V. Ecology at Platia Magoula Zarkou by Comparison

> 'Whether materially present in bricks and mortar or in remote locations, in ruined or destroyed forms or in evanescent memories, they encapsulate traces of lives previously lived and reveal how these are forged in the shadow of wider structures. A focus on houses as refracting such entanglements enables us to grasp the latter's simultaneously temporal, spatial, personal, relational and political nature.'
> Janet Carsten[1000]

Introduction

Following my initial discussion on regional dynamics at the dawn of the Early Bronze Age in western Anatolia, this chapter provides a window into people's dwelling perspectives on the other side of the Aegean basin, namely the western side of the Thessalian plain. Primarily anchored around EBA Platia Magoula Zarkou, this chapter discusses some preliminary differences regarding subsistence strategies and labour organization at the two sites, prior to a discussion of regional economies in Chapter VII. The overarching goal of this study is to understand local social organization on both shores of the Aegean basin from socio-cultural anthropology's perspectives. Given that the sample for this comparison comprises both a hinterland and a coastal prehistoric site, since the beginning of this research, the ecological differences between Platia Magoula Zarkou and Çukuriçi Höyük have been contextualized as among key dissimilarities between the two. However, a thorough study of EBA dwellers and their relation to the surroundings of Platia Magoula Zarkou and Çukuriçi Höyük indicates that the contrast between the two is not as dichotomous as it seemed.

It has already been stated in the introduction and in Chapter II that in the course of our research, the dating for EBA layers at Platia Magoula Zarkou turned out to be from later periods than initially expected. Instead of dating to the EBA 1 period (i.e. between approximately 3000 and 2700 BC), which had been expected from the relative chronology inferred through 'Bratislava bowls' documented at the site, the ^{14}C dates refuted such a hypothesis. Instead, the radiocarbon dating confirmed that EBA 2 layers at Platia Magoula Zarkou date to the mid-3rd millennium BC.[1001] Although Çukuriçi Höyük and Platia Magoula Zarkou were not contemporaneous, which would be required for comparison *stricto sensu*, the last section of this chapter offers a somewhat 'uncontrolled' comparison (to paraphrase an ironic remark by Sahlins) between the two sites in terms of animal breeding strategies. This comparison is not limited to EBA 2 layers at Platia Magoula Zarkou and EBA 1 layers at Çukuriçi Höyük, but it opens up an initial discussion of trends in animal herding strategies in EBA 2 western Anatolia, that differ significantly from the evidence at EBA 2 Platia Magoula Zarkou. This limited evidence points towards a different pathway towards increasing social inequalities within the Thessalian plain and contemporaneous western Anatolia, also seen in the respective household organization.

In this chapter, I show that Platia Magoula Zarkou's EBA 2 assemblage of animal breeding bears a close local and regional similarity to big man societies. For example, the majority of sheep at the site were kept alive quite long, which could be an important indicator (in the sense

[1000] Carsten 2018, 104–105.
[1001] Weninger et al. 2022.

of necessary, but not yet sufficient evidence) for regional exchange and alliance building. Moreover, the enclosure system recorded at this site may also not have exclusively represented a division between the upper and lower town, but also exhibited similarities to Melanesian big man societies in their decentralized social organization, lacking any administrative mechanism, yet with well-attested enclosures.

Like dwellers at Çukuriçi Höyük, inhabitants at Platia Magoula Zarkou also did not reside in self-sufficient ecological and socio-economic local systems. These local systems were open and interactive, meaning they were also integrated into regional exchange networks. Residents at Platia Magoula Zarkou relied on importing chert and obsidian for reproduction. In exchange for these, dwellers at Platia Magoula Zarkou could exchange some of their local output in sheep, wool, and woollen items. Based on wider regional comparisons, the western Anatolian EBA 2 'cattle culture' may even have been accompanied by 'competitive sheep breeding' in the Thessalian plain. Therefore, wealth on the hoof does not necessarily have to be limited to pigs, as documented ethnographically in Papua New Guinea, or to cattle, as seen from EBA 2 western Anatolia, but could also apply to sheep and caprines within a more or less sedentary, non-state constellation, as seen from EBA 2 Thessaly.

To highlight differences and similarities between modes of life at the dawn of the Bronze Age and, most importantly, to understand developments on the Thessalian plain, this chapter is divided into four parts. Firstly, the importance of changes in the landscape surrounding Platia Magoula Zarkou will be described diachronically, from the Middle Neolithic to the Early Bronze Age, along with changes in farming practices. Secondly, drawing from analyses of zooarchaeological and archaeobotanical remains, subsistence strategies will be discussed with reference to the ratio of domestic vs. wild animals and the ratio between species of domestic animals. Thirdly, as the dwellers at Platia Magoula Zarkou markedly favoured the consumption of sheep, this preference will use culling profiles[1002] to compare the prehistoric context with ethnographic examples of sheep herding groups in 20th century western Asia. Finally, a stark difference between a preference for sheep at Platia Magoula Zarkou and goats at Çukuriçi Höyük will be discussed through cross-cultural comparison with regard to local ecological variation and local labour organization at each site. As I have already mentioned, the sets of data from Platia Magoula Zarkou and Çukuriçi Höyük compared here do not only highlight ecological differences between the two sites. Instead, in this chapter, I posit that differences in animal herding strategies can only be understood through a 'holistic comparison', including plant cultivation and craft activities within sedentary, non-state societies. Through such a holistic comparison, the chapter then highlights commonalities and differences in the organization of everyday lives on each shore of the Aegean basin at the dawn of the Early Bronze Age.

V.1. Every River has a Story

Before visiting Platia Magoula Zarkou together with my DOC-team colleague Constanze Moser in March 2017, I learned from the literature that the role of the Pineios River flowing next to the site has been heavily debated. For both the Neolithic and EBA periods alike, the role of the Pineios River was key to understanding the diachronic perspective of modes of production and people's dwelling perspectives at Platia Magoula Zarkou. Uncovering layers of debates about floodplain vs. rain-fed horticulture, corresponding to conflicting interpretations of seasonal vs. permanent occupation in the Neolithic, then led me to discourses on the seemingly

[1002] Culling profiles refers to the zooarchaeological statistical analysis of animal bones. Through culling profiles, it is possible to understand site-specific consumption strategies (e.g. age at slaughter, specialized production strategies).

Fig. 24 The locations of Platia Magoula Zarkou and regional contemporaneous sites (ERC Prehistoric Anatolia/OeAI)

crystallized picture of plough agriculture and the Secondary Products Revolution in a permanent settlement during the Bronze Age at Platia Magoula Zarkou. I followed the changing river's story to understand changes and similarities between Neolithic and Bronze Age occupation at the site. Without resolving disputed theories on Neolithic farming but leaving multiple options open to interpretation, the first section will show that EBA inhabitants could indeed have relied on secondary products in a permanent settlement. This argument will, in a later section, be supported through zooarchaeological data. This is the first and important difference between Platia Magoula Zarkou and Çukuriçi Höyük's respective modes of production, as ploughing was not attested at the latter site, which very likely was also reflected in their household economies.

Platia Magoula Zarkou is a Neolithic and Bronze Age *magoula*,[1003] located 30km west of the modern town of Larissa, on the Western Thessalian Plain (see Fig. 24). The site was excavated between 1979 and 1990 by Kostas Gallis and his team, with a principal interest in studying the Neolithic occupation at Platia Magoula Zarkou and the Late Neolithic cemetery located close to the mound.[1004] At present, the mound at Platia Magoula Zarkou is approx. 6–7m above the ground, with the Middle Neolithic layers below ground, and a thick layer of alluvium covering the surroundings of the mound.[1005] The settlement on the *magoula* does not

[1003] The term *magoula* in modern Greek refers to 'a cheek'. Within an archaeological context, it refers to an anthropogenic mound (e.g. *höyük*, *tepe* in Turkish, *magoula* in Greek). During my fieldwork in March 2017, I stayed in Larissa with the family of a friend. They were curious about my work and explained to me that in Thessaly, the word *magoula* can today also be used to refer to a villager or an ignorant, backward person (e.g. 'Vlachs from Magoula'). In Thessaly, Vlachs are an ethnic, Romanian-speaking nomadic group, moving between winter pastures in the Thessalian plain and summer pastures at Mount Gramoz in the Pindus range.

[1004] Gallis 1982.

[1005] Van Andel et al. 1995; Andreou et al. 1996.

extend beyond 2ha[1006] but an off-mound settlement, surrounding the *magoula*, was attested for the EBA. The final publication related to the excavation of the site is still in preparation. Nevertheless, studies of stratigraphy, finds, and geophysical prospection around the site have been carried out.[1007] This allows us to arrive at interpretations based on a large pool of data, including analyses of the built and unbuilt environment at the site. However, the main goal of this chapter is to understand the dwellers' relationship to the immediate surroundings of the magoula and the subsistence strategies they employed in the EBA.

Today, Platia Magoula Zarkou is located 1km north of the Pineios River. This river originates in the Pindus Mountains, flows through the Trikala and Thessalian plains, and empties into the Aegean Sea. Therefore, one of the advantages of this site was access to a fresh water supply. Another advantage was its proximity to the longest and largest river for transportation in the Thessalian plain. This important natural waterway connection linked the hinterland site with the Aegean coast 60km to the east. According to detailed soil analysis from the area around Platia Magoula Zarkou, dwellers at the site also benefitted from the seasonal flooding of the Pineios River during the Middle Neolithic, which renourished soils for cultivation each year.[1008]

In March 2017, I had the opportunity to observe the role of the Pineios River today, as it flows in close proximity to the site as well as through the extensive Thessalian plain (see Fig. 25). Constanze and I drove from Larissa towards the west, on the EO Larissa Trikkalon highway, exploring the western end of the Thessalian plain, mostly covered with agricultural fields. Spinach-coloured wheat fields contrasted with bright pink orchards. Most of the fields that had been ploughed were now rested and ready to be sowed. A few (mainly cotton) fields were left untouched from the harvest. Some were irrigated with water pipes, but most were not.

The illusion of the plains as infinite lasted for about 25km, but then soon disappeared as we entered a narrower part of the plain. The lower Zarkos Mountains (the highest peak at 734m) limited the panorama on our right-hand side. The insular constellation of the Duvlatan Hills, stretching over 12km north–south, bordered the plains to our left. We crossed through the narrowest part of the Pineios valley since our journey began, which is only 2km wide at this point. Soon after, we left the highway at the Zarko exit and the narrow Pineios valley opened up again, although not as wide as hilly slopes run east–west on the northern side of the Thessalian plain. After a short drive along a dirt road, we reached the mound of Platia Magoula Zarkou, which can easily be spotted from afar. From the top of the *magoula*, it was possible to observe the extensive plains covered with fields and unworked mountain slopes. These merged into the dynamic landscape within which Platia Magoula Zarkou is located. South of the mound, a somewhat orderly line of trees diverted my attention. 'Is this the river?' I asked Constanze. 'Yes, that's Pineios.'

We descended the magoula along a dirt road towards the river, passing some modern agricultural equipment at the edge of the fields. We soon reached the trees along the Pineios. They bore tiny, bright green leaves. The water level seemed to have dropped significantly since the early spring. This was clearly visible from the dry alluvial soil on the bark of the trees, close to the river's edge, indicating that the water level had been approximately 1.5–2m higher. On the river shore, fresh but cracked alluvium gave way to grass where the broken branches allowed. This gift for Thessalian farmers, which originates in the western Pindus Mountains, materialized in front of us in a muddy water running down the Pineios at a slow pace (see Fig. 26). Was this also the case in the Bronze Age?

[1006] Van Andel et al. 1995; Andreou et al. 1996.

[1007] This project was led by Eva Alram-Stern from the Institute for Oriental and European Archaeology of the Austrian Academy of Sciences. Constanze Moser, a member of this cooperative project and our DOC-team, studied the Early Bronze Age layers at the site.

[1008] Van Andel – Runnels 1995.

