"Sheep go to Heaven, (Angora) Goats go to Hell" A Spatiotemporal Analysis of the Angora Goat Economy in Ankara Province (1889-1905)[1]

SEMİH ÇELİK
Koç University, Department of History

In this article, I will endeavour to present new perspectives on the meaning of rural-urban relations from the late 1880s to the first years of the 1900s in the Ankara province through changes in the density of the Angora goat population. The period covered here is coined as the Ottoman industrial revolution (Clark, 1974), the empire's incorporation into the global capitalist economy (Kasaba, 1988), an age of agricultural crisis and restructuring (Quataert, 1975), or the decline/degeneration period of the Ottoman Empire (Lewis, 1958), as defined by Ottoman historians within the context of the empire's cultural and economic dependence on the West; widely conceptualized by the decline literature . The narrative in the literature, regardless of the various parameters examined, shares a common belief in an rapid urbanization where the rural-urban divide has deepened. It has been largely believed that the installation of the railway as of 1890s has accelerated this process. To put it in terms of economic historical terms, it is an accepted fact that this period has formed the basis for the transition from an organic economy an industrial economy (Wrigley, 2016). In this context, the prevalent view is that agricultural production and livestock professions (the primary sector), which are the decisive elements of the agricultural economy, are losing ground in favour of the more "urban", industrial and service sectors.

The historiography developed against this background has begun recently to digress from structural analyses and human actors and take up the history of other actors in nature, especially animals. It would not be wrong to say that we have passed a historiographical turning point

1 An earlier version of this article was presented at the International Congress of the Ottoman Social and Economic History (ICOSEH) conference in Sofia, Bulgaria, on 24-28 July 2017. I am grateful to all attendees of the conference, and Johannes Petrus Gerrits and Uygar Karaca of Koç University for their substantial assistance in implementing ArcGIS. I would also like to thank Assoc. Prof Dr Erdem Kabadayı from Koç University and Sinan Kaya from May 29 University, who read commented on the draft. The compilation of the data used in this study and H-GIS analyses were carried out within the scope of the ERC-Starting Grant, project 679097 UrbanOccupationsOETR conducted by Assoc. Dr M. Erdem Kabadayı of the Department of History of Koç University, where the author has also served as post-doctoral researcher.

for Ottoman historians from the growing interest in animals and human-animal-nature relations. In this context, literature is yet to develop, apart from a study examining animal human relations in the Ottoman Empire compiled by Suraiya Faroqhi (2010), and Alan Mikhail's (2013) monograph which examines the role of animals in the public sphere and the evolution of this role in Ottoman Egypt. It should be said that these kinds of studies, examples of which we shall see more in the future, also represent a partial critique of the history reading outlined above.

This article, besides being a contribution to animal historiography, aims to propose a new method of studying the history of an animal species with its highly specific characteristics, and more generally the effects of agricultural reforms or industrial revolutions on a well-defined economic activity. To that end, the article aims to examine whether there has been a vital change in the Angora goat economy during the observed 17 years between 1889 and 1905. It aims at realizing the said examination by means of Historical Geographical Information Systems (H-GIS) tools, which help us grasp the change over time in the selected qualities of the specific place (animal density in this example).

I shall explain what I mean by the concept of "economy of the Angora goat" before delving into the essence of the argument. Economic historians have been interested so far in the market/exchange value of the Angora goat as a commercial commodity. Thus, a limited analysis is brought about on the different perspectives of Angora goat breeding, involving the decline of the economic value of the Angora goat and its by-products with the collapse of the *sof* industry.

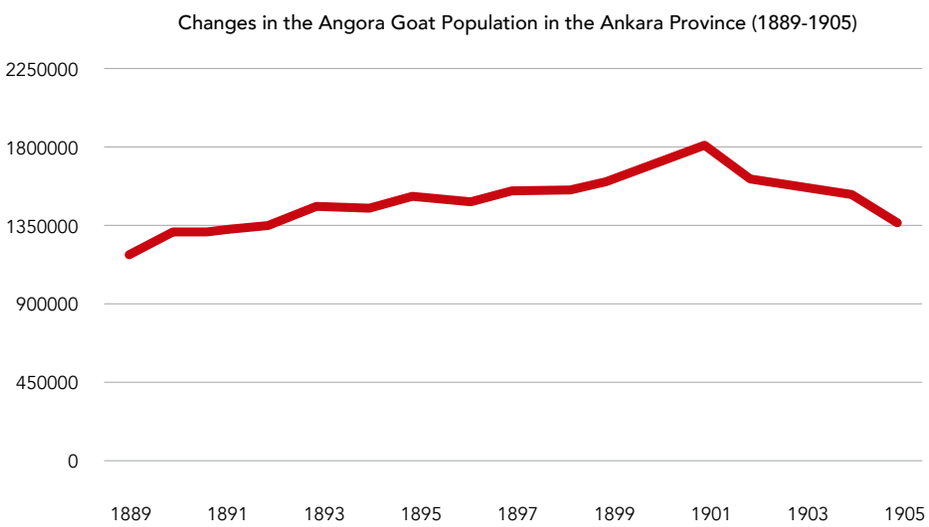
However, I use the concept of "the economy of the Angora goat" in this chapter to express the relationship between the goat breeders, their households, the goats and the natural environment in the broader sense. As Koray Çalışkan (2007) claimed, the commodification of a product in agrarian societies requires close and intimate relations not only between producers and market actors, but farmers, breeders, veterinarians, traders, workers, women, insects and even bushes. Therefore, the "economisation" of a commodity requires the repositioning in a complex way of information, actors, time and space. Following Çalışkan's conceptualization, I put forth here that the Angora goat economy was a vibrant one that reacted not only to the inter-imperial market dynamics in the last quarter of the 19th century, but also to local, economic and climatic changes such as famines or the establishment of the railway system in Ankara. More particularly, it is possible to say that the economy of Angora goat continued to dominate the reorganization of the space in Ankara in the first decade of the 20th century.

