

Plain of Plenty



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Farming Practices, Food Production,
and the Agricultural Potential of the
Late Bronze Age (1600 – 1200 BCE)
Argive Plain, Greece

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Contents

Acknowledgements	viii
Nederlandse samenvatting	ix
Curriculum vitae	x
Chapter 1: Introduction	1
Chapter 2: Mycenaean society and economy	5
The extent of Mycenaean Greece and chronology	5
The Bronze Age collapse.....	7
Summary: The Mycenaean period in Greece	8
Mycenaean society in Linear B textual evidence	8
Societal organization	8
Landowners and users in textual evidence	10
Land use in the Argive Plain tablets	13
Summary: Mycenaean land and society	14
Mycenaean economy.....	15
Taxation	15
Palatial production.....	16
Control over the availability of goods	16
Conclusion: Evidence of economic transactions	18
Summary: Mycenaean society and economy	18
Chapter 3: The Late Bronze Age Argive Plain.....	20
Survey and reconnaissance projects in the Argive Plain	20
Surveys in the eastern Peloponnese	23
The Argive Plain settlements.....	25
Mycenae	25
Tiryns.....	26
Midea	26
Argos.....	27
Lerna	28
Nafplion.....	28
Argive Heraion / Prosymna	28
Mastos.....	29
Asine	29
Tsoungiza	29
Other sites.....	30
Summary: The Argive Plain occupational history	31
The Argive Plain settlement hierarchy and subsistence territories.....	31
Summary: Models of the LH III Argive Plain settlement and land use distribution.....	36
The Argive Plain population estimates	36
Summary: Large and small settlements in the LH III Argive Plain	38
Chapter 4: Reconstructing agricultural systems and agricultural potential.....	41
Approaches to agriculture in the LBA Aegean	41
History of approaches	41
Specialized processual approaches	41
Settlement patterns and landscape analyses.....	43
Current approaches to the LBA Aegean and subsistence.....	46
Agriculture as an integrated system.....	50
Agricultural potential	51
The approach.....	53
Summary: Modelling Late Bronze Age farming and food production	60

Chapter 5: Late Bronze Age agriculture in archaeological data	62
The geography and soils of the Argive Plain	62
Geography	63
Late Bronze Age landscape changes	65
Modern and Bronze Age soils	65
Terracing	69
Summary: The LH III Argive Plain agricultural landscape	74
Late Bronze Age climate in the Argive Plain and its impact on agriculture	74
Current climates in the Eastern Mediterranean and the Argive Plain	76
The LBA climate in the Eastern Mediterranean and the Argolid	76
The impact of climate on the Bronze Age crop production	78
Summary: Climate as a factor in Late Bronze Age farming	79
Agriculture in the LBA material evidence	80
Agricultural tools	80
Special activity sites	81
Agricultural storage	82
Potential trade of agricultural products	85
Summary: material evidence of Mycenaean agricultural practices	86
Vegetation and food crops of the Late Bronze Age Argive Plain	86
Microbotanical evidence	87
Macrobotanical evidence	90
Summary: The Argive plain macrobotanical remains as indicators of farming and food consumption	100
Animals and animal husbandry in the LBA Argive Plain	103
Textual evidence on LBA animal husbandry	104
The LBA Argive Plain zooarchaeological evidence	106
Summary: animal husbandry in the LBA Argive Plain	115
The Argive Plain population through osteoarchaeological evidence	118
The skeletal analysis of the LBA human remains	119
Oral pathologies	124
Isotope signatures	126
Summary: Diet and health of the Argive Plain population	129
Chapter 6: Farming strategies and the agricultural potential of the LH III Argive Plain	132
Model of the agricultural practices in the LH III Argive Plain	132
Settlement system, political geography and landscape potential	132
The LH III Argive Plain cultivation space	134
Land use distribution	137
Agricultural practices in the LH III Argive Plain	139
The LH III Argive Plain diet	149
The LH III average food composition	150
The nutritional composition of the Late Bronze Age diet	154
The LH III diet analysis	158
The agricultural potential of the Argive Plain	166
Individual production areas	167
The agricultural potential in Model 1 (a and b)	169
The agricultural potential in Model 2 (a and b)	171
Summary: Comparing Models 1 and 2 of the Argive Plain agricultural potential	174
Chapter 7: Reconstructing Mycenaean agriculture and subsistence	178
The Argive Plain as an agricultural space	178
Individual subsistence areas	178
The adjacent valleys as production areas	180
The agricultural potential and the Argive Plain population estimates	182
Crops, texts, and people	185
Reconstructing LH III agriculture in the future	188
Conclusion	190
References	193
Cartographic material	222

Appendix 1: Bronze Age chronological systems	223
Appendix 2: Summary table of the ethnographic studies used in the publication.....	224
Appendix 3: Modern soil fertility classes.....	225
Appendix 4: Bronze Age macrobotanical finds from the Argive Plain sites	227
Appendix 5: Tree and maquis species present in the pollen cores of the Bronze Argive Plain (Lake Lerna and Kleonai) and the Southern Argolid (Limni Thermisia and Kiladha).....	229
Appendix 6: Domestic and wild mammals, fish, and bird species present in the LH III deposits of the Argive Plain sites of Mycenae, Lerna, Midea, Tiryns, Asine, and Tsoungiza	230
Domestic and wild mammals, fish, and bird species present in the LH III deposits	230
Appendix 7: Comparative data of ovicaprid sizes and milk yields.....	232
Appendix 8: Stocking rates for (modern indigenous) cattle, sheep, and goats.....	234
Cattle	234
Sheep and goats	234
Appendix 9: The number, age, and sex of the Bronze Age human individuals whose skeletal material are used in this publication	235
Appendix 10: The nutritional values of foodstuffs used in the dietary analysis of this publication	237
Appendix 11: Food consumption, and the production need of different food items according to Diet model 1	238
Appendix 12: Food consumption, and the production need of different food items according to diet model 2	241
Appendix 13: The individual subsistence production areas for different foodstuffs according to model 1 .	244
Appendix 14: The individual subsistence production areas for different foodstuffs according to model 2 .	247
Appendix 15: The agricultural potential of the LH III Argive Plain in Model 1.....	250
Appendix 16: The agricultural potential of the LH III Argive Plain in Model 2.....	252
Appendix 17: The agricultural potential of the three Argive Plain neighbours; the Berbati and Nemea Valleys and Asine plateau	253