Fig. 25 The proximity of Platia Magoula Zarkou to the Zarkos Mountains (S. Cveček)

Fig. 26 The fluctuating water level of the Pineios River, observed in March 2017 (S. Cveček)

Middle Neolithic Floodplain/Rain-Fed Cultivation and Bronze Age Rain-Fed Agriculture at Platia Magoula Zarkou

My question has been posed before. Waterways, flooding, and access to water are staple topics for the discussion of subsistence strategies and the spread of Neolithic farming communities. In the 1980s, Sherratt[1009] proposed two different modes of subsistence for the prehistoric Old World: *floodplain cultivation* during the Neolithic and the Secondary Products Revolution,[1010] including use of the plough, for the Late Chalcolithic and the Bronze Age periods. The *floodplain cultivation* model[1011] was developed based on evidence that all Early and Middle Neolithic sites were established close to water sources – on alluvial plains, beside lakes, along rivers, or close to springs. Sherratt proposed that prior to the 4th millennium BC, the cultivation of crops in the Old World consisted of horticulture in water-rich environments with high groundwater levels and seasonal flooding. Although he described it as horticulture, this form of cultivation was not labour-intensive. He assumed that garden-like conditions were naturally given,[1012] in which spring instead of winter sowing of domesticated plants was preferred to avoid flooding and waterlogging. Within this model, animal herding was exclusively practised for the production and consumption of its 'primary' product: meat.

For the Old World Chalcolithic and Bronze Age, Sherratt's[1013] *secondary product revolution* model largely shaped at least the next three decades of follow-up discussions about the production, consumption, and reproduction of farming societies in the Old World. This model argues for rain-fed cultivation and a reliance on animal power for cultivation. Following the invention of the plough in the 4th millennium BC, oxen were used for traction and ploughing, enabling the cultivation of larger fields, which led to production of surpluses beyond household needs, increasing competition between households, and finally, increasing social inequality. Apart from animal labour, other secondary animal products, such as milk and wool, which supposedly had not been utilized previously,[1014] gained in importance for exchange and the accumulation of wealth, thereby leading to increasing specialization. Based on Goody's writing on plough usage and the impact of agriculture,[1015] Sherratt's model was largely accepted, but has recently been challenged, as ploughing with cows may predate ploughing with oxen, and farmers' utilization of milk dates back to the Neolithic.[1016]

Halstead,[1017] inspired by Goody not only in his writing but also in his methods, therefore proposed a different model for Middle Neolithic and Bronze Age cultivation. What makes his contribution, and consequently the model, particularly valid is his acknowledgement of ethno-

[1009] Sherratt 1980; Sherratt 1981.

[1010] Andrew Sherratt developed a model of *secondary products revolution* for understanding farming in Old World prehistory. This model implies that during the Neolithic, animals were mainly bred for their primary product (meat), whereas animal breeding for secondary products such as milk, wool, traction, ploughing, and riding, emerged in the 4th–3rd millennium BC and its diffusion transformed the Eurasian economy (Sherratt 1981; Sherratt 1983). The latter phenomenon, the use of secondary animal products in 4th–3rd millennium BC, Sherratt labelled the *secondary products revolution*. For more detail, see Chapter III.

[1011] Sherratt elaborated and geographically extended the model previously proposed by Kruk 1973. For a detailed description of Sherratt's model and its shortcomings, see Chapter III.

[1012] Bogaard 2004. Sherratt's use of horticulture is not in line with the anthropological understanding of horticulture. The anthropological distinction between horticulture and agriculture is outlined in Chapter III.

[1013] Sherratt 1981.

[1014] The presence of wool production preceding the Bronze Age finds little support as prior to this period, hair sheep, which do not grow wool at all, rather than wool sheep, were common. In turn, lipid residue data have shown that Neolithic farmers in fact utilized milk – a result that does not accord with Sherratt's theory. In addition, in Neolithic Knossos, ploughing with cows seemed to predate the 4th/3rd-millennium BC ploughing with oxen (Isaakidou 2006; Isaakidou 2011).

[1015] Goody 1976.

[1016] See Helmer et al. 2007; Isaakidou 2011.

[1017] Halstead 1981; Halstead 1987; Halstead 1992b.

graphic methods. Unique to Halstead's approach is its interdisciplinary core, combining zooarchaeological and archaeobotanical expertise with long-term ethnographic fieldwork, alongside long-term archaeological excavations across the eastern and northwestern Mediterranean, including Thessaly. Halstead argued for the validity of particular practices in contemporary rural areas, which remain relevant when discussing prehistoric relations between the natural and social environments. His model opposed Sherratt's floodplain cultivation, instead proposing a rain-fed, bare fallowing, starting in the Neolithic. According to Halstead,[1018] cereals and pulses were grown in rotating cycles on river terraces, in gardens or small fields, close to settlements. He argued that rain-fed, small-scale farming in small forest clearings using human and animal labour for tillage would be more suitable during both the Neolithic and the Bronze Age in the Aegean basin. This argument was recently reinforced in his recent publications[1019] and earlier by Cornelia Becker, who argued that the assemblage of young lambs implies the presence of dwellers at Platia Magoula Zarkou between late winter and spring.[1020]

Pollen analysis from a number of sites strengthened Halstead's claim, indicating that the Aegean basin lowlands were wooded[1021] until the Middle Bronze Age. A recent study on land-use in northern Greece also showed that deciduous oak forest was continually replaced by pastures and wetlands only after 3450 BC, providing a reference for archaeological pastoral indicators.[1022] Therefore, the garden-like natural conditions assumed by Sherratt did not exist during the Neolithic. Extending Sahlins's DMP model[1023] to archaeological data – in which the limiting factor of production is not a scarcity of land but labour – Halstead[1024] proposed a model of mixed farming involving household-based horticulture and animal herding in the prehistorical Aegean basin. He emphasized a distinction between two types of animal herding: a) a sedentary, household-based animal herding practised year-round close to the house in dispersed settlements; and b) a communal transhumance of consolidated herds by a small segment of dwellers at nucleated mound settlements.[1025]

Halstead's rain-fed, small-scale farming and Sherratt's floodplain model have been tested against the data from and around Platia Magoula Zarkou for the Middle Neolithic period.[1026] The drilling cores contemporary to the Middle Neolithic layers at the *magoula* have shown that its surroundings were frequently flooded from the river side, but also from the Zarkos Mountains, since the Late Neolithic layers at the side are built on top of a 75m-wide gully. The same research also identified an Early Neolithic site, Koutsaki Magoula, without any succeeding layers, which was possibly abandoned due to flooding, close to the Pineios River. Based on these outcomes, the authors rejected Halstead's model and supported Sherratt's floodplain cultivation for the Early Neolithic (6500–6000 BC) and Middle Neolithic (6000–5300 BC) in Thessaly. In addition, they questioned whether there had been a permanent settlement at the site during the Middle Neolithic period,[1027] whereas Halstead argued for year-round occupation at Platia Magoula Zarkou based on zooarchaeological evidence.[1028]

Although the analysis of drilling cores support flooding agriculture at Platia Magoula Zarkou during the Middle Neolithic to some extent,[1029] Halstead,[1030] in his recent re-evaluation of

[1018] Halstead 2014b.
[1019] Halstead – Isaakidou 2020; Halstead 2022.
[1020] Becker 2000.
[1021] Alram-Stern 2004.
[1022] Weiberg et al. 2019.
[1023] Sahlins 1972.
[1024] Halstead 1981; Halstead 1987.
[1025] Halstead 1987; Halstead 2014b.
[1026] Van Andel – Runnels 1995; Van Andel et al. 1995.
[1027] Van Andel et al. 1995.
[1028] Halstead 2005.
[1029] Van Andel et al. 1995.
[1030] Halstead 2022.

farming at Platia Magoula Zarkou, claimed that if flood farming did occur, it does not seem feasible that it supported grain harvest. Halstead argued that a single type of cultivation, namely the rain-fed, small-scale farming, was most likely at Middle Neolithic Platia Magoula Zarkou.[1031] He and other scholars argued that since many of the Neolithic settlements were located away from active floodplains,[1032] 'floodwater farming is widely irrelevant to the earlier Neolithic in Greece'.[1033] This excludes the possibility that both, floodwater/floodplain cultivation and rain-fed farming coexisted in Neolithic Greece in space and time, depending on the immediate landscape surrounding the site. Indeed, Halsted and Isaakidou not only excluded floodplain cultivation but they also argued against slash-and-burn cultivation and pastoralism in Greece during the Neolithic. Instead, they promoted a single model of cultivation, namely rain-fed crop farming:

> 'By default, the only practically feasible and empirically compatible earlier Neolithic subsistence base in Greece, at least for the archaeologically known open-air villages, was rain-fed crop farming, with a greater or lesser contribution from livestock husbandry.'[1034]

With reference to Middle Neolithic Platia Magoula Zarkou, it appears likely that both, floodplain cultivation[1035] and rain-fed crop farming,[1036] could exist side by side, rather than either being an exclusive and the only possible model for cultivation during the Middle Neolithic.

Following the Middle Neolithic (5850–5300 BC) occupation at the site, Platia Magoula Zarkou was settled until the end of the Tsangli-Larissa Phase, the earliest phase of the Late Neolithic period (5300–5100 BC). The cemetery of 60 cremation pots close to the site belongs exclusively to the Tsangli-Larissa period and shows little intra-group social differentiation.[1037] Following a hiatus, the site was resettled in the Early Helladic II (2500 BC) and remained in use until the Middle Bronze Age (1700/1500 BC), when it was abandoned before the Mycenaean period.[1038]

The waves of settlement and resettlement at Platia Magoula Zarkou[1039] still raise qe stions about what the landscape surrounding the site was like during the Early Helladic period. If floodplain cultivation is supported for the Middle Neolithic period, would that imply rain-fed cultivation in the Bronze Age? According to climatological data, the EBA climate in Thessaly was similar to today's usual level of humidity and precipitation[1040] of approximately 40m m annually, mostly between October and March. This indicates that flooding could happen only sporadically during the Bronze Age as a major catastrophic event in the spring and summer, but the seasonal fluctuation in the water table (up to 2m) of the Pineios should be seen as the norm. The surroundings of the magoula remained forested during the Bronze Age,[1041] which limited the potential for extensive agriculture. This implies that during the Bronze Age, farming at Platia Magoula Zarkou was somewhat human labour-intensive, since, considering Stone Age technology, clearing forests for the cultivation of crops is a time- and energy-consuming practice.

For a combination of these reasons, the floodplain cultivation model for the Early Helladic period at Platia Magoula Zarkou is undoubtedly not applicable. Garden-like natural conditions

[1031] Halstead 2022.
[1032] Wilkie – Savina 1997 cited in Halstead – Isaakidou 2020.
[1033] Halstead – Isaakidou 2020.
[1034] Halstead – Isaakidou 2020, 84.
[1035] Van Andel et al. 1995.
[1036] Halstead – Isaakidou 2020; Halstead 2022.
[1037] Gallis 1982, 103–116.
[1038] Pentedeka 2011.
[1039] The reason for abandonment of Platia Magoula Zarkou at the end of the earliest Late Neolithic Phase (Tsangli Larisa) in approximately 5300 BC remains unknown.
[1040] Alram-Stern 2004.
[1041] Alram-Stern 2014.

surrounding the magoula and regular flooding were not the case during the EBA as the surroundings appear to have been mainly forested. Instead, a combination of Sherratt's Secondary Products Revolution and Halstead's rain-fed, *small-scale mixed farming* model appears feasible as a farming practice during the Early Helladic period. This will be further explored below through botanical and zooarchaeological data from Platia Magoula Zarkou. For now, I return to the question raised above: how far the Pineios' 'behaviour' of today could be inferred in prehistory? Based on the climatic and archaeological data discussed above, I have shown that the Pineios vignette from the surroundings of Platia Magoula Zarkou from March 2017 remains reasonably valid for the EBA, albeit not for the Middle Neolithic, when seasonal flooding of the Pineios River facilitated farming. Therefore, a major change should be distinguished between Middle Neolithic floodplain cultivation/rain-fed cultivation and Bronze Age rain-fed mixed farming at this site. From this basic understanding of the environment of the Bronze Age, the following section will dwell on herding strategies at Platia Magoula Zarkou (see Tab. 11).