The Angora Goat Economy

For centuries, the Angora goat has come to be highly valued thanks to its unique fur, mohair. To say that Ankara's economic activities depended on the existence of this animal will not be wrong in this context. Mohair and the *sof* industry made Ankara a significant junction for merchants of various backgrounds in the empire. With changes in global production relations, especially in the 16th and 17th centuries, and the development of production technology in the 18th century, the market value and profitability of the

Ankara *sof* decreased considerably. The Ankara *sof* industry had reached its final days by the middle of the 19th century. During the second half of the century, Ankara had become just a source of mohair fibre and raw mohair, and finally an exporter of Angora goats for more developed industries. In the same period, the Angora goat was successfully cross-fertilized in the USA and Cape Town (Planhol, 1975-1977; Faroqhi, 1994; Tamur, 2003; Kadi, 2012; Tan, 2014). Despite the decline in the market value resulting from all these, the Angora goat population increased in the last decade of the century (Graph 1). The fact that the Angora goat needed specific climate conditions to survive, coupled with its delicate nature further placed the sustainability of its economy on the edge. This situation makes efforts to re-evaluate the economy of the Angora goat at the end of the 19th century even more meaningful.

Graph 1. Changes in the Angora Goat Population in the Ankara Province (1889-1905).
This was obtained by compiling the data in (1325/1907) of the Ankara Province Official Yearbook, a royalty-free source.



Historians have portrayed the decline of *sof* production in Ankara not only as the end of an industry, but also as the total expiration of the Angora goat economy in the region (Tamur, 2003, Tan, 2014). However, although the *sof* and shawl industry seemed to have disappeared, it has been able to sustain its economic existence in a broad sense. Undoubtedly, goat breeders played a significant role in this sustainability. So much so that the breeders have opposed countless times the exportation of the Angora goats in the late 19th century. We know that the reactions of 1865, 1878 and 1897 to that end have failed. According to İhsan Abidin (1924), Angora goat breeders tried to make their voices heard by state authorities, but they could not prevent exports (p. 17). Breeders who suffered from this situation secretly gelded the bucks earmarked for export at different times (Şahin, 2013).[2] These and similar reactions show that the economic value of the Angora goat remained important to the breeders, although its market value has declined.

Although the demands of goat breeders were often ignored, Ottoman administrators, especially those in the provinces, ascribed more importance to the Angora goat than its market value. Administrators endeavoured to revive *sof* production in the face of intense competition from Europe in the 1860s. Around the middle of 1868, the Ankara Trade Council decided to establish a mechanized *sof* and shawl production facility (BOA, 1311/1895). The issue of mechanization of *sof* production continued to be discussed even in the 1880s and 1890s. A model farm and shepherds' school established in the outskirts of Ankara in 1890 aimed to educate Angora goat breeders on scientific husbandry (Keskin, 2010).

2 The success of the cross-fertilization efforts in Cape Town is said to be due to a single female goat bearing a male foetus, even though all male goats had been secretly sterilized.

The decline of the *sof* economy and struggles to revive the Angora goat economy continued with efforts to breed the goat outside the limits of the Ankara province. The fact that the geographical location of the Angora goat was limited to the Ankara province was held to be a "delusion" ("bunun başka yerde yetiştirilmesinin imkânsızlığı efkâr-ı batıl [olması]"), for which attempts were made to disprove in the 1870s with efforts to breed the Angora goat in the *Hüdavendigar* province (BOA, 1290/1873). Meanwhile exportation of the Angora goat outside the province, especially to port cities such as Istanbul and İzmir, was banned,. The animals to be exported to said cities had to be selected from castrated bucks ("wethers") older than five-year-olds or "rejects" (BOA, 1323/1905).

Despite its decrease in the market value, the economic value of the Angora goat increased in other aspects. İhsan Abidin states that the centuries-long tradition of not milking Angora goats was abolished by the end of the century. Although the amount of milk they produce is relatively small in comparison to other goat species, Angora goat breeders tried to increase the surplus value in this way. On the other hand, the Angora goat has functioned traditionally as a wet nurse for babies, due to its milk's affinity to human milk. This illustrates that the Angora goat's use value was important beyond its exchange value. We also know that young Angora goats that have not yet been pastured are considered a family member and even children's "playmates." Moreover, the relatively poorer breeders who did not have pens to shelter their herds in winter, kept their goats in their homes (Cronwright Schreiner, 1898, pp. 69, 128). Early republican era literature often portrayed scenes where Angora goats were natural and intimate family members (Oyal, 2013).

