al. *120 Yıllık Eğitim Çınarı*, 202.

was no reason to keep the school open.[669] It seems that this curriculum did not appeal to the needs of the producers.

The conditions for the re-establishments of the agricultural schools appeared in 1880s, as part of the general agricultural policies. At that period, scientific agricultural knowledge was seen as the rescuer of the empire to increase the productivity and thus the revenues of state. In that manner, scientific knowledge was used as the instrument to make the state in the realm of agricultural production. [670]

In the previous chapter it is mentioned that in 1860s scientific knowledge was seen as the instrument to eliminate the disease, and for the diseases to be eliminated, the peasants needed to be educated accordingly, but how? Eliminating diseases was regarded as an urgent step in increasing productivity in that period. In the 1880s, agricultural policy came to be seen as the way of eliminating diseases and educating the peasants who were seen as the cause of 'backward' agriculture that reduced the productivity. And in this way, it was aimed to achieve control over the production and to get the peasants to be productive, subordinate and loyal. If the peasants wanted to be encouraged to produce more and be willing to share this surplus with the state, they needed to believe that they were belonging to a unity, and to be convinced that their knowledge was inferior to scientific knowledge. They also needed to be convinced that using scientific methods would be the only way to save them from a miserable existence. This is how scientific knowledge marginalized peasants' knowledge and 'established its imperialism' based on the conviction that "scientific research is the only legitimate and acceptable source of knowledge and […] through teaching and extension it is possible to improve agricultural

[669] Cengiz et al. *120 Yıllık Eğitim Çınarı*, 206.
[670] To see the discussion on agricultural policy of centralizing state see Chapter 5.

practices".[671] While improving the agricultural practices, the peasants needed to love their land, family and religion, respect order and support the state.[672] For that reason, as part of the general educational policy, scientific agricultural knowledge was sanctified through agricultural education, which would in turn create subordinate and controllable subjects.[673] And for the same reason, agricultural courses in the village primary schools were introduced in 1900.[674] Under the supervision of the Ministry of Trade, Agriculture, Forestry and Mining, agricultural schools were regarded fundamental places to produce the scientific agricultural knowledge, to transmit it to the peasants, thus aimed to bring agricultural policy to the realm of agricultural production and producers. We must look at the differences between the Agricultural College in Halkalı and the Agricultural Practice Schools in the provinces to comprehend the different intentions. While the Agricultural College was designed to raise bureaucrats- who were educated based on the state's agenda- who would then be tasked with duties at the provincial agricultural administrative level, the Agricultural Practice Schools were aimed to making a regional impact. However, for agricultural schools to enter into the realm of producers, the producers had to feel the need for scientific knowledge, if only this knowledge was accustomed to the local conditions.

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[671] Esteva, "Hosting the Otherness of the Other: The Case of Green Revolution", 258.
[672] Boulet, "1848, 1960: Tow Laws for Agricultural Education in France: Essay on Comparisons between the State's Method of Intervention", 251-2. For a leading book on the French state policies on shaping the peasants see Weber, *Peasants into Frenchmen: The Modernization of France 1870-1914*; and the struggles between the Church and centralizing stat efor secular education see Woloch, *The New Regime: Transformations of the French Civic Order, 1789-1820s*.
[673] For a detailed discussion on the education movement in the Hamidian era see Fortna, *Imperial Classroom: Islam, the State, and Education in the Late Ottoman Empire*; Somel,*The Modernization of Public Education in the Ottoman Empire, 1839-1908*; and for a study focusing on village primary schools and agricultural education see Küçükceran, *The Agrarian Economy and Primary Education*.
[674] Küçükceran, *The Agrarian Economy and Primary Education*, 87.

Science needed to be transmitted to the peasants through education, especially through te Agricultural Schools where "… science and knowledge concerning agriculture would be taught."[675] The Agricultural School in Bursa was to be established by a decree in 1888/9 and it was to be called as the Hüdavendigar Agricultural Practice School.[676] It began receiving students in 1891.[677] The founding purpose of the school was to raise the children of land-, vineyard-, or garden-holders to be proficient in both the science and practice of agriculture.[678] The school was designed to accept maximum of 60 students, part of whom stayed at school. The expenses of the students were to be paid by the Agricultural Bank of Bursa, meaning that the education in the school was for free. The curriculum of the school consisted of Turkish grammar, basic accounting, practice and theory on watering the fields, agricultural geography of the Ottoman Empire and Bursa, agricultural physics (*hikmet*), chemistry, climate, sericulture, courses on diseases (the way of eliminating the diseases of trees and animals), poultry, apiculture, botany, husbandry, agronomy (including the definition of the main elements of agriculture instruction on the soil types, the ways of tilling the soil, the ways of sowing the crops, ways of harvest, agricultural implements used, artificial and natural meadows and forming meadows), vegetable and fruit growing, machines (the ways of using them, their benefits, the ways of repairing and producing them), book keeping, public health (air, the causes of poor air quality, swamps) and forestry. The duration of the education there was set as three years. This program was prepared by Cemal Bey, the Consultant of

[675] *Salname-i Hüdavendigar*, 1307, 248.
[676] BOA, İ. MMS. 122/5225, 1308 (Hicri). In the book of Bursa Ziraat Mektebi it is claimed that the name was changed but as was mentioned in the document it was called as *Hüdavendigar Ziraat Ameliyat Mektebi*.
[677] *Bursa'nın Köklü Eğitim Kurumları Bursa Ziraat Mektebi*, 23.
[678] BOA, İ. MMS. 122/ 5225, 1308 (Hicri).

Agriculture and Public Affairs (*Ziraat ve Nafia Müşaviri*).[679] Consultants, inspectors, and Directors were authorized to supervise the exams and functioning of the program.[680] Thus, we can see the ways in which the new bureaucracy and those who were educated in Western agricultural schools had an impact on agricultural education in Ottoman Empire. However, to what extent these schools established direct relationships with the peasants is dubious.

According to a 1911 document, the curriculum apparently changed. The courses were rules of religion (akaid-i diniye), general and special agriculture (ziraat-i umumiye ve hususiye), agricultural industry, (sanayi-i ziraiye), veterinary (fen-i mevaşi ve baytari), science of land measuring (fen-i mesaha-i arazi), French, algebra, agricultural wealth of nation and agricultural accounting (servet-i milel-i zirai ve muhasebe-i zirai), chemistry, planting fruit trees (eşcar-ı müsmire), horticulture, botanic, public health, organic, agricultural and inorganic chemistry, agricultural construction (inşaat-ı ziraiye), agricultural equipments and machines, geometry, math, literary composition, vegetable gardening, poultry and floriculture, Turkish grammar, mines and soils (tabakat ve madeniyat), ethics, course on animal (hayvanat), general and agricultural geography and agricultural practice.[681] Compared to the earlier curriculum, this new curriculum placed increasing importance of the economic side of the agricultural activity. Furthermore, religious courses were probably added as a result of the general education movement of creating well-behaved and moral subjects.[682]

[679] BOA, ŞD.1560/5, 1312 (Hicri). In order to get more details on Cemal Bey see Chapter 5.
[680] BOA, İ. MMS. 122/ 5225, 1308 (Hicri).
[681] *Bursa Ziraat Ameliyat Mektebinde Tedris Edilen Durus-ı Muhtelife Programı*, 28. See Figure B6 in Appendix B.
[682] In order to see the discussion on this issue see Fortna, *Imperial Classroom* and the introduction of the religious courses in village primary schools see Küçükceran, *The Agrarian Economy and Primary Education.*

The school was divided into two programs one for veterinary program and the other was for agricultural training. For the agricultural training in the first year, the students studied the structure of soil in detail. Within the course the instructors elaborated topics such as the necessary agricultural works according to the type of soil, the necessary amount of manures- different types of manures were elaborated such as dungs of cattles, of sheep and of chickens and even the leftovers of silkworms which was unique to Bursa- per dönüm depending on the type of soil and the importance of fertilizers. In the animal course students studied the anatomy of animals in detail and the best practices in breeding. In addition to the religion, French, math, Turkish and geography courses, for the school was a Practice School, there were practice courses three hours in every week.

During the second year, in the course of general and special agriculture, the topics included the methods of reclaiming land- slash and burn and drainage-, methods for leaving the lands to fallow and the types of fallows- light, medium, heavy fallows- and the types of fallows depending on the crops to be sown, knowledge on crops and their amelioration, methods of crops sowing, the relationship between soil and crop, features of grain crops and grain cultivation, the ideal fertility rates per dönüm, maize, rice, heather, sugar cane crops. Related to the cultivation of crops, the agricultural equipments and machines were taught to the students. There was also a sericulture course on silkworm breeding including the marketing of the silkworms and cocoons. It seems that together with a detailed notion about the worms and cocoons, the industrial side of the issue was highly stressed. The course on sericulture could not be taught without a course on the care on mulberry gardens about how to plant mulberry trees, preventing them from diseases ideal conditions of gardens and etc. In addition to apiculture, fishery,

vegetable gardening, botany, organic and inorganic chemistry, algebra, math, physics, ethics, French and literary composition, the claim of state on hygiene found also a place for itself within the curriculum. The students were instructed on all the things about keeping their bodies and environment clean and about how germs cause sickness among other things. And the agricultural practice course continued.

In the third year, the course on general and special agriculture included content on insects that harmed crops and ways to preserve different types of meadows (permanent meadows, meadows of gelembe, uplands (*yayla*) meadows, pastures), the relationship between climate and meadows, meadow seeds and ideal conditions to sow them, weeds in natural meadows and their nutrient value, artificial pastures (clover lands, sainfoin lands, trifolium lands), the ideal climate and places to construct these artificial pastures, as well as industrial crops such as cotton, sesame, flax seed, rapeseed, madder, tobacco and the ways to prevent diseases on these crops. In the third year, it is interesting to see a course on the source of wealth to try to understand the type of economic mindset the state was trying to cultivate. This course highlighted hard workers, liberalism (serbesti-i imal) and competitive market. The right of property and the necessity of privileges, as well as how to create agricultural wealth, were discussed within the framework of this economic mentality. The land- or animal breeding, if land was not cultivated- was rendered as a unit and source of capital to generate a considerable wealth, that is if holder looks after it consciously with the aid of scientific knowledge. In addition, other third year course included planting and caring for fruit trees, horticulture, dairying, cheese making, rose tree planting, canning, sugar cane planting, agricultural construction, floriculture, botanic, organic and inorganic chemistry and agricultural chemistry. The courses can be seen in Table 2.

Table 2. Courses taught in Bursa Agricultural School[683]

First Year	Second Year	Third Year
Turkish	General and Special Agriculture	Special Agriculture
Course on Animals	Agricultural Equipments and Machines	Agricultural Accounting
Type of Soil	Sericulture	General Agriculture and Planting Fruit Trees
Geometry	*Dutçuluk*	Viticulture
Math	Apiculture	Animal Products, Organic Chemistry, Agricultural Mechanics
Geography	Fishery	Cheesemaking
Rules of Religion	Vegetable Gardening	Planting Rose Tree
French	Botany	Canning
Agricultural Practice	Unorganic Chemistry	Making Starch
	Geometry	Confectionary
	Math	Agricultural Construction
	Physics	Floriculture
	French	Botany
	Ethics and Rules of Religion	Organic Chemistry
	Agricultural Practice	Agricultural Physics
	Public Health and Hygiene	Veterinary
	Literary Composition	Science of Land Measuring
		Algebra
		French
		Agricultural Practice

Palairet says that the educational program in agricultural schools did not achieve a great success in the Balkan countries, because of the gap between theory and practice. [684] In a similar vein, Quataert claimed that the influence of these schools were actually limited in the countryside, because the graduates of the schools mostly joined the government bureaucracy, either in the capital or the provincial level.[685] He called the educational efforts of state as a total contradiction. The strong imposition

[683] Table derived from *Bursa Ziraat Ameliyat Mektebinde Tedris Edilen Durus-ı Muhtelife Programı.*
[684] Palairet, *Balkan Economies.*
[685] Quataert, *Anadolu'da Osmanlı Reformu,* 107**.**

of scientific agricultural knowledge, divorced from the local necessities and practices proved to be useless at the local level.[686] Moreover, a career in agriculture might not have been something desired for the children of the rich peasants. He assumed that the schools were designed to attract the children of the both rich and ordinary peasants. The most probable aim behind the establishment of the schools was not to attract the attention of the ordinary peasants but of the rich peasants' children who would return to the village or çiftlik after getting an education and spread the knowledge among the ordinary peasants. Because it seems that the programs were not designed for managing small lands, but larger lands.[687] Furthermore, not only through the graduates, the schools aimed to play the role of extension services with the instructors of the school and the model farms as the experiment fields.[688] Of course if scientific agricultural knowledge was aimed to be spread among the peasants, there was a need for a common language for which negotiation and mutual change was essential. Gupta says that the more the scientific knowledge resembles the indigenous knowledge and is accommodated to the people's lives, the more it was accepted by the peasants. The acceptance was strongly correlated with a good analysis of natural conditions.[689] Berkes says that as long as scientific knowledge complies with local customs and conditions, society is motivated by the market economy to come up with a sort of hybrid knowledge. [690]

[686] Quataert, *Anadolu'da Osmanlı Reformu*.
[687] George Montgomery says that for the students learn how to manage big farms at school, they could apply to the small-scale farms, which proved education to be useless; Montgomery, "Education and Training for Agricultural Development", 172.
[688] For instance in a report published in 1911, the results of different wheat and oat seeds were interpreted, also in order to display the results of the chemical fertlizers three fields were fertilized with different fertilizers and the results were evaluated and a table was attached in the appendix of the report; *Bursa Ziraat Mekebinin 1326-1327 Senesi Tecrübelerinin Netayicini Mübeyyin Rapor*.
[689] Gupta, *Postcolonial Developments.*
[690] Berkes, *Sacred Ecology*

6.2 Silk Institute and silkworm production in Bursa: from negotiation to struggle

As opposed to the Agricultural School in Bursa, the Silk Institute contributed more to 'becoming' of state and society. This institute is extremely important for a number of reasons. Firstly the motive behind its establishment reflects one of the stimuli behind the state's reliance on scientific agricultural knowledge: when one of the important sources of revenue was disrupted. It was after pebrine, a disease on silkworm eggs, visited Bursa. Thereupon an urgency to find a solution in reviving the silk production appeared; that solution was establishing the Silk Institute where the Pasteur method would be taught. Secondly, the Institute became more central when it was made obligatory for producers of silkworm eggs to get a certificate from the Institute. Thus the egg producers were pushed to establish some sort of a relationship with scientific agricultural knowledge, and those who did not have permission came to be regarded as illegal producers. Thirdly, the examination of disease-free cocoons was left to the certified egg producers in the villages which allowed them to act as experts. Thus, the Silk Institute and its graduates enable us to see the tension, as well as interaction, between the scientific agricultural knowledge and the peasants' knowledge. And of course it was not the sole means of state in controlling silk production; distribution of free saplings and tax exemptions had all served to revive silk production. It was in this environment where scientific knowledge on silk raising entered into the domain through the Silk Institute.

6.2.1 Silk Institute

The 1860s and 70s witnessed severe periods of disease, which led the government and merchants to seek ways to revive the silk production in Bursa. Firstly, Hermann Scholer German vice-consul in Bursa, also a silk merchant himself, was deputy

director in the Silk Institute in 1894[691], offered a report to the PDA (Public Debt Adminsitration) to be more pro-active in fighting the disease and boost the yields. He suggested examining the silkworm eggs and butterflies separately under a microscope in the customs of Istanbul before allowing access to the rest of the empire and consequently destroying the diseased ones and permitting to the disease-free ones to be sent as a way to prevent the disease.[692] In response the PDA asked for Pasteur (the French chemist who discovered a method to prevent the Pebrine) to send an expert on silkworm production to work in the customs. Pasteur informed Eugene Maillot, the director of Montpellier Agricultural School, to send an expert. Claiming that this method would be very expensive and a waste of time, Maillot offered a total program of improving silkworm production under the supervision of Kevork Torkomyan, a student from the Montpellier Silk Institute. The PDA found the offer suitable and assigned Torkomyan to this program.[693] With a strong belief in this Pasteur method to exterminate the disease, Torkomyan submitted a report to the Porte underlining the necessity of establishment of Silk Institute in order to teach and disseminate this method to the egg and silkworm producers.[694] He claimed that the producers would ensure disease-free eggs and disease-free generations by using this scientific method and knowledge. [695] Consequently, "particularly [for] raising silkworms and on the science of producing and distinguishing silkworm eggs based on Pasteur method"[696] the Silk Institute was established in 1888 with the initiation

[691] *Salname-i Hüdavendigar*, 1312, 120.
[692] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlanmasında Duyun-ı Umumiyenin Rolü", 913.
[693] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlanmasında Duyun-ı Umumiyenin Rolü", 913.
[694] Vasıta-i Servet, cild 2 (5), nisan 1304, 66.
[695] Torkomyan (1922), *İpek Böceği Beslemek ve İpek Böceği Tohumu İstihsal Etmek Usul ve Kavaidi*, 30.
[696] *Bursa Harir Darüttaliminine Mahsus Talimattır*, 4. See Figure B10 in the Appendix B.

and financing of the PDA. The intention was to benefit from the raw silk revenue.[697] And the PDA actively became a part of the education and examination processes to ensure their capability.[698] The education there constituted of practical and theoretical part. The practical part included attending and participating in silkworm raising in the garden of the Agricultural Practice School with a special focus on using miscroscope. The theoretical part included instruction of scientific knowledge related to silkworm raising. The education took place during the busiest season of silkworm raising which is in the spring and fall.[699]

In this way, the PDA established itself as the vigorous advocator of silkworm production through scientific ways. The agricultural policies were overlapped with the policies of the PDA. Thus, backed up with the central state through regulations and impositions, scientific agricultural knowledge was institutionalized as the rescuer from the disease and from dramatic decline of revenues.

6.3 Silkworm production in Bursa

Based on the travel accounts, Heath Lowry traced the mulberry gardens and raw silk production back to the beginning of the 17th century,[700] though the production of silk goes back as early as 14th century when raw silk was brought from Iran and Syria.[701] Yet, it was after 17th century, that raw silk began to be produced on Bursa lands by cultivating mulberry gardens.[702]

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[697] Torkomyan (1922), *İpek Böceği Beslemek*, 40.
[698] *Bursa Harir Darüttaliminine Mahsus Talimattır*, 6.
[699] *Bursa Harir Darüttaliminine Mahsus Talimattır*, 4-5.
[700] Lowry, *Seyyahların Gözüyle Bursa 1326-1923*, 63.
[701] Lowry, *Seyyahların Gözüyle Bursa 1326-1923*.
[702] Faruk Tabak gives more or less the same dates for the development of sericulture. He says the political and environmental conditions in the second half of the 17th century shifted the economic activities from the plains where grain crops were cultivated towards the hills where trees and animal husbandry predominated the agricultural activities; Tabak, *Solan Akdeniz*, 289- 90.

In the 17th century Evliya Çelebi said that the Bursa plain was full of mulberry gardens. [703] In 1701, Pitton de Tournefort provided details on how mulberry trees were pruned early on: "Most of the Mulberry Trees are low, and as it were, planted in Nurseries. The largest are set one near another, and form small forests, divided by large Thorn-bushes; among which grows a species of Apocin, which not only twines along the Hedges, but also creeps up the highest Trees…".[704] In 1738 Edward Pococke and in 1767 Niebuhr talked about how widespread mulberry gardens were on the Bursa Plain. [705] When we get to the 19th century the travelers continued to talk about the immense spread of the mulberry gardens. Helmuth van Moltke said that everywhere in Bursa were cultivated less with grain than with mulberry trees and that the green leaves of mulberry trees stretched far and wide the field.[706] In 1836 Miss Pardoe wrote "There is scarcely a house in the neighbourhood of Broussa which does not contain several apartments filled with silk-worms".[707] In 1842 Hamilton said that the Bursa Plain was covered with mulberry gardens from the left side of Nilüfer until Apolyont Lake.[708] Supporting these accounts, we can trace mulberry gardens on the Bursa Plain by looking at the Temettuat defters. For instance in Balıklı village on the Bursa Plain close to the Bursa city center, almost everyone has mulberry gardens- even those who did not any arable plot.[709] Likewise, in Dikencik village almost everyone had a mulberry

[703] Günaydın & Kaplanoğlu, "Evliya Çelebi", 48.
[704] Lowry, *Seyyahların Gözüyle Bursa 1326-1923*, 63.
[705] Lowry, *Seyyahların Gözüyle Bursa 1326-1923*, 55-6.
[706] Moltke, *Briefe Über Zustände und Begebenheiten in der Turkei aus den Jahren 1835 bis 1839*, 63.
[707] Miss Pardoe *The City of the Sultan*, 257.
[708] Hamilton, *Researches in Asia Minor, vol.II*, 71.
[709] BOA, ML. VRD. TMT.d. 7494, 1263 (Hicri). Yet, it must have been insufficient to have only mulberry garden to generate a sustainable income, therefore, for instance a certain Mustafa son of bodur Abdullah had 3 dönüms of mulberry garden, 1 of which he rented. And he also had an additional income as a servant.

garden.[710] And in 1844 we can still see the newly established mulberry gardens indicating the continuation in the spread of the gardens.[711] In 1854, Sandison also talked about high production levels in Bursa from immense mulberry gardens.[712] It was not only domestic production that stimulated the increase in silkworm and cocoon production, but it was equally foreign demand for raw material. Donald Quataert said that industrialization in French and Italian silk-weaving mills increased their need for raw materials forcing them to seek foreign suppliers.[713] And when Pebrine disease made it to France and further decreased the native raw material supply for these mills in the 1850s, they turned to Bursa and other foreign suppliers. He said in order to ensure their supply French merchants encouraged large land holders in Bursa to plant "… new tracts of mulberry gardens while local egg-raisers increased the volume of eggs sent to incubation" in order to benefit from steep prices of eggs, cocoons and raw silk. [714] The peak was in 1855, according to Sandison, the production began to diminish afterwards due to Pebrine disease.