List of Figures and Tables

Chapter 2

Table 2.1.	Simplified chronological table of the Bronze Age in mainland Greece showing the relative chronological system and the two absolute dating systems commonly used to describe the period (adapted from Shelmerdine 2008a). This study mainly uses the relative dating system, but whenever relevant, the High Dating is referred to (see footnote 2).....	5
Figure 2.1.	The extent of Mycenaean assemblages in the Aegean in the LH III period	6

Chapter 3

Figure 3.1.	Known LH III sites in the Argive Plain.....	21
Table 3.1.	List of the numbered sites in figure 3.1.....	22
Figure 3.2.	Major survey projects conducted in the surroundings of the Argive Plain.....	24
Table 3.2.	Estimation of densities of small settlement sites in the surveyed areas of the eastern Peloponnese.....	25
Figure 3.3.	The Mycenaean Argive Plain settlement pattern with subsistence territories and 2.5km catchment areas according to Bintliff (1977b: Appx A, map 2A; map adapted from original by current author). Black triangles represent the main settlements of each subsistence territory, which are defined through Thiessen polygons. White triangles, numbers 14, 15, 16 and 17, represent yet uncovered or undefined sites. The known numbered sites (author's interpretation) are: 1) Mycenae, 2) Malantreni, 3) Schoinchori/Melissi, 4) the Argive Heraion (Prosymna), 5) Mastos, 6) Midea (Dendra), 7) Argos, 8) Magoula, 9) Kiveri, 10) Tiryns, 11) Profitis Ilias, 12) Asine, 13) Kandia, 18) Kazarma, and 19) Nafplion	32
Figure 3.4.	Hierarchy of the Mycenaean settlements in the Argive Plain according to Kilian (1988: 297, Fig. 3; map adapted from original by current author).....	33
Table 3.3.	Size, population, and population density estimates for the larger Argive Plain sites in various sources. The total population is calculated according to the density estimate given in the reference.....	37
Table 3.4.	Population numbers for the sites for which only a size estimate is given. The 200ppl/ha population density by Whitelaw (2001) was used to formulate the hypothetical population numbers in this table	38

Chapter 4

Figure 4.1.	Visualization of the reconstruction model of the LBA Argive Plain agricultural potential.....	52
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Chapter 5

Figure 5.1.	The geography of the Argive Plain. The map shows the three main streams, Lake Lerna, and other geographical landmarks mentioned in the text. The EH and LH coastline are after Zangger 1991 and 1993, as is the maximum extension of Lake Lerna. The triangles represent the main sites and are in numeric order: 1) Tsoungiza, 2) Mycenae, 3) Mastos, 4) Midea, 5) Argos, 6) Magoula, 7) Lerna, 8) Tiryns, 9) Nafplion, and 10) Asine	62
Figure 5.2.	Parent materials on and surrounding the Argive Plain. The map was adapted from IGME Geological maps, sheets Nafplion (1964), Argos (1970), Nemea (1970) and Korinthos (1970) by the author	64
Figure 5.3.	Landscape changes around Mycenae and Tiryns, adapted from Finke (1988), Zangger (1993) and Fallu (2017: 30-34 and 211-219). The illustration of the extent of the flood deposits caused by the streams Chavos and Vathyrema around Mycenae and Chania is an interpretation by the current author. To the best knowledge of the current author, there are no previous published visualizations of these flooding events	66
Figure 5.4.	Adaptation from Finke (1988: 71, Figure 18). The marsh and lake deposits in the south of the plain, as well as the recent overbank loams surrounding Argos are more recent developments in the Argive Plain landscape. The LH III surface likely consisted of the Pleistocene alluvial fans of the plain edges, and the Bronze Age alluvial deposits, mostly deposited during the EH, almost entirely covering the inner plain	67
Figure 5.5.	Land use potential of the Argive Plain and Berbati Valley. Fertile soils (see also Appendix 3) are marked in white. The map is adapted from Ritzou (2013: 66, Fig 2.17) and Drakaki and Sideri (2014: 30, Fig. 2.17).....	68
Figure 5.6.	Potential slopes (steeper than 6°) suitable for terracing without altitude limitations and within 2.5km buffer from the edge of the flat plain.....	72
Figure 5.7.	Slopes suitable for terracing around the main LBA Argive Plain sites within a 2.5km buffer. The Argive Heraion is included in the sites, since the LBA terraces detected in the Mycenae Survey (Iakovidis and French 2003) are known to continue close to the site	73
Table 5.1.	Area of land in hectares that could have been terraced in the Argive Plain region. Areas are based on the slope parameters and calculations presented in figures 5.6 and 5.7.....	74
Table 5.2.	Terraced area in hectares if 30-90 percent of the potential slope area available was used.....	74
Figure 5.8.	Locations of the climate data mentioned in the text. 1) Elliniko, Athens, 2) Kleonai, 3) Lake Lerna 4) Argos 5) Tripoli, 6) Asea valley, 7) Agios Phloros, 8) Gialova Lagoon, 9) Mavri Trypa cave, 10) Alepotrypa cave	75