This intimacy was further enhanced by the exceptional care required due to the "delicate" nature of Angora goats. Ankara's 1907 yearbook mentioned specialized shepherds selected to tend to Angora goats were difficult to come by. Shepherd dogs also had to be specially trained (Tamur, 2003). Angora goats were also thought to be harmful to the environment due to their appetite for young shoots of trees. As early as 1848, Tabib Hayrullah (1264/1848) stated that the Angora goat was a species harmful to forests and that it was "fairly impetuous and perfidious and disposed to wandering". Almost eighty years after that, İhsan Abidin (1924) stated that the Angora goats were fierce enemies of foresters, to the extent that foresters endeavoured to curb the reproduction of this species (p. 11). Besides the damage to the forest economy, the goat economy was mutually exclusive with sheep economy (Cronwright Schreiner, 1898, p). A quick glance at 1845 *temettuat* registers will show that sheep population was very low in towns and villages where the Angora goats dominated.[3] The same is true from the opposite angle as well. Despite its delicate, fragile and demanding qualities, the value of the Angora goat for breeders and other actors at a time when the *sof* industry was collapsing reflects on the numbers of Angora goats in the last quarter of the century.

---

3 This author has conducted a general research examining the Angora goat economy and sheep economy in the same region within the framework of the Koç University, ERC-Starting Grant, 679097 UrbanOccupationsOETR project, yet unpublished.

Counting the Angora Goats in Ankara

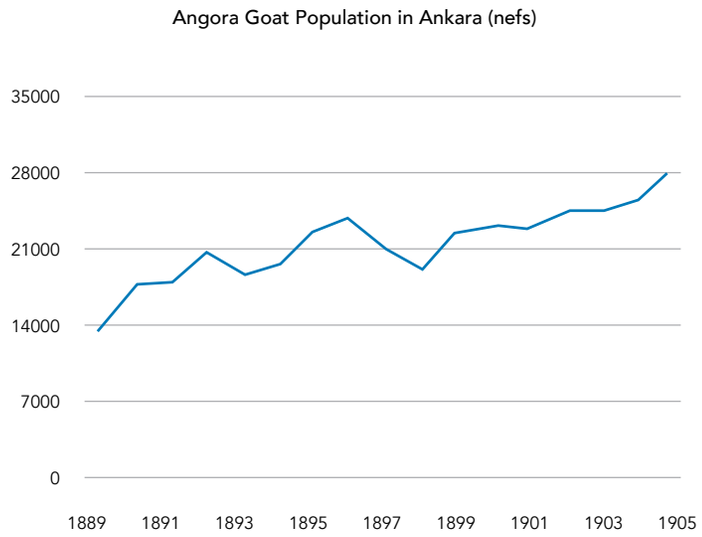
Since its establishment, the Ottoman State has closely followed the dimensions of agricultural production and animal husbandry within the borders of the empire. Behind this was the motivation of collecting taxes and procurement of the capital's provisions. Especially sheep were the animals of great significance for Istanbul's meat consumption. From the 1780s until the mid-19th century, the meat of the city and the army was provided by a system called the "sheep tithe." The system was based on the obligation of sheep breeders in Rumelia to sell one tenth of their produce to the palace at the going rate. One result of this system consists of the livestock registers/censuses in the Ottoman archives (Uzun, 1997). The state and its representatives, on the other hand, were receiving taxes in kind (sometimes also in cash) at varying rates of sheep and goats during the early-modern period (Emecen, 1988).

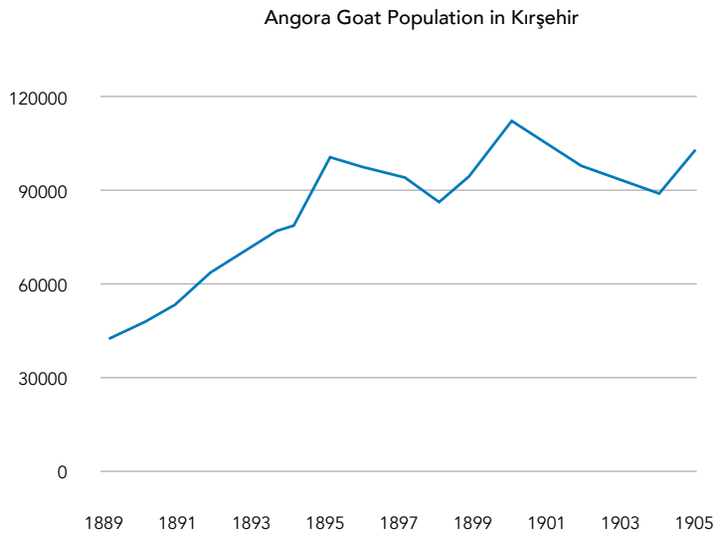
The system changed as of the middle of the nineteenth century and replaced with a system that would provide the capital's meat requirement directly from the market. The tithe system was rescinded in favour of a goat tax in cash that covered the whole empire. Thus, taxable animals and by-products were counted on an annual basis to calculate tax amounts (Emecen, 1988).