The golden days of silkworm production began to fade with the entrance of China and Japan into the world market and eventually the onset of the disease.[715] In his 1859 report, Sandison stated that it was feared that the disease that destroyed silkworms in Europe would make it to the Ottoman Empire, but there had been on the whole a decent level of product, yet far from the level in 1855.[716] Thus we see the first signs of decline in silkworm production, and the beginning of the disease in the

[710] BOA, ML.VRD. TMT.d. 7493, 1263 (Hicri). Again here 3 dönüms of mulberry garden seems to have been not enough for sustenance of a family. A certain little İbrahim son of ali had 3 dönüm mulberry garden, whereas he had extra income as a laborer.
[711] ML. VRD. TMT.d. 7437, 1263 (Hicri). In Samanlı village there was newly formed 4 dönüms of mulberry garden of Kürt Mehmet, son-in-law of hasan son of tavus.
[712] Sandison, "Turkey (Brussa): Report of Mr. Consul Sansdison, on the Trade in the District of Brussa for the Year 1854", 131.
[713] Quataert, "The Silk Industry of Bursa, 1880-1914", 285.
[714] Quataert, "The Silk Industry of Bursa, 1880-1914", 286.
[715] Quataert, "The Silk Industry of Bursa, 1880-1914", 286.
[716] Farley, *The Resources of Turkey*, 104.

Ottoman Empire. In 1861 the impact of disease was strongly felt in the overall silkworm production. Sandison said: "The malady still prevailed with various anomalies; insect eggs from the same identical stock, distributed in different premises, giving in the one a most plentiful product, in the other next to none, owing probably in the latter case to some mismanagement or noxious atmospheric influence. In some places, the yield was most favorable; in other middling or scant…".[717] That is to say that rather than a complete failure, it was more like a fluctuation in the amount of eggs and cocoons[718] which made sericulture an insecure source of income for the sustenance of a family.

Within this environment some peasants continud with the mulberry gardens in the villages of Bursa, other felled the mulberry trees and turned to cultivate other more secure crops. In 1863, the villages close to Bursa Vakıf, Hacı İvaz, Samanlı and Kilisan complain about the flooding of Kaplıkaya stream which harm their crops and mulberry trees.[719] Similarly, von Warsberg talked about the numerousness of mulberry trees when he was strolling around Bursa, yet the mulberry gardens became like a patchwork on the northern side of the city.[720] On the other hand, Torkomyan reported that some of the peasants cut their mulberry gardens and turned them into grain fields.[721] Due to the destruction of mulberry gardens and fluctuated product from the diseased eggs, in the 1860s, cocoon production declined from 3,000,000 in 1855 to 500,000 kg in 1860.[722] There had been little signs of recovery in 1870, as the

[717] Sandison, "Report by Mr. Consul Sandison on the Trade &c. Of Brussa for the year 1861", 350.
[718] Sandison, "Report by Mr. Consul Sandison on the Trade &c. Of Brussa for the year 1861", 350.
[719] BOA, MVL. 647/2, 1279 (Hicri).
[720] Von Warsberg, *Ein Sommer im Orient*, 111.
[721] It was also mentioned in 1325 Salname that some mulberry garden-holders cut their trees and turned their gardens into grain field; *Salname-i Hüdavendigar*, 1325, 259.
[722] Torkomyan(1922), *İpek Böceği Beslemek*, 28.

production output hardly met the need for silk manufacture. The export of mulberry trees and silkworms were banned[723] on which Maling also writes in 1872. [724]

6.3.1 Visit of Pebrine

As the raising of silkworm was a high income generating economic activity till the mid 19th century, silkworms began to be kept in much unhealthier and congested places[725] which made them vulnerable to Pebrine disease. The spread of Pebrine led the discussions on production methods. While some efforts to find disease-free eggs were made by producers to sustain silkworm raising (such as getting eggs from Japan) producers were further discouraged after being sold diseased eggs by some fraud merchants. Furthermore as a result of a rivalry between French and Italian egg producers, diseased-eggs were circulated in the market around the 1870s which caused further harm to the producers who began to barely recover and did not know how to separate the disease-free eggs from the diseased ones.[726] Driven to keep receiving money from silkworms, the Sublime Porte was in pursuit of finding some ways to overcome the disease and revive the production.[727] Tersis Efendi, member of Council of Cassation (*Meclis-i Temyiz*), was sent to Bursa to inform the producers on some possible ways to keep the cocoon productions at a sufficient level even if the eggs were diseased.[728] In the following years, Tersis Efendi would determine precautions in his reports. The first signs of revival were beginning to be seen during

[723] BOA, BEO. AYN.d. 884/5, 1295 (Hicri).
[724] Günaydın & Kaplanoğlu, "Maling II", 150.
[725] Ahmet Rıza, "Mekteb-i İdadi-i Mülkide Okuttuğum Sanayiden 'İpek Böceği ve İpekçilik' Dersi", *Fevaid*, (12), 14 nisan 1304, p. 91, and Torkomyan underlines that due to benefiting from growing demand, peasants started to breed more silkworms than the capacity of their sikworm rooms (*böcekhane*) which made easier the spread of the disease, called Pebrine; *Salname-i Hüdavendigar*, 1325, 259.
[726] Torkomyan(1922), *İpek Böceği Beslemek*, 29.
[727] BOA, BEO.AYN.d. 878/126, 1285 (Rumi); BEO.AYN.d. 878/134, 1286 (Rumi).
[728] BOA, BEO.AYN.d. 878/46, 1284 (Hicri), BEO.AYN.d. 878/134, 1286 (Rumi).

that period.[729] At the same time, local commissions were put in charge of preventing the circulation of the diseased eggs.[730] These robust endeavors were regularized with the entrance of the PDA and the introduction of the Pasteur method, which was the extermination of diseased butterflies and creation of generations free from disease. As Quataert underlined, the revival was the result of a combination of continuing market demand- both from domestic filature mills and the foreign states especially France[731]- the Public Debt Administration, efforts of central state and silk merchants.[732] The impositions placed on silk imports, free sapling distribution[733] and tax exemptions for the newly formed gardens[734] and of course the Silk Institute- which provided education on scientific methods in silkworm production- institutionalized scientific agricultural knowledge at this very time with a strong belief that science would rescue the empire. Nonetheless, without the increase in demand and an amelioration in the prices the elimination of Pebrine would not motivate producers to return to silkworm and cocoon production.

6.3.2 Market impact or Pebrine?

In 1854 Sandison warned of the possible dangers of cheaper silk prices due to China's vast supply.[735] He wrote: "… in years, when China can pour in vast supplies into Europe, and reduce the value of the article to the lowest scale, they are exposed

[729] BOA, BEO. AYN.d. 878/146, 1286 (Rumi).
[730] BOA, BEO. AYN.d. 883/110, 1292 (Hicri).
[731] In 1922, 10 % of the cocoons were exported to France, while the remaining ones were sent to the filature mills in the city in order to obtain raw silk as another export item; Birgül & Çanaklı, *Cenubi Marmara Havzası Bursa Vilayeti Coğrafyası* , 200.
[732] Quataert, "The Silk Industry of Bursa, 1880-1914", 289, 292.
[733] Kağıtçıbaşı & Yaşar, *Bursa'nın Ekonomik Tarihi,* 263. As to the traveler Paul Lindau narrated from Vital Cuinet, 30,000,000 mulberry tree were planted between 1890-4; Günaydın & Kaplanoğlu, "Paul Lindau", 212. Not only state, but BTSO also sent free saplings to producers; BTSO, *Bursa Ticaret ve Sanayi Odası İlk Karar Defteri*, pp.28-30, 108, 132. And also Agricultural School was distributing free sadlings; Kaplanoğlu, *Meşruiyet'ten Cumhuriyet'e Bursa (1876-1926)*, 176.
[734] BOA, A.DVN. 182/19, 1278 (Rumi)
[735] Sandison, "Turkey (Brussa): Report of Mr. Consul Sansdison, on the Trade in the District of Brussa for the Year 1854", 132.

to most prejudicial or ruinous competition, from their silks and cocoons being loaded with 10 per cent of tithe- now levied exactly ad valorem on both- and 12 per cent more of customs and exportation. In times of high prices this is not felt…".[736] Giovanni Federico shows to what extent China's share in world trade had grown. In 1820-24 China exported 2,800 quintals of silk compared to Anatolia's exportation of 1,350 quintals of silk, from the 23,500 quintals of silk that were produced in total during the same period of time. In 1856-59, Anatolia's export of silk rose to 8,000 quintals, whereas the amount from China rose to 35,400 quintals out of 69,700 quintals of silk that were produced in total.[737]

In that way, as the international competition became fiercer, the income from exporting raw silk items caused dissatisfaction among the producers as one writer mentioned nearly thirty years later. In the 1883/4 in the Provincial Yearbook in an article on silkworm production it is claimed that there was not much demand to mulberry gardens by the producers despite the efforts of state and the entrance of improved silkworm eggs, tri-fold increase in market prices of fresh cocoons from 1877/8 to 1880/1.[738] When he compared the situation to fifteen or twenty years prior, the writer said that the producers did not satisfy with the incomes from the silkworm production due to the decreasing demand for silk items in the international market, as well as cheap supply from Italian producers. What he suggested was increasing the number of the mills in Bursa to sell cheap manufactured silk items on the foreign market, which he believed would create a strong demand for domestic silkworm producers.

[736] Sandison, "Turkey (Brussa): Report of Mr. Consul Sansdison, on the Trade in the District of Brussa for the Year 1854".
[737] Federico, *An Economic History of Silk Industry (1830-1930)*, 196.
[738] *Salname-i Hüdavendigar*, 1301, 297.

Looking at the international picture, Giovanni Federico states that "… sericulture is an industry which can survive only in countries where labor is abundant, and therefore peasants are satisfied with extremely low wage."[739] Concerning the Ottoman Empire, low wages were acceptable by the gender discrimination. It is generally claimed that silk-worm and egg-raising had predominantly entrusted to women, whereas men were engaged in other agrarian works.[740] Moreover it was regarded as an off-peak season in agriculture, thus could be sustained together with other agricultural works. This would explain the presence of mulberry garden together on arable field, vineyard and vegetable gardens as shown in Temettuat defters.

Yet, we are not able to observe silk-raising in the long run, because in the context of the Ottoman Empire we are talking about change in one of the factors in production. There was diminished demand in WWI and then some mulberry trees were cut down in Bursa for firewood during the Greek occupation.[741] The most important change came with the population exchange with Greece, so new residents of Bursa who knew nothing about cocoon and egg raising cut the mulberry trees.[742] But before then, until the eve of WWI, Bursa enjoyed the restoration of silk production beginning from 1880s; disease-free eggs, silkworm and cocoon production again reached to a point that met not only domestic needs but also ensured export to Europe.[743] Based on the account of the writer in Salname, it could

[739] Federico, *An Economic History of Silk Industry (1830-1930),* 195.
[740] Quataert, "The Silk Industry of Bursa, 1880-1914", 291; and Dalsar, *Türk Sanayi ve Ticaret Tarihinde İpekçilik*, 406.
[741] Bursa Mecmuası, 1. Sene (9), 1 nisan 1334, p. 142; As a response to Hadi bey who attributes more responsibility to experts, Mehmed Rauf says that recently the mulberry gardens dramatically decreased in Bursa due to a sharp decline in market, and the experts had nothing to do when market demand diminshed.
[742] Personal Interview with Bayram Akıncı, Görükle Mübadil Evi, 29/06/2016; he claimed that because they knew nothing on cocoon and silkworm raising they cut all the mulberry trees which left from the Greek population of Görükle, and turned the lands into maize and grain fields.
[743] BTSO, *Bursa Ticaret ve Sanayi Odası İlk Karar Defteri*, 47.

be said that science could be a cure when the foreign demand increased. Or like a chicken and egg dilemma, it can also be thought that when foreign demand increased science was espoused as a quick instrument to respond the demand. What was certain was the linearity between the foreign market demand and the institutionalization of scientific agricultural knowledge. But still, Torkomyan and the Silk Institute, as well as new production methods based on the Pasteur principles were regarded as the reasons for the increase. What did new methods include and what was new in this method? And to what extent could the Institute control the knowledge and production in silk raising? And what kind of role did it play in restoration of silk production after the 1880s? In order to understand under what conditions and to what extent producers demanded scientific knowledge, it is necessary to understand the cultivation of mulberry gardens and production of cocoons and silkworm eggs before and after this education was introduced. Knowing the details of production is also important to understand to what extent scientific knowledge and peasants' knowledge intertwined or differentiated.

6.3.3 Silkworm production methods: before and after the Silk Institute

6.3.3.1 Mulberry gardens and silkworms before the Silk Institute

The peasants were producing silkworms and cocoons long before the 19th century. It is crucial to elucidate the methods of the peasants before the Institute in order to understand what was new in the claims.

Sestini gives the most detailed information on planting mulberry tree and garden care, as well as silkworm production in his travel to Bursa in 1779:

> These people do not begin by planting mulberry tree; first they sow it. The first year, they transplant the cuttings and place them one by one and a little distance [from one another]. They do the same thing the following year: they take them from where they were planted and replant them somewhere else. The third year they transplant them once again and place them in rows one after another and in

> square plots. Some are planted at one-and-a-half 'brasse' distance, and still others at little more than 'brasse' distance [from each other]
> From this point on, they cut the top of the tree in order to delay its growth and to make it grow little branches all around the trunk. At that time, they are careful to remedy the dryness of the season by watering them; and they turn the earth twice a year, once in month of April, and the other after they have gathered the leaves.
> When the mulberry tree has grown small branches and has sprouted at its top and sides, they do not pick the leaves yet in the silk worm season. On the contrary, they cut the little branches that are very close to the trunk and they make bundles of them sell in town.
> Due to this process the mulberry trees only grow a little and are kept at the height of a man. If the trunk is already very strong, then in the first years they leave the principal branches at the top of the tree. Later they cut them to the same height and so they have three or four heads growing on the tree. As soon as the mulberry tree wood is formed, the trees are so thick and the leaves and the branches so dense that one would not be able to see a man who is hidden there. Those which are used to make plantings are almost white mulberry trees [….]
> Travelling in the countryside, I observed that when some of the trees had barely begun to lose their little branches they began to turn the earth. The soil in Brusse is in general sandy […] Sometimes a tree dies after six, ten or more years, the trunk rotting from too much humidty. They substitute [it with] a tree of the same age [….]
> In my opinion when their trunks are too close together it is harmful [….]
> But what makes it very advantageous is that the same piece of land contains both mulberry trees and vines, all sorts of fruit trees and above all, cucumbers, melons, cabbages and other vegetables.
> The old usage is to have the silk worm eggs to hatch at eh spring equinox as it practiced in all the nations of Europe (who know to take the advantage of the knowledge that they acquired in their education) [….]
> One does not abandon to nature the care of making the silk worms hatch. The skill is used with success. One keeps the larva in warm places in order to make them hatch earlier. As soon as they hatch, they slowly accustom the worms to the [mulberry] leaves, and first they lay them down in the baskets. When they begin to grow, they lay them out on mats, giving them every day the little branches necessary for their subsistence (without removing the older ones). And each meal forms a new layer which raises the level of their bed, which they change only three times during their entire upbringing […]
> As soon as the time comes when they stop feeding, they place oak branches along the tables raised in levels one on the top of another, and choosing the site that each likes they go to build their own cocoons.[744]

In the mid-19th century Temettuat records also show multiple cultivation of mulberry trees. In Balıklı village, Şahinzade Salih Bey, son of İsmail, had 40 dönüms of arable mulberry garden 20 dönüm of which were vegetable garden that generated 600 kuruş in revenue in 1843.[745] Yet, mulberry gardens in Bursa were not only the gardens where vegatables were planted, but also the places where animals were grazed. In

[744] Lowry, *Seyyahların Gözüyle Bursa*, 57-9.
[745] BOA, ML.VRD. TMT.d. 7494, 1263 (Hicri).

order to benefit from the market demand it seems that Bursa peasants made use of their lands intensively. In Dikencik village for instance, a certain delibaş Hacı Hasan had 10 dönüms of arable mulberry gardens (*sabangir dut hadikası*), whereas Salih Efendi, son of Mehmed, had 30 dönüms of arable mulberry garden from which he also obtained revenue from shepherds. [746] This indicates us that they both grew vegetables (as we understand from the term *sabangir*) and rented to shepherds. Similarly, Hacı İsmail, son of Ömer had 12 dönüms of arable mulberry gardens from which he got received revenue from shepherd again. Thus, mulberry gardens served both as meadows where animal were grazed and vegetables had been cultivated. In the absence of huge waste lands, they used the mulberry gardens in intensive ways, which indicates their knowledge and experience with mulberry trees, vegetable cultivation as well as their relationship with animal breeding, when wanted to take advantage of conditions in the market.

With this multiple usage, garden care was the first step in silk worm and cocoon production on which Miss Pardoe gives detailed information. According to her, there were predominantly more white mulberry trees (which were more nutritious than the other varieties) and said that "There is scarcely a house in the neighbourhood of Broussa which does not contain several apartments filled with silk-worms…"[747]. With regard to these insects Pardoe (1836) wrote the following:

> The Asiatic method of rearing the worm is totally different from that of Europe, and, according to the account given to me, much more profitable in its results, as well as simple in its process. The Asiatics never approach it with the hand: when it is hatched, the floor of the apartment is covered with layers of mulberry branches to about three or four inches in depth; and upon these the insects are laid, and suffered to feed undisturbed until their first sleep, when they are covered by a fresh supply of boughs similar to the first, through which they eat their way, and upon which they subsist until their next change. This operation is repeated four times, always at the period when the worm casts its skin [….] Every crevice of the apartment is carefully stopped to prevent the admission of air, and a fire of charcoal ashes is kept up constantly throughout the day and night … the mode of

[746] BOA, ML. VRD. TMT.d. 7493, 1263 (Hicri).
[747] Miss Pardoe, *The City of the Sultan*, 257.

> feeding … greatly increases its quantity, and diminishes the labour of the feeders (pp.256-7).[748]

The 'profitable' methods of the 'Asiatics' were called into doubt after the 1860s when Pebrine led to a decrease in overall production of silkworm eggs. In 1869, a German traveler Warsberg narrates the gardening methods and tries to reason the possible factors behind the pebrine, based on the observations of Silk mill holder, Mr. Dufour. Warsberg began by comparing the differences in the mulberry gardens between Europe and Bursa, as the first step of silkworm raising. He said that tame mulberry trees were generally used in Europe, while only the wild mulberry tree was used in Turkey.[749] Only the shrub of these wild mulberry trees was allowed to grow, its branches are broken off earlier to serve as food to the worms, which was the second difference from Europe where the peasants only serve the leaves to the worms.[750] He said that giving leafy branches is very much important to keep the silkworms alive, and one way to prevent them from being affected by the disease based on an experiment done by Mr. Dufour. [751] He said that "The natural state of this animal is like any other caterpillar on the tree itself to get the food. Must have creep, must strive from one leaf to another…". [752] While serving the leaves without the branches cause overeating, laying them close to each other made them to easily go into fermentation, thus caused indigestion in silkworms, which as a result made them vulnerable to disease. Thus Mr. Dufour said the disease was not due to the climate, poor conditions of the rooms (*böcekhane*), or illness of the mulberry trees

[748] Miss Pardoe, *The City of the Sultan*, 256-7.
[749] Von Warsberg, *Ein Sommer im Orient*, 150. Not all the peasants were using wild tree. Görükle peasants were using tame mulberry tree, Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 35.
[750] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 35.
[751] Von Warsberg, *Ein Sommer im Orient*, 151.
[752] Von Warsberg, *Ein Sommer im Orient*.

(because nowhere were the trees infected with illness).[753] Approaching Mr. Dufour's observations with suspicion, Warsberg asked if the Bursa peasants knew the right way to feed their silkworms, why and how pebrine infected the silkworms in Bursa. Mr. Dufour could not bring forth a satisfactory explanation aside from the prevalence of 'traditional methods' of production- without mentioning what 'traditional' means- and the insufficiency of the industry in driving silk production.[754]

What was certain was the dramatic decrease in mulberry trees and gardens beginning from the 1860s. Relating the decline with diminishing market demand, the writer in the 1883/4 provincial yearbook observed that the mulberry trees were uprooted and turned into vineyards or grain fields. Some even became shrubbery or thorn patches. [755] Similarly, Torkomyan mentioned in the yearbook that peasants turned mulberry gardens into grain fields.[756] Thus, at the end of the 1860s immense mulberry gardens on the Bursa plain and in the city that ones made Bursa look like a huge greenery were turned into scattered patches on the northern side of the city.[757]

6.3.3.2 Return of mulberry gardens: what was new?

Beginning from the 1880s, travelers observed the revival of mulberry gardens.[758] The mulberry gardens again spread throughout the plain, on all available lands. However,

[753] Von Warsberg, *Ein Sommer im Orient*, 152.
[754] Von Warsberg, *Ein Sommer im Orient*, 154.
[755] *Salname-i Hüdavendigar*, 1301, 297.
[756] *Salname-i Hüdavendigar*, 1325, 259.
[757] Von Warsberg, *Ein Sommer im Orient*, 111.
[758] In 1886 Mrs. Walker says the first thing that she witnessed on their road from Muradiye upwards to Uludağ was the young mulberry trees which might adress us the newly formed mulberry gardens, Walker, *Eastern Life and Scenery, vol.II*, 130. In 1891 someone from Bursa says that for a couple of years the peasants again turned to planting mulberry trees, and forming gardens, Bursa, 1. Sene (15), 21 şubat 1306/ 24 receb 1308, p. 1; Mehmet Ziya says that the lands which were left uncultivated 5-10 years ago now became full of mulberry trees, İhtifalci Mehmet Ziya, *Bursa'dan Konya'ya Seyahat*, 146. In 1893 it was stated in Bursa newspaper that the former mulberry gardens which had been turned into grain fields after pebrine were again reverted to mulberry gardens, Bursa Gazetesi, 3. Sene (124), 20 Zilkade 1310, p. 1. Deligiannis says that between 1880-1920 the arable fertile lands were converted into mulberry gardens in Görükle, Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 38.

mulberry gardens spread due to the pressure that was put on land and the trees were planted much closer to each other than before as Torkomyan mentioned in his book. According to him, the trees should have been planted seven meters apart from each other in order to absorb more sunlight and allow their roots to grow better, increasing thus their productivity (the total amount of leaves). However, in Bursa the mulberry trees were planted at most one or two meters apart from each other.[759] According to Torkomyan, while this was shortening the lifespan of the trees by three or four or even more years, it also decreased the total yields of the leaves.[760] If trees were planted seven meters apart from each other, then 22 years after their planting, they could produce 100 kg of leaves, though the total amount in Bursa was far fewer than this. Can we say that the peasants in Bursa were resistant to change? Would silk-raisers who had been doing this for almost 300 years constantly resist this increase in their productivity by their own will? There must have been other explanations. In 1905 the average productivity of the mulberry trees was estimated to be 1500 kg leaves per dönüm.[761] Torkomyan estimated 1000 kilo leaves per dönüm of garden which consisted of 25 trees planted six meters apart from each other.[762] And the average yield in Bursa was 1500 kg during that period. Then can we talk about far fewer productivity rates?