Farming and Seasonality at Platia Magoula Zarkou	
Middle Neolithic	**Late Neolithic, EBA**
Floodplain cultivation (Van Andel et al. 1995) Rain-fed cultivation (Halstead 2022)	Rain-fed mixed farming/Secondary product revolution
Possible seasonal occupation of the site (Van Andel et al. 1995) but not necessarily (Becker 2000)	Year-round occupation of the site

Tab. 11 Differences between farming and the seasonality of households at Platia Magoula Zarkou

V.2. Zoography and Botanography at Platia Magoula Zarkou

The second section of this chapter looks at the evidence from the Neolithic and Early Bronze Age zooarchaeological and botanical assemblage of relevance for Platia Magoula Zarkou. The main aim is to understand whether these data indicate a change in animal breeding and types of farming between the Neolithic and EBA periods, which have previously been inferred from drilling cores and discourses on the importance of the Pineios River for cultivation. What is the dwelling perspective of EBA inhabitants at Platia Magoula Zarkou? How and what type of footprint have they left behind in the archaeological record? Does the attested EBA enclosure wall at the site necessarily support a division between the upper and lower towns? This section provides an overview of mixed regional economies at Neolithic Platia Magoula Zarkou, in comparison to rain-fed mixed farming in which bovine energy was exploited for ploughing fields and other forms of traction and transport during the EBA. The last section of this chapter considers closely two main features that others very likely might be tempted to interpret as immediate evidence for social inequality at Platia Magoula Zarkou: the plough and the presence of the enclosure wall. As I show, however, these two features cannot be simply linked to social inequality: in fact, the enclosure walls have also been attested for societies without ploughing, such as Melanesian big man societies. Instead of thinking of the enclosure walls as necessary indicators of social inequality, it is possible to think of the coexistence of ploughing agriculture and enclosure walls as socio-economic facts accompanying the communal conversion of surpluses to the benefit of the local community rather than solely as a benefit of the chiefly few.

At Platia Magoula Zarkou, the Early Helladic[1042] evidence comes from a single context at the site. A rectangular structure, hereafter referred to as a room, was excavated along with pottery, small finds, and botanical and zoological remains. These finds were recovered from

[1042] The term Early Helladic is coterminous with the Early Bronze Age and Early Thessalian periods.

inside and around the room. The exact location of the zoological material was not recorded during the excavation, and therefore the actual butchering, refuse dumping, and bone manufacture activities cannot be mapped.[1043] These well-analysed data nevertheless provide valuable information about the consumption and herding strategies of this particular domestic unit, although the archaeological context of a single room poses a major methodological obstacle for household archaeology. The latter approach aims at understanding socio-economic processes through the comparison of multiple contexts (e.g. multiple dwellings, multiple houses) at an archaeological site. Therefore, a household archaeology approach generally requires a larger number of exposed archaeological units (e.g. rooms, structures) for intra-site comparison. Only then is it possible to make inferences concerning economic strategies at that settlement.[1044] As there is a lack of such a context at Platia Magoula Zarkou, where different households cannot be compared on-site, the issue will be addressed through a regional comparison with two contemporary Thessalian sites: the hinterland site of Argissa Magoula[1045] and the coastal site of Pevkakia[1046], which I also visited during fieldwork in the spring of 2017. Undertaking a comparative inquiry into a particularity or resemblance of the context excavated at Platia Magoula Zarkou and other regional sites will enable this study to address similarities and differences in economic strategies within the region.

Late Neolithic Mixed Regional Economy

At Platia Magoula Zarkou, analyses of 10,918 animal bones indicate that sheep and goats predominated during all settlement phases, from the Neolithic to the Bronze Age.[1047] During the Late Neolithic (Tsangli Phase), dwellers at Platia Magoula Zarkou relied on multiple subsistence strategies. Among domestic animals, they predominantly herded sheep and goats (62.9%), followed by cattle, (18.5%) pigs (17.0%) and dogs (1.6%).[1048] Among wild animals, they predominantly hunted aurochs and red deer, as well as other small game such as foxes, badgers, wild cats, hares, tortoises, and a few birds.[1049] No fish remains[1050] were recovered from the site, but the dwellers collected river mussels from the Pineios River.[1051] Among regional exchange items, dwellers at Platia Magoula Zarkou may have exchanged chocolate chert, Melian obsidian, and locally produced grey on grey pottery.[1052] Only a single sample of

[1043] Becker 2000.

[1044] Tringham 2015.

[1045] Argissa Magoula is located on the eastern Thessalian plain, on the northern bank of the Pineios River, 4.5km from the modern town of Larissa and approximately 25km east of Platia Magoula Zarkou. Argissa Magoula is a mound settlement, which was inhabited during the Early Neolithic (6450–6000 BC) (Reingruber 2005; Reingruber et al. 2017) and the Middle Neolithic (5750–5600 BC) (Reingruber et al. 2017). Following a period of abandonment of approximately 2500 years, Argissa was re-settled during EBA 1, around 3000 BC (Hanschmann – Milojčić 1976). The Pineios River flows immediately to the south of Argissa Magoula, and has also partially eroded the site. For the location of Argissa Magoula, see Fig. 24 above.

[1046] Pevkakia is a coastal mound settlement on the eastern Thessalian plain, located 2km south of the modern town of Volos, next to the Pagasetic Gulf of the Aegean Sea. Pevkakia was first settled during the Late Neolithic (3820–3560 BC– uncalibrated dates) (Andreou et al. 1996), then abandoned for approximately 1000 years, and resettled during EBA 2, around 2400 BC (Christmann 1966). The Pineios River's fluvial connection between Platia Magoula Zarkou and Argissa Magoula does not include Pevkakia: neither through the Pineios River itself nor its adjacent tributaries. The Pineios River empties into the Aegean Sea approximately 40km north of Pevkakia. For the location of Pevkakia, see Fig. 24 above.

[1047] Becker 1991.

[1048] Becker 1991.

[1049] Becker 1991.

[1050] The lack of fish bones at Platia Magoula Zarkou could be ascribed to the lack of water sieving during the excavation, so that potential fish bones were missed (E. Alram-Stern, pers. comm. 2020).

[1051] Becker 1991.

[1052] Pentedeka 2011; Pentedeka 2017.

botanical remains from the Late Neolithic points towards cultivation of bitter vetch,[1053] which could have been integrated into the DMP. Ploughing was not attested at this site during the Late Neolithic. The main activities of this mixed regional economy comprised rain-fed mixed farming, including plant cultivation, animal herding, hunting and gathering/collecting, as well as pottery production and participation in obsidian and chocolate chert exchange during the Late Neolithic period at Platia Magoula Zarkou (see Tab. 12).

LATE NEOLITHIC MIXED REGIONAL ECONOMY					
Hunting	**Gathering, collecting**	**Animal herding**	**Plant Cultivation**	**Crafts**	**Regional economies**
Big game: aurochs, red deer Small animals: foxes, badgers, wild cats, hares, a few birds	River mussels, no fish remains	Sheep, goats, cattle, pigs, dogs	Bitter vetch	Production center of grey-on-grey pottery	Obsidian, Chocolate chert, and gray on gray pottery exchange
Targeted aurochs, red deer, and tortoise hunting		The primary importance of sheep and goats (without a plow)	Small botanical record (1 seed only)	DMP	Trade within the Thessalian plain and the Aegean World

Tab. 12 Model of mixed regional economy at Platia Magoula Zarkou during the Late Neolithic Period

Early Bronze Age Animal Herders

Despite a break in occupation at the settlement at Platia Magoula Zarkou between the Late Neolithic (Tsangli phase) and Early Bronze Age, the proportional distribution of animal herding did not change much between these occupation periods. During the EBA, sheep and goats (56.7%) remained the predominant groups of animals herded at the site, followed by cattle (22.6%), pigs (22.5%), and dogs (1.3%) (see Fig. 27). The EBA ratio between sheep and goats at Platia Magoula Zarkou was 3:1, which corresponds to the archaeological record from other Thessalian sites, including Argissa Magoula and Pevkakia. This implies that at all Thessalian EBA sites, sheep were generally more significant than goats during the EBA.[1054] The 'consumption ratio' (3:1 of sheep to goats), however, also implies that within a herd, sheep considerably outnumbered goats throughout centuries of occupation at the site. Caprines[1055] at Platia Magoula Zarkou were killed off at an older age during the EBA than in the Neolithic, which confirms the extraction of sheep hair for wool during the EBA.[1056] The evidence for wool production during the EBA can be further supported through small finds, which include multiple spindle whorls, loom weights, and needles recovered from the site.[1057]

With regard to the predominance of sheep and goats at all contemporaneous sites in EBA 2, I will bring in an ethnographic case for highlighting that herding of the same animals at multiple regional sites does not necessarily amount to evidence for only local, on-site subsistence. Instead, the same type of animals bred at different regional sites could also be mobilized for regional alliance and peace building. The prime importance of sheep and goats across Thessalian EBA 2 sites resembles the importance and role of domesticated pigs among the Tsembaga

[1053] Jones – Halstead 1993.
[1054] Becker 1991.
[1055] The term 'caprine' here refers to both sheep and goats. Within zooarchaeology, 'caprine' can also be used as an umbrella term for sheep, goats, and wild goats (ibex).
[1056] Becker 1991.
[1057] Britsch 2018; C. Moser, pers. comm. 2020.

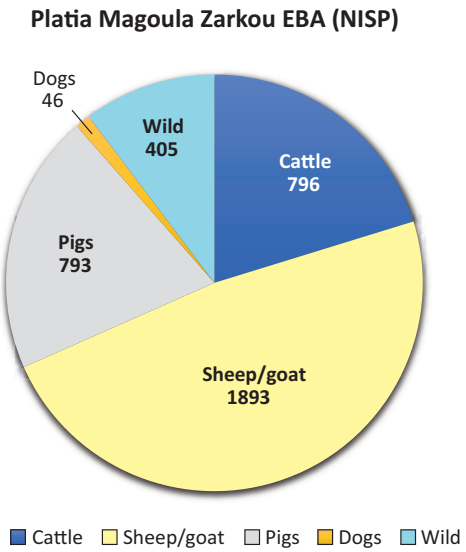

Fig. 27 Proportional representation of domestic and wild animals (NISP) at EBA Platia Magoula Zarkou (after Becker 1991)

and other Maring tribes on Papua New Guinea observed in the 1960s.[1058] The rearing of pigs based on vegetable surpluses observed among the Tsembaga in fact benefitted the entire Maring group, not only as subsistence, but also for other purposes. The Maring regularly hosted the year-long pig festival (known as *kaiko*), which rotated from one site to the other throughout the year. The *kaiko* marked the end of the ritual cycle, which can last five to twenty years, depending on the growth of pigs. Moreover, *kaiko* also contributed to the maintenance of peace, the movement of goods, the exchange of personnel (e.g. finding a marriage partner), and the distribution of pork as an important form of protein intake.[1059] Although the importance of sheep and goats beyond subsistence at Platia Magoula Zarkou remains challenging to understand from the archaeological data, it is important to note that although all EBA Thessalian sites mainly relied on sheep and goats (among domestic animals), this does not imply that sheep and goats were exclusively used for subsistence by local village groups. Instead, the primarily reliance on sheep and goats at every Thessalian site could, at the same time, provide the basis for regional competition and alliance building between sites.