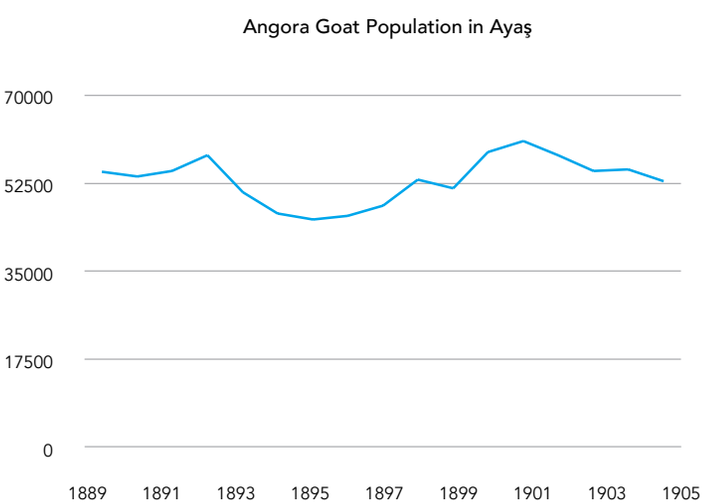
Beyond tax issues, property problems in the second half of the century forced Ottoman rulers to set legal norms for ensuring animal ownership. For this purpose, in 1867, "the decree for the prohibition of theft of buffaloes and water buffaloes and asses and horses" was published. This decree was intended for the identification and supervision of individual animals by means of proprietary permits (Barakat, 2015, p 111). Other regulations designated marketplaces where livestock and goats were to be sold. Later, in 1904, a new tax regime forced Ottoman rulers to classify livestock and goat under the heading of "domesticated animals." All these developments show that animal censuses under scrutiny here and elsewhere are not static by nature. The classification of these censuses and their rationale and forms reflect the changes in the ideas of Ottoman rulers regarding animals and their ever-changing nature and functions. The change in the concepts that define and classify animals from livestock to domesticated animals was due to the change in value that Ottoman rulers attributed to the different species within different political-economic frameworks. Besides, the results obtained in the censuses were highly problematic. Breeders often tended to declare smaller numbers of animals, relocating some of their livestock to stockyards in other regions during the census or bribing the census officer. Moreover, in the process of converting the micro-data of the census to macro-data, plenty of errors were made in the calculations, with the resulting figures not quite related to reality (Bolton, 2007; İhsan Abidin, 1924).

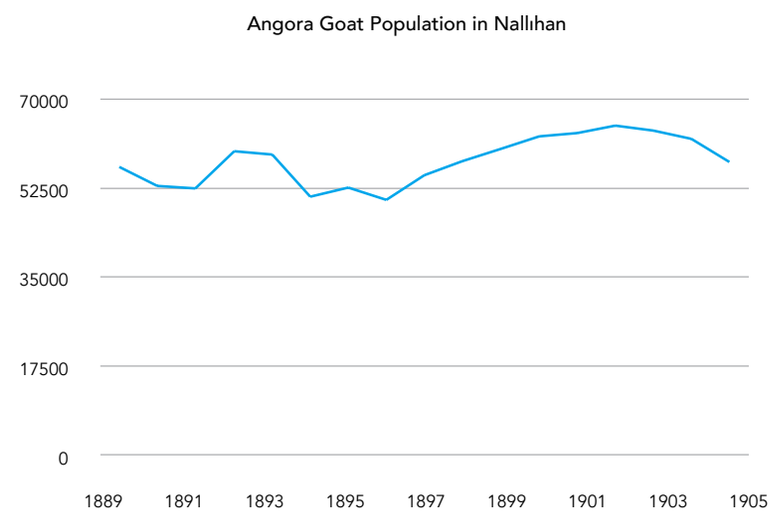
For the analysis in this section, I used the domesticated animal records for the past 17 years in the 1907 Ankara yearbook (BOA, 1323/1907). For deficiencies or inconsistencies, I applied data that existed in the annals of those years.

In addition to the inconsistency problems, the data I have cited here for the H-GIS study also present the abovementioned problems. However, the following graphs I created to test the representation and reliability of the data show that the data correctly reflect the patterns of





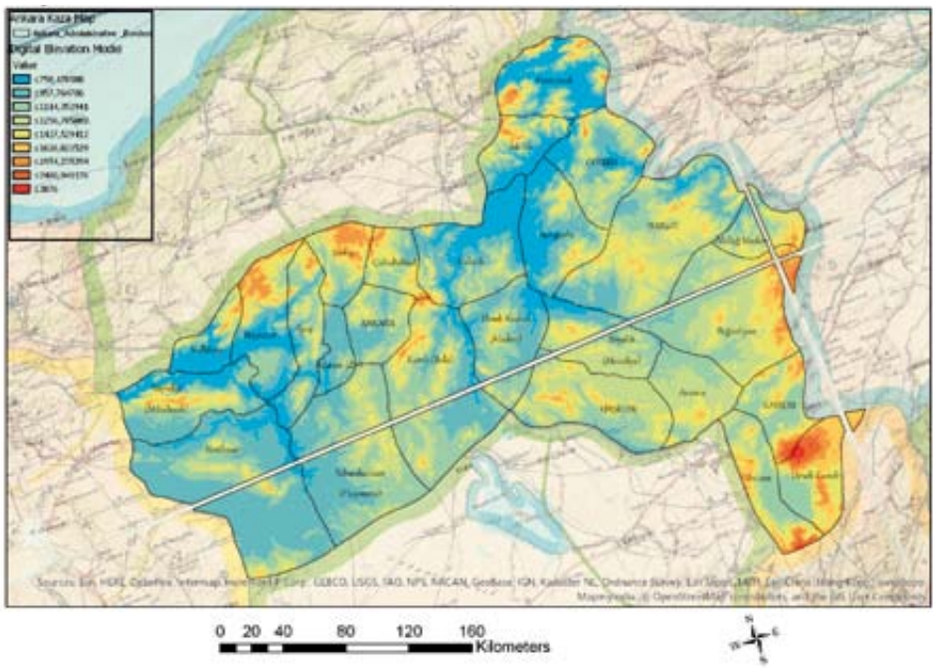




change of similarly structured spatial units, even though this data does not reflect actual figures (Graphic Set 1).