Deligiannis narrated that first the land should be cleaned from all shrubs and trees, by digging the soil as deep as 60 cm with sharpened spades.[763] This must have been done between July and September. After buying the saplings, in February or March they were planted in rows that were 1.90 cm apart from each other. Some

[759] Torkomyan(1922), *İpek Böceği Beslemek*, 89. Whether we could not know that the owners abided the rule, in 1893, the minimum distance between the mulberry trees were set as 2 arşın (1,36 meters) and maximum as 8 arşın (5,36 meters); BOA, DH. MKT. 230/80, 1311 (Hicri). Thus, the state might have tried to find a midway between the practices of peasants and claims of scientific knowledge.
[760] Torkomyan(1922), *İpek Böceği Beslemek*, 89.
[761] *Salname-i Hüdavendigar*, 1325, 346.
[762] Torkomyan(1922), *İpek Böceği Beslemek*, 245.
[763] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 35.

peasants were cultivating onions among the rows, but it would have been better not to cultivate anything, thereby allowing all the saplings to grow. Görükle peasants were turning the wild mulberry trees into tame ones after two or three years, which turned into a nice garden in five or six years.[764] There was not much difference from the Sestini's account above, meaning the methods of caring mulberry gardens did not much changed. Thus, while the role of the variety of mulberry tree- tame or wild- might have been overstressed, relationship between distance and productivity needs more explanations or more factors should be included to explain the productivity, such as the weather, the soil, the terrace to explain the complex relationship between the tree and its environment.

Aside from ecological questions, cultivation of the trees cannot be isolated from the socio-economic conditions of that period. Coinciding with the increasing eagerness for land for animal grazing and the boom in rice cultivation, the cultivation of mulberry trees and the formation of mulberry gardens adapted scientific agricultural knowledge to its own socio-economic conditions, which reflects how scientific agricultural knowledge and peasants' knowledge intertwined.

In this way, like in the mid-19th century as mentioned above, spread of mulberry gardens brought again intensive use of gardens, particularly for animal breeding, especially where meadows were not enough to meet the need. Concurrent with spread of mulberry gardens, the demand for sheep was also in a trend of increase which brought about agreements between flock owners and garden owners. Gardens had been the meadow areas for a long time, as was claimed in Bursa newspaper.[765] In March the sheep owners and butchers let their sheep onto the

[764] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 35.
[765] Bursa, 1. Sene (18), 14 mart 1307/16 şaban 1308, p. 1; Bursa, 1. Sene (15), 21 şubat 1306/ 24 receb 1308, p. 1; and *Salnamei Hüdavendigar*, 1301, 254.

gardens to graze.[766] Based on such an intensive use Hüseyin Vassaf observed the spread of mulberry gardens towards the Atıcılar meadow. He said the former meadows began to be covered with mulberry trees.[767] Such contraction in the meadow areas- also due to refugee settlement as I discussed in Chapter Four- forced the people to make agreements which made the disputes between the garden-holders and animal owners inevitable.[768] Furthermore, the spread of the mulberry gardens might have driven the population closer to the wetter areas which were under constant threat of floods.[769] In the previous chapters I talked about increase in rice cultivation which coincided with the revival of mulberry gardens leading to conflicting interests. For instance, the villagers near Kestel wrote that the waters of rice field (close to their village) belonging to the former mayor of Hüdavendigar, caused the roots of the mulberry trees to rot[770] although at some places rice cultivation and mulberry gardens were sustained together as income generating crops that could be substituted for another in case of failure in one of them.[771]

Under these conditions, as a high-income generating economic activity, we certainly know that the mulberry gardens were spreading. As was estimated in the Hüdavendigar yearbook of 1904/5, the total area of mulberry garden reached to149,832 dönüm, of which yielded a total 1,834,264 kg in fresh cocoons.[772] These numbers coincided with the period when cocoons and silkworms began to be valuable on the market again. This was also the golden period of the imposition of scientific knowledge on silkworm production. In Bursa newspaper, someone from Bilecik wrote that out of three dönüms of mulberry garden he could get an income of

[766] Bursa, 1. Sene (18), 14 mart 1307/16 şaban 1308, p. 1.
[767] Vassaf, *Bursa Hatırası*.
[768] To see a sample see for instance Bursa, 1. Sene (15), 21 şubat 1306/ 24 receb 1308, p. 1.
[769] BOA, MVL. 647/2, 1279 (Hicri).
[770] BOA, DH.İ. UM. EK.53/47, 1337 (Rumi).
[771] BOA, DH.MUİ.103-2/12, 1326 (Rumi).
[772] *Salname-i Hüdavendigar*, 1325, pp.346-7.

3,000 kuruş, whereas the same amount of grain field was generated 300-400 kuruş at most.[773]

6.3.3.3 What was new in silkworm raising

It was the conditions of silkworms that became the real targets of change, thus real arena of both the interaction, as well as struggle between scientific knowledge and peasants' knowledge, as it will be seen below. Torkomyan published a book that consisted of what he had taught in the Institute. It is apparent that he aimed for the silkworm raisers to be acquainted closely with the worms, as the essence of production. He had a strong belief that if the producers had detailed information on all the phases of worms and on what to do when they were confronted with any kind of disease in silkworm, cocoon or egg, they would find the cure based on this scientific knowledge.

The book begins with an introduction regarding to what extent the Silk Institute became essential in the revival of silk raising after the disease dramatically decreased the total yields.[774] He provided statistics from 1888 –data since the establishment of the Silk Institute- until 1919 to prove that after the Silk Institute was

[773] Bursa, 3. Sene (127), 21 haziran 1309/ 19 zilhicce 1310, p. 3. As a more sophisticated information on the relationship between mulberry trees and silkworm production Torkomyan makes a good calculation. There were three ways of mulberry leaves supply; first one can buy in the market- but it is a little bit expensive way-, second one can rent a mulberry garden, third one can form his own mulberry garden. The third way was the cheapest one compared to others. Once it was rented or formed, for raising the silkworms there were 4 modes of production; first wage labors beginning from the worms hatched their eggs until they finished with spinning their cocoons, second wage labors who were going to help the family members after the third metamorphose of the worms until they finished spinning the cocoons, third caring the worms only by the family members, fourth sharecropping; Torkomyan(1922), *İpek Böceği Beslemek*, 245-6. Sharecropping, mostly widespread among the huge garden-holders, can be two ways, first the sharecroppers keep the worms in the rooms that the holder provided, second they keep them in their own rooms; Torkomyan(1922), *İpek Böceği Beslemek*, 248. He recommends the large-garden holders to use sharecroppers in their gardens to get more yields, Torkomyan(1922), *İpek Böceği Beslemek*, 249. In order to instantiate the accounts of Torkomyan a sample can help; according to a document in 18863, for 150 dönüm mulberry garden to be harvested in 15 days there needed 600 laborer; BOA, MVL.646/84, 1279 (Hicri).

[774] Torkomyan(1922), *İpek Böceği Beslemek*.

established the yields increased radically. [775] The interest of students from not only Hüdavendigar but also from other regions in learning scientific methods on silk-raising was widespread.[776] According to his claim, the silk raisers from all around the Empire were eager to learn the methods in order to get rid of Pebrine and increase their yields, thus the Institute filled this gap.

In his book he detailed the phases of a silkworm from the time that he hatches the egg until the reproduction.[777] He underlined the necessary conditions for the silkworm to be raised; the heat, the cleanliness, the bedsteads, the necessary amount of mulberry leaves for each year of silkworm[778], instructions about various types of diseases and what to do to fight with these diseases. He listed the preconditions in raising the silkworms as the following; i) the necessary care in balancing different ages of silkworms, ii) the necessary distance between the insects, cleaning their bedsteads and the ways of feeding on bedsteads and leaves with branches; iii) the feature of the weather of the room where silkworms were raised and the necessary conditions there, iv) apportion of mulberry branches to the silkworms and the cleanliness of the leaves, v) the brightness of the silkworm rooms, vi) ways of spinning, vii) number of silkworms to be raised in a given amount of place.[779] In order to elucidate this list he first said that not all silkworms wake up at the same time, and the silk raisers should not try to do this, instead they had to take care of them separately, especially in feeding them. Secondly, they should not be

[775] Torkomyan(1922), *İpek Böceği Beslemek*, 40.
[776] Torkomyan(1922), *İpek Böceği Beslemek*, 32-7.
[777] To see the stages look at Figure B7 in the Appendix B.
[778] The first 7- 8 days after he hatched from the egg was considered as the first year, then it stopped eating and sleeps and during the sleep it casts its skin, then in its second age it became bigger and lives again for another 7-8 days. Like this the worm has 5 ages, during the 5th age it lived longer than the others, 12 days, and began to make cocoon at the end of its 5th age; Torkomyan(1922), *İpek Böceği Beslemek,* 93 to see the illustrations. After the silkworm make the cocoons, if the peasants do not reel the silk at home, they either sent the fresh cocoons to the silk fabrics, or dry them in ovens or at home under the sun and sell dry cocoons in the market, or reproduce eggs to be sold in the market.
[779] Torkomyan(1922), *İpek Böceği Beslemek,* 122.

raised in a congested area. Thirdly, their bedsteads should be cleaned of the leftovers in order to prevent fermentation in the humid environment.

These precautions were necessary to avoid disease and used as supplementary to ensure that Pasteur method was successfull, once the disease-free offspring was generated based on this method. In basic scientific statements, the method was based on discriminating the diseased eggs from the disease-free eggs, thereby generating disease-free offspring without having much loss.[780] Deligiannis, the Greek teacher of Görükle village, wrote in his diaries that before the Pasteur method, what they had done was that 17-18 days after the branches were served to the cocoons, they cut ten cocoons, extracted the worm from the cocoon cut the belly of the worm with a knife in order to remove its stomach, and pressed it on the cocoon. If the cocoon turned red, breeding was regarded as successful; otherwise all the cocoons were burned. [781] In order to prevent such loss, the Pasteur method was based on ascertaining the disease free-eggs before they became silkworms. The first step was to examining the female butterfly after she spawned via a microscobe.[782] If the Pebrine germs were detected, all the eggs of the butterfly were burned, because it means that, without exception, the eggs would be infected with the disease.[783] In this way, separating the diseased eggs and exterminating them, would ensure disease-free eggs.

The emphasis of Torkomyan on the cleanliness and regulating the heath was shared by other writers during this period. In 1886, Mrs. Walker recounted details on the conditions of the rooms and silkworms. The temperature of the room should be

[780] Torkomyan(1922), *İpek Böceği Beslemek*, 45.
[781] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 37.
[782] Torkomyan(1922), *İpek Böceği Beslemek*, 108.
[783] Torkomyan(1922), *İpek Böceği Beslemek*, 106.

below 22˚C, otherwise the silkworm fall ill.[784] Rather than preventing the admission of the air, as Pardoe observed before, airing the rooms but preserving from dry air was seen as healthier, for which emptying the trays and cleaning the rooms was emphasized. In Bursa newspaper it is claimed that in order to prevent the continuation of the disease in silkworms in consecutive years, the rooms should be wiped by water rimmed by eyestone (*göztaşı*) and added lime.[785] Ahmed Rıza, the instructor of Silk-Raising Lecture in High School, mentioned the appropriate ways of regulating the heat of the worms. He said that caring for silkworms in one's bossom to control the heat was primitive, dirty, and harming the worms which needed spacious and light-filled rooms. [786]

Underlining these precautions and why these conditions are vital, Torkomyan asserted that once the worm got sick, nothing could be done to cure the worm. He further listed what needed to be done for various diseases. In case of detection, in order to prevent the spread of muscardine, it is necessary to change the beds of the worms and spread a mixture that consisted of sulphur and nitre to the room.[787] Additionally the room must be cleaned every year with chlorine and sulphur fume before the eggs were placed there. In order to prevent Flacherie, (*baygınlık*), the worms must be kept in airy and bright rooms, the heath of the room should not exceed 22-23 ˚C, mulberry leaves must be cleaned, rooms should not be brushed off, the worms should be started spinning before June, 22nd in order to avoid adverse effects from warmer weather.[788] Keeping the rooms clean was not enough; in 1912

[784] Walker, *Eastern Life and Scenery, vol.II*, 175.
[785] Bursa, 1. Sene (34), 11 temmuz 1307, p. 2.
[786] Ahmed Rıza, "Mekteb-i İdadi-i Mülkide Okuttuğum Sanayiden 'İpek Böceği ve İpekçilik' Dersi", *Fevaid*, (12), 14 nisan 1304/ 15 şaban 1305, p. 91.
[787] Torkomyan(1922), *İpek Böceği Beslemek*, 100.
[788] Torkomyan(1922), *İpek Böceği Beslemek*, 115.

the state passed a regulation against throwing the leftowers of the silkworms into the street.[789]

Torkomyan said he didn't write the book to demean the experiences of the silk-raisers but to overcome some deficiencies, revise some methods, and thereby regulate the essential principles of silkworm raising by combining practice and theory –and at the same time taking care of economic interests. This claim of Torkomyan is important for several reasons. First, it's important that he asserted he was combining practice and theory, which indicates that he did not neglect methods and experiences. Yet, he was reproducing this rhetoric of science vs. peasant knowledge by saying that science would fill in the gap and correct the fallacies, which severs the ties of the knowledge with the socio-economic environment in which it has been produced. He asserted that the silkworm raisers used to keep the worms in congested areas, not leaving much space between them. Hence their yields used to be low compared to the number of silkworms they raised.[790] Without observing why they might have been kept in small rooms, he could not manipulate the people to make the rooms bigger or to convince them that fewer insects would give more yields. And this is also important for another reason; he strongly associated science with productivity. Throughout the whole book he attempted to prove that while older methods were yielding less, new methods based on science would achieve maximum productivity. Such a strong belief in science and the claim of productivity would certainly be appreciated by the state and the PDA who were seeking ways to increase the yields. Through various regulations scientific knowledge started to establish itself in silkworm and cocoon production.

[789] BOA, DH. HMŞ. 9/2, 1330 (Hicri).
[790] Torkomyan(1922), *İpek Böceği Beslemek*, 126.

6.4 Beyond education: promotions or standardization for more control?

To attract more attention among the peasants and to move them closer to 'scientific ways of silk raising' several supplementary precautions were taken by the state and the PDA. They collaborated, as their aims were the same; increasing silk yields. They did this sometimes in a mandatory way through issuing some regulations or through incentives such as tax exemptions or through competitions and monetary awards, making education in scientific agricultural knowledge as something demanded by the producers.

In 1891, import duties in silkworm eggs were increased to promote native egg producers.[791] Then, in 1893, supplementary precautions were taken. A regulation was issued that brings tax exemptions to the newly formed mulberry gardens.[792] According to the regulation, the exemption was only for the newly established ones- thus the land must have been uncultivated before- and it must have started from the fourth year after planting trees. If these conditions were met, they were to be exempted from tax for three years. Furthermore, it was stated that those who formed 50 dönüm gardens on non-cultivated waste lands were to be awarded with a bronze medal, those who formed 100 dönüm were to be given silver, and those who formed lands larger than 100 dönüms were to receive gold. [793] All these awards and exemptions were conditioned with the permission of Agricultural officials of the province and representatives of the PDA who was obliged to check the gardens were well-cared for and aligned with scientific principles. Thereupon the PDA was to

[791] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 918.
[792] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü".
[793] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü".

ascertain the potential yield of the garden.[794] What is remarkable here is that the tax exemptions were stipulated on the formations of gardens based on the scientific principles. And – in cooperation with the Ministry of Interior and Ministry of Agriculture, Forestry and Mining– the PDA acted as the representative of this scientific knowledge. In this way, the aim was to take production under control and registration.

With a regulation in October 1893- which at that time only concerned Bursa and İzmit, the only places where a School was present- raising eggs bounded to a certificate from the Silk Institute. In this way, the control on formation of new mulberry gardens was enlarged. It was a step to further control knowledge and production and scientific knowledge to establish itself more than before (at least in theory).[795]

Through seven articles, a systematic control by the Silk Institiute and experts was brought in egg production. With the first article, producing silkworm eggs to sell on the market was prohibited without permission from the Silk Institute or from any other equivalent school. Those who were producing the eggs for their own use- both the fresh or dry cocoon producers- could continue their production without the permission, as long as they prove to the PDA Office that the eggs were examined under a microscope.[796] In the second article, it was claimed that those who did not have a diploma from the equivalent schools could apply to the Institute and could receive a certificate after taking some tests to be allowed to sell the silkworm eggs on the market. In October 1894, Hüdavendigar newspaper announced 143 certificate holders.[797] Yet we should say that the examinations were not very easy.

[794] BOA, DH.MKT. 230/80, 1311 (Hicri).
[795] BOA, İ.KAN. 1/24, 1309 (Rumi).
[796] BOA, İ.KAN. 1/24, 1309 (Rumi).
[797]Hüdavendigar, 26. Sene (1609), 21 eylül 1310, p.2

For instance in September 1894, 89 egg producers applied to take the examinations to get the certficate. And among those who took the exams, only 44 passed and receive the certificate.[798] According to the fourth article those who sell silkworm eggs without permission would be penalized with 10 golden Ottoman lira and their silkworm eggs would be burned in front of a Committee.[799] According to the sixth article the egg producers should report the amount they were going to harvest to the PDA Office.[800]

The regulation had several purposes. Explicitly it aimed to generate disease-free eggs in order to secure the production of healthy silkworms. In doing this the first step was to produce healthy eggs and take the healthy eggs under registration. Registering healthy eggs also served in the state's interest to control revenues and acquire the greatest share from the entre production. Additionally certified egg-producers served like the agency in spreading scientific knowledge in the villages. Being the only ones who were allowed to circulate their eggs, they were also entrusted with examining the eggs of the peasants who were producing eggs for their own reproduction- to produce cocoons-. In other words, they acted like extension service.

On the eve of the regulation, the writers in the newspapers complained that some peasants were still using the 'old methods'. For them 'new methods' were associated with hygiene and the care of the eggs and conditions of worms.[801] Yet, they were turning to 'scientific methods' slowly.[802] But these 'scientific ways' actually were not only limited to hygiene and care on eggs and worms- even though

[798] Hüdavendigar, 26. Sene (1606), 14 eylül 1310, p.1
[799]Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 920.
[800] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 921.
[801] Bursa Gazetesi, 3. Sene (124), 20 zilkae 1310/ 24 mayıs 1309, p.2.
[802] Bursa Gazetesi, 3. Sene (127), 19 zilhicce 1310/ 21 haziran 1309, p. 3.

they were regarded as the main necessities- but also in providing the necessary conditions to keep the rooms under appropriate temperatures and humidity in different phases of metamorphosis.[803] In July 1891, one writer said that the fluctuated temperature in the summer months declined the overall production twofold, because all the worms got sick and died before spinning their cocoons. [804]

Çiftçi says that after this regulation, the number of the egg producers who applied for certificate had increased.[805] It was not a surprise that most of the people wanted to secure their production by getting permission from the PDA, especially when the government forced the people to inch closer to scientific agricultural knowledge, if they wanted to continue their economic activity. Of course relating the eagerness of the people only with the imposition of the state would be underestimating their interest in the new methods in increasing production. Those who had already been producing eggs wanted to ensure their production were eager for education. For instance, in May 1893, before the regulation, some young producers around Bursa applied to the Provincial Government in order to be educated in producing silkworms using the Pasteur method.[806] Until 1921 a total of 1,432 people took the diploma and 465 people got certificates.[807] Yet, we should not think that these numbers reflect the total capacity of production. Even though the Institute continued its dominance throughout the years in giving certificates in order to sell the eggs, it was not the case that only the certificate-holder egg producers survived on market.

[803] Ahmed Rıza, "Mekteb-I İdadi-I Mülkide Okuttuğum Sanayiden 'ipek Böceği ve İpekçilik' Dersi", *Fevaid*, (14), 14 mayıs 1304, p. 110.
[804] Bursa Gezetesi, 1. Sene (34), 17 zilhicce 1308/ 11 temmuz 1307, p. 2.
[805] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 921-2.
[806] Bursa Gazetesi, 3. Sene (120), 21 şevval 1310/ 26 nisan 1309, p. 4.
[807] Torkomyan(1922), *İpek Böceği Beslemek*, 32.

Competitions, exhibitions and monetary awards served as supplementary to these regulations. In March 1893 the PDA held a competition among the silkworm producers.[808] According to the terms of competition, in April a Committee would register the applicants, and some representatives of this Committee would make constant visits to the rooms where the silkworms were kept and record the observations in order to make final decisions.[809] The applicants were expected to produce minimum of 50 kg of the Bagdad type of cocoons and minimum of 40 kg of yellow European type of fresh cocoon, or a minimum 1 okka raw silk out of one box (20 grams) of eggs.[810] The time given for harvesting was 10 days after the silkworms started spinning their cocoons. The winners were announced in the 144th issue of Bursa newspaper.[811] They were awarded with a microscope and money depending on their rank.[812] Awarding with a microscope was regarded as important for encouraging them to use a microscope. As it became the symbol of the scientific knowledge, getting the cocoon producers acquainted with it, how to use it and to develop an interest of science means getting them closer to scientific knowledge.