Figure 5.9.	The wetter (blue) and drier (red) climatic conditions, and the shorter dry periods (dark red) in the Peloponnese according to the referenced studies (source). The period of interest to this study is marked yellow. The LBA ‘collapse’ is currently dated to c. 1200 BCE	78
Table 5.3.	Average rainfall in millimetres per year needed for diverse types of crop cultivation in the Eastern Mediterranean according to archaeoethnographic studies	79
Figure 5.10.	Locations of the sources of the micro- and macrobotanical data mentioned in the text. The sites in order are 1) Assiros Toumba, 2) Mesimeriani Toumba, 3) Aliko, 4) Kleonai, 5) Tsoungiza, 6) Mycenae, 7) Synoro, 8) Midea, 9) Tiryns, 10) Lake Lerna, 11) Lerna, 12) Iria, 13) Koiladha bay, 14) Limni Thermisia, 15) Kouphovouno, 16) Agios Phloros, 17) Kotihi lagoon, 18) Pylos, 19) Akrotiri, Thera, 20) Knossos, Crete, 21) Palaikastro, Crete, 22) Chania, Crete, 23) Thessaloniki Toumba, and 24) Archontiko, 25) Salamis	87
Figure 5.11.	The find locations of the zooarchaeological data mentioned in the text. The sites in order are: 1) Tsoungiza, 2) Mycenae, 3) Midea, 4) Tiryns, 5) Lerna, 6) Asine, 7) Fourni, 8) Kosona, 9) Pylos, and 10) Knossos, Crete	103
Table 5.4.	The Minimum Number of Individuals (MIN) in three LH III Argive Plain sites, Mycenae, Lerna, and Midea. The assemblage of Mycenae consists of 99 selected individuals from two separate contexts (Price <i>et al.</i> 2017). The Lerna assemblage includes the Lerna V+VII, VII+V, VII and VII+Class ³² layers (Reese 2008). The Midea assemblage includes the LH III ³³ period, which was published on two occasions (Reese 1998 and 2007). The numbers of individuals from the sites should not be compared, because the Mycenae assemblage represented only a selected number of individuals, not the complete collection. There are further chronological discrepancies between the studies.....	109
Figure 5.12.	Locations of the osteoarchaeological sites mentioned in the section are 1) Tragana Agia Triada, Lokris, 2) Mirou, Lokris, 3) Kolaka, Lokris, 4) Modi, Lokris, 5) Atalanti, Lokris, 6) Kalapodi, Lokris, 7) Zeli, Lokris, 8) Athens, 9) Almyri, 10) Mycenae, 11) Midea, 12) Argos, 13) Lerna, 14) Tiryns, 15) Asine, 16) Voudeni, Achaia, 17) Kalamaki, Achaia, 18) Spaliareika, Achaia, 19) Agia Triada, Achaia, 20) Pylos, 21) Kouphovouno, Laconia, 22) Sykia, Laconia, 23) Armenoi, Crete, and 24) Knossos, Crete	118

Chapter 6

Figure 6.1.	The land area (dark grey) that could be used for agriculture on a slope under 6°	135
Figure 6.2.	Areas (purple) excluded from the agricultural space because of difficult access	135
Figure 6.3.	The ‘production areas’ outside the Argive Plain, the valleys of Nemea, Kleonai and Berbati, as well as the plain of Asine, all marked in blue	136
Figure 6.4.	Final agricultural area of the Argive Plain based on topographic and soil variables.....	137
Table 6.1.	Average yields of wheat and barley in various sources. The section above represents yields based on ethnographic fieldwork, and the section below yield estimates for historic and prehistoric time periods	145
Table 6.2.	Yields of species of legumes in the Eastern Mediterranean. All numbers are kilograms per hectare	147
Table 6.3.	Estimations for the yields of olives and olive oil with references. Olive yield is bimodal. The lower figure indicates the yield in the ‘off’ year for olives, and the higher number the main year of production	148
Table 6.4.	Estimations of the average yields of figs and grapes in the Eastern Mediterranean	148
Table 6.5.	The share (in percent) of different foodstuffs in prehistoric and early historic diet in Greece.....	152
Table 6.6.	Amounts of different foodstuffs (kg/yr) in ethnographic studies of rural communities in the Mediterranean	153
Table 6.7.	Basic energy requirements per sex and activity levels as given by the FAO/WHO and adjusted to the LBA individuals according to their reconstructed weights (marked in bold)	156
Table 6.8.	Calculated daily energy needs of children and elderly in a LBA household. The formula for calculating the BMR of children was calculated by the author, while the BMR of the older female is provided by the FAO/WHO. The weights of the children are taken from the mean weights for 3-0, and 11-18-year-olds provided by FAO (1991)	156
Table 6.9.	Recommendations for the daily protein, fats, and carbohydrates intake for an average LBA individual with a daily energy intake of 2400kcal	157
Table 6.10.	The average calorific and nutrient content of different foodstuffs in the LBA diet as presented in the USDA database. Further information on the items is compiled in Appendix 10	159
Figure 6.6.	Two diet sub-models, a and b, in which specifically the consumption of cereals, meat, and dairy is examined in more detail. The shares of each food item are of the total food resource (cereals, legumes, meat etc.) consumption in diet models 1 and 2	160
Figure 6.5.	The composition of different foodstuffs in diet model 1 as percentages of the total	160
Figure 6.7.	The composition of different foodstuffs in diet model 2 as percentages of the total	161
Figure 6.8.	The annual consumption of different LBA foodstuffs per person in kilograms in diet model 1a.....	162
Figure 6.9.	The annual consumption of different LBA foodstuffs per person in kilograms in diet model 1b.....	162
Figure 6.10.	The annual consumption of different LBA foodstuffs in kilograms in diet model 2a	163
Figure 6.11.	The annual consumption of different LBA foodstuffs in kilograms in diet model 2b	163
Table 6.11.	Nutrient intake in diet models 1a, 1b, 2a and 2b with WHO/FAO recommendations for intake of protein, carbohydrates and fats for an adult resembling the size and level of activity of a LH III person	164
Table 6.12.	Variables used in the analysis of the agricultural potential of the Argive Plain, excluding land use models which are based on the diet models presented in section 6.2.3.....	166
Table 6.13.	‘Personal’ plot sizes in sub-models 1a and 1b. The two rightmost columns of the table indicate, how much space (in ha) is required to produce a foodstuff for one person’s annual dietary needs. Since most of the foodstuffs in the LBA dietary model yield varying volumes each year, spatial needs of each product are calculated from the minimum and maximum volumes of their respective yield ranges.....	169
Table 6.14.	‘Personal’ plot sizes in sub-models 2a and 2b, calculated in a similar way as in Table 6.13.....	169