Although this article aims to go beyond them, it may be possible to reach meaningful conclusions about the economy of the Angora goat in the Ankara province by merely looking at the numbers. We can see in the table above that the relatively urban administrative centres such as Ankara and Kırşehir had increased Angora goat populations. Meanwhile predominantly rural areas such as Ayaş, Nallıhan and Beypazarı, where the larger section of the populace subsists on farming and animal husbandry, and historically the Angora goat is intensively bred, the number of goats remained fixed within a certain range. This becomes more visible post-1894, when the railway arrived in Ankara. Looking at the graphs, establishing a positive correlation between the increase in the population of Angora goats in the administrative centres and the decrease

Graphic Set 1. Change in Angora goat population in some Ankara districts (1889-1905). This was obtained by compiling the data in (1325/1907) of the Ankara Province Official Yearbook, a royalty-free source.



Map 1. The Ankara province's 1899 district boundaries and Angora goat habitats, based on the Digital Elevation Model (DEM). Geographical reference and analyses were carried out using ArcGIS PRO software, with reference to R. Huber, Empire Ottoman: Division Administration, 1899, dressée d'après le Salname 1899 map.

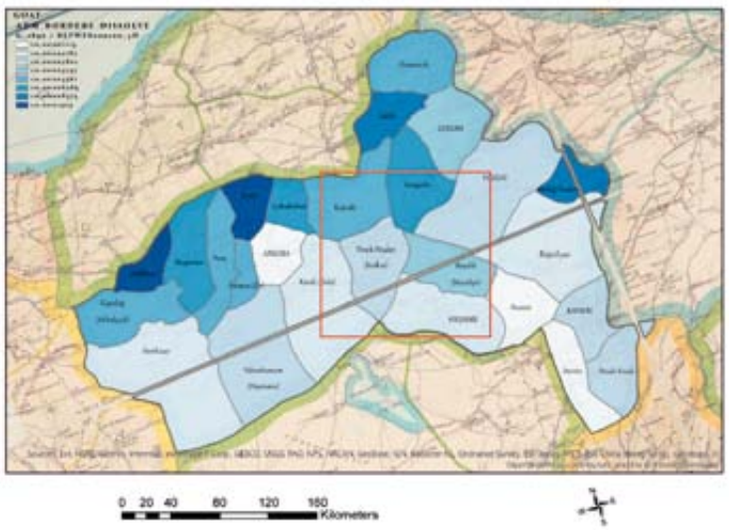
in provincial districts during 1892-1896 becomes possible. It may be speculated that this decrease in the regions where the agricultural production and livestock determined the economy is caused by the "migration" of the Angora goat to the administrative centres. The fact that the change in the goat population in some provincial districts not reflected in the graphs accounts for 50% of the population demonstrates, besides its significance of such activity, the vivacity and fluidity of the Angora goat economy. Looking merely at the numbers, although it allows all these interpretations, may lead at least partially to misleading results.

Estimating Angora Goat Density via Historical Geographic Information Systems (H-GIS) Tools

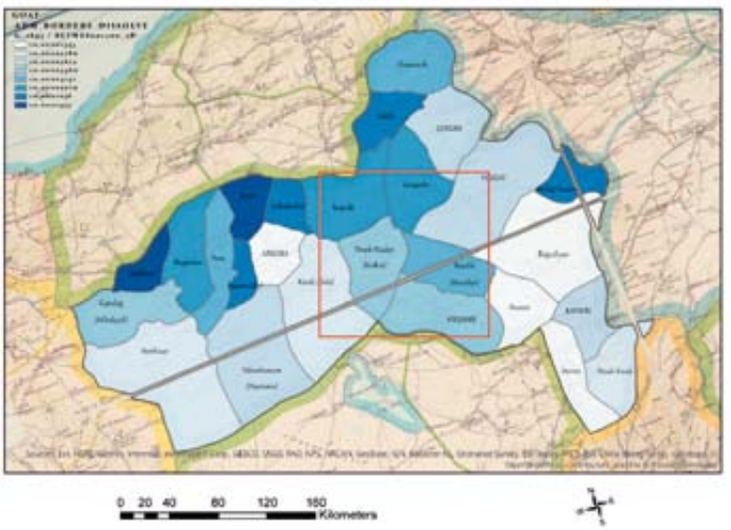
In addition to its characteristics as a species, the fact that the Angora goat's home range is limited by the climatic and geographical conditions compels us to go beyond census values in order to understand the Angora goat economy. During the period covered here, the Angora goat ideally bred at an altitude of about 800-1,200 metres. This necessitated that pens were built within this range, too (Ihsan Abidin, 1924, p 26, Cronwright Schreiner, 1898, pp. 66). While looking only at the numbers makes it possible to say that the Angora goat economy was sustainable at the end of the 19th century, adding altitude to our analysis will allow us a deeper look into the different aspects of this economy's change of direction. The following Angora goat density maps (Map Set 1) do not show merely the areas of goat numbers concentrated in a limited geographical area. Beyond that, and more importantly, they show the significance of systems and actors that would be otherwise marginally visible. The fact that the Angora goat is concentrated more in districts less favourable for breeding in comparison to those with areas that are more suitable demonstrates the insistence of breeders and other actors in maintaining this economy despite the lack of physical space in these districts. When the change in density of Angora goat numbers in the same district is compared with the change in the goat population, the existence of an organic economy that determined social and economic relations in spite of industrialization and urbanization is revealed.