In addition to encouraging silkworm, egg and cocoon production, as well as the formation of mulberry gardens, the Ministry of Interior issued orders to protect the existing mulberry gardens. The more income the trees generated, the more they became the target in conflicts between people. There were several cases in which the mulberry trees were burned due to hostilities. In 1898 it came to the point that an

[808] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 924.
[809] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 925.
[810] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", 926.
[811] Bursa Gazetesi, 3. Sene (143), 12 rebiyyülahir 1311/ 11 teşrinievvel 1309, p.2
[812] Çiftçi, "Hüdavendigar Vilayetinde İpekböcekçiliğinin Canlandırılmasında Düyûn-ı Umumiye İdaresinin Rolü", pp. 929-30.

order was issued concerning the collective punishment of the villagers if the mulberry trees were set on fire due to these hostilities.[813]

Tax exemptions, protections, competitions and regulations were supported in conjunction with the distribution of free saplings, throughout the end of the 19th century, when the demands of the peasants for free saplings were greater than before. In 1899, when "… the foreign consortium failed to deliver the promised number of mulberry bushes, the government provided funds to purchase one-half million plants from Bursa nurseries and sent them to waiting cultivators."[814] As a result of cooperation between government, the PDA and the Chamber of Trade and Agriculture, the latter also undertook the distribution of saplings where state failed to do so. In 1899, the Chamber distributed mulberry bushes in Bandırma.[815] Or again in the same year in order to boost silkworm production, free bushes were distributed in Atranos.[816] In 1912, this time the PDA promised to distribute free saplings to those who demanded and announced that they would reserve some funds to improve the trees. [817] Until 1922, the PDA distributed a total of 77,326 mulberry bushes to the Bursa district.[818]

Concurrently, as next step in silk production, new public ovens that adhered 'scientific principles' were established to minimize the loss of cocoons while drying. Cocoons were either sold as fresh or dried in the market. A reader in Bursa newspaper wrote that previously the cocoons were dried under the sun or by fire in the ovens, causing vast amount of loss. [819] He said the ovens in Bursa, then, which

[813] BOA, DH. MKT.2142/66, 1316 (Hicri), DH.MKT.2157/96, 1316 (Hicri), DH.MKT.2188/19, 1316 (Hicri), DH.MKT.2182/81, 1316 (Hicri).
[814] Quataert, "The Silk Industry of Bursa, 1880-1914", 290.
[815] BTSO, *Bursa Ticaret ve Sanayi Odası İlk Karar Defteri*, 108.
[816] BTSO, *Bursa Ticaret ve Sanayi Odası İlk Karar Defteri*, 132; and Hüdavendigar, 33. Sene (1968), 25 cemazilahir 1319/ 26 eylül 1317, p. 1.
[817] BOA, ŞD. 1240/11, 1328 (Rumi).
[818] Birgül & Çanaklı, *Cenubi Marmara Havzası Bursa Vilayeti Coğrafyası*, 203.
[819] Bursa, 3. Sene (126), 4 zilhicce 1310/ 7 haziran 1309, p. 2.

were built according to the scientific principles would prevent the loss. However, he underlined that the ovens were built only in Bursa, thus they could not meet the entire need. Therefore it was just decided that to build in Demirtaş and Fildar villages which were the leaders in cocoon production. [820] Mrs. Walker said that all the ovens were in the silk factories and they were expensive to use. Moreover they were far from the villages, causing poor peasants to lose some of the products. [821] Yet, Ahmet Vefik Paşa opened public ovens along the high roads, which were "…the property of the village schools, and the small charge made for the use of them (about a farthing kilogram of cocoons), is within the means of smallest purse, while by the immense quantity of cocoons brought, a small income is derived for the benefit of the schools". [822]

In such an environment where encouragements and regulations were insistently driving the producers to scientific methods and knowledge, no doubt the main aim was increasing production. Meanwhile, it served to monitor, control and to take the production and the producers under registration. Via the certificates, via the competitions, via free saplings and tax exemptions, the aim was to take all the production under control. The state's pursuit to overcome Pebrine legitimized the institutionalization of scientific knowledge, especially with an increase in the overall cocoon production- from 4, 104,000 kg in 1888 to 18,338,000 kg in 1908 in all over the empire.[823] This opened a space for the state and the PDA to control, rule over and manipulate the production, however this was not a space where they could enforce the rules by themselves; it was a realm of both negotiation and struggle.

[820] Bursa, 3. Sene (126), 4 zilhicce 1310/ 7 haziran 1309, p. 2.
[821] Walker, *Eastern Life and Scenery, vol.II*, 178.
[822] Walker, *Eastern Life and Scenery, vol.II*, 179.
[823] Torkomyan(1922), *İpek Böceği Beslemek*, 40. Look at Figures B8-B9 in Appendix B to see the numbers.

6.5 The limits of scientific knowledge

Through the regulations, competitions and tax exemptions, government, the PDA and the Silk Institute tried to take all production under control. In this environment of production, egg producers had more ties with this controlled space, whereas fresh or dry cocoon producers enjoyed a relatively free space. And of course, not every egg or cocoon producer could be controlled. Accessing education was not easy for egg producers. For instance in September 1894, 101 egg producers applied to the Institute, among whom only 44 producers were approved to take the exams to obtain the diploma.[824] What happened to the remaining ones; did they stop producing eggs? Most of the producers did not, as we know from the accounts of Deligiannis. He said that in Görükle there were four egg producers who had a diploma, whereas six producers did not.[825] Newspapers also showed instances of egg producers without diplomas.[826] Deligiannis said that before 1900, the Department of Silkworm Raising in Bursa could not achieve systematic control in production.[827] Before then, only the careful producers were selling the good quality seed at a much more expensive rate than the other producers,[828] which apparently led to the uncontrolled circulation of eggs, sometimes of species that were not appropriate, as pointed out by one writer in the Hüdavendigar newspaper. [829] The writer called on the PDA to give credits to the producers who did not have much capital in order to achieve more control on production.

[824] Hüdavendigar, 26. Sene (1608), 26 rebiyyülevvel 1312/ 14 eylül 1310, p. 1.
[825] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, p. 40.
[826] Hüdavendigar, sayı:1968, 25 cemazilevvel 1319, p. 2; BOA, BEO. 3724/279262, 10 rebiyyülevvel 1328
[827] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 38
[828] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 38.
[829] Hüdavendigar, 33. Sene (1974), 9 şaban 1319/ 7 teşrninsani 1317, p. 3; Torkomyan elucidates in his book the best type of silkworm was 'Bombryx' to get the best quality silk; Torkomyan(1922), *İpek Böceği Beslemek*.

Deligiannis said that it was after 1900 when the certificated egg producers were able to circulate the disease-free eggs, and the cocoon producers could sustain their cultivation, as long as the eggs were examined under the microscope by the expert egg producer in the village.[830] Thus it seems that it was after 1900 when there has been achieved some sort of a control on production, but not entirely, as mentioned above.

At that period for the producers it was sufficient to ensure basic hygienic conditions for the worms, regardless of whether or not they had a diploma. He said that the women were washing the houses with plenty of water, plastering with lime, disinfecting the rooms with sulphur fumes or acid and cleaning the mats on which the worms would lie 10 or 15 days before hatching their eggs.[831]

However, as the aim of the scientific knowledge became increasing its control on production, the impositions became harsher to compel the producers to produce in one single way. There were increased claims in the importance of using a microscope to ensure cleanliness, which also came with new stipulations. According to new regulation in January 1902, the cocoon producers who were producing for their own production were pushed more to become accustomed to scientific methods.[832] According to 1893 regulation the only thing that the cocoon producers had to do was to get their eggs examined under a microscope. In 1902 it is claimed that the cocoon producers were to be pushed to examine the eggs under microscope in the temporary examination stations that would be built soon.[833] Yet it was the silkworm egg producers who were taken under strict standardization and increased control. The second article defined in detail how to breed silkworms for eggs. The

[830] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 38.
[831] Kılıç & Ulutaş, *Bir Mübadele Köyü Görükle ve Nilüfer Belediyesi Mübadele Evi*, 38.
[832] BOA, ŞD. 529/35, 1316 (Rumi).
[833] BOA, ŞD. 529/35, 1316 (Rumi), article 1st.

certificate was conditioned to the submission of a detailed report on the amount of the eggs, the names of the rooms that the producer keep the worms, the number of and area in which he build bedsteads, and the number of microscope that were used.[834] A new article was added to the regulation with the aim of eradicating Flacherie (*baygınlık*), that is the diseased cocoons were to be burned to ensure totally healthy offsprings.[835] Furthermore, the regulation reflects the eagerness of the state to appropriate the yields more than before, by elucidating different tax items, such as the eggs, the cocoons, the worms and others. Thus, with recording all the stages of production, the state aimed at standardization and appropriation of the yields more so than before.

Such strict standardization of the egg producers was of course met with oppositions, mostly on building bedsteads (*kerevet*) which meant new expenses for the producers. The cocoon and egg producers from Küplü, in Bilecik, petitioned claiming that the regulation could not be applied in their villages. For the name of the producers Artin Kaztacıyan mentioned that it has recently been announced in the first article of the revised regulation that the eggs that had been reserved for reproduction should be from among those which were kept on bedsteads (*kerevet*) not on other places, all along their five ages.[836] He said that in their method they were keeping the silk worms on the mat in three phases of metamorphosis, and in their place in two phases. To him the peasants did not enough capital to build the bedsteads in the way as mentioned in the regulation, which would cause their withdrawal from silk raising. He underlined that with their own methods they had been obtaining the greatest yields throughout the years and they became successful in eradicating the diseases. Obliging the peasants to produce in certain way would either direct them to using

[834] BOA, ŞD. 529/35, 1316 (Rumi), article 2nd.
[835] BOA, ŞD. 529/35, 1316 (Rumi), article 7th.
[836] BOA, BEO. 2025/ 151804, 1318 (Rumi).

foreign eggs which would not fit the local environmental conditions, thereby reducing the yields, or direct them to few native producers like him. However, this obligation would exceed even his means. He stressed that it was important to protect the local eggs and egg producers.

Either way, he said if the government became insistent on applying the regulation, the peasants would soon or late stop producing cocoons. As long as the peasants could preserve the seed, ensure their supply, they partially applied science.[837] They insisted in maintaining producing their seeds in the way that they knew best. Once the seed started to be imported, the peasants could face with a total destruction, unless they brought about some kind of standardization which was beyond their means. In this case, as Artin Kaztacıyan emphasized their seeds were perfect for their environment where foreign seeds would not work. He implied that their practices and experiences were the product of their local environment and scientific knowledge. Thus, with the agency of Kaztacıyan, it was the product of the relationship between scientific agricultural knowledge and peasants' knowledge, and of process of 'becoming' of state and society.

During his trip to Anatolia, Professor Bayer at the Berlin Agricultural School, claimed that it was the duty of the local Agricultural officials to protect the local seeds and encourage to rely on local seeds.[838] To him, foreign seeds would destroy the originality of the local seed and would gradually diminish the yields. Even the transfer of seeds from other regions would not fit the environment as well as the local seed.[839] Hence, like Kaztacıyan underlined in the document, Professor

[837] Kloppenburg, *First The Seed: The Political Economy of Plant Bio-Technology 1492-2000.*
[838] "Ziraat Vekaletince Türkiye'de Tedkik Seyahati İçin Davet Olunan Berlin Ziraat Mektebi Profesörlerinden Baver "Anadolu'da Tetkik Seyahati", *Ziraat Vekaleti Mecmuası*, (8), 182.
[839] "Ziraat Vekaletince Türkiye'de Tedkik Seyahati İçin Davet Olunan Berlin Ziraat Mektebi Profesörlerinden Baver "Anadolu'da Tetkik Seyahati", *Ziraat Vekaleti Mecmuası*, (8), 182.

Bayer saw local experts as vital figures in preserving the local seeds that fit in with the local environment.

It is at this very point where scientific knowledge and peasants' knowledge started to clash. On the side of state agricultural policies, we see the most barren form of increasing control of institutionalized scientific knowledge to mold the production into a monolithic shape without any regard to local differences. The more the institutionalized scientific knowledge became oppressive and aggressive, the more it received oppositions from the local varieties. Yet, to what extent scientific knowledge could enter the domain of peasants was strongly related to how it was introduced. In other words, it is important to look at the nature of relationship between social groups and state.[840] Here, it is important to note that Artin was himself also a graduate from the Silk Institute, he apparently became very successful in adapting scientific knowledge to the local conditions. As Jenny Springer claimed the success of scientific knowledge depended on the local agents' adaptation to local knowledge and circumstances.[841] For the same reason, we should say that because institutionalized scientific knowledge entered into the domain of the peasants through the individuals, it was not independent from the individual himself. The government policies of scientific agricultural knowledge embodied in the individual transmittors, thus it shows how the state policies were 'becoming' or how it turned to struggle. If the individual became successful in meeting the need of the locals and creating hybrid knowledge and if they reach a decent level of production, they could defend their methods against the government impositions by claiming that they were satisfactorily successful in producing.

[840] Migdal, *State in Society*. Look at Chapter Five to see details of the discussion on state.
[841] Springer, "State Power and Agricultural Transformation in Tamil Nadu".

Küplü villagers were not the only ones who opposed the new regulation. Demirtaş and Balatiyunus villagers claimed that they could not apply the new regulations, and their eggs were well known and highly demanded in Bursa. They had been producing their eggs using the same method for many years.[842] The peasants from Demirtaş said that they had already improved their trees and gardens, and they saw no reason to change their methods. Doing so would cause their devastation and ruin of the silkworm egg production in the long run. They were insistent in continuing producing the eggs in the way that they had been doing until that point in time. Because 'they saw no reason to change their methods', the peasants who had been producing silkworm for nearly 300 years and had a strong belief in their methods, they only allowed the new methods and practices to enter up to their needs.

In the 1922 edition of his book, Torkomyan mentioned that in Bursa generally the silkworms were kept in bedsteads (kerevet) until the third metamorphosis and they were moved from the bedsteads afterwards. He said that this way of breeding could cause unhygienic conditions and accordingly could lead to diseases, the best way to keep them was by leaving them on bedsteads during their all the phases. [843] In 1926, science came to be presented as the force that overcome the natural conditions to minimize the losses and reach maximum productivity; the eggs were kept in special boxes, called *karlık*, to regulate their heating and prevent their awakening before the weather got warm.[844] And of course, the peasants needed to finance these special boxes and a special incubator for regulating the awakening

[842] BOA, BEO. 2042/153140, 1319 (Rumi).
[843] Torkomyan(1922), *İpek Böceği Beslemek*, 134. In the earlier version of the book (kept in the Atatürk Library) published in 1314 (1899) he did not mention the state of phases of silkworm breeding in Bursa in order to compare see Torkomyan (1899), *İpek Böceği Beslemek ve İpek Böceği İstihsal Etmek Kavaidi*.
[844] Delil & Dinçel, *Bursa Ticaret ve Sanayi Odası Mecmuası*, 40-42.

time.[845] Subjugating nature and standardization of the environmental conditions through science meant that the peasants had to shoulder an extra financial burden.

Hence, it seems that peasants continued with their methods, if they found no benefit in changing their methods, and they rejected to apply what was enforced as regulations under the name of scientific knowledge. Thus, scientific knowledge of the state could not have the absolute force of transformation or destruction, as long as it was dissociated from the needs and conditions of peasants. For that reason, it was a story of negotiation, interaction and mutual change, as well as struggle.

6.6 Conclusion

The aim of education was essentially to provide the peasants with the '… social motivation for scientific work'[846] as underlined by Montgomery. For Bursa the motivation was to get rid of Pebrine and other diseases in order to take advantage of the market conditions.

Cocoon and raw silk production in Bursa were in dramatic decline beginning from the 1860s due to Pebrine. In the meantime, the entrance of China and Japan as the supplier of raw silk threw Ottoman silkworm raising into a great crisis. Cocoon and raw silk production fell dramatically from 1855 until 1870s. During this period, the producer peasants cut their mulberry trees and turned the gardens into grain fields. Because disease was regarded as the principle cause in the devastation of silk production, all the hopes were built on the scientific method which was developed in France by Pasteur and was brought to the Ottoman Empire by Torkomyan. With the establishment of the Silk Institute, Torkomyan began to educate the producers in the French method of fighting with the disease. The

[845] Delil & Dinçel, *Bursa Ticaret ve Sanayi Odası Mecmuası*, 40-42.
[846] Montgomery, "Education and Training for Agricultural Development", 171.

cooperation of the PDA, government and the Silk Institute in forcing the peasants to espouse scientific methods brought about a second spring to cocoon and egg production mainly in the 1890s. It was that period when the impositions of scientific knowledge became more rigid to quicken the revival in cocoon and egg production in order to respond market conditions.

While the ordinary cocoon producers had to be clean and to care about the conditions of silkworms was seen as enough for productivity, the egg producers- who were seen as the fundamentals of increasing productivity by ensuring healthy offsprings of silkworms- were forced to receive a scientific education. But this was something that they themselves also wanted in order to overcome the disease. In that way, the seed became the real subject of change and also struggle, as was presented the only way to fight against the disease in order to benefit from market opportunities. Compared to the seed, nothing much had been changed in mulberry gardens, but more care and appropriate timing in tilling the soil, pruning, weeding and cleaning the leaves, when we compared the accounts of Sestini in the 18th century and the practices of Görükle peasants at the end of the 19th century. It seems that what Torkomyan suggested had already been known by the 18th century peasants.

In this environment, when scientific knowledge was implemented more to fight against diseases – and thus was less about standardization and control – the people adopted new methods without much opposition. This was at a time when they could take advantage of opportunities in the market. Of course, this does not mean that the peasants adopted the principles immediately, and we should not think that government was an almighty and absolute power and controlled all the certificates and it was able to prevent non-certificated egg producers, as seen above. We can still

say that disease created the interaction between peasants' knowledge and scientific knowledge.

However, in this silkworm case the government was driven by increasing the income from silkworm production as much as possible. Thus gradually scientific knowledge was turned from fighting against the disease to standardization which would generate control on production and income. In this way, the meaning of scientific knowledge went beyond fighting the disease and standardization and control became prominent features; free space for the local methods and practices was contracted, and the oppositions raised from among the peasants. Claiming that they see no reason to make further changes in their methods, they became insistent in maintaining their methods. Thus, because fighting against disease was a reasonable claim, the producers adopted the basic principles and formed their hybrid knowledge that was proper to their local environment. What is remarkable here is that hybrid knowledge meant a change in both peasant and scientific knowledge, remarking the means through which state was present in society. For instance Artin, the graduate from the Silk Institute was able to find a mid way between on the one hand the practices, needs and means of peasants and on the other hand scientific knowledge. They did not want to accept anything outside their needs. Furthermore, it was their seed which they tried to protect against foreign seeds claiming that the letter would not fit to their environment. This indicates that they could provide their own seeds by the partial application of science, thus they became partially dependent on the market for providing their seeds.

Through Artin Kaztaciyan we can see how scientific knowledge and peasants knowledge merged and how scientific knowledge was changed by adjusting, to meet the local needs and conditions. The clash started when peasants'

knowledge was regarded as something that needed to be standardized, controlled and changed by the scientific knowledge regardless the local conditions.

The same is true for other components of agrarian change, such as machinery or new crops and intensive use of land. For instance as we have seen in the last chapter, because rice fields needed more labor, Dikencik Çiftlik brought machinery to the çiftlik when additional labor was not available. Yet in silkworm raising and raw silk production, machinery was only needed in the mills.[847] Or we can see that the demand for machinery increased during WWI period, when there was a smaller labor force.[848]

Not only the demand for machines, the socio-economic and environmental conditions determined the adoption of the new crops. The model farms in which there was more productivity when applying fertilizer [849], were designed to serve as models to encourage peasants to use fertilizers, to use machines or to try new crops. However, if there was no benefit for the peasants, the experiments remained as limited experiences. For instance, turnips were not used as leguminous crops, because the peasants did not need such a way of intensive use of land; mulberry gardens and fallow lands seemed to be sufficient to graze the animals.

Thus, the needs of peasants which were shaped by domestic and foreign demand, the limits of the land regime, population increase and environment- all of which- determined their response to the change in agricultural knowledge. Any kind of attempt disregarding these factors would be met by oppositions. For that reason, presenting the agricultural knowledge and practices as backward is a fiction and

[847] There are lots of petitions asking for the exemption from custom due for importing machines to filature mills; BOA, ŞD. 1811/16, 1304 (Hicri); BOA, MV. 42/22, 1306 (Hicri); BOA, İ. İMT. 3/11, 1319. And also there was only one petition to have machines to harvest mulberry leaves of 150 dönüm garden; BOA, MVL. 646/84, 1279.
[848] BOA, DH. UMVM. 83/17, 1334 (Rumi); BOA, DH.UMVM.83/14, 1333 (Rumi).
[849] *Bursa Ziraat Mektebi 1326-7 Senelerinin Tecrübelerinin Netayicini Mübeyyin Rapor*.

nothing but reproducing the statist view. Instead of this fiction, in this chapter I underlined how scientific knowledge and peasants' knowledge underwent intertwined changes. In reality, they produced 'distinct forms of knowledge' varying to the local environments and needs. The clash started, when they failed to produce a common language.

CHAPTER 7

CONCLUSION

This dissertation mainly aimed at providing a new look into agricultural knowledge outside the concepts of the presences/ absences and failure in capitalist transformation. By re-approaching the issues of land regime, population dynamics, modernizing states, environment and education this dissertation intended to show the ways in which agricultural knowledge has changed.

By change in agricultural knowledge this study not only addressed the knowledge of peasants on land, environment, crops and animals- all of which are the components of agricultural production- but also it addressed the scientific knowledge which sometimes appeared as the proper way of eliminating the diseases, sometimes exterminating locusts, sometimes maintaining living conditions (i.e. emphasis on hygienic conditions). At times, this scientific knowledge was used to determine which crops should be cultivated or how tree should be planted. It's vital to underline that scientific knowledge did not only mean applying fertilizer, using machines and rotating the crops in a certain way. In revealing the motives among the claims of scientific knowledge, this research underlines that both forms of the knowledge were under change.

In that sense, this research stresses that agricultural knowledge of the peasants was changing as the land, environment and population underwent transformations. At the same time, scientific knowledge which appeared as an instrument in linking state with society also underwent some changes as a result of mutual interaction and negotiations. By re-approaching the changes in this environment, land regime and population this research attempted to understand how

these factors created certain way of change in peasants' knowledge and how 19th century centralizing state positioned in trying to extend its presence and dominance during different periods of time. At this very point it should be underlined that peasants' knowledge and scientific knowledge were not two distinct spheres, but instead formed hybrid knowledge which corresponded to the peasants' needs, unless scientific knowledge surpassed the social, natural and economic barriers and failed to meet the needs of the peasants. It was at this point when the relationship of mutual interaction and negotiation turned into struggle and peasants began to be deemed as 'reactionary'. In other words, this is the story of how scientific knowledge turned into a vehicle of state mentality from a cure and way of knowing.

Within this framework, this research offers methodological and conceptual conclusions alongside some specific statements on the land and labor regime, the vakıf system, state-making and centralization and its periodization, as well as a reinterpretation on population dynamics and transfer of skills.