Table 6.15.	Key to yield models in the agricultural potential tables 6.20 and 6.21. All figures represent yields in kilograms	171
Table 6.16.	Summary of the agricultural potential of the LH III Argive Plain, its neighbouring areas, the Nemea and Berbati Valleys and the plain of Asine, and the minimum and maximum areas for terraced fields according to models 1a and 1b. The figures in bold represent population numbers, the main results of the analysis.....	172
Table 6.17.	Summary of the agricultural potential of the LH III Argive Plain, its neighbouring areas, the Nemea and Berbati Valleys and the plain of Asine, and the minimum and maximum areas for terraced fields according to models 2a and 2b. The figures in bold represent population numbers, the main results of the analysis.....	173

Chapter 7

Table 7.1.	The agricultural potential of the neighbouring valleys and plains to the LH III Argive Plain in model 1, calculated in a similar fashion to the agricultural potential of the Argive Plain (tables 6.16 and 6.17), and expressed as population numbers	181
Table 7.2.	The agricultural potential of the neighbouring valleys and plains to the LH III Argive Plain in model 2, calculated in a similar fashion to the agricultural potential of the Argive Plain (tables 6.6 and 6.7), and expressed as population numbers	181
Table 7.3.	Extrapolation of special workforce (smiths and constructors) of the total workforce, and the amount of workforce of the total population discussed in the text.....	185
Table 7.4.	The agricultural potential of specialized production of olives, olive oil, grapevines and figs on terraces in model 1 (a and b)	188

Appendix 7

Table 1.	Bronze Age cattle, sheep and goat wither heights in reference data	232
Table 2.	The average wither heights and weights of modern indigenous cattle, sheep and goat of Greece based on the fact sheets of the Ministry of Rural Development and Food (Georgoudis <i>et al.</i> 2011)	232
Table 3.	The estimations of Dahl and Hjort (1976: 144–45, 164–65) for the average milk yield of small African indigenous cattle	233

Appendix 11

Table 1.	Variables in diet model 1, and in sub-models a and b. The numbers can be best explained by using cereals as an example: in diet model 1, cereals form 75 percent of the dietary energy. The total daily energy need is 2400kcal per person (section 6.2), of which 75 percent is 1800kcal. Of the 1800kcal, 70 percent, or 1260kcal consists of barley, and 30 percent, or 540kcal, of wheat in sub-model 1a. In sub-model 1b, these figures are reversed. The resulted energy need per foodstuff can be used to calculate how much (in weight) of said foodstuff needs to be consumed annually to reach the needed energy targets. This figure equals to the minimum annual food production target per person	238
Table 2.	The consumption requirements of different foodstuffs per person in diet sub-model 1a. Share in g/d represents daily consumption of food expressed in grams, and share in yr/kg annual consumption in kilograms, calculated according to the percentual shares of sub-model 1a. Need after seed loss represents the production need of cereals and legumes after reseeding stock (10 percent of total) is added multiplying the annual consumption need by 1.10. Need after storage loss represents the total production need of foodstuffs for one person after reseeding stock and storage losses (multiplying factor 1.15) are added to the consumption needs	239
Table 3.	The consumption requirements of different foodstuffs per person in diet sub-model 1b. As with Table 2 and sub-model 1a, the 'Need after storage losses' represents the total production need of foodstuffs for one person after reseeding stock and storage losses are added to the consumption needs	240

Appendix 12

Table 1.	Variables in diet model 2, and in sub-models a and b. See further explanation in Appendix 11, Table 1	241
Table 2.	The consumption requirements of different foodstuffs per person in diet sub-model 2a. See further explanation in Appendix 11, Table 2. The 'need after storage losses' represents the total production need of foodstuffs for one person after reseeding stock and storage losses (multiplying factor 1.15) are added to the consumption needs	242
Table 3.	The consumption requirements of different foodstuffs per person in diet sub-model 2b. See further explanation in Appendix 11, Table 2	243

Appendix 13

Table 1.	Key to yield models. Medium yields 1 consists of 600kg cereal yields and the minimum yields of all other foodstuffs. Medium yields 2 consists of 600kg cereal yields and the maximum yields of all other foodstuffs....	244
Table 2.	Spatial requirements to produce the plant crops of diet model 1a. If cereals can be produced 400kg per hectare, and per annum they are needed 164.34kg (including reseeding and storage losses), it takes to produce the needed volume of cereals when fallow fields (50 percent of the field space) are included.....	244