The first step towards estimating the density of the Angora goat in the Ankara province was to find a map where we could geographically reference the administrative borders of the Ottoman state. The most suitable example for this was the map drawn by R. Huber in 1899. The map was appropriate for both the temporal and procedural purposes of this section, because Huber also had based his map on the 1899 annals. Once the Huber map is geographically referenced in real space, the next step was to input the administra-

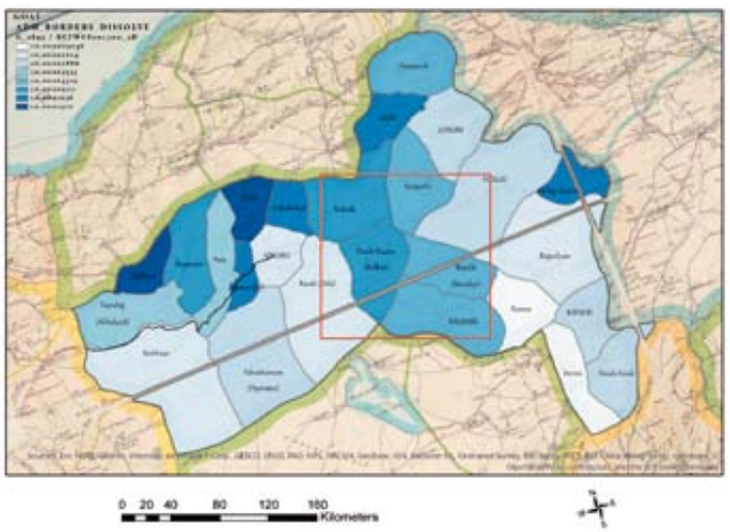
DEM Angora Goat Density 1890



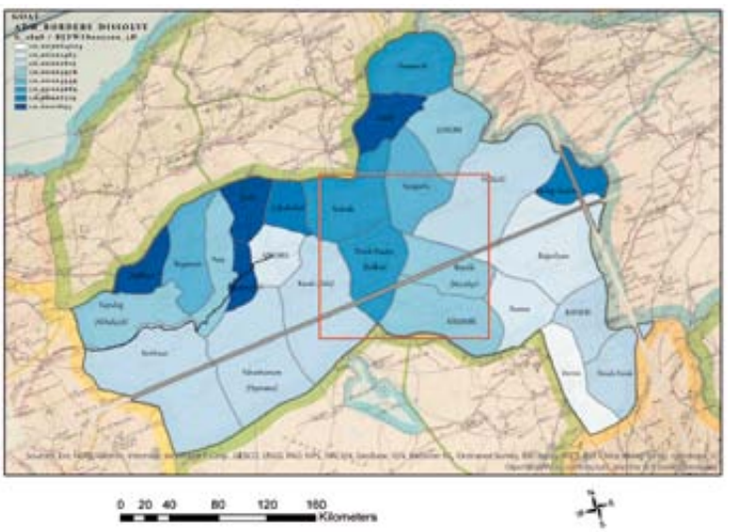
DEM Angora Goat Density 1893



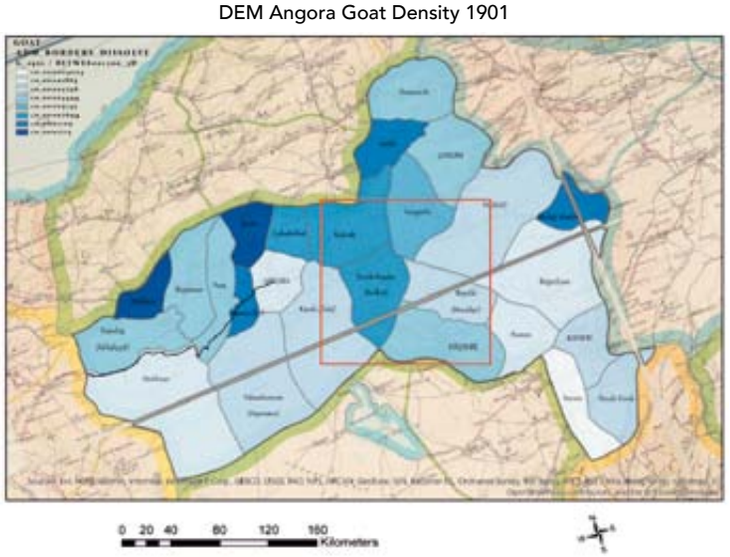
DEM Angora Goat Density 1895



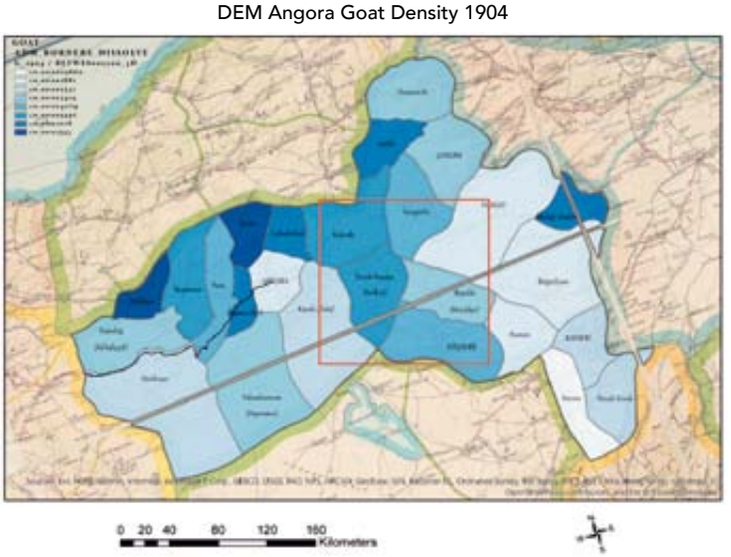
DEM Angora Goat Density 1898



DEM Angora Goat Density 1901



DEM Angora Goat Density 1904



Map Set 1. Digital Elevation Model (DEM)-based Angora goat density maps in the Ankara province districts (1890-1893-1895-1898-1901-1904). Geographical reference and analyses were carried out using ArcGIS PRO software, with reference to R. Huber, Empire Ottoman: Division Administration, 1899, dressée d'après le Salname 1899 map.