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This dissertation did a thorough reading of various primary sources. Primary sources from BOA were used comparatively with consular reports and newspapers to differentiate the interests of local and central state, which could be sometimes presented as if it were the same. In that way, to some extent it was also possible to concretize the notion of 'state', different interests of central and local states, and how these interests had changed over time.

While a deep reading of the state archives could only present a limited point of view on the peasants, diverse resources were necessary not only to grasp the behaviors and responses of the peasants, but also to constitute a historical narrative.

In that framework, consular reports, travel accounts, newspapers for the later periods facilitated the search for peasants throughout the century and brought the stories of the peasants to the light.

Still it is equally important to note that the rural world was not constituted of provincial state and peasants. There were several intermediaries and levels between state and peasants. Analyzing some rare data on the institutions such as the PDA, the Chambers of Commerce and Agriculture and Regie is vital in understanding the various players in the state. Exploiting data on these institutions, and rare data on the individuals- such as the experts and agricultural graduates- sheds light on different aspects of rural life.

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First of all, I put forward a clear definition of agricultural knowledge to clarify what is meant by the changes. Agricultural knowledge is the knowledge of the crops, of the way (i.e. methods) through which the crops were cultivated, of the soil on which the crops were cultivated, of the environment where the crops were cultivated, and of the tools by which the crops were cultivated. Based on this definition, it can be said that agricultural knowledge is basically the product of the relationship among the people and their local environment. By environment, I do not mean a narrow definition of the climatic and topographic conditions, but also how the land was used in close relation with geophysical conditions, which was not free from the way the land was possessed.

Nonetheless, agricultural knowledge was not only formed by environment and people, but also by scientific knowledge. Scientific knowledge was turned into a vehicle of policies in order to make the state power with the intention of controlling

and increasing the production and its share from the production. As Joel Migdal argues in his state-in-society model, state is on the one hand a powerful image as if it were a single, ultimate and almighty idea, on the other hand it had conflicting set of rules derived from different groupings inside and those it was in relation with.[850] The use of scientific knowledge as an agency by state organization helped us to bring to light the conflicting set of rules, as well as the almighty idea, besides how the organization changed, interacted and 'became' in various levels of governmental organizations.

In order to establish the hegemony over production, the discourses of 'unproductivity' and 'backwardness of peasants' gave the idea-state the necessary legitimacy. In this way, scientific knowledge and peasants' knowledge were pushed into separate realms. Peasants' knowledge came to be defined as 'backward' and unproductive, whereas scientific knowledge symbolized the improvement and advancement. This research revisits the notion of 'backward agricultural knowledge' and 'backward' peasantry which implies stagnancy and non-change. Throughout the work it was highlighted that agricultural knowledge of the peasants had been undergoing change for a long time. It was impossible to retain the same agricultural knowledge while environmental conditions, market opportunities, land regime and population were changing. The peasants responded these changes in their own way within the power struggles. They tried to benefit from the market opportunities with minimum cost. What produced the notion of 'backward' was the discourse of centralizing state which tried to take the peasants under control and dominance.

The meaning of 'advanced' acquired different connotations related to the concerns throughout the 19th century. While diseases gave scientific knowledge the

[850] Migdal, *State in Society*.

necessary legitimization, the ways of fighting with the diseases were subject to change, so was the meaning of scientific knowledge. While banning rice cultivation seemed scientific (based on the reports of municipal doctors) in the second half of the 19th century for the local and central government, at the beginning of the 20th century scientific turned into obligations of applying 'advanced methods' in rice cultivation (i.e. planting eucalyptus and willow tree on the margins of swamps). Even though local government was not so willing to allow rice cultivation at the very beginning of 20th century, it could not stand against the income from rice, so agreeing with central government to not sacrifice the income from rice cultivation and utilizing the unproductive swamps which the central and local governments had failed to drain. Similarly when the Ministry of Finance rejected to finance chemicals to eliminate the locust invasions, mass mobilization was posed as the 'scientific' way of fighting against locusts. When this policy could not be imposed any more, local governments took the initiative and invited scientists, which then turned into a change in central policy towards locusts. In silkworm breeding, 'scientific' methods in raising the silkworms changed from the 1880s to the beginning of the 20th century in order to enhance the standardization and control. Thus, this research underlines both peasants' and scientific knowledge had changed throughout the 19th century. It turned into a vehicle of control and standardization from one of curing illnesses.

Scrutinizing the change in scientific knowledge enabled us to observe that change in state policies and centralization were also not linear processes. While centralization was seen as information-gathering during the first half of the 19th century, it became standardization and ambition of control at the beginning of the 20th century, precisely during the last years of the Hamidian period. In that respect,

this research revisits the 19th century modernization and centralization policies by going over the agricultural policies and discourse of scientific knowledge.

Relatedly, the relationship between peasants' agricultural knowledge and scientific agricultural knowledge was also not linear. The diseases gave scientific knowledge the necessary legitimacy as the rescuer. Yet, eliminating the diseases was also on the agenda of the peasants. Thus, the more scientific knowledge turned to its roots among the peasants and adjusted to the local environment, the more the peasants' knowledge tended to intertwine with scientific principles and form hybrid knowledge. This period can be called negotiation, interaction and mutual change. But, this relationship turned to struggle when the universal claims of scientific knowledge threatened the relative autonomy of producers in responding to market fluctuations. By protecting their relative control on their seeds, the peasants wanted to feel secure in sustaining their livelihood. In that manner, in this research the change in agricultural knowledge was not conceptualized only through struggle, which was caused by ignoring the peasants' needs and assuming them to be a closed community. Rather, it is argued that peasants needed scientific knowledge in the form of a remedy to their problems. When the requirements of scientific knowledge began to interfere into their way of life and extend their means, the struggle began. Thus, the change in agricultural knowledge was manifested partly by forming a hybrid knowledge and partly thrıugh a struggle to protect their seeds.

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Because the countryside did not consisted of segregated areas between small peasantry and çiftliks, their relationship determined directly or indirectly the way the agricultural production and knowledge changed. Power relations and balance of

power obviously played a significant role in this way. For that reason, any change in land owning initiated a change in agricultural knowledge and production. However, the way agricultural knowledge changed was not independent from market conditions. Whereas market demand stimulated sheep breeding in Mihaliç, market conditions pushed rice cultivation and silkworm breeding in Bursa, which perfectly aligned with the local environmental conditions and land owning. Though market could not have been a formative factor alone, the demand gave a certain way to the agricultural production, thus manipulated the change in agricultural knowledge.

In addition to the market conditions scrutinizing geographical conditions and environmental changes provided a holistic approach to the change in land regime and in agricultural knowledge. In Mihaliç, driven by the market opportunities enlarging swamps worked for the benefit of çiftlik-holders to form new çiftliks or extend the existing ones to take the advantage of sheep breeding. Abundant grain cultivation decreased while sheep breeding, tobacco and linseed increased at the end of the 19th century Mihaliç. The old agreements on the commons were broken to the disadvantage of the small peasants, as the boundaries of commons became vague due to the inundations and expansion of swamps, as the sheep breeding became more profitable, and small peasants were increasingly in debt.

In Bursa, since there were not many large pastures and most of the villages were partitioned by vakıfs and peasants had usufruct rights on small plots, the growing swamps triggered more intensive use of gardens and vineyards and pushed the increasing population to use the margins of swamps as rice fields as an income-generating crop. Even though cultivating rice was not new for Bursa peasants it regained its popularity at the end of the 19th century. Thus, the gardens, vineyards

and rice fields brought about a more intensive use of the existing lands at the end of the 19th century Bursa.

While the commons were partitioned by the sheep-breeders in Mihaliç, in Bursa the available commons were invaded by the mulberry gardens which stiffened intensive use of the gardens. Moreover, the lack of large pastures and the presence of vakıf village system- which in a way prevented the formation of çiftliks- gave way to clover fields and to sell the clovers in the market as a nutritious crop for the animals. Absentee land-holders turned their plots to clover fields, or mulberry and vegetable gardens where animals could also be grazed. But still as the swamps extended and- as the marshy lands began to be used as rice fields which conflicted with the grazing season- as all the available lands were filled by mulberry trees, and as population increased the peasants increasingly began to exploit the hills of Uludağ by opening lands from the forests.

An important factor in the change in agricultural knowledge is the population movements to Mihaliç and Bursa. While increase in population number meant a shift in land/ population ratio, it seems that population meant more than numbers in Bursa and Mihaliç. The refugees from Rumelia, Bulgaria and Caucasus transferred their skills and knowledge. While some of them struggled to continue what they had been doing back in their home countries, those who began to indigenize started to adapt their skills to their new environment. Some insisted on animal breeding, particularly horses and powerful oxen, at the expense of the struggles against the local rice cultivators whose crops had been eaten by the animals of these refugees. Yet, their well-tended animals became wide-spread and highly-demanded especially by the land-holders who adopted agricultural machines. Some destroyed the mulberry trees to continue the cultivation of maize and other crops

which they had brought from their homeland and provided well-cared maize seeds to the native peasants. Some spread rose tree cultivation. Some stimulated rice cultivation and some spread efficient methods in vegetable gardening. And while they transferred their skills, they learned several skills from the native population.

While agricultural knowledge was changing as a result of these factors- for the agricultural yields constituted the main source of revenue of the centralizing state- centralizing state intended to achieve control over agricultural production and the yields. More yields meant more tax income and more tax income meant more powerful economy and empire.

The first step of control was information gathering about the rural conditions and production at the first half of the 19th century. To that aim a small provincial bureaucracy was constituted to gather information and to take care of the agricultural matters in provinces. As the problems concerning the land issues and taxation remained unsolved due to complex power struggles and the concerns of state, the diseases on the plants and animals was put forward as problems that could be solved by scientific knowledge around the 1860s. Eliminating the diseases was the consensus on which peasants and state agreed on. Yet scientific knowledge was loaded with more meaning than eliminating the diseases after the 1870s.

As controlling and increasing the agricultural revenues became a more urgent need for the treasury, scientific agricultural knowledge went beyond eliminating the diseases. It gained more meaning such as improvement in seeds, adopting new agricultural implements, achieving new methods without fallow and the introduction of new crops. After the1880s, the appointment of experts who had graduated from the European Agricultural Colleges in the provinces as agricultural inspectors, agricultural directors and agricultural consultants, and the establishment

of provincial cooperators of central state such as the Chambers of Commerce and Agriculture, the PDA and the Regie spread provincial representatives of scientific knowledge. Yet, as these general principles of scientific knowledge- which were divorced from the needs and conditions of peasants- continued to be imposed, the peasants reacted against these impositions.

After the 1890s, also with the increase in European educated directors and consultants and their strong devotion to the superiorty of science, the discourse came to be educating these 'ignorant' and 'backward' peasants by means of the scientific knowledge, combined with the intention of asserting more control over production. This control was justified through binary oppositions such as dirty vs. hygienic, local-based vs. universal, backward vs. advanced. This appeared at the same time as a way for creating standard and controllable subjects and environment. While the meaning of scientific knowledge was changing accordingly, the relationship of mutual interaction and negotiation between peasants' knowledge and scientific knowledge turned to be the one of struggle.

This struggle could be seen most clearly in silkworm and cocoon raising. Bursa had been famous for silkworm and cocoon raising and silkworm production. Since the 17th century travelers observed the vast mulberry gardens all around Bursa lands. However in the mid-19th century, a disease infecting silkworms called Pebrine, caused an excessive decrease in cocoon and silkworm production and certainly a decline in the revenues of the treasury. Additionally as a result of the emergence of China and Japan as the cheap suppliers of cocoon eggs and their dominance in the market, raw silk from Bursa lost its share in the world market after the 1860s.

As a solution to this recession firstly the government sought ways to eliminate the disease. The method that was discovered by Pasteur brought to

Ottoman lands by Torkomyan who had been trained at the French Agricultural School. This method that Pasteur discovered was to be the scientific method that would revive the silkworm production. The scientific method was twofold; it first aimed to detect the diseased eggs and exterminate them to prevent the spread of the disease, secondly to prevent the eggs to got sick by regulating the conditions of the rooms that the worms were kept, the conditions of the mulberry leaves, the conditions of feeding the worms, and of course by educating the producer peasants accordingly.

At this stage the needs of the peasants and the government overlapped and the relationship with the scientific knowledge can be defined through hybridity and interaction. The producers tried to follow the basic teachings regarding the conditions in order to eliminate the diseases. Yet, as we learned from the accounts, the egg producers were not taken under total registration. At the beginning of the 20th century government and local cooperators attempted to take the egg-producers under a complete control and standardization in order to ensure a stable level of production and achieve control on the production. This was done to control not only production but also the subjects, and scientific methods and knowledge came to be imposed as the proper way to produce and maintain living conditions. All the other conditions were marginalized as ‘backward’ or causing ‘backwardness’. In this way, scientific knowledge came to represent something superior to peasants’ knowledge, methods and way of living. It was regarded a way of penetrating the lives of peasants. That was how the struggle started. Education and scientific knowledge were used as the vehicles to establish the dominance, however as we said before the idea-state was not an almighty power and could not impose policies always, particularly when the

policies became threatening for the peasants. And they tried their best to preserve their control on seed to maintain their semi-autonomy.

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One of the important phenomena discussed in this study, though not profoundly, is the vakıf system and the role of this system in changing land regime. The spread of huge vakıf landed estates of the mothers and sisters of Ottoman Sultans beginning from the last decades of 18th century appeared as an important phenomenon in Mihaliç. It is arguable that after ayans were eliminated and their possessions were annexed by Emlak-ı Hümayun, these members of dynasty entered the scene. This can be interpreted as the entrance of central state through a channel, though it is not to say that central state was able to establish a total authority. On the one hand, these members of dynasty appeared as rich and reliable managers, on the other hand they had to share the authority with the powerful local tax-farmers in order to administrate these income-generating units.

Regarding the early characteristics of these çiftliks it can be said that vakıf çiftliks were designed as complete economic units, meaning that they were not closed entities. Instead, we can paint a better picture of the land regime and the sustenance of agricultural production by examining the relationship among other çiftliks to ensure the sustenance of seeds and future harvest, the relationship between animal husbandry and market crop production and grain production, and the presence of different labor organizations within the çiftliks and with neighboring villages (i.e. wage labor, sharecroppers, tenant farmers). During this early period grain production and animal breeding seemed to be in balance.

After mid-19th century, as the tax-farmers gained power and were motivated by the market conditions in sheep breeding, they acted as de-facto owners of the çiftliks. Enabled by the geographical conditions, the powerful local tax-farmers gained more control over these çiftliks, and some of these formed their private çiftliks with the motivation of benefit of sheep breeding.

While powerful local tax-farmers took over these vakıf çiftliks, vakıf villages were taken under the dominance of the Provincial Evkaf Directorates in 1835.[851] In Bursa whose lands had overwhelmingly been partitioned by small vakıf villages, a complex relationship between tax-farmers, vakıf trustees and small peasants had an impact on agricultural production after the mid-19th century. The trees, in particular, became the subject matter among these parties at the mid-19th century, though we do not see the involvement of the Evkaf Administration in the disputes on mulberry trees at the end of the 19th century, during which there was a re-spread of mulberry trees.

Considering also the importance of the geographical conditions, in Bursa the Evkaf Directorate had been more powerful than the local power-holders especially in cases of disputes in the mid-19th century. But through the end of the century whereas in Mihaliç tax-farmers, merchants and local power-holders became prominent, in Bursa the small peasants took the lead and acted as *de facto* possessors of the lands. Abstaining from reaching concrete conclusions about the vakıf system due to lack of more data on vakıfs and also becuse a deeper analysis on this issue is beyond the scope of this study, this research opens up further discussions on the diverse ways of change in the land regime in Mihaliç and Bursa, concerning the relationship between vakıf landed-estates and the appearance of local powerful figures as the tax-farmers

[851] Genca, "Osmanlı Hukukunda Vakıfların Denetimi (Evkaf-ı Hümayun Nezareti)", 547.

in Mihaliç, the relationship between the vakıf villages and predominance of small peasants in Bursa.

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This research purposefully did not touch upon certain issues. One of these issues is mechanization in agriculture. The reason behind that is due to the piecemeal information on the spread of agricultural machines and tools. First of all, there is a need to elaborate what is meant by agricultural machines. The age-old agricultural tool of Ottoman peasants was the wooden plough which they made themselves. Because the wooden plough cannot turn the soil upside- down efficiently, the tool was considered as the cause behind the less productivity[852], marshy water holes and accordingly the spread of malaria.[853] In this manner, with an expectancy to increase the productivity the transformation from wooden plough to iron plough was systematically emphasized in the newspapers beginning from last decades of the 19th century. The iron plough became one of the symbols of 'advanced' agriculture.

Yet, there was not much information about how far this symbol was widespread among the ordinary small peasants. The detailed information started in 1916 with the Provincial Council reports on agriculture. According to the report prepared by the Director of Inventory of Agricultural Tools ten home-made and some European made iron ploughs were sold to the peasants.[854] He regarded the demand for the iron ploughs was decent, but for the agricultural machines the peasants needed to be incentivized by experiencing the results with their own eyes.

[852] Ziraat Gazetesi, 2. Sene (3), 27 Ramazan 1299/1 ağustos 1298, p.40.
[853] Ziraat Gazetesi, 3. Sene (10), 15 Cemazilevvel 1301/5 Mart 1300, p. 75.
[854] BOA, DH. UMVM. 83/13, 1331.

In order to do this a budget was claimed to transfer the agricultural machines from village to village.[855]

In 1919, it seems that the demand for iron plough gained momentum. Only during three months 297 iron ploughs were sold.[856] But the demand for agricultural machines did not increase much. The prices of these machines could possibly explain why. In 1888 the price of a reaping machine was 800-1000 franc, a threshing machine 2000-4000 franc, seed drill machine 450-800 franc, and a riddle machine 50-300 franc.[857] Thus, it seems that while iron plough was becoming prevalent, agricultural machines were far from the field of interest of the peasants, except for some of the çiftlik-holders discussed above in Chapter Six.

The data did not allow us to follow the tendency of the peasants in obtaining the iron plough before the 20th century which was the core period of this research. Furthermore, it does not seem enough to rely only on the reports of the Provincial Council fully understand the tendency of small peasants. The sale and demand numbers cannot prove that all of the sold iron ploughs were actually used by the peasants. They could have been found useless by the peasants when the types of iron ploughs selected were unsuitable to the soil of the region.[858] For all these reasons, the issue of machinery and the change in agricultural tools remained intact within the scope of this research.

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Three chapters in this dissertation were dedicated to the comparison between two districts, Bursa and its neighbor Mihaliç. Obvious differences in agricultural

[855] BOA, DH. UMVM. 83/13, 1331
[856] BOA, DH. UMVM. EK. 110/54, 1334.
[857] Vasıta-i Servet, vol.2(10), 15 haziran 1304.
[858] Ziraat Gazetesi, 3. Sene (17), 1 Ramazan 1301/18 Haziran 1300, p. 132.

production in these two neighboring districts indicated us how micro-histories are important.

The regions are special for a few reasons. The first is their proximity to Istanbul, which meant they were an integral part of domestic market demand. Both lie on the Marmara Sea and had important ports for external trade. Secondly, these two neighboring districts had different natural conditions from each other, which enabled us to observe how these conditions prompted various changes in agricultural knowledge. Thirdly, these two districts had different land-owning forms, that is independent çiftliks, independent villages, vakıf-çiftliks and vakıf villages, which provided different insights to in what ways land-owning played a role in change in agricultural knowledge.

In Mihaliç the story of change in agricultural knowledge was the change of the importance placed on grain production. It diminished due to sheep breeding through the end of the 19th century. Older agreements between the çiftliks and small peasants on renting small plots for grain cultivation broke due to the eagerness for sheep breeding and small peasants were forced to exploit small tracts of lands by cultivating tobacco, linseed and vegetable crops (such as onion). On the other hand, the çiftlik-holders continued extensive methods of grain cultivation and animal breeding on vast lands of çiftliks. Through the end of the century they obtained machines in order to extend the grain cultivation. Huge plains of Mihaliç were under the threat of inundations which with the blurred margins of swamps, encouraged sheep breeding and summer crop cultivation. Obviously, this was not free from struggles on land among powerful land-holders/ merchants/ tax-farmers, new comer refugees, small peasants and increasing population of human and sheep.

In Bursa on the other hand, the geographical features of the region did not allow for vast grain fields and huge çiftliks. These features had forced the peasants to develop a symbiotic relationship between animal husbandry and crop cultivation since earlier times. The spread of high-income generating mulberry gardens since the 17th century gave way to a unique way of making use of the gardens as vegetable growing and grazing places. The vakıf village system determined the use of lands such as constraining planting trees and turning the meadows to arable lands by the will of the peasants. These conditions created exclusive solutions; clover lands to benefit from animal breeding and planting the mulberry trees on common lands. As the human and tree population increased through the end of the 19th century people sought ways to make use of the margins of the swamps which oriented them to rice cultivation.

Having said this, this study draws a sketch of the 19th century agricultural practices, crops and methods to the extent that the primary sources allowed. Hence, this study also contains stories of different crops throughout the 19th century. Clearly, some of the crops were deeply analyzed while some of them were not due to the limits of sources. We know about the changes in silkworm and mulberry gardens, but we do not have profound knowledge on the changes in rice cultivation. Again while we have more knowledge on the agricultural methods in Bursa, we have less information on the methods and practices in Mihaliç. Still, this study opens up a floor of further discussion and research on this issue.

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In establishing the relationship between scientific knowledge and peasants' knowledge, this study makes an important contribution by making the experts,

intermediaries and the teachers visible. Even though they were hardly represented in the primary sources and we have rare data on their role and functions, their presence and endeavors address the way they embraced scientific knowledge which largely determined the way the peasants' needs, knowledge and practices intertwined with scientific knowledge. In that way, this study concretizes the relationship between scientific knowledge and peasants' knowledge and it opens up further studies about the role and function of these intermediaries.

Nonetheless the main contribution of this study to Ottoman historiography is that of redefining agricultural knowledge and practices which have so far remained in the dark. Redefining agricultural knowledge also gave way to new questions such as different stages of state policies and the limits of these policies, environmental change and its effects, the relationship between environmental changes and transformation of land regime, how the peasants responded to these changes, population shifts and the changes in the land regime, transfer skills and the locality of knowledge, education and scientific knowledge and their changing agenda, the struggle over seed in maintaining the semi-autonomy on production.