Following caprines, cattle (22.6%) were the second most represented group found among domestic mammals at Platia Magoula Zarkou. The culling profiles for the EBA indicate an increase in the slaughter of older individuals: approximately 40% of animals were slaughtered young (below 2 years of age) and 60% of them at an older age (above 2 years of age).[1060] Similar to caprines, the culling profiles of cattle indicate the use of secondary products at Platia Magoula Zarkou during the EBA. This was observed from the shift in slaughtering practices towards a majority of older rather than young cattle in the EBA period, in comparison to the Neolithic period, when cattle were mostly slaughtered young, below 2 years of age. Cattle could be used for ploughing, harvesting, and threshing, as well as in transport and trade during the EBA. The use of cattle for traction and ploughing was inferred at Platia Magoula Zarkou from zooarchaeological identification of two morbidly altered cattle cervical vertebrae.[1061] A small proportion of the EBA assemblage also comprises dog bones, which do not bear any cut marks.[1062]

Sharing a similar proportional importance to cattle (22.6%), pigs (22.5%) were the third most represented domestic animal group at Platia Magoula Zarkou. Male and female individual animals were slaughtered around or below two years of age, which primarily indicates pig breeding for meat consumption. A few older female pigs were left alive longer for reproduction, whereas most male pigs were slaughtered below two years of age.[1063] This record finds a suitable comparison with the coastal regional site of Pevkakia, where most pigs were also slaughtered below two years of age.[1064]

[1058] Rappaport 2000 [1968], 22.
[1059] Rappaport 2000 [1968], 165.
[1060] Becker 1991.
[1061] Becker 1991.
[1062] Becker 1991.
[1063] Becker 1991.
[1064] Hinz 1979.

With reference to the well-studied Tsembaga case from Papua New Guinea, the record from Platia Magoula Zarkou is quite different. The big man groups of Tsembaga castrated most of their male pigs at three months of age to prevent mating and to breed more docile animals.[1065] The Tsembaga killed most of their pigs, both male and female, after two years of age.[1066] As pigs were the main domesticated animal group crucial for the Tsembaga's diet, and considering the effort involved in rearing them (also known as the food reserve on the hoof), Rappaport observed that 'more energy was expended to raise food for pigs than was returned in the form of pork'.[1067] The same cannot be said for Platia Magoula Zarkou, where pigs were not reared beyond two years of age and were not the most important animals in terms of diet or rearing effort. Instead, pigs at Platia Magoula Zarkou represented an important, although not the main, share of food reserves on the hoof, which could be fed with vegetal surpluses and through feeding in the forests nearby.

An interesting observation has been made regarding the representation of some meaty pieces recovered at Platia Magoula Zarkou. Within and around the excavated room, specific pieces are underrepresented in the Neolithic and EBA layers. These comprise pig, cattle, and sheep ribs and vertebrae (chops and ribeye), as well as pork and bovine skulls.[1068] Whereas the non-meaty parts could be considered as butchery waste, in the case of meaty parts, it seems likely that these were eaten elsewhere, possibly shared beyond the household, which is unavoidable considering the large size of a cow. However, given that these pieces (ribs and vertebrae) were missing from both the Neolithic and Early Bronze Age layers, it appears more likely that this assemblage represents a long-standing butchering and food preparation practice. In this case, meat could be fleshed from bones and consumed within different households, whereas vertebrae and ribs were discarded as butchery waste, outside the living room or the settlement.

Animal Herders but also Foragers

Apart from domestic animals, a small proportion of the EBA assemblage at Platia Magoula Zarkou consisted of wild animals, which gained in importance during the EBA in comparison to the Late Neolithic period. The assemblage of hunted animals comprises large game, such as aurochs and red deer; small game, such as wild boar, foxes, badgers, wild cats, and hares; as well as collected river mussels (e.g. *Unios crassus*); negligible amounts of tortoise and bird bones; and a broken piece of cockle shell from the Aegean Sea.[1069] This record demonstrates that dwellers at Platia Magoula Zarkou did not rely exclusively on domestic animals for subsistence, but also integrated wild animals and collected river mussels into their diet, although the latter were of minimal importance for subsistence.

Cutting marks, as a sign of slaughtering and consumption, have been identified on all wild animal bones except for carnivores.[1070] Among deer bones, meaty bones are entirely missing at Platia Magoula Zarkou, which may indicate that deer hunting was targeted at the acquisition of hide and antlers that were then brought to the site and partially worked, rather than solely for meat.[1071] With reference to the ethnographic evidence of more or less sedentary farming communities, dwellers at Platia Magoula Zarkou not only hunted for subsistence: hunting also served as a means for negotiation between male and female power[1072] or as the basis for a

[1065] Rappaport 2000 [1968], 70.
[1066] Rappaport 2000 [1968], 62.
[1067] Rappaport 2000 [1968], 62.
[1068] Becker 1991.
[1069] Becker 1991.
[1070] Becker 1991.
[1071] Becker 1991.
[1072] Kent 1989; Zvelebil 1992.

regional gift and commodity exchange[1073] during the EBA. In both sedentary and non-sedentary societies, it is primarily men who hunt larger game, and in both cases hunting is associated with a form of social prestige. In mobile hunter-gatherer societies a male hunter[1074] is valued through their larger contribution to the 'income pool' for subsistence, which is distributed equally within a hunter-gatherer group.[1075] In contrast to that, among sedentary farming societies male hunters gain prestige since 'hunting confers male identity and status'.[1076]

The carnivore hunts documented at Platia Magoula Zarkou (and also at Çukuriçi Höyük), are neither unique nor limited to hunting for the consumption of meat. For example, among sedentary agro-pastoralists in southern Ethiopia, hunting a beast (e.g. a lion, leopard, jackal, hyena, etc.) grants a young man permission to marry. The meat of these animals is not consumed, but the hunter (soon to become a married man) is obliged to bring back either the claws, skin, or head of the animal to the settlement. These items serve as proof of his success and the assurance that he has become a fully 'adult man' who can marry and provide for his family,[1077] according to the male age-class in the region. Among agro-pastoralists, as with hunter-gatherers, hunting is organized communally: men from the same band or village[1078] organize and carry out a communal hunt. Interestingly, like in the southern Ethiopian case, the assemblage at Platia Magoula Zarkou does not point towards the consumption of carnivores, since none of the carnivore bones recovered from the site bear cutting marks.[1079] Instead, hunting for fur and possibly for the negotiation and retention of male power over females, as a display of power among men, or as an important practice involved in rites of passage, appear very likely to have been common practice during the EBA at Platia Magoula Zarkou.

A striking similarity between Çukuriçi Höyük and Platia Magoula Zarkou is the absence of birds, which were not important hunting prey at either of the sites. In both cases, however, the environmental features do provide a favourable habitat for birds: a forested area close to the Pineios River at Platia Magoula Zarkou, and close proximity to the Aegean Sea, two streams, and a forest at Çukuriçi Höyük. The scarce evidence of birds in the zooarchaeological assemblage at Platia Magoula Zarkou confirms that these were not hunted, as only 15 bird bone fragments were found (out of 10,918 bones analysed), representing a crane, a grey goose, an egret, and a marsh harrier.[1080] I have already noted that there were practical reasons for this at Çukuriçi Höyük as, according to ethnographic observations, bird hunting is a time-consuming activity with low return rates. Apart from this, the assemblage from western Anatolia points towards birds (e.g. ducks) being of symbolic importance already associated with the dead during EBA 1, as seen from the duck vessels found in Yortan cemetery. However, widely shared bird symbolism peaked during EBA 2 in coastal and hinterland western Anatolia.[1081]

[1073] Gingrich 2017a.

[1074] For the recent archaeological evidence of a 9000-year-old human burial interpreted as a female hunter at the Andean highland site of Wilamaya Patjxa, see Haas et al. 2020. This evidence points towards nongendered labour practices among early hunter-gatherers, where females were also big-game hunters.

[1075] Hallowell 1926; Woodburn 1982.

[1076] Kent 1989, 6.

[1077] Y. Ejigu, pers. comm. 2019.

[1078] In the case of sedentary groups, these men belong to different households.

[1079] Becker 1991.

[1080] Becker 1991.

[1081] Yılmaz 2016. The lack of birds and their possible symbolic importance in western Anatolia is briefly described in Chapter III. Regarding the symbolic importance of birds, marble owl-headed idols are commonly found in settlements and burial grounds dating to EBA 2 western Anatolia (e.g. Troy, Yortan, Beycesultan, and Seyitömer Höyük). These assemblages point to the symbolic meaning of birds, a belief that was seemingly cultivated during the EBA 2 and 3 periods and even the Middle Bronze Age in western Anatolia. For the distribution and a detailed analysis of owl-headed idols, see Yılmaz 2016. However, the bird-shaped EBA 1 pottery from Yortan cemetery predates the owl-headed marble idols, which indicates that 'bird symbolism' emerged in the region during EBA 1. This can be further supported by the lack of birds within the zooarchaeological record, indicating a strong aversion to bird consumption among EBA settlers in western Anatolia. Seemingly, this practice was not

In Thessaly, the assemblage appears to vary between hinterland and coastal sites. A conspicuous absence of birds has been documented at both Thessalian hinterland sites – Platia Magoula Zarkou and Argissa Magoula – whereas dwellers at Pevkakia, on the Aegean coast close to the modern town of Volos, hunted both land and sea birds. Among these, the most common were waterfowl,[1082] which can traditionally be used for food, down, and feathers. In Thessaly, there is no evidence for the existence of any religious or funeral symbolism connected to water birds or ducks dating to the Early Bronze Age II. Outside Thessaly, bird symbolism has been found on Early Bronze age jewellery and painted pottery in the Cyclades, and bird-shaped vessels have been recovered from Crete and the Cycladic island of Ano Kouphonissi.[1083]

Animal Herders and Foragers: but also Cultivators Using Plough Agriculture

In comparison to the rich animal record, the botanical record recovered from the EBA room at Platia Magoula Zarkou is extremely limited.[1084] Only four charred remains have been recovered from the destruction layer of the room: two barley seeds from the southern part of the excavated area, one bitter vetch seed from the central part, and one emmer grain from the north of the room.[1085] All of these grains had been prepared for consumption, as none of them contained any threshing remains[1086]. Moreover, Jones and Halstead[1087] proposed that all of these samples within a single room points towards multi-grain household consumption strategies, which does not support the existence of the *Mediterranean polyculture* (e.g. a redistributive economy of specialized products such as olive, wheat, and grape) proposed by Renfrew[1088] for this period.

The complementary evidence of the botanical and zoological record at Platia Magoula Zarkou, however, provides considerable evidence for subsistence strategies at the site. Dwellers at Platia Magoula Zarkou relied heavily on domestic animals, especially sheep, but also goats, pigs, and cattle. While pigs[1089] were mostly bred for meat, the culling profiles of sheep, goats, and cattle support the utilization of secondary products such as wool, milk, and animal labour, which was not the case at Çukuriçi Höyük. Men at Platia Magoula Zarkou also engaged in communal hunts, in which wild animals were hunted for consumption as well as for the negotiation of power among men and between men and women during the EBA. The four archaeobotanical samples confirm that both cereals and legumes were cultivated around Platia Magoula Zarkou. This is evidence for the rotation of crops rather than land, which can be further supplemented by the use of a plough and the integration of domestic animals into farming through manure. The zooarchaeological and botanical record from Platia Magoula Zarkou therefore supports rain-fed mixed farming in which bovine energy was exploited for ploughing fields, traction, and transport during the EBA (see Tab. 13).

limited to western Anatolia, as the zooarchaeological record from Platia Magoula Zarkou equally confirms the absence of birds within the archaeological context in the EBA Thessalian plain.

1082 Becker 1991.

1083 Alram-Stern 2004, 328. For a detailed list of sites and authors interpreting bird symbolism during the Early Bronze Age on the Cycladic Islands and Crete, see Alram-Stern 2004, 328.

1084 This result is most likely due to the nature of the excavation, since sieving and flotations (through which more botanical remains could be recovered) were not conducted at Platia Magoula Zarkou.

1085 Jones – Halstead 1993.

1086 'Threshing remains' refers to all waste (which can be recycled and used elsewhere) removed from the plant in the process of threshing to get to the grain. Husk remains are only one group among 'threshing remains'.

1087 Jones – Halstead 1993.

1088 Renfrew 1972.

1089 There is no certainty about how pigs were fed at Platia Magoula Zarkou although they could have been fed with vegetal surpluses (if any) and through feeding in the forests nearby.