tive boundaries into the ArcGIS software in the form of polygons to construct the two-dimensional geography of the Ankara province. Then the whole of these two-dimensional polygons was superimposed on the Digital Elevation Map (DEM) that contains the elevation data on modern Turkey's spatial references, and three-dimensional geographical areas of each district were calculated. The rivers and lakes were masked because these were outside the Angora goats' habitat. Thus, the ideal geographical area where the Angora goat can be bred in the Ankara province was mapped (Map 1).

Map 1 shows us the home ranges of Angora goats and neighbouring areas. Green areas represent elevations of 800-1,200 metres, the ideal home range of the Angora goat. We have assumed that the Angora goat did not breed in other areas in theory. Looking at this map, we see that the Angora goat habitat is particularly concentrated in the Sivrihisar, Yabanhamam and Bala districts, in the southern and southwestern regions.

The above maps (Map Set 1) allow us to carry our analysis to 3D space by superimposing the Angora goat census data on the Digital Elevation Model. Density maps suggest that the Angora goat economy moved towards the more limited (marked red) districts when compared to the Angora goat habitats in Map 1. Beyond this, we may also arrive from these maps at the following conclusions:

- In particular, with the advent of the railway in Ankara in 1894, it can be said that the economy of the Angora goat began to concentrate in the middle and southwestern districts in the province. Although our maps do not reflect the change of density of the goat in the Ankara district centre, it can be seen in the increase in the number of animals in the centre and in the goat density in the neighbouring districts. In this context, particularly the Kalecik, Mecidiye, Kırşehir and Denek-Maden districts stand out.
- These districts have "jammed" high numbers of goat populations in relatively smaller areas of land suitable for grazing and breeding Angora goats. Looking at the density maps, we can say that the development of the railway did not deepen the rural-urban divide, but rather facilitated an increase in the number of goats in towns with administrative centres by bringing pastures, goat pens, shearing tools and Angora goat breeders that make up the Angora goat economy closer to these areas.
- Maps of Angora goat populaces indicate that the climatic imperatives for sheltering, feeding and shearing of the stock play an important role also in determining the locations of human settlements. One can expect that human settlements in regions where the Angora goat economy is concentrated to appear in the same elevation range. Further research into human geography and their comparison with the geography of Ankara will tell us more on this (Yıldırım, 2006).
- It can be said on a macro-economic scale that the successful cross-fertilization of the Angora goat in the USA and South Africa, marginally influenced the Angora goat economy in Ankara over a 17-year period. Although in the US there were some 900,000 Angora goats in the 1900s, Ankara maintained the role of the main mohair supplier worldwide. Similarly, the British trade did not change much in volume although the British Empire found an inexpensive source for mohair by officially adding South Africa

to its colonies in 1902 (in the 1880s there were close to 1 million Angora goats in Cape Town). This reality of the Angora goat economy, that is, the sustainability of the economy becomes clearer from the following letter written by George Gatheral to S.C. Cronwright Schreiner (1898) in April 1897:

The mohair clip of Asia Minor has been for generations a kind of investment, and the entire stock of the staple is never thoroughly cleared out. We have a familiar proverb among the native dealers that Asia Minor is like an old flour sack, no matter how much you beat or shake it, you will always shake some dust out. (pp. 162-163)

It is possible to say that while the period examined is not long enough to allow us to make analyses on a macro-scale, we can safely say that the Angora goat economy maintained its vitality at a time when we could expect global demand for mohair and *sof* to decline.

• Just as many tools used to represent historical reality, H-GIS applications obscure more than they expose. There are also some issues here regarding analysis.

Although Ankara's goat economy was able to survive climatic anomalies (the agricultural crisis in the 1890s), the conjectural decline in global demand, and technological developments, what was the prevailing economy in the Ankara region for centuries was now being replaced by an economy based on cereal production and exports. With the establishment of the railway in 1894, grain exports exceeded mohair for the first time in history (Kaynar, 2016).[4] Of course, it is not possible to see this detail in Angora goat density maps at this point.

Similarly, climatic changes and changes in vegetation entail a deeper analysis. İhsan Abidin (1924), although not too clearly, suggests a positive correlation between the decline of the *sof* industry and Angora goat economy, and the deforestation of Central Anatolia (p. 26). Although we can see that the Angora goat survived during the 17 years observed in this analysis, more long-term studies should also take into consideration the changes in climate and vegetation cover.

• While this section has attempted a reassessment of the economics of the Angora goat within the historical framework, the method of applying it to resources can serve as a model for future studies. As Geoff Cunfer and colleagues (2006) have claimed, using the Historical Geographical Information Systems tools to position animals in time and space can give us the opportunity to conduct Long-Term Socio-Ecological Research (LTSER). From this perspective, other more extensive studies on different aspects of climate and geography, using different sources such as current animal censuses on the Angora goat, will enable historians, economists, climate scientists, zootechnics specialists and other experts in the field to join forces to analyse the past and the future of this unique species.