APPENDIX A

CULTIVATED LANDS IN BURSA AND MİHALİÇ[859]

	1302 (in dönüm)		1325* (in hectare)
	BURSA**	MİHALİÇ	BURSA***
Tarla (arable land)	60,747	596,880	351,632
Bağ (vineyard)	200,000	2,100	16,256
Dutluk (mulberry garden)	-	-	18,862
Zeytinlik (Olive grove)	-	-	10,243
Bağçe ve … yeri (Gardens and Orchards)	317,000	2,305	4,240
Çayır, Yoncalık, Mera (Meadow, Clover land, Pasture)	21,548	132,850	11,400
Göl (Lake)		-	54,000
Ormanlık (Forest land)	785,000	955,000	480,540
Hali yer (waste land)	-	-	368,577
Toplam (total)			1,315,750

[859]The date derived from *Salname-i Hüdavendigar*, 1302, 362, 394;*Salname-i Hüdavendigar*, 1325, 301.

*In order to convert hectare to dönüm it must first be put 000 behind the number in hectare, and then divide into 92, *Salname-i Hüdavendigar*, 1325, 301.

** The numbers for Bursa only includes Bursa city center, Kite and Cebel-i Atik, not the surrounding villages.

*** The numbers for the year of 1325 are those of overall amount of İnegöl, Mihaliç, Gemlik and the central Bursa districts.

APPENDIX B

FIGURES

Figure B1. Map of Bursa and Mihaliç[860]

[860]BOA, HRT.h. 1221, 1341.

Figure B2. Map of Bursa District[861]

[861]BOA, HRT.h. 993, 1314.

Figure B3. Map of Hüdavendigar [862]

[862] Richard Kiepert map, 1904-1907, http://maps.nypl.org/warper/maps/27324#Preview_Rectified_Map_tab.

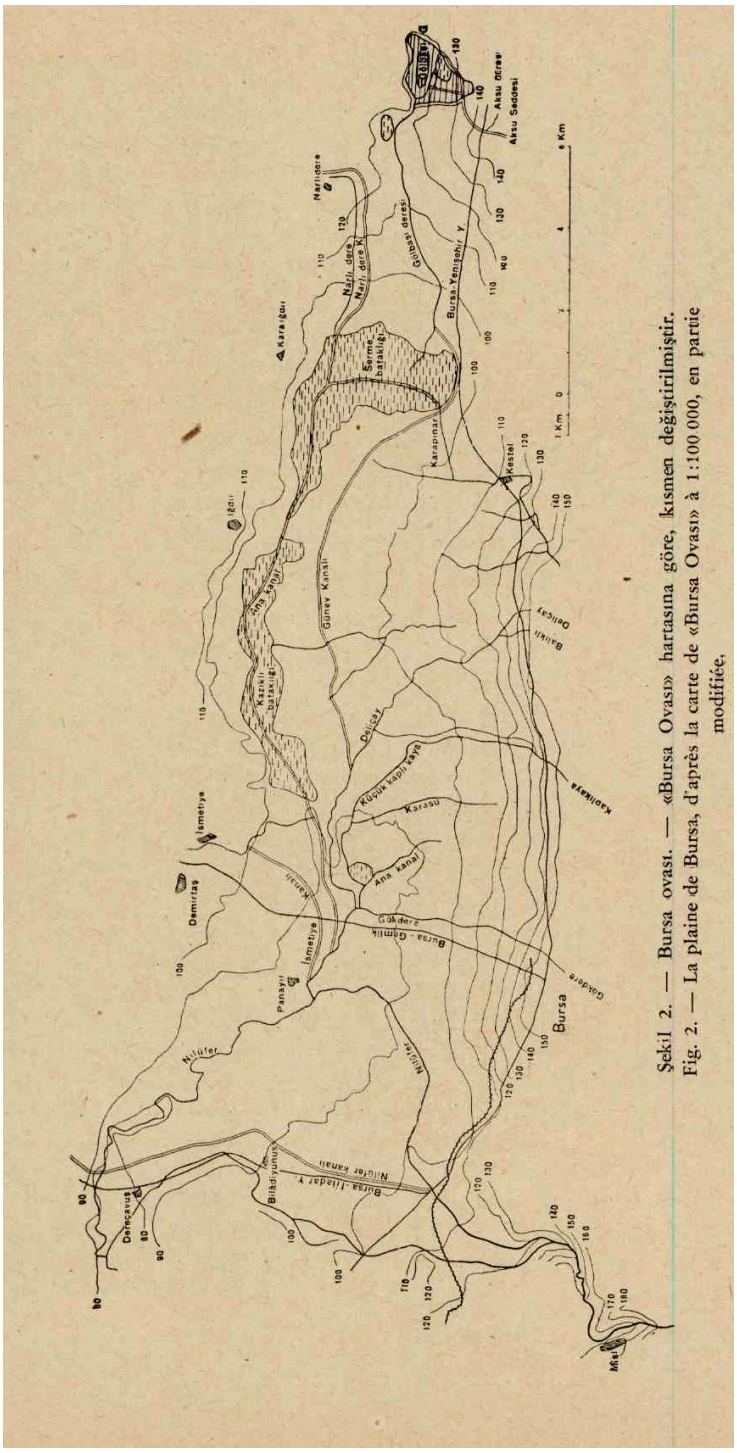


Figure B4. Map of Bursa Plain in 1930s[863]

[863]Ardel, *Bursa Ovası ve Çerçevesi*, 64.

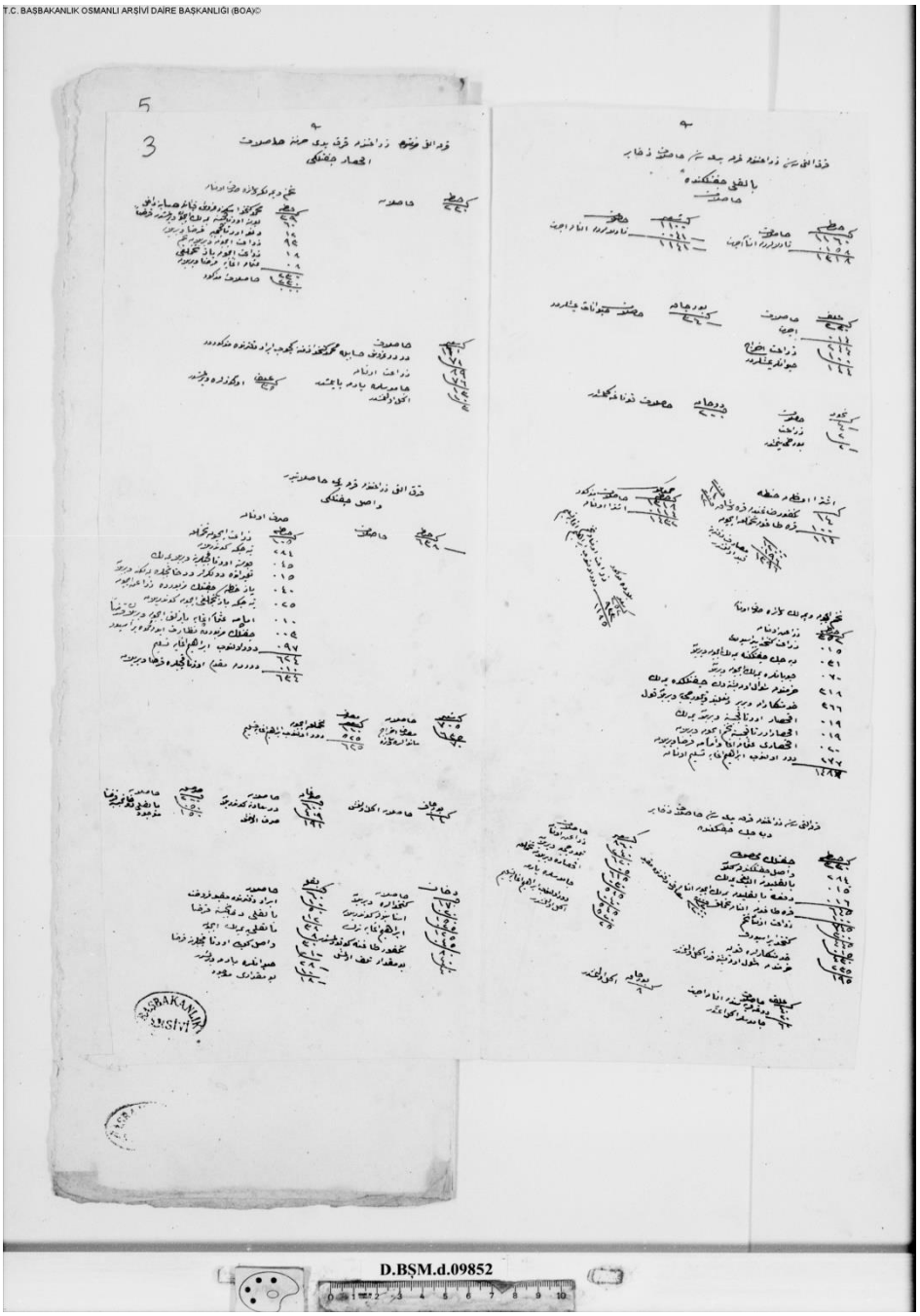


Figure B5. Sample Page from BOA. D.BŞM.d. 9852

هر صنفه عائد درسلر ایله ساعت دروسی مشعر جدولدر

اسامیٔ دروس	اوچنجی صنف ساعت	ایکنجی صنف ساعت	برنجی صنف ساعت	ملاحظات
عقائد دینیه	٠	٠	٣٠	
زراعت عمومیه وخصوصیه	٣٦	٣٦	٣٦	
صنایع زراعیه	٣٠	٣٦	٠	
فن مواشی وبیطری	٤٥	٠	٠	
فن مساحهٔ اراضی	٣٠	٠	٠	
فرانسزجه	٣٠	٣٠	٦٠	
علم جبر	٣٠	٠	٠	
ثروت ملل وزراعی ، محاسبهٔ زراعی	٤٥	٠	٠	
حکمت وعلائم جویه	٣٠	٣٠	٠	
اشجار مثمره	٣٠	٠	٠	
باغجیلق	٣٠	٠	٠	
نباتات	٣٦	٣٦	٠	
حفظ الصحه	٣٦	٠	٠	
کیمیای عضوی ، زراعی ، معدنی	٣٦	٣٨	٠	
انشاآت زراعیه	٣٦	٠	٠	
آلات زراعیه وماکنهٔ زراعیه	٠	٧٢	٠	
هندسه	٠	٣٠	٣٠	
حساب	٠	٣٠	٣٠	
کتابت	٠	٣٠	٠	
سبزه جیلك	٠	٣٦	٠	
طاوقچیلق وچیچکجیلك	١٥	٠	٠	
ترکجه ، صرف ونحوعثمانی	٠	٠	٣٠	
طبقات ومعدنیات	٠	٠	٣٤	
معلومات مدنیه واخلاقیه		٣٠		
حیوانات	٠	٠	٣٨	
جغرافیای عمومی وزراعی	٠	٠	٦٠	
عملیات زراعیه	هرکون اوچ ساعت	هرکون اوچ ساعت	هرکون اوچ ساعت	

اخطار : عملیات زراعیه اوچ ساعت اوکلدن اول اوچ ساعتده اوکلدن صکره اولق اوزره ترتیب ایدیلهجکدر .

Figure B6. Curriculum of Bursa Agricultural School[864]

[864] *Bursa Ziraat Ameliyat Mektebinde Tedris Edilen Durus-ı Muhtelife Programı*, 28

Figure B7. Stages of Growth of a Silkworm[865]

[865]Torkomyan (1922), *İpek Böceği Beslemek*, 22

١٣٢١ ،١٣٢٠ ١٣٢٢ سنه‌لرى ظرفنده داخل ولايتده بولنان ميزان محلرنده صاتيلان قوزه‌نك نوع ومقداريني مبين بروسه ديون عموميه نظارتندن ويريلن جدولدر

بونلره تابع ميزان محللرى	١٣٢٠ سنه‌سى			١٣٢١ سنه‌سى			١٣٢٢ سنه‌سى		
	ياش قوزه	نيم‌قورى قوزه	قورى قوزه	ياش قوزه	نيم‌قورى قوزه	قورى قوزه	ياش قوزه	نيم‌قورى قوزه	قورى قوزه
	كيلوغرام	كيله	كيلوغرام	كيلوغرام	كيله	كيلوغرام	كيلوغرام	كيله	كيلوغرام
بروسه	١٣٥٠٦١٧	٥٥١٤٩	٨٦٠٥٥	١٨٤٥٧١٣	٨٩٠٥٧	٧٣٥٦٤	١٥٥٨٣٥٤	٨١٢٢٥	٦١٠٥٨

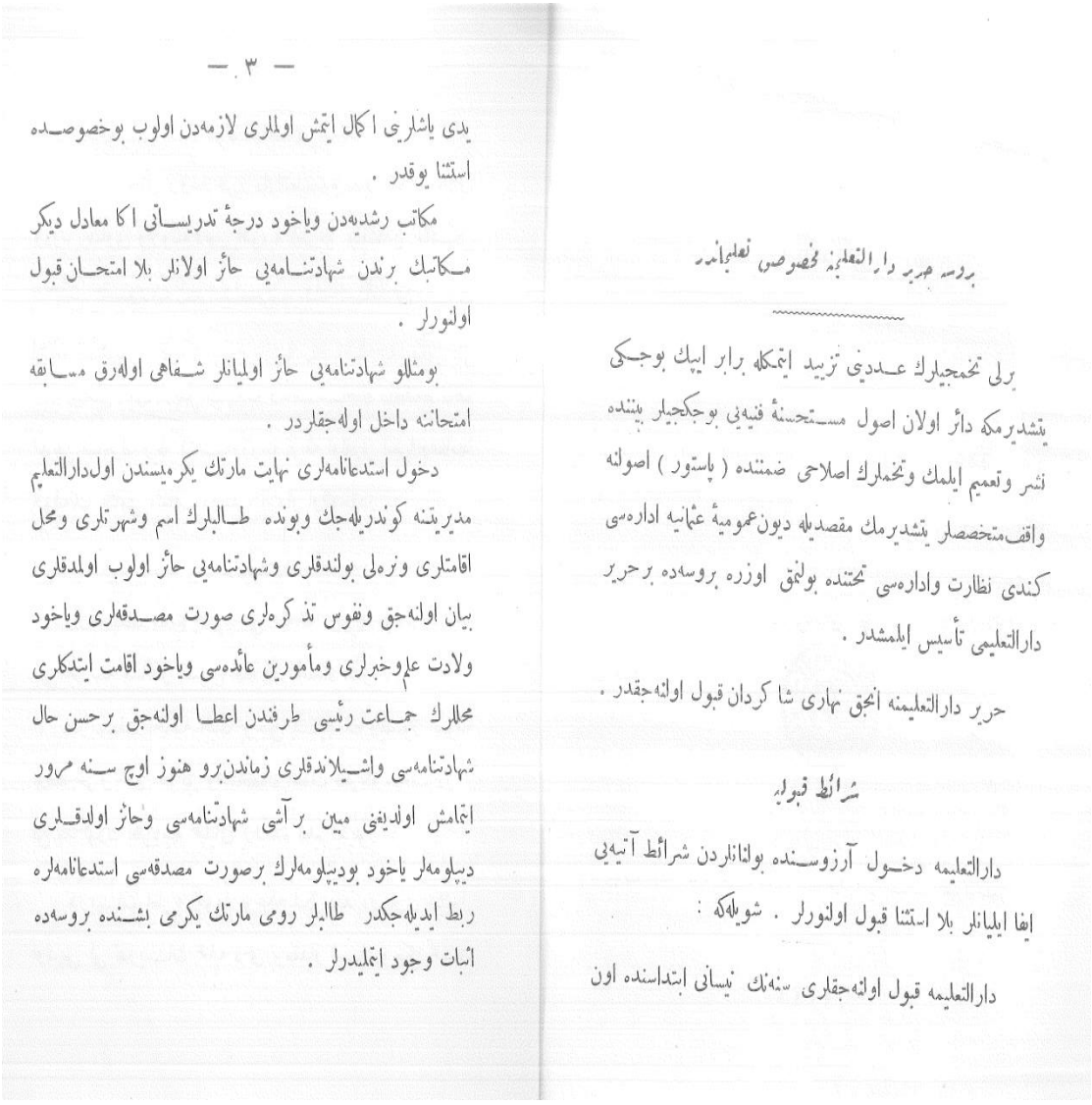
Figure B8. Cocoon Production in Bursa in 1904, 1905, 1906[866]

داخل ولايتده ايپك استحصال اولنان قضالرده ١٣٢٢ سنه‌سى ظرفنده نه‌مقدار پاكت آچيلوب نقدر قوزه آلندىغنه ودوتلقلرنك وسعتيله حاصل اولان بهر دونمدن آلنان يابراغك مقدارينه دائر جدولدر

اسامئ لوا وقضا	ياش قوزه	آچيلان قوطى	برقوطيدن آلنان مقدار	دوتلقلرنك وسعتى	بهر دونمدن آلنان يابراق
	كيلوغرام	عدد	كيلوغرام	دونم	كيلوغرام
بروسه	١٨٣٤٢٦٤	٤٣٠٠٠	٤٣	١٤٩٨٣٢	١٥٠٠

Figure B9. Statistics on Cocoon Production, Amount of Mulberry Gardens and Mulberry Leaves per dönüm[867]

[866] *Salname-i Hüdavendigar*, 1325, 345.
[867] *Salname-i Hüdavendigar*, 1325, 346.



برسه حرير دار التعليمه مخصوص تعليمنامه‌در

برلى تخمجيلرك عددينى تزيد ايتمكله برابر ايپك بوجكى يتشديرمكه دائر اولان اصول مستحسنهٔ فنيه‌يى بوجكجيلر بيننده نشر وتعميم ايلمك وتخملرك اصلاحى ضمننده (پاستور) اصولنه واقف متخصصلر يتشديرمك مقصديله ديون عموميهٔ عثمانيه اداره‌سى كندى نظارت واداره‌سى تحتنده بولنمق اوزره برسه‌ده برحرير دارالتعليمى تأسيس ايلمشدر .

حرير دارالتعليمنه انجق نهارى شاكردان قبول اولنه‌جقدر .

شرائط قبوليه

دارالتعليمه دخول آرزوسنده بولنانلردن شرائط آتيه‌يى ايفا ايليانلر بلا استثنا قبول اولنورلر . شويله‌كه :

دارالتعليمه قبول اولنه‌جقلرى سنه‌نك نيسانى ابتداسنده اون

— ٣ —

يدى ياشلرينى اكمال ايتمش اولملرى لازمه‌دن اولوب بوخصوصده استثنا يوقدر .

مكاتب رشديه‌دن وياخود درجهٔ تدريساتى اكا معادل ديكر مكاتبك برندن شهادتنامه‌يى حائز اولانلر بلا امتحان قبول اولنورلر .

بومثللو شهادتنامه‌يى حائز اولميانلر شفاهى اوله‌رق مسابقه امتحانه داخل اوله‌جقلردر .

دخول استدعانامه‌لرى نهايت مارتك يكرميسندن اول دارالتعليم مديريتنه كوندريله‌جك وبونده طالبلرك اسم وشهرتلرى ومحل اقامتلرى ونره‌لى بولندقلرى وشهادتنامه‌يى حائز اولوب اولمدقلرى بيان اولنه‌جق ونفوس تذكره‌لرى صورت مصدقه‌لرى وياخود ولادت علمخبرلرى ومأمورين عائده‌سى وياخود اقامت ابتدكلرى محللرك جماعت رئيسى طرفندن اعطا اولنه‌جق برحسن حال شهادتنامه‌سى واشيلاندقلرى زماندن برو هنوز اوچ سنه مرور ايتمامش اولديغنى مبين برآشى شهادتنامه‌سى وحائز اولدقلرى ديپلومه‌لر ياخود بودپلومه‌لرك برصورت مصدقه‌سى استدعانامه‌لره ربط ايديله‌جكدر طالبلر رومى مارتك يكرمى بشنده برسه‌ده اثبات وجود ايتمليدرلر .

Figure B10. First Page of Instructions for Silk Institute[868]

[868] *Bursa Harir Darüttaliminine Mahsus Talimattır*, 2,3.