EBA Platia Magoula Zarkou – Zooarchaeological and botanical evidence	
Domestic Animals	Sheep predominating
Wild Animals	Present (big and small game)
Domestic Plants	Present (barley, emmer, bitter vetch)
Planting Strategies	Usage of animal labor for plowing, traction – Agriculture

Tab. 13 Zooarchaeological and archaeobotanical evidence for subsistence at Platia Magoula Zarkou

Ploughing and Social Inequality

Based on the Ethnographic Atlas, Goody showed that 'in particular the plough is an instrument employed almost entirely by men'.[1090] This statement is compatible with recent ethnographic observations in northern Greece[1091] and Ethiopia,[1092] which have shown that women also engage in ploughing in the absence of a husband or a deceased father. This shows that ploughing by women is an exception rather than a rule in societies with plough agriculture. Goody[1093] also showed that the introduction of the plough for cultivation may have resulted in the cultivation of larger pieces of land than under a horticultural regime, as well as increased production of agricultural surpluses. Given that ploughing enables the cultivation of larger fields in a shorter period of time than cultivation by a horticultural regime, this implies that the use of a plough for cultivation would 'free' other men within a household (both older and younger) from farming. Provided that women in agricultural societies 'are either secluded in the home or occupied almost wholly in the domestic sphere',[1094] these men not involved in plant cultivation practices could engage in other subsistence activities or crafts, whereas women mostly limited their activities to the household and domestic crafts.

Goody's insights can be linked to the archaeological evidence from Platia Magoula Zarkou in the following way. If men were in charge of ploughing and were the owners of the stock, then the agricultural surplus at Platia Magoula Zarkou would necessarily result in major differences between households on-site. Although this cannot be tested against the available archaeological data since only one part of the room has been excavated at this site, there is ample evidence that surplus production not only benefitted particular households, but also the wider village community at Platia Magoula Zarkou. The on-site, collective benefit can be observed through the enclosure wall encircling the mound (see Fig. 28): to construct it, dwellers needed to mobilize communal labour. At Platia Magoula Zarkou, this enclosure not only guaranteed a safe place for a particular household or a dwelling unit, such as has been observed at EBA 2 Lerna[1095] or EBA 1 Karataş,[1096] but to multiple households within the agglutinated settlement on top of the mound. By contrast, the off-mound settlement at Platia Magoula Zarkou, which resembled the on-mound, agglutinated settlement pattern, was not enclosed.

Given the claim that non-state societies do not have external borders but boundaries (that are permeable and negotiable),[1097] and therefore territory among these societies is not commonly perceived as a bounded unit, the evidence from Platia Magoula Zarkou provides the evidence that borders do exist within non-state societies. On the one hand, the archaeological evidence from the EBA settlement of Platia Magoula Zarkou shows that territory on the fringes

[1090] Goody 1976, 35.
[1091] Halstead 2014b, 48.
[1092] Schlee – Strecker 2019.
[1093] Goody 1976.
[1094] Goody 1976, 33.
[1095] Pullen 1985.
[1096] Eslick 1988; Eslick 2009.
[1097] Barth 1969.

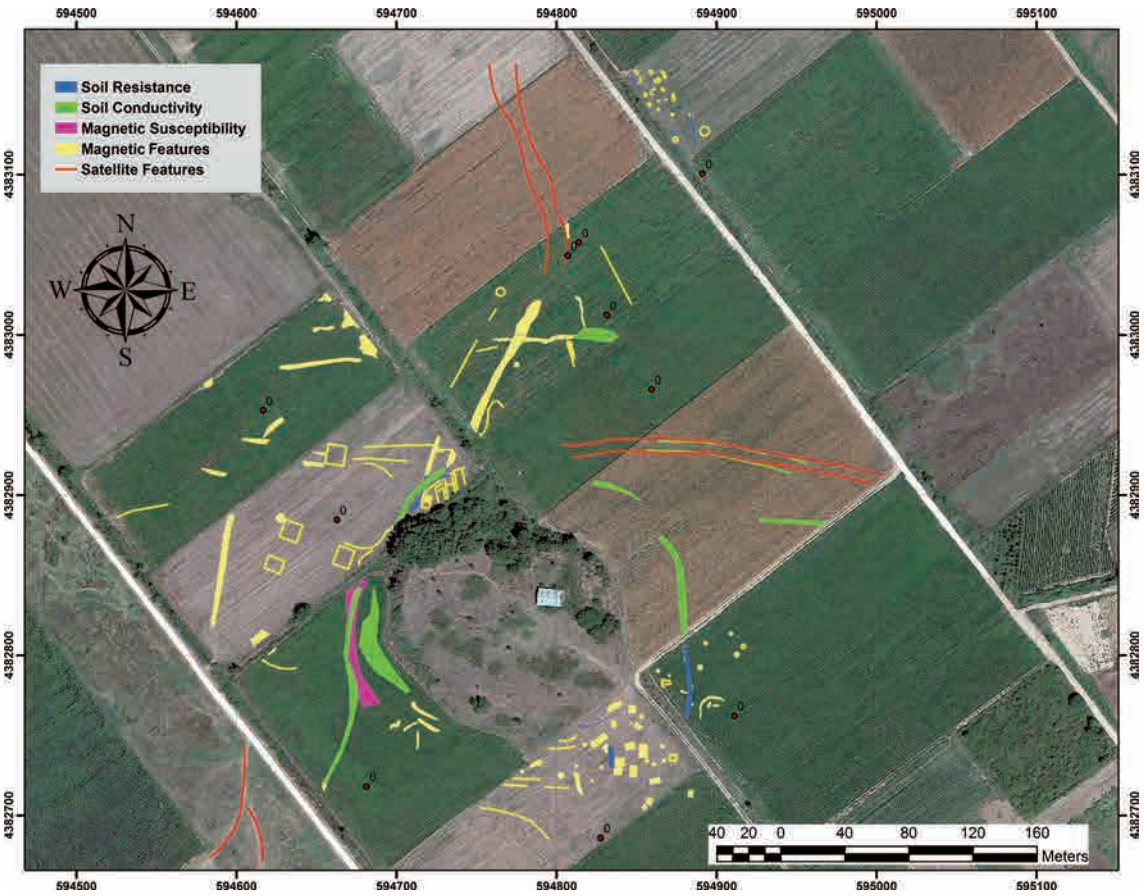

Fig. 28 Circular enclosure surrounding Platia Magoula Zarkou as seen from geophysical investigations (after Sarris et al. 2022, fig. II.2.12)

of the settlement was not a finite and bounded category. This is evident from the off-mound, lower settlement at Platia Magoula Zarkou, which was not enclosed – and therefore the possibility of extension or contraction of the built territory was subject to the life cycles of domestic groups and the possible expansion or contraction of the off-mound settlement. On the other hand, the upper settlement was spatially separated from but archaeologically united with the lower one at Platia Magoula Zarkou. The on-mound settlement was spatially separated as it was built on top of the mound. However, the enclosure wall provided an architectural unity between the on-mound and off-mound settlements. Thus, the same enclosure wall also separated the inner circle of the off-mound settlement from the rest, beyond the enclosure. Therefore, the on- and off-mound settlement within the enclosure wall at Platia Magoula Zarkou was ostensibly a finite, circumscribed, and bounded unit, in contrast to the off-mound settlement beyond the enclosure.

Recent anthropological contextualization of enclosures in the contemporary globalized world defined enclosures as 'social processes that delimit and restrict the movement of specific goods, people, and ideas'.[1098] The direct application of such an understanding to the archaeological record at Platia Magoula Zarkou would then imply that the enclosure at this site was necessarily a border, across which 'movement is structured within the context of unequal power relations'.[1099] However, this specialized view of borders and enclosures – which delimits

[1098] Cunningham – Heyman 2004, 293.
[1099] Cunningham – Heyman 2004, 293.

the mobility of people, goods, and ideas between states – cannot be simply applied to Platia Magoula Zarkou, which was not an early state, let alone a nation.

Another possible conclusion can be drawn with reference to enclosures documented in non-centralized non-state societies. Recently, Roscoe[1100] reviewed in detail the colonial and ethnohistorical evidence concerning village fortifications in Papua New Guinea. He showed that village palisades (made of locally available wood, reed, and cane), were the most common form of defensive work in Papua New Guinea up to colonial times.[1101] These man-made palisades established a clear border between villages and the surrounding areas (as well as within villages), although these villages were part of larger imagined communities, the so-called tribal societies (see Fig. 29). These man-made enclosures did not necessarily enclose only whole villages, but also a group of households within a village (see Fig. 29). Moreover, Roscoe (2008) showed that enclosures in these societies not only served as a passive defensive tool to keep attackers out, but also to keep them within the enclosures after an attack.

The conclusion I draw from these numerous ethnographic cases of enclosed sites[1102] is that the enclosure walls or palisades do not necessarily indicate a two-tiered settlement organization. The latter was suggested for EBA 2 western Anatolia, where enclosure walls seemingly attested 'the presence of different social groups and administrative mechanisms'.[1103] Although the EBA 2 layers of Platia Magoula Zarkou are contemporaneous with EBA 2 in western Anatolia, the same argument cannot be directly applied to Platia Magoula Zarkou. No evidence has been found at Platia Magoula Zarkou to suggest administrative mechanisms or a metric system, although there is evidence for ostensibly different social groups dwelling at the site. In the context of Platia Magoula Zarkou, Roscoe's research therefore appears to speak more closely to the archaeological record. He demonstrated through ethnographic means that enclosure walls and palisades are also compatible with more or less 'egalitarian', non-centralized tribal constellations, such as big man societies in Papua New Guinea. A similar archaeological observation of the sites demonstrated more or less 'egalitarian' relations between households at Thessalian Neolithic sites such as Dimini[1104] and Sesklo.[1105]

Without excavating the off-mound settlement, it cannot be concluded with certainty whether the enclosure wall at Platia Magoula Zarkou was indeed an indicator of unequal power relations[1106] or whether the economic growth and population pressure within the circumscribed upper settlement at Platia Magoula Zarkou made it necessary to extend the settlement beyond the enclosure walls.[1107] According to the geophysical prospection (see Fig. 28 above), there are no visible differences between the on-mound and the off-mound settlements at Platia Magoula Zarkou, and there is no archaeological evidence for administrative mechanisms at the site. This evidence points towards rather balanced power relations between the upper and lower settlements at Platia Magoula Zarkou. Considering this record, it is apparent that neither the existence of ploughing agriculture (that could support the allocation of surpluses in unequal ways) nor the presence of enclosures (that ostensibly divided social groups) supports the interpretation of a two-tiered social organization at Platia Magoula Zarkou, necessarily indicating a centralized social organization such as a chiefdom. Instead, the enclosure at Platia Magoula

[1100] Roscoe 2008.
[1101] Farmer 1957, 250; Roscoe 2008, 507.
[1102] See Roscoe 2008.
[1103] Şahoğlu 2005, 340.
[1104] Despite the existence of two enclosure walls at Late Neolithic Dimini, the diet did not vary between dwellers residing within the inner enclosure and those within the outer enclosure (Halstead 1992a).
[1105] Souvatzi 2012; Souvatzi 2008; Souvatzi 2014.
[1106] Cunningham – Heyman 2004, 293.
[1107] Population growth and escalating economic power was ascribed to the EBA 2 western Anatolian fortified settlements in the eastern Aegean islands (Poliochni, Thermi) and western Anatolian coastal sites (Troy, Bakla Tepe, Liman Tepe) (Kouka 2016b, 131).