4 One of the reasons for this was the promotion of agricultural production to refugees from the Balkans and the Caucasus, who were placed in fertile areas along the railway line in the late 19th century.

References

Barakat, N. (2015). Marginal actors? The role of Bedouin in the Ottoman administration of animals as property in the district of salt, 1870-1912. *Journal of Economic and Social History of the Orient*, *58*(1-2), 105-134.

Bolton, M. (2007). Counting llamas and accounting for people: livestock, land and citizens in southern Bolivia. *The Sociological Review, 55*(1), 5-21.

Clark, C. E. (1974). The Ottoman industrial revolution. *International Journal of Middle East Studies, 5*(1), 65-76.

Cronwright Schreiner, S. C. (1898). *The Angora goat and a paper on the Ostrich*. New York, NY: Longmans, Green, And Co.

Cunfer, G. *et al.* (2006). From LTER to LTSER: Conceptualizing the socioeconomic dimension of long-term socioecological research. *Ecology and Society*, *11*(2), 13.

Çalışkan, K. (2007). "Markets and fields: An ethnography of cotton production and exchange in a Turkish village." *New Perspectives on Turkey*, *37*(3), 115-145.

Emecen, F. (1988). Ağnam Resmi. In *TDV İslam Ansiklopedisi* (pp. 478-479). Vol. 1, İstanbul: Türkiye Diyanet Foundation.

Faroqhi, S. (1994) Mohair manufacture and mohair workshops in seventeenth-century Ankara. *İstanbul Üniversitesi İktisat Fakültesi Mecmuası. 41* (1-4), 211-236.

Faroqhi, S. (2010). Introduction. In S. Faroqhi (Prep. by) *Animals and people in the Ottoman Empire* (pp. 11-55). İstanbul: Eren.

Huber, R. (1899). *Empire Ottoman: Division Administration, 1899, dressée d'après le Salname 1899*. F. Loeffler.

Ihsan Abidin [Akıncı]. (1340/1924). *Ankara keçisinin hâli ve ıslahı*. İstanbul: Vatan Matbaası.

Kadı, İ. H. (2012). *Ottoman and Dutch merchants in the eighteenth century: competition and cooperation in Ankara, Izmir, and Amsterdam*. Leiden: Brill.

Kasaba, R. (1988). *The Ottoman Empire and the world economy*. New York, NY: SUNY Press.

Kaynar, İ. S. (2016). *Engürü'den Ankara'ya: 1892-1962 arasında Ankara'nın iktisadi değişimi*. (Unpublished PhD Thesis). Marmara University, İstanbul.

Keskin, Ö. (2010). Osmanlı İmparatorluğu'nda modern ziarat eğitiminin yaygınlaşması: Ankara numune tarlası ve çoban mektebi. *Osmanlı Tarihi Araştırma ve Uygulama Merkezi Dergisi OTAM, 28* (28), 87-106.

Lewis, B. (1958). Some reflections on the decline of the Ottoman Empire. *Studia Islamica, 9*, 111–127.

Mikhail, A. (2013). *The animal in Ottoman Egypt*. Oxford: Oxford University Press.

Oyal, Ö. F. (2013). *Keçi, zanlı, kurban, cefakâr*. İstanbul: Yapı Kredi Yayınları.

Planhol, X. (1975-1977). Rayonnement urbaine et selection animale: une solution nouvelle du probleme de chevre d'Angora. *Bulletin de la Section de Geographie, Etudes de Geographie Historique 82*, 179-196.

Şahin, G. (2013). Türkiye'de Ankara keçisi (Capra hircus ancryrensis) yetiştiriciliğinin dünü bugünü ve yarını. *CBÜ Sosyal Bilimler Dergisi*, *11* (2), 338-352.

Quataert, D. (1975). The Agricultural Bank and agricultural reform in Ottoman Turkey, 1888-1908. *International Journal of Middle East Studies, 6*(2), 210-227.

Tabib Hayrullah. (1264/1848). *Fenn-i ziraatten beyt-i dehkani*. İstanbul.

Tamur, E. (2003). *Ankara keçisi ve Ankara tiftik dokumacılığı: Tükenen bir zenginliğin ve çöken bir sanayinin tarihsel öyküsünden kesitler*. Ankara: Ankara Ticaret Odası Yayınları.

Tan, S. (2014). XIX. Yüzyılda Anadolu'dan Güney Afrika'ya tiftik keçisinin yasal ve kaçak sevkiyatı. *Osmanlı Tarih Araştırma ve Uygulama Merkezi Dergisi OTAM*, 35 (35), 137-152.

T. C. Başbakanlık Osmanlı Arşivi (BOA). (1290/1874). HR.I.3 419/25.

T. C. Başbakanlık Osmanlı Arşivi (BOA). (1311/1895). SD. 1536/21.

T. C. Başbakanlık Osmanlı Arşivi (BOA). (1323/1905). DH.MKT.882 /42.

Uzun, A. (1997). İstanbul'un *et ihtiyacının sağlanması: ondalık ağnam uygulaması (1738-1858)*. (Ph. D. thesis). Istanbul University, Istanbul.

Yıldırım, B. E. (2006). *Ankara Sancağı'nın tarihi coğrafya bakımından yerleşme ve nüfusu (1871-1907)*. (Unpublished Master's Thesis). Ankara University, Ankara.

Wrigley, E. A. (2016). *The path to sustained growth: England's transition from an organic economy to an industrial revolution*. Cambridge: Cambridge University Press.