Table 3.	Spatial requirements to produce the animal products of diet model 1a. If 4.67kg of sheep's milk is needed per year, and one sheep produces a minimum 60kg of milk per year, share of that sheep is needed to produce the needed milk. The maximum pasture area to sustain one sheep is 0.4ha. The 0.078th of a sheep thus needs of pasture space for one person's milk production at its maximum	245
Table 4.	Spatial requirements to produce the plant crops of diet model 1b	245
Table 5.	Spatial requirements to produce the animal products of diet model 1b	246
Table 6.	Summary table of the land areas needed to produce foodstuffs in diet sub-models 1a and 1b. Colour coding refers to the individual foodstuffs in tables 2-5 which form the food groups 'cereals', 'fruit crops', 'dairy', and 'meat'	246

Appendix 14

Table 1.	Spatial requirements to produce the plant crops of diet model 2a. See key to yield models in Appendix 13, Table 1	247
Table 2.	Spatial requirements to produce the animal products of diet model 2a. See key to yield models in Appendix 13, Table 1	247
Table 3.	Spatial requirements to produce the plant crops of diet model 2b	248
Table 4.	Spatial requirements to produce the animal products of diet model 2b	248
Table 5.	Summary table of the land areas needed to produce foodstuffs in diet sub-models 2a and 2b. Colour coding refers to the individual foodstuffs in tables 2-5 which form the food groups 'cereals', 'fruit crops', 'dairy', and 'meat'	249

Appendix 15

Table 1.	The agricultural potential of the LH III Argive Plain according to sub-model 1a, expressed as numbers of population. The number of people that could be sustained by a specific land area is achieved by dividing the land area (ha) by the individual subsistence areas needed to produce the foodstuffs included in diet model 1a. See Appendix 13 for the formulation of the subsistence areas. Land that could be terraced is added to the land area available in the Argive Plain (= 'plain') and neighbouring valleys and the plain of Asine (= 'valleys')	250
Table 2.	The agricultural potential of the LH III Argive Plain according to sub-model 1b, expressed as numbers of population	251
Table 3.	The agricultural potential of tree crop cultivation on terraced fields in the Argive Plain in models 1 and 2. The population numbers here express the number of people to whom tree crops could be produced on terraces only. Since fruit yields, consumption, and production shares are the same in models 1 and 2, these figures apply to both models	251
Table 4.	The agricultural potential of dried figs on terraced fields for palatial payment rations where the need per person is 150kg per annum. Since fruit yields, consumption, and production shares are the same in models 1 and 2, these figures apply to both models	251

Appendix 16

Table 1.	The agricultural potential of the LH III Argive Plain according to sub-model 2a, expressed as numbers of population	252
Table 2.	The agricultural potential of the LH III Argive Plain according to sub-model 2b, expressed as numbers of population	252

Appendix 17

Table 1.	The agricultural potential of the three Argive Plain neighbours; Berbati and Nemea valleys, and Asine plateau in model 1. The results have been achieved with the same individual subsistence area sizes as in model 1 of the Argive Plain agricultural potential (see Appendix 13)	253
Table 2.	The agricultural potential of the three Argive Plain neighbours; Berbati and Nemea valleys, and Asine plateau in model 1. The results have been achieved with the same individual subsistence area sizes as in model 2 of the Argive Plain agricultural potential (see Appendix 14)	253

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Nederlandse samenvatting

De Argolis in het noordoosten van Peloponnesos, Griekenland, was een van de kerngebieden van de Myceense cultuur die de laatste eeuwen van de Bronstijd (c. 1600-1200 v. Chr.) in Griekenland omvat. Het gebied staat bekend om zijn opmerkelijke nederzettingconcentratie, waarbij verschillende centrale plaatsen op korte afstand van elkaar lagen op een relatief kleine vlakte. Hoewel de centrale nederzettingen op de Argolis grondig zijn onderzocht, was niet goed bekend hoe het gebied in staat was deze centra en hun bewoners van voedsel te voorzien. Bovendien is de aard van de landbouw in het gebied nooit goed onderzocht.

In deze studie wordt onderzocht welke landbouwstrategieën de Myceense bevolking gebruikte om in hun levensonderhoud te voorzien, en hoe de landbouw verknoopt was met de samenleving van de Argolis. In dit onderzoek wordt onderzocht hoe groot de bevolking kon zijn op basis van het voedsel dat in dit gebied werd geproduceerd. Het onderzoek is onderdeel van het bredere SETinSTONE project. Dit project onderzoekt of de arbeidskosten van monumentale bouwprojecten die op het Myceense vasteland werden uitgevoerd, zoals de bouw van vestingmuren en uitgebreide graven, een uitputting van de werknemers- en milieubronnen veroorzaakte, wat mogelijk heeft bijgedragen aan de sociaal-politieke crisis - de ineenstorting van de Bronstijd - in ca. 1200 v. Chr.

Om de voedselproductie op de Argolis in de Late Bronstijd te bestuderen, is een model gemaakt van het lokale landbouwpotentieel. Het model bevat de reconstructie van de Myceense landbouwpraktijken in relatie tot de Myceense politieke organisatie: een complex, hiërarchisch systeem onder toezicht van paleisbesturen. De modellering bestaat uit een reeks

berekeningen voor een schatting van het soort en de hoeveelheid voedsel die door de plaatselijke bevolking werd geconsumeerd, hun energieverbruik en de hoeveelheid land die nodig was voor het cultiveren van gewassen en het houden van dieren. De voor het model benodigde gegevens zijn gebaseerd op gepubliceerde archeologische, geografische, en etnografische studies. Deze aanpak van het combineren van gegevens uit verschillende bronnen in een samenhangende analyse is essentieel voor het onderzoek van boerengemeenschappen uit de Bronstijd, waarvan de materiële resten schaars zijn.