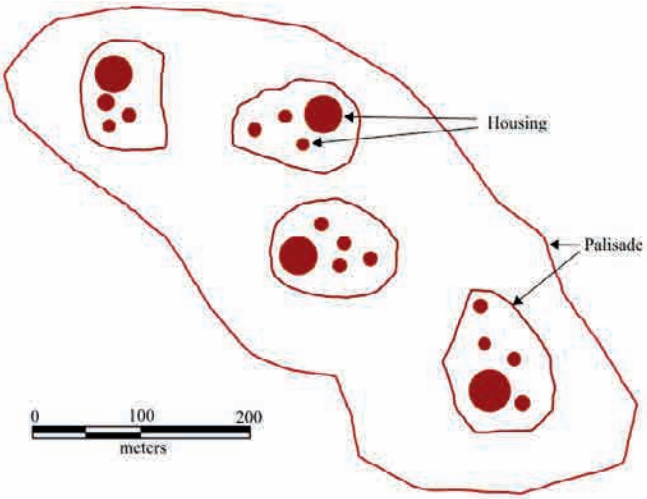

Fig. 29 A suggested reconstruction of an Anga fortified settlement (after Roscoe 2008, fig. 3)

Zarkou can be understood as an internal, permeable 'border' across which the movement of objects, ideas, and most likely people was not limited and restricted but permeable. The enclosure at Platia Magoula Zarkou therefore does not support the existence of a division between a ruling elite and commoners, but is instead a product of the communal conversion of surpluses to the benefit of the local community, such as has recently been proposed for prehistoric affluent societies by Roberto Risch.[1108]

V.3. The Ethnographic Contextualization of Animal Remains at Platia Magoula Zarkou

Given that the animal remains from Platia Magoula Zarkou support the secondary product revolution, I look into the ethnographic evidence of what types of societies correspond to culling profiles at this site. The ethnographic analogy is here used to support an actors- or people-centred view of quantitative data coming from this site, beyond the simple indicators of milk, meat, or wool exploitation that culling profiles are commonly used for. Based on this ethnographic comparison, the chapter concludes with the contextualization of pastoralism vs. transhumance at this site, indicating that the more or less sedentary EBA 2 society at Platia Magoula Zarkou may have integrated transhumance on the neighbouring Pindus Mountains alongside the rain-fed mixed farming, in which the site and its households were embedded. Without evidence for any overall mobility of households at EBA 2 Platia Magoula Zarkou, we cannot exclude the partial mobility of segments of these household members on a seasonal basis, these being in charge of transhumance pasturing for domestic animals such as sheep, goat, and cattle.

In this section, the archaeological record outlined above will be contextualized regarding ethnographic evidence of sheep-herding societies in moderate climate zones of western Asia, as well as outside this region. As the ratio between sheep and goats at Platia Magoula Zarkou differs widely from the ratio at Çukuriçi Höyük, the difference will be outlined with respect to (i) ecological differences at both sites; (ii) physical properties specific to sheep and goats, as well as the organization of labour with reference to sheep and goat herding; and (iii) the available farming technology.

[1108] Risch 2018.

The ratio between sheep and goats at Platia Magoula Zarkou, where sheep largely outnumbered goats in the herd, is similar to 20th-century ethnographic accounts of Iranian pastoral groups (alongside widespread evidence in most parts of southern Arabia). Among the Lur (a pastoral tribe in the Zagros Mountains), goats were economically less significant than sheep. The same was reported for the Basseri in Fars Province[1109] and the Shahshevan in northwestern Iran.[1110] Nevertheless, goats were indispensable for pastoralism as practised by the Lur.[1111] In the absence of sheepdogs, Black-Michaud[1112] reported that at least two to three goats (but usually more) were mixed into a flock of a hundred sheep to prevent them dispersing over the terrain, to assist the shepherd, and to lead the herd. As sheep produce less milk than goats, the latter were more valued for their milk by the Lurs. Among secondary products, the Lurs used goat skins as twine, horse blankets, and as containers for milk and drinking water. Despite these advantages, goats never constituted more than 15–20% of the herd among the Lur.[1113]

Evidence for Multiple Sheep Products: Meat, Milk, Wool, and Possibly Exchange

These ethnographic observations correspond to the record at Platia Magoula Zarkou, where the ratio of sheep consumption, and therefore also the number of herded animals was much larger than that of goats: the sheep-to-goat ratio at Platia Magoula Zarkou during the EBA was 3:1.[1114] However, the fact that sheep reproduce more slowly than goats (as they have fewer offspring) indicates a conscious preference for sheep over goats. This could only be sustained by well-organized herd management, in which a community controlled the quicker reproduction of goats by keeping fewer of those in the herd than sheep. However, despite the similarities in the proportion of sheep to goats between Platia Magoula Zarkou and the accounts of pastoral nomads from Western Asia, there is a major difference between the two communities. The zooarchaeological record at Platia Magoula Zarkou provides evidence that animals were slaughtered throughout the year,[1115] and therefore the households were occupied year-round. By contrast, the pastoral households in Western Asia described above (in contrast to those in southern Arabia[1116]), including the herd and all members of a household, were mobile. Therefore, these accounts do not completely explain the case of Platia Magoula Zarkou, but they nevertheless highlight potential uses and breeding motivations for sheep and goats that can be partially applied to the prehistoric case study.

The ratio between sheep and goats has been widely discussed within zooarchaeology,[1117] in ethnographic accounts of nomadic tribes,[1118] and for more or less sedentary mixed farming groups, in which both sheep and goats are kept close to a settlement, year-round.[1119] Some authors have favoured explanations of the predominance of sheep over goats based solely on environmental factors[1120] or the physical needs and the abilities of the two types of animals, including the question of which of them can better adapt to a particular environment.[1121] Other scholars have provided explanations beyond ecological determinism, recognizing the

[1109] Barth 1961.
[1110] Tapper 1979.
[1111] Black-Michaud 1986.
[1112] Black-Michaud 1986.
[1113] Black-Michaud 1986.
[1114] Becker 1991.
[1115] Becker 1991.
[1116] Gingrich – Heiss 1986.
[1117] Payne 1973; Halstead 1992a; Halstead 1996; Halstead 2005; Helmer et al. 2007; Halstead 2011; Halstead 2015.
[1118] Barth 1956; Jacobs 1965; Tapper 1979; Black-Michaud 1986; Lancaster – Lancaster 1991.
[1119] Jacobs 1965; Yalçın 1986; Nagy et al. 1991; Boyazoglu 2002; Gültekin et al. 2017.
[1120] Boyazoglu 2002.
[1121] Halstead 1992b; Halstead 1996.

importance of social organization, which disproves the Malthusian growth model of animal herds in non-state societies that are not dependent on a market economy,[1122] and a multiplicity of factors that lead to either a preference for sheep or goats among a given community.[1123] I associate my work with the latter two approaches. By understanding the multiplicity of factors, including the local environment; the physical properties of sheep and goats; the utility of sheep and goats; and local labour organization and its socio-political context, I aim to understand the predominance of sheep over goats at Platia Magoula Zarkou through multiple lines of evidence.

Within prehistoric archaeology, the advantage of sheep over goats has been attributed to the ability of sheep to store fat, which indicates a low-risk meat strategy[1124] since the stored tail fat can be used by sheep themselves to survive during the dry seasons when pasture is poor. Apart from meat and milk products, sheep provide two important secondary products for human consumption: sheep tail fat and wool. Rendered tail fat, which can be stored at room temperature over long periods of time and is easy to transport, is still commonly used in Near Eastern cuisine today. When preparing lamb meat, the sheep tail fat can be cut off. Therefore, it is very likely that the dwellers at Platia Magoula Zarkou were already knowledgeable in processing sheep tail fat (among other animal fats) from the Neolithic on, and therefore also during the Bronze Age. Traces of carcass fat found in pots are more empirically supported than evidence of milk processing during the Neolithic.[1125]

Continuity in the extraction of wool between the Neolithic and the Bronze Age has not been demonstrated. In Neolithic Thessaly, sheep were hairy, and the process of switching to woolly-coated sheep has only been documented for the Bronze Age,[1126] around approximately 3000 BC. Along with this change, considerable differences between Neolithic and Bronze Age sheep exploitation is evident from the culling profiles at Platia Magoula Zarkou. Whereas during the Middle Neolithic 15% and in the Late Neolithic 17% of animals were slaughtered at an old age, the number of older slaughtered animals increased significantly to 28% in the Bronze Age. The size of the sheep increased from the Neolithic to the EBA, which has also been reported for two other Thessalian sites – Argissa Magoula and Pevkakia.[1127] This indicates that dwellers at Platia Magoula Zarkou employed new herding strategies during the EBA, since the larger proportion of slaughtered older sheep indicates wool production,[1128] or more precisely, a combined model of fleece-/wool-, milk-, and meat-oriented herding strategies.[1129] In proportion to female sheep, a large number of male sheep at Platia Magoula Zarkou were slaughtered at a young age, a characteristic of meat production.[1130]

The EBA culling profiles at Platia Magoula Zarkou are comparable with the strategies of Basseri herders, where sheep raising served various purposes, including the production of milk and milk products (e.g. yoghurt, *kashk*,[1131] sour milk, and cheese), lamb skins, wool, and woollen rugs. Barth[1132] observed that among the Basseri, 'most male and many female lambs and kids are slaughtered for meat', which was not dried, smoked, or salted, but eaten fresh. Despite sheep playing an important role in subsistence among the Basseri, they exchanged

[1122] Barth 1961; Rappaport 2000 [1968].
[1123] Lancaster – Lancaster 1991.
[1124] Halstead 1992b; Halstead 1996.
[1125] Halstead 2014a, 421; Whelton et al. 2018.
[1126] Benecke 1994.
[1127] Hinz 1979.
[1128] Becker 1991.
[1129] Helmer et al. 2007.
[1130] Becker 1991.
[1131] *Kashk* (کشک in Persian, كشك in Arabic, *keşk* in Kurdish, *keş peyniri* in Turkish) is drained yoghurt or sour milk, formed into chunks.
[1132] Barth 1961, 8.

Tab. 5. Schlachtalteranalyse bei Schafen und Ziegen (kombination von Mindestindividuenzahl und Synosierungszustand an Extremitätenknochen)

	1	2	3	4	5	Summe
MB	-	1	-	3	-	4
FB	5	12	5	12	13	47
SN	3	6	8	7	5	29
MN	4	10	2	7	4	27

in Prozent:

	1 -- 3	4	5	Summe
MB	25,0	75,0	-	100,0
FB	46,8	25,5	27,7	100,0
SN	58,7	24,1	17,2	100,0
MN	59,3	25,9	14,8	100,0

1 neonatus/foetal
2 jünger als 3 - 4 Monate
3 Monate bis 3 Jahre
4 älter als 15 - 20 Monate
5 älter als 3 - 3,5 Jahre

Tab. 14 Culling profiles of sheep and goats from Platia Magoula Zarkou (after Becker 1991, tab. 5)

sheep for agricultural crops with their sedentary village ‘friends’ since they did not cultivate crops themselves. Although it remains challenging to understand preservation practices at Platia Magoula Zarkou, the fact that many rams and some ewes were slaughtered young, a practice which was also documented among the Basseri, proves that household-based consumption (rather than primary production of caprines for exchange) was an established practice during the EBA at Platia Magoula Zarkou. This can be further supported through statistical evidence, which shows that during the EBA, almost three quarters of caprines were slaughtered below three years of age, while slightly more than a quarter were slaughtered older, being kept for the production of wool and the reproduction of the herd (see Tab. 14).[1133] This record is significantly different from that of the Lurs.[1134] The EBA caprine culling record at Platia Magoula Zarkou, however, differs significantly from the Neolithic context, when most caprines were slaughtered below three years of age. With reference to Roy Rappaport’s observation of pig breeding among the Tsembaga, it seems that dwellers at Platia Magoula Zarkou during the EBA purposely kept sheep and goats alive for longer during the EBA than during the Neolithic. This may have led to local (on-site) as well as regional (between sites) competition linked to sheep and goat breeding, assuming that caprines also provided the major share of subsistence at other Thessalian sites.