REFERENCES

PRIMARY SOURCES

Prime Ministry Ottoman Archives (BOA/ Başbakanlık Osmanlı Arşivleri)

BOA, A.DFE.d. 786/48

BOA, A.DVN. 182/19

BOA, A.DVNS.MHM.d. 24/628

BOA, A.MKT.MHM.495/75

BOA, A.MKT.MHM.503/9

BOA, A.MKT.MHM. 503/25

BOA, A.MKT.MHM.528/18

BOA, A.MKT.MHM. 529/18

BOA, A.MKT.UM. 395/3

BOA, BEO.216/16175

BOA, BEO.274/20538

BOA, BEO. 780/58474

BOA, BEO. 983/73662

BOA, BEO.1056/79132

BOA, BEO. 1224/91752

BOA, BEO. 2025/ 151804

BOA, BEO. 2042/153140

BOA, BEO. 3204/240297

BOA, BEO.3296/247176

BOA, BEO, 3560/266953

BOA, BEO. 3693/276920

BOA, BEO. 3704/27773

BOA, BEO. 3724/279262

BOA, BEO.AYN.d. 878

BOA, BEO.AYN.d. 878/126

BOA, BEO.AYN.d. 878/134

BOA, BEO. AYN.d. 878/146

BOA, BEO. AYN.d. 879

BOA, BEO. AYN.d. 881/123

BOA, BEO. AYN.d. 881/202

BOA, BEO. AYN.d. 881/207

BOA, BEO. AYN.d. 881/256

BOA, BEO. AYN.d. 881/261

BOA, BEO. AYN.d. 881/268

BOA, BEO.AYN.d. 881/261

BOA, BEO. AYN.d. 883/110

BOA, BEO. AYN.d. 884/5

BOA, BEO. AYN.d. 884/24

BOA, BEO.AYN.d. 884/88

BOA, BEO. AYN.d. 1071/74

BOA, C.EV. 62/3082

BOA, C.EV. 377/19136

BOA, C.EV. 402/20362

BOA, C.İKTS.20/981

BOA, C.İKTS. 20/1309

BOA, C.ML.219/9076

BOA, D.6484/1

BOA, D.BŞM.1054

BOA, D.BŞM.d. 9449

BOA, D. BŞM.d. 9649

BOA, D.BŞM.d.9852

BOA, D.BŞM.d. 9970

BOA, DH.İ. UM. EK.53/47

BOA, DH. İD. 80/45

BOA, DH.İD.99/8

BOA, DH.İD. 181/15

BOA, DH.H. 30 /7

BOA, DH.H. 67/44

BOA, DH. HMŞ. 9/2

BOA, DH. MKT.110/39

BOA, DH. MKT. 230/80

BOA, DH. MKT. 255/36

BOA, DH. MKT. 304/6

BOA, DH.MKT.333/41

BOA, DH.MKT. 883/38

BOA, DH.MKT. 1077/25

BOA, DH.MKT. 1436/106

BOA, DH.MKT.1475/94

BOA, DH.MKT.1494/118

BOA, DH.MKT.1534/10

BOA, DH.MKT. 1562/10

BOA, DH.MKT. 1728/55

BOA, DH.MKT. 1748/29

BOA, DH.MKT.1752/13

BOA, DH.MKT. 1782/61

BOA, DH. MKT.2142/66

BOA, DH.MKT.2157/96

BOA, DH.MKT.2182/81

BOA, DH.MKT.2188/19

BOA DH. MKT. 2330/30

BOA, DH. MKT. 2455/18

BOA, DH.MKT. 2788/59

BOA, DH.MUİ.87-2/23

BOA, DH. MUİ. 100/19

BOA, DH.MUİ. 103-2/12

BOA, DH.MUİ. 142/76

BOA, DH.UMVM.73/19

BOA, DH.UMVM. 83/13

BOA, DH.UMVM.83/14

BOA, DH.UMVM. 140/70

BOA, DH. UMVM. EK. 110/54

BOA, Ev.d.10147

BOA, Ev.d. 10263

BOA, Ev.d. 10675

BOA, Ev.d. 12346

BOA, Ev.d.23066

BOA, HAT.1227/47920-D

BOA, HR. İD. 1339/24

BOA, İ.DFE. 15/30

BOA, İ. DUİT. 70/33

BOA, İ. İMT. 3/11

BOA, İ. KAN.1/10

BOA, İ.KAN. 1/24

BOA, İ.MVL. 38/702

BOA, İ. MMS. 122/5225

BOA, İ.MSM. 3/36

BOA, İ.TNF. 3/4

BOA, ML.VRD.TMT.d. 7385

BOA, ML. VRD.TMT.d. 7396

BOA, ML. VRD. TMT.d. 7406

BOA, ML.VRD.TMT.d. 7437

BOA, ML.VRD.TMT.d. 7493

BOA, ML.VRD.TMT.d. 7494

BOA, ML.VRD.TMT.d. 7507

BOA, ML. VRD. TMT.d. 7512

BOA, ML.VRD.TMT.d. 7542

BOA, ML.VRD.TMT.d. 7545

BOA, ML.VRD.TMT.d.7549

BOA, MVL. VRD.TMT.d. 7558

BOA, ML.VRD.TMT.d. 8887

BOA, ML.VRD.TMT.d. 8927

BOA, ML. VRD. TMT.d. 8958

BOA, MV. 42/22

BOA, MVL. 254/84

BOA, MVL.525/8

BOA, MVL.646/84

BOA, MVL. 647/2

BOA, MVL.667/48

BOA, MVL.711/62

BOA, MVL. 735/54

BOA, ŞD.113/19

BOA, ŞD. 529/35

BOA, ŞD. 1240/11

BOA, ŞD.1537/18

BOA, ŞD. 1540/9

BOA, ŞD.1546/23

BOA, ŞD. 1560/5

BOA, ŞD. 1570/29

BOA, ŞD. 1575/1

BOA, ŞD. 1592/18

BOA, ŞD.1606/35

BOA, ŞD.1612/2

BOA, ŞD. 1811/16

BOA, ŞD.2398/25

BOA, ŞD.2402/13

BOA, ŞD.2402/29

BOA, ŞD. 2403/12

BOA, ŞD. 2419/6

BOA, ŞD.2428/31

BOA, ŞD. 2438/31

BOA, T. 524/53

BOA, T.525/90

BOA, T.533/13

BOA, T.534/18

BOA, T. 526/584

BOA, Y.PRK. OMZ.2/35

BOA, Y.MTV.9/59

BOA, Y.MTV.85/108

BOA, Y.MTV. 227/96

BOA, Y.PRK. AZJ.4/18

Laws and Regulations

"Taşra Mülkiye ve Mal Memurlarına Verilen Talimattır" 1274/1858, *Düstur,* Seri 1, vol 1, pp.555-558.

"Ziraat Memurlarının Vezaif-I Memuriyetlerine Dair Talimattır" 1274/1858, *Düstur*, Seri 1, vol 1, pp.593-595.

"Taşra Ziraat Müfettiş ve Muallimleri Hakkında Nizamname"1316/1900, *Düstur*, Seri 1, vol 7, pp. 398-400.

"Zürraın Rejiye ve Rejinin Zürraa Karşı olan Hukuk ve Vezaifine ve Ahkam-ı Cezaiyeye Dair Nizamname" 1302/1886,*Düstur*, Seri 1, vol 5, pp.696-727.

"Ziraat Odaları Nizamnamesi" 1328/1912, *Düstur,* Seri 2, vol 4, pp.541-544.

National Library (Milli Kütüphane)

"Bursa Harir Darüttalimine Mahsus Talimattır" 1322/1906, Dersaadet.

"Bursa Ziraat Ameliyat Mektebinde Tedris Edilen Durus-ı Muhtelife Programı" 1327/1911, Bursa.

Ticari ve İktisadi Bursa Rehberi. 1900. İstanbul.

ISAM Library

"Hüdavendigar Vilayeti 1329 Senesi Meclisi Umumi Zabıtname ve Mukerreratı" 1330/1914, Hüdavendigar.

Hüdavendigar Salnamesi, 1287

Hüdavendigar Salnamesi, 1296

Salname-i Hüdavendigar, 1301

Salname-i Hüdavendigar, 1302

Salname-i Hüdavendigar, 1303

Hüdavendigar Vilayeti Salnamesi, 1307

Hüdavendigar Vilayeti Salnamesi, 1316

Hüdavendigar Vilayeti Salnamesi, 1318

Hüdavendigar Vilayeti Salnamesi, 1324

Hüdavendigar Vilayeti Salnamesi, 1325

IBB Atatürk Library Archives

"Çekirge İtlafına Dair Kanun ve Talimat" 1329/1913, Dersaadet.

"Bursa Ziraat Mektebinin 1326-1327 Senesi Tecrübelerinin Netayicini Mübeyyin Rapordur" 1327/1911, İstanbul.

National Archives, Foreign Office Department

FO 78/441 (1841)

FO 78/490 (1842)

General Directorate of Foundations, İbrahim Hakkı Konyalı Library (Vakıflar Genel Müdürlüğü, İbrahim Hakkı Konyalı Kütüphanesi)

No. 3516. 1174/ 1760

SECONDARY SOURCES

Addison, C. G. (1838). *Damascus and Palmyra: A journey to the East. Vol.I*. London: Richard Bentley.

Agrawal, A. & Sivaramakrishnan, K. Introduction. In Agrawal, A. & Sivaramakrishnan, K. (Eds.) *Agrarian environments: Resources, representation, and rule in India*. Durham; London: Duke University Press.

Ahmet Rıza. (1304). Mekteb-i İdadi-i Mülkide okuttuğum sanayiden 'ipek böceği ve ipekçilik' dersi. *Fevaid*, *11, 12, 14*, 86-110.

Akagündüz, Ü. (2016). II. Meşrutiyet döneminde toplumsal bir sorun olarak sıtma ve sıtmadan korunma çareleri. *Kebikeç, 41*, 95-123.

Akpınar, M. (2013). Bir Tanzimat bürokratının portresi: Krikor Ağaton Efendi (1823- 1868). *Tarih İncelemeleri Dergisi, XXVIII* (2), 329-354.

Ambrosoli, M. (1997). *The wild and the sown: Botany and agriculture in Western Europe, 1350-1850*. Cambridge: Cambridge University Press.

Appuhn, K. (2013). The nature of Ottoman history. *Eighteenth- Century Studies, 46* (2), 302-306.

Ardel, A. (1945). Bursa Ovası ve çerçevesi. *Türk Coğrafya Dergisi, 7-8*, 62-96.

Arı, K. (2008). Tarihsel süreçte mübadele ve Bursa. In Abacı, D. Z. (Ed.) *Bursa'nın tarihsel zenginliği göçmenler* (pp.142-176). Bursa: Osmangazi Belediyesi Yayınları.

Aşkın, A. (2017). *Institutions, economy and environment in the Nineteenth Century Ottoman Empire: The case of imperial landed estates (Çiftlikât-ı Hümayun) of Mihaliç, 1840-1850* (Unpublished MA Thesis). Boğaziçi University, İstanbul.

Aytekin, A. (2008). Cultivators, creditors and the state: Rural indebtedness in the nineteenth century Ottoman Empire. *Journal of Peasant Studies, 35* (2), 292-313.

Barkan, Ö. L. (1980). Çiftlik.In Barkan, Ö. L. *Türkiye'de toprak meselesi toplu eserler 1*, (pp.789- 797). İstanbul: Gözlem Yayınları.

Barkan. Ö. L. (1980).Çiftçiyi topraklandırma kanunu ve Türkiye'de zirai bir reformun ana meseleleri. In Barkan, Ö. L. *Türkiye'de toprak meselesi toplu eserler 1*, (pp.449-544). İstanbul: Gözlem Yayınları.

Barkan, Ö. L. & Meriçli, E. (1988). *Hüdavendigar livası tahrir defterleri*. Ankara: Türk Tarih Kurumu.

Barkley, H. C. (2009). *A ride through Asia Minor and Armenia: Giving a sketch of the characters, manners and customs of both the Mussulman, and Christian inhabitants.* Whitefish, MT: Kissinger Publication.

Baskıcı, M. (2011). Machine prices and mechanization of Ottoman agriculture, 1860-1914. *Yakın Doğu Üniversitesi Sosyal Bilimler Dergisi, 4* (1), 68-79.

Behar, C. (1987). Malthus and the development of demographic analysis. *Population Studies, 41* (2), 269-281.

Berber, F. (2011).19. Yüzyılda Kafkasya'dan Anadolu'ya yapılan göçler. *Karadeniz Araştırmaları, 31*, 17-49.

Berkes, F. (2008). *Sacred ecology*. New York: Routledge.

Birgül, M. F. & Çanaklı, L. A. (Eds.) (2009). *Cenubi Marmara havzası Bursa vilayeti coğrafyası*. Bursa: Bursa İl Özel İdaresi.

Bloch, M. L. (1966). *French rural history*: *An essay on its basic characteristics.* (J. Sondheimer, Trans.). Berkeley: University of California Press.

Boserup, E. (1965). *The conditions of agricultural growth: The economics of agrarian change under population pressure.* London: G. Allen & Unwin.

Boulet, M. (2009). 1848, 1960: Two laws for agricultural education in France: Essay on comparisons between the state's method of intervention. In Vivier, N. (Ed.) *The state and rural societies policy and education in Europe, 1750-2000* (pp.247-258). Belgium: Brepols.

Brassley, P. (2009). Agricultural education, training and advice in the UK, 1850-2000. In Vivier, N. (Ed.) *The state and rural societies policy and education in Europe, 1750-2000* (pp. 259-278). Belgium: Brepols.

BTSO. (2009). *Bursa Ticaret Odası ilk karar defteri (1884-1890),* Bursa: BTSO.

Burçak, B. (2008). Modernization, science and engineering in the early nineteenth century Ottoman Empire. *Middle Eastern Studies, 44* (1), 69-83.

Burgess, R. (1835). *Greece and the levant/ diary of a summer's excursion. Vol.II.* London: Longman, Rees, Orme, Brown, Green & Longman.

Bursa'nın köklü eğitim kurumları Bursa Ziraat Mektebi. 2010. Bursa: Bursa Büyükşehir Kitaplığı.

Cengiz et al. (2011). *120 yıllık eğitim çınarı Halkalı Ziraat Mekteb-i Alisi*. Gıda ve Tarım ve Hayvancılık Bakanlığı Eğitim, Yayım ve Yayınlar Dairesi Başkanlığı Matbaası.

Clark, Gregory. (2007). *A farewell to alms: A brief economic history of the world.* Princeton: Princeton University Press.

Cuinet, V. (2001). *La Turquie d'Asie geographie, administrative statistique descriptive et raisonnée de chaque province de l'Asie-Mineure*. İstanbul: İsis.

Curtis, D. (2016). Did the commons make medieval and early modern rural soceties more equitable? A survey of evidence from across Western Europe, 1300-1800. *Journal of Agrarian Change, 16* (4), 646-664.

Çatal, N. (1981). *Minareliçavuş Köyü monografyası* (Unpublished PhD Thesis). İstanbul Üniversitesi, İstanbul.

Çiftçi, C. (2012). Hüdavendigar vilayetinde ipekböcekçiliğinin canlandırılmasında Düyûn-ı Umumiye idaresinin rolü. *Belleten, LXXVI* (27), 905-949.

Çölaşan, U. E. (Ed.). (1968). *Bursa iklimi*. Ankara: Tarım Bakanlığı Devlet Meteroloji İşleri Genel Müdürlüğü.

D'Abadal, L. A. (2002). Agriculture, agronomy, and political economy: Some missing links. *History of Political Economy, 34* (2), 449-478.

Dağlı, Y. & Kahraman, S. A. (2003). *Günümüz Türkçesiyle Evliya Çelebi seyahatnamesi: Bursa- Bolu- Trabzon- Erzurum- Azerbaycan- Kafkasya- Kırım- Girit, vol.II.* İstanbul: YKY.

Dalsar, F. (1960). *Türk sanayi ve ticaret tarihinde Bursa'da ipekçilik*. İstanbul: Sermet Matbaası.

Davenport, E. (1927). *The farm.* New York: Macmillan.

Dean, E. O. (1919). *Opportunities in farming*. New York, London: Harper & Bross.

Delil, H. & Kavaklı, M. (2016). *Bir Oğuz köyü İğdir*. İstanbul: İrfan Yayınevi.

Delil, H. & Dinçel, Ö. F. (Eds.) (2015).*Bursa Ticaret ve Sanayi Odası mecmuası*. Bursa: Bursa Ticaret ve Sanayi Odası.

Denker, B. T. (1967). Bursa ovasında bugünkü ziraat. *İstanbul Üniversitesi Coğrafya Enstititüsü Dergisi, 8* (16), 101-111.

Diser, L. (2012). Laboratory versus farm: The triumph of laboratory science in Belgian agriculture at the end of the nineteenth century. *Agricultural History, 86* (1), 31-54.

Dobb.M. (1963).*Studies in the development of capitalism*.New York: International Publishers.

Doğan, C. (2018). 20. Yüzyılın başında Galata limanında hijyen, veba ve farelerle mücadele. *Kebikeç, 45*, 329-345.

El-Shakry, O. S. (2007). *The great social laboratory: Subjects of knowledge in colonial and post-colonial Egypt*. Stanford, California: Stanford University Press.

Esteva, G. (1996). Hosting the otherness of the other: The case of Green Revolution. In Marglin, S. A & Apffel- Marglin, F (Eds.). *Decolonizing knowledge: from development to dialogue* (pp. 185-248). New York: Oxford University Press.

Erder, L. T. (1976). *The making of industrial Bursa: economic activity and population in a Turkish city 1835-1975*. Ann Arbor: University Microfilms International.

Erler, M. Y. (2002). Kıbrıs'ta çekirge istilası. *Kastamonu Eğitim Dergisi, 10* (1), 195-204.

Ertürk, S. A. *Bursa ovası ve çevresinin ziraat hayatı* (Unpublished PhD Thesis). İstanbul Üniversitesi Sosyal Bilimler Enstitüsü Coğrafya Anabilim Dalı, İstanbul.

Evered, K. T. (2014). Draining an Anatolian desert: Overcoming water, wetlands and malaria in early republican Ankara. *Cultural Geographies, 21* (3), 475-496.

Farley, J. L. (1862). *The resources of Turkey*. London: Longman, Green, Longman, and Roberts.

Faroqhi, S. (2005). Indebtedness in the Bursa area 1730-1740. In Afifi, M. & Chih, R. &Marino, B. & Michel, N. & Tamdoğan I. (Eds.) *Sociétés rurales Ottomanes/ Ottoman rural societies* (pp. 197-213). Cairo: Institut Français d'Archéologie Orientale.

Federico, G. (1997). *An economic history of silk industry (1830-1930)*. Cambridge; New York: Cambridge University Press.

Forestier-Peyrat, E. (2014). Fighting locusts together: Pest control and the birth of Soviet development aid, 1920-1939. *Global Environment, 7* (2), 536-571.

Fortna, B. (2002). *Imperial classroom: Islam, the state, and education in the Late Ottoman Empire*. Oxford; New York: Oxford University Press.

Fox- Genovese, E. (1976). *The origins of Physiocracy: Economic revolution and social order in eighteenth-century France.* Ithaca: Cornell University Press.

Fussell, G. E. (1945). History and agricultural science. *Agricultural History, 19* (2), 126-127.

Genca, E. (2014). Osmanlı hukukunda vakıfların denetimi (Evkaf-ı Hümayun Nezareti). *İstanbul Üniversitesi Hukuk Fakültesi Mecmuası, 72* (1), 531-554.

Gilmartin, D. (1994). Scientific empire and imperial science: Colonialism and irrigation technology in the Indus Basin. *The Journal of Asian Studies, 53* (4), 1127-1149.

Gökgöl, M. (1937). *Şimali-Şarki Anadolu yaylasında ziraat araştırmaları.* İstanbul: Kenan Basımevi.

Gökmen, E. (2010). Batı Anadolu'da çekirge felaketi. *Belleten, LXXIV* (269), 127-180.

Groove, A. T. & Rackham, O. (2001). *The nature of Meditarennian Europe: An ecological history*. China: Ehrhardt.

Gupta, A. (1998). *Postcolonial developments: Agriculture in the making of modern India*. Durham: Duke University Press.

Günaydın, N. & Kaplanoğlu, R. (2000). *Seyahatnamelerde Bursa*. Bursa: Altan Matbaacılık.

Güran, T. (1960z). *1840-1910 Osmanlı tarım ekonomisine giriş: Yapısal sorunlar, tarımsal kredi*. İstanbul: İstanbul Üniversitesi İktisat Fakültesi.

Güran, T. (2014). Zirai politika ve ziraatte gelişmeler, 1839-1976. In Güran, T. (Ed.) *19. Yüzyılda Osmanlı ekonomisi üzerine araştırmalar* (pp. 47-67). İstanbul: Türkiye İş Bankası Kültür Yayınları.

Hadjıkyriacou, A. (2011). *Society and economy on an Ottoman island: Cyprus in the eighteenth century* (Unpublished PhD Thesis). Department of History School of Oriental and African Studies University of London, London.

Hamilton, W. (1842). *Researches in Asia Minor, Pontus, and Armenia: With some accounts of their antiquities and geology.* London: John Murray.

Hasluck, F. W. (1910). *Cyzicus: Being some account of the history and antiquities of that city, and of the district adjacent to it, with the towns of Apollonia Ad Ryndacum, Miletupolis, Hadrianutherae, Priapus, Zeleia, Etc*. Cambridge: Cambridge University Press.

Hızlı, M. (2006). Ömer Fuat Bey'in Anadolu mektupları. *Bursa Araştırmaları: Kent Tarihi ve Kültürü Dergisi, 13,* 34-39.

Hodge, J. M. (2007). *The triumph of the expert*: *Agrarian doctrines of development and the legacies of British colonialism.* Athens: Ohio University Press.

Hunt,E. H. & Pam, S. J. (2011). Agricultural depression in England, 1873-96: Skills transfer and 'Redeeming Scots'. *The Agricultural History Review, 59* (1), 81-100.

Hüseyin Kazım, (1331). *İlmi ve tatbiki çiftçilik dersleri*. Kütüphane-i İslam ve Askeri: Dersaadet.

İhtifalci Mehmet Ziya, (1328). *Bursa'dan Konya'ya seyahat*. İstanbul: Vatan Matbaası.

İnal, O. (2011). Environmetal history as an emerging field in Ottoman studies: An historiographical view. *Osmanlı Araştırmaları/ Journal of Ottoman Studies, 38*, 1-25.

İnal, S. (1945). *Yeşil Bursa denizinde inci Uludağ*. İstanbul: Hüsnütabiat Basımevi.

İnalcık, H. (1984).The emergence of big farms, çiftliks: State, landlords and tenants. *TurcicaIII*, 105-126.

İnalcık, H. (1993).Village, peasant and empire. In İnalcık, H.*The Middle East and the Balkans under the Ottoman Empire: Essays on economy and society*, (pp. 137-160) Bloomington: Indiana University Turkish Studies.

İnalcık, H. (1982). Rice cultivation and the çeltükci-re`aya system in the Ottoman Empire. *Turcica 14*, 69-141.

İnalcık, H. (1980). Osmanlı idare, sosyal ve ekonomik tarihiyle ilgili belgeler: Bursa kadı sicil'lerinden seçmeler. *Türk Tarih Belgeleri Dergisi 10*, 1-91.

İpek, N. (1991). Kafkaslar'dan Anadolu'ya göçler (1877-1900). *On Dokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 6*, pp. 97-134.

İslamoğlu, H. & Faroqhi, S. (1979). Crop patterns and agricultural trends in sixteenth- century Anatolia. *Review (Fernand Braudel Center)*, 2 (3), 400-436.

İslamoğlu-İnan, H. (1987). State and peasants in the Ottoman Empire: A study of peasant economy in North-Central Anatolia during the sixteenth century. In İslamoğlu- İnan (Ed.) *The Ottoman Empire and the world- economy* (pp. 101-159). Cambridge [Cambridgeshire]; New York: Cambridge University Press.

Jardine, W. (1858). *Memoirs of Hugh Edwin Strickland.* London: Van Voorst, Paternoster Row.

Jessene, J-P & Vivier, N. (2010). Norhern France, 1750-2000. In van Bavel, B & Hoyle, R.(Eds.). *Rural economy and society in Northwestern Europe, 500-2000. Social relations: Property and power* (pp.139-166). Belgium: Brepols.