De resultaten van dit proefschrift tonen aan dat de landbouw van de Myceense boeren duurzaam was en dat zij goed bestand waren tegen bedreigingen zoals droogte en plagen. De Argolis vlakte in de Late Bronstijd was ideaal voor landbouwgemeenschappen die streefden naar duurzaamheid zonder hoge productiviteit. Dit proefschrift bespreekt de bestaande schattingen van de ruimte die nodig is om één persoon in het Neolithicum en de Bronstijd van de Egeïsche Zee van voedsel te voorzien. Eerdere schattingen van deze 'bestaansruimte' hebben geen rekening gehouden met de ruimtelijke behoeften en arbeidsbehoeften van de veestapel. Zuivel- en vleesproductie kunnen echter een dramatische invloed hebben op het landbouwpotentieel.

Daarom draagt dit onderzoek bij aan een beter begrip van de landbouwpraktijken en het bestaanssysteem van de Myceense samenlevingen in de eeuwen vóór de ineenstorting van de Bronstijd. Het illustreert hoe de vorming van de Myceense elites een diepgaande invloed kan hebben gehad op de plaatselijke landbouwgemeenschappen en via hen op de gehele samenleving.

Curriculum vitae

Riia Timonen was born in Mikkeli, Finland in 1985. She attended upper secondary school at Mikkelin Yhteiskoulun lukio between 2001 and 2003. In 2005 she began her Bachelor's studies in Art and Culture Studies at the University of Jyväskylä, Finland, specializing in Classical Greek and Roman art, museology, and heritage studies. During her BA and MA studies, Riia participated in archaeological 3D-recording projects in Greece, organized by the Finnish Institute at Athens. She also completed a semester in Milan, Italy, where she studied Art History and Egyptology. She completed her MA studies in Art History at the University of Jyväskylä in 2012. Her MA thesis focused on the depictions of mythical bear in Finnish prehistoric and early historical art. After graduation, Riia participated in several archaeological excavation and geophysical survey projects in mainland Greece, Crete and Sicily, organized by the Finnish Institute at Athens, University of Helsinki, and the Institute for Mediterranean Studies (IMS-

FORTH). In 2016, she was selected as a PhD Candidate in the SETinSTONE project at Leiden University, Faculty of Archaeology, headed by Prof.dr. Ann Brysbaert who was her initial supervisor. She completed her PhD under the supervision of Prof.dr. Bleda Düring and Dr. Amanda Henry. Riia investigated the food production potential of the Mycenaean Argive Plain, northeastern Peloponnese, Greece. Her dissertation, on which this book is based, presented a systematic study of the local agricultural practices and landscape resources, resulting in the estimation of the area's agricultural potential. During her PhD studies, Riia participated in excavation projects in central mainland Greece, took on various teaching and administrative tasks at the Faculty of Archaeology, and enjoyed being an active member of the PhD community. Riia is interested in studying rural lifeways in the Bronze Age Aegean, with a special focus on dietary and cultivation practices and tracing past agricultural activities in modern landscapes.

Chapter 1

Introduction

This monograph investigates the agricultural economy of the Mycenaean society of the Late Bronze Age (c. 1600-1200 BCE) Argive Plain, located in the north-eastern Peloponnese, Greece. The study consists of three main topics. Firstly, it offers a reconstruction of the local agricultural practices which formed the main subsistence strategy of the local population. Secondly, it performs an evaluation of the potential of the environment for food production through crop and animal husbandry. Thirdly, on the basis of a combination of environment and cultural aspects, it establishes an estimation of the population that could be sustainably fed. These three aspects will give new insights to the Late Bronze Age Argive Plain society, and the relationship it had with the environment.

The Late Bronze Age in southern mainland Greece and the Aegean islands has traditionally been referred to as the Mycenaean period (Maran and Wright 2020; Shelton 2012; Shermeldine *et al.* 2008). The Mycenaean period is known for its monumental sites, such as fortified settlements with walls of 'Cyclopean' masonry, burial architecture consisting of grave circles and beehive-shaped tholos tombs, and skilfully crafted gold and bronze items recovered in burial contexts (e.g. Crowley 2010; Hitchcock 2012; Laffineur 2012). The accomplishments of the Mycenaeans also include an early writing system called the Linear B script (e.g. Killen 1984; Nakassis 2013; Palaima 2012). These assemblages have triggered a long tradition of archaeological research dedicated to the deciphering and interpretation of the Linear B texts (from their first published translations by Bennett Jr. in 1953 to the most recent works by Judson 2020; Salgarella 2020; Zurbach 2020, and others), and understanding Mycenaean societal and political organization (e.g., the collective papers of Redistribution in the Aegean Bronze Age 2011, published in *American Journal of Archaeology*).

The Late Bronze Age Argive Plain has been associated with Homer's epic works, and considered as the place of origin for heroes such as king Atreus and his son Agamemnon (see Deger-Jalkotzy and Lemos [eds.] 2006; Gill 2008: 67). Inspired by epic tales, and the visible remains of the Bronze Age fortified settlements, the area became a popular destination for aristocratic travellers in the 18th and 19th centuries. Traveller's stories stimulated academic research interest in the area (e.g. Kotsonas 2020; Morris 2000). The first archaeological excavations were conducted in the Argive Plain as early as the latter half of the 19th century (Kotsonas 2020).

Famous scholars such as Schliemann and Tsountas were first to work at the Late Bronze Age sites of Mycenae and Tiryns. In the early 20th century, their work was continued by scholars such as Wace and Pendlebury, representing the newly established British School at Athens (Muskett 2014: 41-48; Webster 2008: 20). Today, many foreign and local archaeological schools, universities, and cohorts continue to excavate at Argive Plain sites, their work representing the continuum of more than a century of scholarly interest in the area.