Caprines at Platia Magoula Zarkou were not the Main Store of Value

A substantial difference between breeding sheep largely for subsistence or primarily for exchange can be further demonstrated by comparing the Basseri and Platia Magoula Zarkou culling profiles with those of other nomadic groups, who herded sheep mostly for exchange. Basseri culling profiles differ significantly from those observed among the Shahshevan and Lurs, whose domestic economies were strongly dependent on market economies, unlike in the case of the Basseri. Shahshevan and Lur sheep herders castrated most of the young rams, which

[1133] Becker 1991.
[1134] Black-Michaud 1986.

they left alive much longer than the Basseri did. The Basseri instead slaughtered most young rams and herded the rest of the uncastrated rams together with the ewes before selling them on the market.[1135] For the Lur, sheep and goats were a means of subsistence, but at the same time they were primarily forms of 'pastoral capital'.[1136] Lur sheep herding was not only an ecological specialization but also an economic one, targeting urban consumers through market exchange. Among Lurs, culling was 'reduced to the automatic elimination by sale of ewes when their teats show infertility (usually at 5.5 or 6.5 years of age) and of stud rams before they enter into their seventh year'.[1137] Hence, Lur pastoral households made use of milk and milk products on daily basis, but did not slaughter either rams or ewes solely for consumption:

> 'In Luristan female sheep and goats are never sold and never slaughtered when still of an age to bear young unless barren or quite clearly on the point of death … If, because of the location of the camp and the distance involved, it is feared that the animal will die on the way, it is slaughtered and eaten by the herder, his family and other households in the same camp, to which neighbourliness dictates that he should offer a portion of the uncooked meat.'[1138]

As shown above, the Lur intentionally herded sheep to be long-lived in order to maximize the production of milk and milk products for subsistence, as well as wool and sheep for sale on the market. The author emphasized that among Lurs, sheep are rarely slaughtered for daily subsistence, since 'for 90% of Luri nomads the only domestic alternative to milk products as a source of animal proteins is the flesh of their own sick and wounded animals'.[1139]

This same practice was not observed among the Basseri or at Platia Magoula Zarkou, where herders slaughtered a larger proportion of young rams and some young ewes. By contrast, the Lurs did not slaughter their young rams, but instead castrated them. This suggests that sheep and goats were not perceived solely as 'capital' or as a store of value and wealth at Platia Magoula Zarkou, as was the case for the Lurs. Instead, at the Thessalian EBA site, like among the Basseri, caprines were seen as a means of subsistence in which both primary (meat – including the meat of young animals) and secondary products (milk and milk products, wool) served as multiple sources for subsistence and reproduction during the EBA, without specialization based solely on wool production or sheep breeding for exchange. Correspondingly, it is important to highlight that sheep and goat breeding at EBA Platia Magoula Zarkou did not represent a specialized animal breeding economy: caprine breeding constituted a large share of a mixed animal breeding economy, which also included cattle and pigs.

Another difference between Basseri nomads compared to the Shahshevan was observed regarding the inheritance and transfer of stock. Whereas Basseri sons inherited an equal share of the stock from their father at marriage,[1140] among the Shahshevan, stocks were owned by joint paternal and fraternal households, which means that Shahshevan sons did not own an independent herd until their father's death. This difference can be ascribed to differences in household size, stock size, male life spans, and requirements for labour; however, many of these differences can primarily be ascribed to the larger or smaller sizes of pastures. Among Basseri households, pastures were small and so was the number of stock owned; among the Shahshevan, larger, joint households managed larger herds.[1141] Considering the similarity in consumption and animal breeding strategies between the Basseri and dwellers at Platia

[1135] Tapper 1979; Black-Michaud 1986.
[1136] Black-Michaud 1986.
[1137] Black-Michaud 1986, 53.
[1138] Black-Michaud 1986, 46.
[1139] Black-Michaud 1986, 43.
[1140] Barth 1961, 18–19.
[1141] Tapper 1979.

Magoula Zarkou, it is likely that a flock of sheep and goats was owned by a single household, transferred from a father to sons when they married. As sheep were bred for their wool, meat and milk, this would grant each household at Platia Magoula Zarkou access to the relevant means of subsistence.

Pastoralism vs. Transhumance

From the above accounts, it has become evident that dwellers at Platia Magoula Zarkou were not pastoralist nomads, as they engaged in both animal breeding and land cultivation. Moreover, they bred mixed herds of caprines, cattle, and pigs, the latter furthermore indicating a more or less sedentary lifestyle. Even so, there is supporting evidence for the possible mobile breeding of caprines at Platia Magoula Zarkou. Eleven pathologies were found on the EBA caprines, favourable conditions for transhumance existed around the site, with pastures at different altitudes.[1142] Here, it is necessary to distinguish between two different types of livestock-oriented modes of subsistence activities, namely pastoralism/nomadism and transhumance. The traditionally interchangeable (albeit problematic) use of pastoralism/nomadism and transhumance within socio-cultural anthropology has recently been addressed elsewhere;[1143] however, the misuse of the two terms also persists in zooarchaeology.

For a definition of what are actually two distinct economic and social systems, I follow the encyclopaedic entry in the *International Encyclopedia of Social and Behavioral Sciences*. There, pastoralism is defined as 'a mode of subsistence that involves raising domestic animals in grassland environments using herd and household mobility',[1144] which is the case for the Basseri, Lurs, and Shahshevan pastoralist groups described above. In turn, transhumance is understood as a 'form of mixed farming, practiced by the inhabitants of settled communities, technologically adjusted to a certain set of environmental conditions, which combines livestock herding with arable agriculture'.[1145] Transhumance was and still is practised in the Alps, the Balkans, the Himalayas, and other regions across the world where the topography allows for movement between summer pastures at higher and winter pastures at lower elevations.

Within these two distinct, albeit ideal types of subsistence, household mobility plays a distinctive role. In pastoralist societies' dwellings, the herd, and all household members are on the move, constantly moving to fresh grassland throughout the year. By contrast, transhumance is practised seasonally by only a small segment of a local resident unit. Livestock run in consolidated herds, moving to higher grounds for pasture in the spring and returning to the village at the end of the summer. In winter, animals are stalled and fed or simply fenced close to the settlement. The majority of the population is sedentary and resides in the village throughout the year, engaging in the cultivation of crops and craft activities, as well as storing enough food and fodder for winter (see Tab. 15). As Platia Magoula Zarkou was occupied throughout the year, this eliminates the possibility of pastoralism, linked with the permanent mobility of households. Instead, a form of transhumance, as an integral part of mixed farming, similar to Halstead's model, remains likely.

Transhumant herding of sheep and goats at Platia Magoula Zarkou is further supported when considering the topographic surroundings of the site. Platia Magoula Zarkou is located on the edges of the vast Thessalian plain, in the foothills of the Zarkos Mountains (highest peak at 734m) that are linked to the higher Pindus Mountains in the west (highest peak at 1424m). The Zarkos and Pindus mountains were suitable for summer pastures. Until recently these pastures were exploited by Vlachs, a transhumant group who moved seasonally along

[1142] Becker 1991.
[1143] Schuyler 2005.
[1144] Galaty 2015.
[1145] Schuyler 2005, 359.

	Pastoralism/Nomadism	Transhumance
Horticulture/Agriculture	Absent	Present
Household mobility	Whole household is mobile	Only a small segment of a household or a village is mobile, on a seasonal basis
Dwelling mobility	Mobile or seasonal dwellings	Permanent dwellings, additional seasonal dwellings on summer pastures
Herd mobility	Mobile herds	Seasonally mobile herds
Animal stalls	Absent	Animals stalled in the winter, but not necessarily
Storage of fodder	Absent	Present but not necessary, during the winter animals may graze on harvested fields, provide manure

Tab. 15 The difference between pastoralism and transhumance (after Schuyler 2005; Galaty 2015)

a south–north axis, between the Thessalian plain and the Pindus Mountains. Vlachs practised mixed farming in the lowlands in the summer while the upland summer pastures were solely exploited by grazing. Vlachs were involuntarily settled during the 20th century, due to land reforms (including forests, meadows, fields, and pastures) that limited access to previously communal spring and summer pastures.[1146]

V.4. Raising Livestock: A First Supra-Regional Comparison between Platia Magoula Zarkou and Çukuriçi Höyük

Location Evidence for Transhumance at Platia Magoula Zarkou

The material for EBA Platia Magoula Zarkou presented above provides a perspective on dwelling that is rather different from Çukuriçi Höyük. Plough-based agriculture and potential transhumance for Platia Magoula Zarkou stand in stark opposition to Çukuriçi Höyük's horticulture without a plough, with the herding of domestic animals on a sedentary horizontal scale. Nevertheless, certain similarities between the two sites regarding subsistence practices persist. This includes the hunting of game, collection of wild fruits and nuts, and a wider participation in regional mixed economies. Based on the wider regional comparison of Platia Magoula Zarkou, this chapter's conclusion shows that sheep may have been raised not only for the Secondary Products Revolution , meaning for wool, but also as an important regional item of exchange and even competition between the big man societies in the EBA 2 Thessalian plain. As Pevkakia and Argissa, which are contemporaneous to Platia Magoula Zarkou, also bred mostly sheep, this provides a major structural similarity to Melanesian big man societies, where pigs were the main item of regional exchange and competition between households.

In a strictly contemporaneous context to western Anatolia, during EBA 2, the 'sheep culture' of Thessaly was parallel to the emerging 'cattle culture' in western Anatolia. A later slaughtering of sheep at Platia Magoula Zarkou during EBA 2 in comparison to the Neolithic period therefore supports the shift from predominantly local consumption of sheep during Neolithic times to both local consumption and regional competition based on sheep breeding during the EBA 2 period. In both cases, these processes were not detached from households but based on household-related breeding and competition between dwellers at this site as well as in the wider region. Why is this significant to the central thesis of this book? Because

[1146] Halstead 2014b, 305, 335.

changes in herding strategies are not only relevant for transformations in animal breeding and its manipulation. They are also changes in a dwelling perspective, which resonate within households as well as in the wider social and regional landscape.

Traditional preferences for either sheep (at Platia Magoula Zarkou) or goats (at Çukuriçi Höyük), and the differences between the predominance of sheep or goats can also be assigned to environmental factors. Contemporary precipitation indicates a considerable difference between the Thessalian plain (with approximately 450mm per year) and the more humid conditions in the Izmir region (with approximately 700mm annually). In both cases, most of the rain falls during the winter season, between October and March, and seasons of drought are not an exception but a shared characteristic of the Mediterranean climate.[1147] In the case of Çukuriçi Höyük, the higher precipitation facilitated year-round breeding close to the site, as discussed in Chapter III, whereas at Platia Magoula Zarkou less precipitation made the seasonal movement of animals more likely.

The differences in the numbers of sheep and goats at Çukuriçi Höyük and Platia Magoula Zarkou can also be contextualized with respect to topography.[1148] The restricted basin at Çukuriçi Höyük, which was partially covered with marshes, was more suitable for goats than sheep due to their feeding practices. As goats are browsers, they can easily cope with limited pastures,[1149] which was the case in the immediate surroundings of Çukuriçi Höyük. In turn, grazing sheep were better adapted to the Thessalian plain, as they require extensive pastureland for grazing.

All three Thessalian EBA sites – Platia Magoula Zarkou, Argissa Magoula, and Pevkakia – are located on alluvial plains surrounded by mountains reaching up to 1500m in elevation. Mountainous environments adjacent to plains provide distinct climatic and soil zones in which both the fertile deep soils of the Thessalian plain and the steep rocky slopes of the Pindus Mountains could provide economically important landscapes. In this case, the location evidence further supports the possibility of transhumance in later prehistory.[1150] Secondly, animal ploughing and traction was practised at Platia Magoula Zarkou, whereas it has not been confirmed at Çukuriçi Höyük. This implies that at Platia Magoula Zarkou during the EBA farming was less human labour- and land-intensive, meaning that more land could be cultivated by a single household, irrespective of its size. This would free some of the men and possibly children belonging to the same household from plant cultivation activities over the summer, who could then take the animals to higher pastures in the spring and return in the autumn, while the rest of the community could engage in plant cultivation and craft activities.