Kabadayı, E.(2010). Introduction of Merino sheep breeding in the Ottoman Empire, its success and failures in implementation. In Faroqhi, S (Ed.) *Animals and people in the Ottoman Empire*. İstanbul: Eren Yayıncılık.

Kağıtçıbaşı,E. & Yaşar, E. *Bursa'nın ekonomik tarihi (1326-1900)*. Bursa: BTSO.

Kalfayan. (1327). *Pirinç ziraati, cild 5*. Dersaadet: Mekteb-i Sanayi Matbaası.

Kandemir, S.(1938). *Köy kalkınması hakkında rapor*. Ankara: Ziraat Vekaleti Birinci Köy ve Kalkınma Kongresi Yayını.

Kaplanoğlu, R. *Bursanın bereketi Gürsu*, Gürsu: Gürsu Belediyesi.

Kaplanoğlu, R. (Ed.) (2015). *Bursa Osmangazi ilçesi Çağlayan ve Nilüfer köyleri*. Bursa: Osmangazi Belediyesi.

Kaplanoğlu, R. & Kaplanoğlu, O. (2014). *Bursa göç tarihi.* Bursa: Nilüfer Belediyesi.

Kaplanoğlu, R. Bursa'da Balkan göçmenleri. www.academia.edu/5413112/BURSADA_BALKAN_G%C3%96%C3%87MENLER%C4%B0

Kaplanoğlu, R. Güneydoğu Marmara bölgesinde bulunan Kafkas göçmeni köyler. www.circassiancenter.com/cc-turkiye/arastirma/0176_guneydogumarmara.htm

Kaplanoğlu, R. *Bursa'nın doğu kapısı Kestel*. Bursa.

Kaplanoğlu, R. (2006). *Meşruiyet'ten Cumhuriyet'e Bursa (1876-1926)*. İstanbul: Avrasya Etnografya Yayınları.

Karateke, H. (Ed.). (2013). *Evliya Çelebi's Journey from Bursa to the Dardanelles and Edirne from the fifth book of Seyahatname.* London: Brill.

Kasaba, R. (2009). Batı Anadolu'da göçmen emeği (1750-1850). In Keyder, Ç. (Ed.) *Osmanlı'da toprak mülkiyeti ve ticari tarım* (pp.119-127). İstanbul: Tarih Vakfı Yurt Yayınları.

Kaya, A. Y. (2007). Ion Ionescu De La Brad: XIX. Yüzyıl ortasında Osmanlı tarım ekonomisi ve politik ekonomi. *Kebikeç, 27*, 95-110.

Kazıklı, A. (2011). Kazıklı Köyü. *Bursa Araştırmaları: Kent Tarihi ve Kültürü Dergisi, 31*, 56-7.

Kelly, M. & O Grada, C. (2014). Debating the Little Ice Age. *Journal of Interdisciplinary History, XLV* (1), 57-68.

Kelly, M. & O Grada, C. (2014). The waning of Little Ice Age: Climate change in early modern Europe. *Journal of Interdisciplinary History, XLIV* (3), 301-325.

Kerans, D. (2001). *Mind and labor on the farm in the Black- Earth Russia (1861-1914*). Budapest, Hungary; New York: Central European University Press.

Kerridge, E. (1969). The agricultural revolution reconsidered. *Agricultural History, 43*(4), 463-476.

Keyder, Ç. (1991). Introduction: Large scale commercial agriculture in the Ottoman Empire?. In Tabak, F &Keyder Ç (Eds.). *Landholding and commercial agriculture in the Middle East* (pp. 1-13). Albany: State University of New York Press

Kılıç, Ş. & Ulutaş, O. (2016). *Bir mübadele köyü Görükle ve Nilüfer Belediyesi mübadele evi*. Bursa: Nilüfer Belediyesi.

Kılınçoğlu, D. T. (2012). *The political economy of Ottoman modernity: Ottoman economic thought during the reign of Abdülhamid II (1876-1909).* (Unpublished PhD Thesis). Princeton University, US.

Kloppenburg, J. R. (1988). *First the seed: The political economy of plant bio-technology 1492-2000.* Cambridge: Cambridge University Press.

Kolars, J. F. (1963). *Tradition, season and change in a Turkish village.* Chicago.

Koyunluoğlu, A. M. T. (1935). *Anadoluda Türkler: Eti, Frik, Lid, Bitinya, Iran, Roma, Bizans, Büyük Selçuk, Anadolu Selçuk ve Osman oğulları zamanında (İznik) ve Bursa tarihi.* Bursa: Bursa Halkevi.

Kratz, F. W. & Bridges, C. B. (1956). Malaria control in Turkey. *Public Health Report (1896-1970), 71* (4), 409-416.

Kurt, B. (2016). II. Abdülhamid dönemi nafia çalışmalarına bir örnek: Nilüfer Nehri'nin ıslahı ve Bursa ovası bataklıklarının kurutulması projesi. In *Odrysses'den Nilüfer'e uluslararası Nilüfer sempozyumu*. Bursa: Nilüfer Belediyesi.

Küçükceran, Z. (2014). *The agrarian economy and primary education in the Salonican countryside in the Hamidian period (1876-1908).* İstanbul: Libra Kitapçılık.

Küçükceran, Z. (2017). *Agrarian change, production and labor regime in 19th century Bursa: Balıklı çiftliği in Mihaliç*. Paper presented at Labour history: Production, markets, relations, policies (from the late Middle Ages to the early 21st Century, Ioannina, Greece.

Küçükceran, Z. (2016). *Production in a vakıf çiftlik: A case from Mihaliç, Hüdavendigar*. Paper presented at CIEPO-22, Trabzon, Türkiye.

Lampe, J. R. & Jackson, M. R. J. (1982). *Balkan economic history, 1550-1950: From imperial borderlands to developing nations.* Bloomington: Indiana University Press.

Leonard, C. S. (2011). *Agrarian reform in Russia: The road from serfdom*. New York: Cambridge University Press.

Lowry, H. (2004). *Seyyahların gözüyle Bursa 1326-1923.* (S. Alper, Trans.). İstanbul: Eren Yayıncılık. (original work published 2003).

Mac Farlane, C. (1850). *Turkey and its destiny: The result of journeys made in 1847 and 1848 to examine into the state of that country, vol.I.* London: John Murray.

Macey, D. A. J. (1995). Agricultural reform and political change: The case of Stolypin. In Taranovski, T. (Ed.) *Reform in modern Russian history: Progress or cycle?.* Washington, D.C.: Woodrow Wilson Center Press; New York: Cambridge University Press.

Magmumi, Ş. (2001). *Bir Osmanlı doktorunun anıları: Yüzyıl önce Anadolu ve Suriye.* İstanbul: Büke Yayınları.

Mardin, Ş. (1985).Tanzimattan Cumhuriyet'e iktisadi düşüncenin gelişmesi (1838-1918). In Belge, M. (Ed.) *Tanzimattan Cumhuriyet'e Türkiye Ansiklopedisi, Vol 3.*(pp. 618-634). İstanbul: İletişim Yayınları.

Marglin, S. A. (1996). Farmers, seedsmen, and scientists: Systems of agriculture and systems of knowledge. In Marglin, S. A & Apffel- Marglin, F (Eds.). *Decolonizing knowledge: From development to dialogue* (pp. 185-248). New York: Oxford University Press.

Mauro, F. & Hardison, P. (2000). Traditional knowledge of indigenous and local communities: International debate and policy initiatives. *Ecological Applications, 10* (5), pp. 1263- 1269

Mazoyer M. & Roudart, L. (2009). *Dünya tarım tarihi: Neolitik çağdan günümüzdeki krize* (Ş. Ünsaldı, Trans.). Ankara: Epos. (original work published 2006)

McNeill, J. R. (1992). *The mountains of the Meditarennean world: An environmental history.* Cambridge; New York: Cambridge University Press.

Mehmed Cavid Bey.(2001). *İktisat ilmi* (S. Alpun Çakmak, Trans.). Ankara: Liberte Yayınları.

Mehmed Rauf. (1334). *Bursa mecmuası, 1*(9), 142-163.

Mevsim, H. (Ed.). (2009). *Bulgar gözüyle Bursa. İstanbul: Kitap Yayınevi.*

Meyer, J. H. (2007). Im migration, return, and the politics of citizenship: Russian Muslims in the Ottoman Empire, 1860-1914. *International Journal of Middle East Studies, 39* (1), 15-32.

Migdal, J. (2001). *State in society: Studying how states and societies transform and constitute one another*. Cambridge; New York: Cambridge University Press.

Mikhail, A. (2010). An irrigated empire: The view from Ottoman Fayyum. *International Journal of Middle East Studies, 42*, 569-90.

Mikhail, A. (2011). *Nature and empire in Ottoman Egypt: An environmental history*. New York: Cambridge University Press.

Mikhail, A. (2017). *Under Osman's tree: The Ottoman Empire, Egypt, and environmental history.* Chicago: Univesity of Chicago Press.

Miss Pardoe. (1838). *The city of the Sultan and domestic manners of the Turks in 1836, Vol. II.* London: Henry Colburn Publisher.

Moltke, H. v. G. (1876). *Briefe über zustände und begebenheiten in der Turkei aus den jahren 1835 bis 1839.* Berlin: E. S. Mittler.

Moon, D. (2013). *The plough that broke the steppes: Agriculture and environment on Russia's grasslands, 1700-1914*. New York: Oxford University Press.

Montgomery, G. (1967). Education and training for agricultural development. In Southworth, H. & Johnston, B. (Eds.). *Agricultural development and economic growth* (pp.147-179). Ithaca: Cornell University Press.

Munro, J. A. R. & Anthony, H. M. (1897). Explorations in Mysia.*The Geographical Journal, 9* (2), 150-169.

Munro, J. A. R. & Anthony, H. M. (1897). Explorations in Mysia (Continued).*The Geographical Journal, 9* (3), 256-276.

Murray, J. (1854).*Handbook for travellers in Turkey in Asia: Including Constantinople, the Bosphorus, Dardanelles, Brousa and Plain of Troy: with general hints for travelers in Turkey vocabularies, etc*. London: John Murray.

Musavver rehber-i seyyahin: Bursa ve civarı. 1319. İstanbul: Matbaa-i Ahmet İhsan ve Şürekası.

North, D. C. & Thomas, P. T. (1973). *The rise of the Western world: A new economic history.* Cambridge: University Press.

Ortaç, H. (1946). *Bursa köyleri*. Bursa: Ant Basımevi.

Ömer Fuat Bey. Ömer Fuat Beyin Anadolu mektupları: Karacabey. *Sebilürreşad, 256*, pp.362-363.

Öntuğ, M. (2009). *Ahmet Vefik Paşa'nın Anadolu sağ kol müfettişliği.* Konya: Palet Yayınları.

Palairet, M. (1997). *The Balkan economies c. 1800-1914: Evolution without development.* Cambridge, UK.: New York: Cambridge University Press.

Pallot, J. (1999). *Land reform in Russia 1906-1917: Peasant responses to Stolypin's project of rural transformation*. Oxford: Clarendon Press; New York: Oxford University Press.

Pamuk, Ş. (1990). *100 soruda Osmanlı- Türkiye iktisadi tarihi 1500-1914.*İstanbul: Gerçek Yayınevi.

Pamuk, Ş. (1984).*Osmanlı ekonomisi ve dünya kapitalizmi 1820- 1913: Ticaret, Sermaye ve Üretim İlişkileri.* Ankara: Yurt Yayınevi.

Pamuk, Ş. (1987).Commodity production for export and relations of production in Ottoman agriculture, 1840-1913. In Islamoglu-Inan, H (Ed.), *The Ottoman Empire and the world economy* (pp. 178-202). Cambridge: Cambridge University Press.

Pamuk, Ş. (2009).Türkiye'de tarım ve iktisadi gelişme 1880-2000. *Mükiye Dergisi, 262*, 63-76.

Parsagyan, H. (1881). *Çekirge ve onu mahvetmenin çareleri.* İstanbul: Kahtazdegan Ermenistan Merkez İane Komisyonu.

Pazzogli, R. (2009). From private initiative to state intervention: The origins of agricultural education in Italy. In Vivier, N. (Ed.) *The state and rural societies policy and education in Europe, 1750-2000* (pp. 231-246). Belgium: Brepols.

Pirenne, H. (1937). *Economic and social history of medieval Europe*. New York: Harcourt, Brace and Company.

Pococke, R. (1745). *A description of the East and some other countries, vol. II*. London: W. Bowyer.

Pomeranz, K. (2000). *The great divergence: China, Europe and the making of the world economy*. Princeton, N.J: Princeton University Press.

Quataert, D. (1993). Agricultural trends and government policy in Ottoman Anatolia 1800-1914. In Quataert, D. *Workers, peasants and economic change in the Ottoman Empire 1730-1914* (pp.17-30). İstanbul: Isıs Press.

Quataert, D. (1993). Main problems of the economy during the Tanzimat period. In Quataert, D. *Workers, peasants and economic change in the Ottoman Empire 1730-1914*. İstanbul: Isıs Press.

Quataert, D. (1987). The silk industry of Bursa, 1880-1914. In İslamoğlu- İnan (Ed.) *The Ottoman Empire and the world- economy* (pp. 284-299). Cambridge [Cambridgeshire]; New York: Cambridge University Press.

Quataert, D. (2008). *Anadoluda Osmanlı reformu ve tarım 1876-1908.* (N. Ö. Gündoğan & A. Z. Gündoğan Trans.). İstanbul: Türkiye İş Bankası Yayınları.

Reuss, M. (2008). Introduction: Seeing like an engineer: Water projects and the mediation of the incommensurable. *Technology and Culture, 49* (3), 531-546.

Root, H. (1987). *Peasants and king in Burgundy*: *Agrarian foundations of French absolutism.* Berkeley: University of California Press.

Sandison, D. (1855). *Summary of report from Mr. Consul Sandison, Turkey (Brussa).*

Sandison, D. (1862). *Report by Mr. Consul Sandison on the trade & c. of Brussa for the year 1861*.

Sarç, Ö. C. (1934). *Ziraat ve sanayi siyaseti: Zirai ve sınai iktisat*. İstanbul: Arkadaş Matbaası.

Schneider, E. C. A. (1846). *Letters from Broosa, Asia minor*. Chambersburg, Pa: Publication Office of the Ger. Ref. Church.

Scott, J. C. (1998). *Seeing like A state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.

Silier, Oya. (1981). *Türkiye'de tarımsal yapının gelişimi (1923-1938).* İstanbul: Boğaziçi Üniversitesi.

Skaria, A. (2000). Cateching the natural. In Agrawal, A. & Sivaramakrishnan, K. (Eds.) *Agrarian environments: resources, representation, and rule in India*. Durham; London: Duke University Press.

Somel, A. S. (2001). *The modernization of public education in the Ottoman Empire, 1839-1908.* Leiden; Boston: Brill.

Springer, J. (2000). State power and agricultural transformation in Tamil Nadu. In Agrawal, A. & Sivaramakrishnan, K. (Eds.) *Agrarian environments: Resources, representation, and rule in India*. (pp. 86-98). Durham; London: Duke University Press.

Stirling, P. (1969). *Turkish village*. London: Weidenfield and Nicolson.

Stoianovich, T. (1992). Balkan peasants and landlords and the Ottoman state: Familial economy, market economy, and modernization. In Stoanovich, T. (Ed.). *Between East and West: The Balkan and the Mediterranean worlds, vol.1 Economies and societies: Land, lords, states and middlemen* (pp. 15-38). New York: A.D. Caratzas.

Stotz, C. L. (1939). The Bursa region of Turkey. *Geographical Review, 29* (1), 81-100.

Şen, F. (2011). Bursa çiftliklerinde yeni kurulan mahalleler. *Bursa Araştırmaları: Kent Tarihi ve Kültürü Dergisi, 34*, 40-44.

Şevki, O. (1928).*Bursa ve Uludağ: Seyyahlara rehber.* İstanbul: Türk Seyyahin Cemiyeti.

Tabak, F. (2010). *Solan Akdeniz 1550-1870: Coğrafi- tarihsel bir yaklaşım*. (N. Elhuseyni, Trans.) İstanbul: Yapı Kredi Yayınları. (original work published 2008).

Terzibaşoğlu, Y. (2004). Land- disputes and ethno- politics: Nortwestern Anatolia, 1877-1912. In Engerman, S. & Metzer, J. (Eds.) *Ethno-nationality, property rights in land and territorial sovereignty in historical perspective* (pp.153-180). London: Routledge.

Terzibaşoğlu, Y. (2001). Landlords, refugees and nomads: Struggles for land around late-nineteenth century Ayvalık. *New Perspectives on Turkey, 24*, 51-82.

Tevfik, İ. A. (2006). *Velosipet ile bir cevelan: 1900'e doğru İstanbul'dan Bursa'ya bisikletli bir gezi* (C. Kayra, Trans.). İstanbul: Türkiye İş Bankası Kültür Yayınları.

Thompson, F.M.L. (1968). The second agricultural revolution, 1815-1880. *Economic History Review, New Series, 21* (1), 62-77.

Todorov, N. (1985). Social structures in the Balkans during the eighteenth and nineteenth centuries. *Etudes Balkaniques, 21*(4), 48-71.

Toprak, Z. (1985). II. Meşrutiyet döneminde iktisadi düşünce. InBelge, M. (Ed.) *Tanzimat'tan Cumhuriyet'e Türkiye ansiklopedisi, Vol 3.*(pp. 635-640). Istanbul: İletişim Yayınları.

Torkomyan, K. (1922). *İpek böceği beslemek ve ipek böceği tohumu istihsal etmek usul ve kavaidi*. Dersaadet: Düyun-ı Umumiye-i Osmaniye Varidât-ı Muhassasa İdaresi Matbaası.

Tökin, İ. H. (1934). *Türkiye köy iktisadiyatı.* İstanbul: Matbaacılık ve Neşriyat Türk Anonim Şirketi.

Tropp, J. (2012). Locust invasions and tensions over environmental and bodily health in the colonial Transkei. In Gordon, D. & Krech S. (Eds.) *Indigenous knowledge: and the environment in Africa and North America* (pp. 113-128). Athens: Ohio University Press.

Turyan, H. (2006). Kumkadı köyü. Bursa Araştırmaları: *Kent Tarihi ve Kültürü Dergisi, 12*, 54-55.

Türk ziraat tarihine bir bakış. 1938. İstanbul: Devlet Basımevi.

Vassaf, H. (2010). *Bursa hatırası.* Kara, M. & Kemikli B. (Eds.). Bursa: Bursa Büyükşehir Belediyesi.

Veinstein, G. (1991). On the çiftlik debate. In Tabak, F & Keyder Ç (Eds.). *Landholding and commercial agriculture in the Middle East* (pp. 35-53). Albany: State University of New York Press.

Vivier, N. (2009). The interventions of the French state in rural society: The major concerns of the state, mid-18th mid 20th Century. In Vivier, N. (Ed.) *The state and rural societies policy and education in Europe, 1750-2000* (pp.57-76). Belgium: Brepols.

Vivier, N. & Petmezas, S. (2009). The state and rural societies.In Vivier, N. (Ed.) *The state and rural societies policy and education in Europe, 1750-2000* (pp.11-33). Belgium: Brepols.

Von Warsberg, A. F. (1869). *Ein sommer im Orient*. Wien: Verlag von Carl Gerold's Sohn.

Wagstaff, J. M. (2013). *Geographical studies on modern Turkey and Ottoman Empire.* İstanbul: Isıs Press.

Walker, M. A. (1886). *Eastern life and scenery, with excursions in Asia minor, Mytilene, Crete, and Roumania*. London: Chapman & Hall.

Weber, E. J. (1976). *Peasants into frenchmen: The modernization of France 1870-1914*. Stanford, Calif.: Stanford University Press.

White S. (2014). The real Little Ice Age. *Journal of Interdisicplinary History, 44* (3), 327-352.

White, S. (2012). *Osmanlı'da isyan iklimi: Erken modern dönemde Celali isyanları*, (N. Elhüseyni, Trans.). İstanbul: Alfa Yayınları. (original work published 2011).

White, S. (2010). Rethinking disease in Ottoman history. *Internatonal Journal of Middle East Studies, 42* (4), 549-567.

Williams, E. R. (2015). *Cultivating empires: Environment, expertise, and scientific agriculture in late Ottoman and French mandate Syria* (Unpublished PhD Thesis). Georgetown University, Washington DC.

Woloch, I. (1994). *The new regime: Transformations of the French civic order, 1789- 1820s*. New York: W. W. Norton.

Yalazı, Ş. (2017). *Hüdavendigar vilayeti salnamelerinde Karacabey*. İstanbul: Avrasya Etnografya Yayınları.

Yalazı, Ş. (2011). Apolyont Gölü'nde ulaşım. *Bursa Araştırmaları: Kent Tarihi ve Kültürü Dergisi, 34*, 54-56.

Yalazı, Ş. (2009). Karacabey'in eski- eskimeyen yüzleri. *Bursa Araştırmaları: Kent Tarihi ve Kültürü Dergisi,24*, 26-32.

Yalçınkaya, M. (2010). "*Their science, our values": Science, state and society in the 19th century Ottoman Empire* (Unpublished PhD Thesis). University Of California, San Diego.

Yıldırım, M. A. (2014). Birinci Dünya Savaşı yıllarında Osmanlı Devletinin beşinci düşmanı: Çekirgeler. *Gaziantep University Journal of Social Sciences, 13* (4), 1017-1042.

Yıldırım, M. A.(2014). XIX. yüzyılın sonlarından itibaren Halep vilayetinde çekirge istilalarına dair notlar. *Tarih Okulu Dergisi, 7* (XIX), 535-560.

Yıldırım, M. A. (2010). Osmanlı'da ilk çağdaş zirai eğitim kurumu: Ziraat Mektebi (1847-1851). *OTAM, 24*, 223-237.

Yusufoğlu, F. Ö. (2018). *Agrarian relations and estate (çiftlik) agriculture in Ottoman Thessaly (c.1780-1880)* (Unpublished PhD Thesis). Boğaziçi University, İstanbul.

Ziraat vekaletince Türkiye'de tedkik seyahati için davet olunan Berlin Ziraat Mektebi profesörlerinden Baver. (1927). Anadolu'da Tetkik Seyahati. *Ziraat Vekaleti Mecmuası, 4* (8).

Ziya, R. (1934). Bursa 'nın Keles köyü. *Ülkü, 3* (15), 234-240.