From the beginning, the work at the Late Bronze Age sites of the Argive Plain focused on recovering the riches that could connect the sites with the ancient legends of kings, gods, and adventurers. Over time, this interest developed into a focus on the political organization of the plain and its neighbouring regions. It is only in recent years that the focus of Mycenaean studies in general has shifted from the palatial centres and their elites towards the broader society and local political systems (Feuer 2011: 68; Lupack 1999; 2011; Nakassis 2013; 2015; Sjöberg 2004; Wright 2004). How Mycenaeans related with their environment and sustained themselves are topics much less investigated. The deciphered Linear B texts, and the archaeobotanical and zooarchaeological data collected from the Late Bronze Age sites have shed limited light on local agriculture. However, little is known about how agriculture operated. Furthermore, quality estimates of the sustainability of the local agricultural production are lacking. Research tradition has mostly focused on palatial activities and the elites, and farming systems remain poorly understood.

This study contributes to the study of the Late Bronze Age rural communities of mainland Greece by investigating how they practiced agriculture. In this study, the term rural refers mainly to the people and areas located outside more densely inhabited settlements with administrative functions, but without directly contrasting it with urban, as urbanization in the Aegean context is seen to have taken place later, from the Early Iron Age onwards, perhaps beginning as early as the post-Mycenaean period (de Polignac 2005; Haggis 2015; Lemos *et al.* 2009). Rural further refers to people who resided in communities whose main livelihood came from agriculture, and to areas where agricultural activities took place. The case study area, the Argive Plain, is a first-rate example of a region where previous research has almost exclusively focused on the activities of the local Mycenaean elite. Thus, the

plain is recognized by many as one of the Mycenaean core areas (Bennet 2011: 157; Kilian 1988), and it is home to some of the most imposing Late Bronze Age settlements: Mycenae, Tiryns, and Midea. At the end of the Late Bronze Age, during the Mycenaean period, the Argive Plain was characterized by a unique settlement pattern, with several large settlements located within a few kilometres from each other. A few of these settlements, Mycenae, Tiryns and Midea, were fortified with defence walls, some of which were assembled from massive, unworked stone blocks so astonishing in size and appearance that they became commonly known as the Cyclopean style. Due to their walled character, these settlements are sometimes referred to as citadels, which points to their likely use as strongholds, places of potential refuge for the population living in their surroundings (Iakovidis 1983). In addition, they are often defined as Mycenaean palaces or palatial centres, inhabited by the local elites, administrative bodies, and specialist workers (see §2.2.1 and 3.4 in this volume).

The Argive Plain also included other large Late Bronze Age settlements such as Argos, Nafplion, and Argive Heraion, which were not walled and whose function and status has remained undefined due to the absence of evidence. The question of the relationship between the most notable settlements of the region has never quite been solved. Perhaps because of this, the land use of the plain has not been discussed in great detail, with the notable exception of John Bintliff, who conducted a detailed study of the area and its environment for his PhD dissertation (Bintliff 1977a). Archaeological investigations in the area, such as the Mycenaean Survey (Iakovidis *et al.* 2003), the Western Argolid Regional Project ¹ (e.g. Caraher *et al.* 2017) and the geological studies of Zangger (e.g. 1993, 1994) have continued apace since Bintliff's dissertation, creating new data of the local environment. In addition, new methods such as Geographic Information Systems and remote sensing enable more careful analysis of the landscape and its changes (e.g. Bonnier *et al.* 2019; Galaty *et al.* 2014; Knitter *et al.* 2019; Pullen 2022). Such studies have created great potential for new investigations that can significantly expand the knowledge of Late Bronze Age subsistence strategies.

This study has three main aims. The first is to develop a comprehensive understanding of the agricultural practices in the Argive Plain area, specifically in the last centuries of the Late Bronze Age, in the Late Helladic III

(1420/1410-1330/1315-1200/1190 BCE)² period, when the Mycenaean culture experienced a peak in wealth and power. The second aim is to estimate the potential of the region to sustain its populations. This analysis of the agricultural potential consists of a series of calculations of the crop productivity, environmental affordances, and food consumption. The calculations result in a number of people who could be sustained by the region and by the specific methods and knowledge that was available to produce food. The third, wider aim is to better understand the Mycenaean society as a whole and relate the agricultural practices to the social and political organization of the region. The societies in the Late Bronze Age Aegean region were in a state of transformation, from small subsistence communities towards larger state-like societies, with a more distinguished hierarchy. Most of the population consisted of non-elite members, farmers and simple workers, whose lifestyle likely resembled that of their ancestors. Therefore, Mycenaean societies cannot be understood only based on the newly established elite, even though their activities are much better recorded in the archaeological evidence. Studying the Late Bronze Age farming practices can help to place the emphasis on the non-elite. In addition, the establishment of the maximum size of the population that could be sustainable in a region enables more realistic observations of the potential of the local communities to adapt to major changes in their lives. In the Late Bronze Age, these could be sprouted for example by emerging elites and increasing social stratification, new foreign connections, and environmental changes.

Through these aims, this work touches upon a few key elements of the wider research tradition of the Bronze Age societies of the Eastern Mediterranean. Reconstructions of food production processes produce information on the environmental exploitation and resilience of the local population. These two themes, sustainability and resilience, have become increasingly important in recent archaeological research (specifically for Greece, see e.g. Lantzas 2016; Marston 2015; Timonen and Brysbaert 2021; Weiberg and Finné 2018), not least because they resonate with the pressing issues of our modern societies. In relation to the end of the Bronze Age, which is characterized by a major societal and political crisis, it is reasonable to ask whether Mycenaean communities were thriving in the given environmental conditions, cultural practices, and with the available technology, or if they were on their way to a subsistence crisis. A growing, developing

¹ Up to date, and to the best knowledge of the current author, the Western Argolid Regional Project has completed their survey in the Western fringes of the Argive Plain, but has not yet published their Bronze Age finds. Findings of other periods can be found for example in Erny and Caraher 2020, Gallimore *et al.* 2017 and Tetford *et al.* 2017 and 2018.