Highly speculative, albeit possible, is the interpretation that the missing pork and beef parts at Platia Magoula Zarkou were processed and taken to the summer pastures, where either

[1147] I stayed in Selçuk (western Anatolia) in October and November 2018. Except for a big storm on the weekend before my arrival, there were no rainy days until the very end of November, when the humidity was extremely high and the temperatures cooled down to just a few degrees Celsius overnight. Before my departure, Stephanie (the DOC-team member and zooarchaeologist) and I visited Bakla Tepe, a site contemporaneous with Çukuriçi Höyük, located 25km north of Selçuk. Bakla Tepe was supposedly located below an immense hydroelectric dam, as seen from Google Maps. We drove by without being able to spot any signs of the Tahtalı Dam, except for the wire fence surrounding it. We parked the car next to the fenced wall and the doors leading to the dam's interior, patrolled by two guards who were stationed in a white cargo container. They walked out and we asked about the location of the prehistoric site. One of them pointed towards a distant spot covered with a small patch of water – we knew the site was underwater, but we were not able to locate it ourselves. However, this gave me the opportunity to inquire about the lack of rainfall that season. I asked, 'Su nerede?' meaning 'where is the water?' in my broken Turkish. One of the guards quickly adjusted to my language expertise and responded: 'Yağmur yok – su yok', meaning 'no rain – no water'.

[1148] Lancaster – Lancaster 1991; Lancaster – Lancaster 1992.

[1149] Lancaster – Lancaster 1991.

[1150] Forbes 1995.

smoked or salted meat would allow the 'shepherds' to survive over the summer months.[1151] This does not downplay the importance of sharing meat (especially beef) beyond the household, but the evidence that the same meaty pieces would be consumed outside the room over a few centuries remains unlikely. Therefore, the continuity of dominance of sheep along with the absence of the same meaty parts at Platia Magoula Zarkou supports the interpretation that this assemblage results from labour organization at the site, rather than representing a redistributive economic system.

Labour Organization at Çukuriçi Höyük and Platia Magoula Zarkou

With reference to the overall organization of labour, the main differences between Çukuriçi Höyük and Platia Magoula Zarkou are not limited to animal herding strategies. Although at Çukuriçi Höyük dwellers bred domestic animals close to the site all year round, at Platia Magoula Zarkou, transhumant herding is more likely. The latter led to the absence of some men as well as older children and unmarried youngsters in the summer months, whereas dwellers appear to have been more sedentary at Çukuriçi Höyük. This can be further supported by metallurgical production, which at the Anatolian site moved from open spaces in the Late Chalcolithic into individual houses during the EBA, whereas only a single copper pearl was found at Platia Magoula Zarkou.[1152] In the room at Platia Magoula Zarkou no other metal tools have been excavated, whereas at Çukuriçi Höyük the DMP ensured the production of metal tools for domestic use and (in a limited proportion) also for exchange. Therefore, at Platia Magoula Zarkou, males seem to make a stronger contribution to domestic economies through transhumant animal herding and the ploughing of soils, whereas at Çukuriçi Höyük, rain-fed cultivation remained in the hands of women, in the absence of the plough. Meanwhile, males invested more labour into the production of metals at the site, which was only possible through the greater contribution of women, and especially of children and very young adults, to animal herding close to the site and to cultivating the fields.

In coastal and hinterland western Anatolia sheep were more important at all other contemporaneous sites except Çukuriçi Höyük. On a similar note, Çukuriçi Höyük also differed from the other contemporaneous sites in terms of the scale of metal production. Whereas at other regional sites metalworking was limited to a particular household in the restricted integration manner as previously outlined, at Çukuriçi Höyük metal production was of a *generalized craft integration* type. From this, it appears that goat herding, which is less labour-consuming than sheep herding, is strongly linked to intensive metal production, whereas sheep predominated at all other sites where metalworking was not a village expertise at the dawn of the EBA.

On the Thessalian plain, the earliest deliberate smelting of arsenical copper alloys dates to the Late Neolithic period, based on the evidence from the Late Neolithic eastern Thessalian sites such as Dimini, Sesklo, and Pevkakia, and arsenical copper smelting continued into the EBA 1 period at Dimini and Petromagoula.[1153] Except for Rachmani, Thessalian Late Neolithic and EBA sites providing evidence of deliberately smelted arsenical copper tools and weapons were located within a radius of 50km from the four different copper sources close to the modern coastal town of Volos in eastern Thessaly.[1154] All of them are eastern Thessalian sites, either coastal or sites just slightly inland from the Aegean Sea, located on the major land-based trading routes.[1155] Most of the artefacts recovered from these sites comprised tools rather than weapons and they were commonly recovered from settlements and not graveyards.[1156] It is

[1151] Becker 1991.
[1152] C. Moser, pers. comm. 2015.
[1153] McGeehan Liritzis 1990, 231.
[1154] McGeehan Liritzis 1990, 231; Tanasi et al. 2019.
[1155] McGeehan Liritzis 1990, 231.
[1156] McGeehan Liritzis 1990, 231.

also significant that metalworking has not been widely attested in the Thessalian hinterland, including Platia Magoula Zarkou.

Therefore, it is evident that Platia Magoula Zarkou, located in the western end of the Thessalian plain was not an important metalworking centre and neither was the site located close to metal sources. Instead, wool production and sheep herding played an important role in most of the western Thessalian EBA sites, whereas metalworking was more widely attested in eastern Thessalian coastal sites. The reasons for this are manifold. Firstly, transhumant sheep breeding was ecologically possible. The Zarkos and Pindus mountains close to Platia Magoula Zarkou and Argissa, as well as the Magnesia Mountains near Pevkakia, provided suitable high-altitude summer pastures complementary to the winter pastures on the Thessalian plain. Secondly, the adoption of the plough allowed some men to detach themselves from plant cultivation and to be absent from the village community over the summer months. These men would take care of the sheep and goats in the higher summer pastures in spring and summer, and return to the community over the winter. Thirdly, the production of wool and woollen products seems to have been of greater importance in western Thessaly, whereas metalworking was more widely attested on the Eastern Thessalian Plain, close to important land-based and maritime exchange routes, overlapping with local metal sources. That implies that whereas men, women, and children dedicated time to metal production in the households at Çukuriçi Höyük, men at Platia Magoula Zarkou contributed to subsistence through ploughing and transhumance, while women more likely engaged in weaving and the production of fleece and woollen items.

Sheep at Platia Magoula Zarkou played an important role in subsistence (meat, milk, and milk products) and were not solely a store of value or exploited only for wool or exchange. That view is supported through ethnographic accounts of pastoral communities in Western Asia. As the assemblage of the sheep-to-goat ratio at Platia Magoula Zarkou resembles the record from other Thessalian plain sites, wool and sheep were of specific importance for the regional mixed economy during the EBA, having a similar role to pigs among big man societies in Melanesia. In the latter region, despite the fact that each household in the broader region bred pigs, these animals served as a primitive form of wealth, being an important item for marriage exchanges, feasting, barter exchange, and competition between households on a local and regional scale.[1157] Therefore we should not postulate that within EBA Thessaly sheep were present everywhere or assume that households were self-sufficient, but should instead consider that these animals and items played a key role in the establishment and maintenance of alliances beyond the household. For a reconstruction of the EBA mixed regional economy (with transhumance), see Tab. 16.

Chapter Summary and Conclusion

The assemblage from Platia Magoula Zarkou resembles animal breeding in big man societies for the following three reasons. Firstly, among big man societies pigs were an important item for regional exchanges and alliances, and young pigs were never killed but were left alive for longer. The same can be observed for Platia Magoula Zarkou, where the majority of sheep were slaughtered only after two years of age, in contrast to the slaughter of young sheep and goats below one year of age at Çukuriçi Höyük. Secondly, the presence of enclosure walls does not necessarily correspond to centralized, but also to non-centralized societies. Drawing from the rich evidence concerning enclosure walls from Papua New Guinea's big man tribal societies, the enclosure at Platia Magoula Zarkou does not demonstrate a clear difference

[1157] Rappaport 2000 [1968]; Lederman 2015.

EARLY BRONZE AGE MIXED REGIONAL TRANSHUMANCE ECONOMY					
Hunting	**Gathering, collecting**	**Animal herding**	**Plant cultivation**	**Crafts**	**Regional economies**
Big game: aurochs, red deer Small animals: foxes (no cutting marks), badgers, wild cats (no cutting marks), hares	River mussels, a single cockle shell from the Aegean Sea, no fish remains	Sheep, goats, cattle, pigs, dogs Sheep:goat ratio of 3:1	Barley, bitter vetch, emmer	Textile production, including wool items	Obsidian exchange, a single cockle shell from the Aegean Sea
Targeted hunting of aurochs and red deer		The primary importance of sheep and goats, plowing with cattle, evidence for the utilization of secondary products	Small botanical record (only five seeds) but evidence for plow agriculture	Intensification of textile production	Trade within the Thessalian plain and the Aegean world, no evidence for trade with the Near East
The exploitation of wild animals integrated into the mixed farming economy (as a risk-buffering strategy, the negotiation of power relations, and possibly commodity exchange)		Agriculture (cultivation of domesticated plants in fields with usage of animal and animal labor for draft, plowing, and manure)		Part of the DMP	Inter-regional exchange of commodity items

Tab. 16 Model of mixed regional economy at Platia Magoula Zarkou during the EBA (with transhumance)

between the upper and lower mound settlement plan. This provides no evidence for administrative mechanisms, which corresponds to the ethnographic cases from Papua New Guinea. Thirdly, the animal assemblage from Platia Magoula Zarkou indicates that hunting, though playing a marginal role in subsistence, remained significant during the EBA.

The difference in labour organization becomes evident when combining animal herding with craft activities. Dwellers at Çukuriçi Höyük spent less time on breeding sheep and producing wool, which therefore must have been acquired from elsewhere, and instead specialized in metal production. At Platia Magoula Zarkou, in the absence of metalworking, dwellers used more of their time and labour for sheep breeding and the production of wool and woollen items. In contrast to the locally produced wool, dwellers at Platia Magoula Zarkou relied on importing flint and obsidian stone tools, as well as metal tools, from outside. This evidence points not only to differences between a coastal site such as Çukuriçi Höyük and a hinterland site such as Platia Magoula Zarkou, but also to different types of labour organization and regional economies. Whereas locally produced wool or woollen items served as exchange items for the procurement of goods from the outside at Platia Magoula Zarkou, the same was the case for metal objects at Çukuriçi Höyük. This remains possible, despite the fact that most dwellers at Thessalian plain sites during the EBA produced wool locally. For example, among big man societies in the Papua New Guinea lowlands, each household owned pigs, but these were mobilized for the construction of regional exchange networks and household-based representations of wealth.[1158]

In a strictly temporal context, the assemblage from Platia Magoula Zarkou is almost contemporaneous with the western Anatolian EBA 2 cattle culture, the period during which cattle became the predominant item of subsistence. During this time, the western Anatolian sites

[1158] Lederman 2015.

became divided into upper and lower towns, with attested chiefly buildings. Although similar evidence is missing for the Thessalian plain, enclosures were detected at Argissa and Pevkakia – however, caprines remained predominant at these sites. It appears evident that the stronger reliance on cattle breeding in western Anatolia was inherently linked to increasing social inequality during EBA 2 and a stronger regional competition for wealth. However, the assemblage being examined provides evidence for the possibility that in the Thessalian plain competitive sheep breeding was contemporaneous to the western Anatolian Bronze Age 'cattle culture'. In both cases, Platia Magoula Zarkou and Çukuriçi Höyük fall outside the 'cattle culture' category. At both sites, caprines, rather than cattle, predominated in the archaeological record. This implies that the predominant consumption and most likely also the herding of these animals was tied to a household, given that a large majority of animals were slaughtered young, below 3 years of age. Thus we cannot expect that in the case of Platia Magoula Zarkou, sheep breeding was solely for subsistence and not for regional consumption – and possibly even for regional competition – since dwellers at Platia Magoula Zarkou slaughtered sheep later than their predecessors during the Neolithic.