² This chronology is based on the presentation of Manning (2010: 23, Table 2.2). However, see section 2.1 of this book for further discussion about Helladic chronology. See also Friedrich *et al.* 2020, Manning 2014 and 2022, and Pearson *et al.* 2018 and 2022 for the most recent dating for the Thera eruption, which is the key determinant in the Aegean Bronze Age chronology.

population such as the Mycenaean population of the Argive Plain would ideally have reached a state of balance between its immediate needs and the available resources. By tracking down maximum population capacities through the analysis of food production, it is possible to see whether this was, in fact, the case. While the maximum capacity of the environment to sustain a population does not equal actual population numbers formulated by demographic methodologies, a comparison of these two approaches can shed light on regional sustainability, and potentially on its causality to population growth and decline (see [Chapter 4](#) pp.50-54 for further discussion).

Moreover, by focusing specifically on the human-environment relationship, it is possible to get a better understanding of how much the resource availability was dependent on the increasing modification of the local landscape. This is particularly relevant in a context where the local economy was transforming from subsistence farming into gathering wealth through specialized agricultural production such as wool and oil. The study of the size of the population of the Late Helladic III Argive Plain can further help to examine its position in the wider Mediterranean network, which, at the time, was dominated by the prominent Near Eastern and Egyptian civilizations. Finally, determining the local population sizes helps to examine the development of Mycenaean monumental architecture. In the Argive Plain context, the end of the Late Bronze Age was a period of high activity in large-scale construction projects. Most of the massive Cyclopean fortification walls were constructed at this time. Simultaneously, large tholos and chamber tomb cemeteries were dug in hillslopes (Hitchcock 2012; Voutsaki 2012), and a road system characterized as ‘Mycenaean highways’ emerged on the eastern side of the plain (Brysbaert 2013; 2020; 2021; Hitchcock 2012; Janssen 2002; Lavery 1990; Voutsaki 2012). These projects required a substantial workforce and organizational skills (Brysbaert 2013). Whether these workforces and the resources used for the construction became depleted in this period, as suggested in earlier literature, is now being analyzed in great detail (Brysbaert 2020; 2021; Timonen and Brysbaert 2021). Most recently, these themes were investigated in 2016-2021 by the SETinSTONE project (ERC grant agreement no. 646667), to which this study contributes by examining the capacity of the Argive Plain to sustain its population.

One of the main research interests of the Argive Plain has been its Late Helladic III settlement pattern which, due to the aforementioned abundance of large, fortified settlements, is considered rather unique in the Late Bronze Age Aegean context (e.g. Shelmerdine 1997, 1999a). At the same time, the plain is lacking

systematically collected evidence (i.e. survey data) of small rural sites which would prove the presence of agricultural communities and households (e.g. Wright 2004). This is one of the main reasons why Argive Plain agriculture or the agricultural labourers have not been examined intensively. The concept of agricultural potential can provide an alternative method to study regional subsistence strategies when there is a scarcity of settlement data (see section 4.2. in this book for more details). The process of formulating the agricultural potential examines the relation between the input and output efforts of food production. These consist, for example, of the available environmental conditions, species, and technology, and the basic subsistence needs per capita, household, and other units such as the local administrative elite. Due to a long history of research in the Argive Plain region, a vast amount of data is available from the local fortified settlements (see [Chapter 3](#) with references). Besides rich material finds of ceramics and metals, excavations have yielded botanical, faunal, and skeletal data (see [Chapter 5](#)).

This study approaches the Argive Plain subsistence activities through a literature review of these and other published data sets. The data is divided into six groups based on geography and soils, climate, flora, fauna, material and agricultural objects (limited to storage and agricultural installations), and human remains. Through comparative, interdisciplinary analysis, it examines local agriculture as an integrated system of intensive farming and animal husbandry. These data sets are combined with published data from similar contexts in the Middle and Late Bronze Age mainland Greece. ArcGIS will be used to analyze and visualize the data obtained. Literature analysis is supplemented with observations made during site visits. More importantly, studies of recent farming communities following traditional (i.e., mostly pre-industrial, non-mechanized methods without extensive use of fertilizers) practices are used as analogies for agricultural practices in semi-arid environments. A great deal of research has been devoted to the examination of Linear B tablets found at various sites (e.g. Aranvantis and Vasilogamvrou 2012; Nakassis 2013; Palaima 2012; Shelmerdine 2008b). However, due to their emphasis on elite activities, the information they include is only partially relevant to the topic of this monograph. Therefore, textual evidence will not be central to this study.

This monograph consists of eight chapters of which this introduction is the first. The second chapter provides an overview of the universal characteristics of the Late Bronze Age Aegean societies and the economic systems. Much of the evidence of the societal stratification, land and other ownership, and the regional and overseas flow of products derives from the Linear B records, and will be summarized. Third chapter introduces the

reader to the Argive Plain in the LH III period, right before the end of the Bronze Age. The focus of the chapter is on determining the local settlement pattern, based on the scattered data available. The chapter also provides an overview of the recent excavations and surveys in the Argive Plain sites and its surroundings. Fourth discusses the methodological background for the reconstructions of early agricultural systems and introduces the analysis of the agricultural potential. The data collected for the analysis are presented in the fifth chapter, which is divided into six subchapters,

each presenting one type of data. The reconstruction of the Late Bronze Age agricultural practices and the analysis of the agricultural potential of the Argive Plain are presented in the sixth chapter. Finally, the seventh chapter discusses the results in relation to the population estimates presented for the area and examines the yet unanswered questions concerning the subsistence strategies and land use organization of the Argive Plain. The conclusions are presented in the final chapter.