AGRICULTURAL TERRACES AND FARMSTEADS OF BOZBURUN PENINSULA IN ANTIQUITY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
THE MIDDLE EAST TECHNICAL UNIVERSITY

BY

VOLKAN DEMİRCİLER

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
DEPARTMENT OF SETTLEMENT ARCHAEOLOGY

FEBRUARY 2014

Approval of the Graduate School of Social Sciences

Prof. Dr. Meliha ALTUNIŞIK
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

Prof. Dr. D. Burcu ERCİYAS
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

Prof. Dr. Numan TUNA
Supervisor

Examining Committee Members

Prof. Dr. Asuman G. TÜRKMENOĞLU (METU, GEOE) _____

Prof. Dr. Numan TUNA (METU, SA) _____

Prof. Dr. Sevgi AKTÜRE (METU, CRP) _____

Prof. Dr. Yaşar E. ERSOY (HİTİT UNIV, ARCHAEO) _____

Assoc. Prof. Dr. Lale ÖZGENEL (METU, ARCH) _____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name: Volkan DEMİRCİLER

Signature:

ABSTRACT

AGRICULTURAL TERRACES AND FARMSTEADS OF BOZBURUN PENINSULA IN ANTIQUITY

DEMİRCİLER, Volkan

Ph.D., Department of Settlement Archaeology

Supervisor: Prof. Dr. Numan TUNA

February 2014, 158 pages

In this thesis, the agricultural terraces and farmsteads lying in a region which encompasses the study area limited with the Turgut Village in the north and beginning of the Loryma territorium in the south, in the modern Bozburun Peninsula (also acknowledged as the Incorporated Peraea in the ancient period) are examined and questioned.

It is put forward that, despite the disadvantages caused by the topographical structure of the region for the agricultural production, terrace farming was successfully applied, particularly during the Hellenistic period, and production increased dramatically, through the operation of a well-organized agricultural system under the Rhodian control.

With the application of an extensive survey method, photogrammetry and Geographical Information Systems (GIS), it has been understood that the agricultural terraces were built as a result of a conscious action and in an organized manner, in consideration of the topographical structure (elevation, slope, aspect) and pedological characteristics of the region. Moreover, through the interpretation of the relationship between 18 farmsteads that were recorded in the course of field surveys carried out in 2009-2012 and the agricultural terraces, it has been concluded that these farmsteads were the significant parts of the economy system that was shaped within the framework of the intensive agrarian practices.

Keywords: Agricultural Terraces, Farmsteads, Rural Archaeology, Geographical Information Systems (GIS), Rhodian Peraea, Bozburun Peninsula

ÖZ

ANTİK DÖNEMDE BOZBURUN YARIMADASI TARIM TERASLARI VE ÇİFTLİK EVLERİ

DEMİRCİLER, Volkan

Doktora, Yerleşim Arkeolojisi Bölümü

Tez Yöneticisi: Prof. Dr. Numan TUNA

Şubat 2014, 158 sayfa

Bu tezin konusunu antik dönemde Birleşik Rodos Pera'sı olarak adlandırılan, günümüz Bozburun Yarımadası'nda kuzeyde Turgut Köyü, güneyde Loryma antik kenti teritoryumunun başlangıcı ile sınırlandırılmış bir çalışma alanını kapsayan bölgedeki tarım terasları ve çiftlik evleri oluşturmaktadır.

Bölgenin topografik yapısının tarımsal üretim için sebep olduğu dezavantajlara rağmen; özellikle Hellenistik dönemde teras tarımının başarılı bir şekilde uygulandığı ve tarım sisteminin Rodos kontrolünde çok iyi organize edilmesi sayesinde üreminin ciddi miktarlarda arttığı ileri sürülmektedir.

Yöntem olarak ekstansif yüzey araştırması, fotogrametri ve Coğrafi Bilgi Sistemleri'nin (CBS) kullanıldığı çalışmada, tarım teraslarının bölgenin topografik yapısı (yükseklik, eğim, bakı) ve toprak özellikleri dikkate alınarak bilinçli ve organize bir şekilde inşa edildikleri anlaşılmıştır. Ayrıca, 2009-2012 yılları arasında gerçekleştirilen arazi çalışmaları esnasında tespit edilen toplam 18 adet çiftlik evinin tarım terasları ile olan ilişkilerinin yorumlanması sayesinde bunların yoğun tarım pratikleri çerçevesinde şekillenen ekonomik sistemin önemli birer parçası oldukları sonucuna varılmıştır.

Anahtar Kelimeler: Tarım Terasları, Çiftlik Evleri, Kırsal Arkeoloji, Coğrafi Bilgi Sistemleri (CBS), Rodos Perası, Bozburun Yarımadası

To Mehtap

ACKNOWLEDGEMENTS

I would like to express my sincere thanks and regards to my supervisor, Prof. Dr. Numan TUNA for his guidance and support throughout this thesis. I would like to express my gratitude to Prof. Dr. Sevgi AKTÜRE, Prof. Dr. Asuman G. TÜRKMENOĞLU, Prof. Dr. Yaşar E. ERSOY and Assoc. Prof. Dr. Lale ÖZGENEL for their supporting and guidance through doctoral steering and examining committee meetings. I would like to thank to Prof. Dr. G.M. Vedat TOPRAK for his guidance during the surveys and GIS works. I would also thank to my dear friend Dr. E. Deniz OĞUZ-KIRCA for her comments and contributions into this study.

TABLE OF CONTENTS

PLAGIARISM iii
ABSTRACT iv
ÖZ vi
DEDICATION viii
ACKNOWLEDGEMENTS ix
TABLE OF CONTENTS x
LIST OF FIGURES xii
LIST OF TABLES xiv
LIST OF PLATES xv

CHAPTER

1. INTRODUCTION 1
   1.1 Problem Definition and Objectives of the Study 1
   1.2 Significance and Limitations of the Study 2
   1.3 Method of the Study 4
   1.4 Layout of Thesis 9
2. RURAL LANDSCAPE IN ANTIQUITY 11
   2.1 Agricultural Terraces 11
   2.2 Farmsteads 16
3. INCORPORATED RHODIAN PERAEA IN ANTIQUITY: A CASE STUDY IN BOZBURUN PENINSULA 27
   3.1 Defining the Study Area 27
   3.2 Historical Background 28
   3.3 Physical Setting 36
4. ANALYSIS OF THE DATA ON AGRICULTURAL TERRACING AND FARMSTEADS 40
   4.1 GIS Analysis of the Agricultural Terraces 40
   4.2 Typology of the Farmsteads and Their Relations to the Agricultural Terraces…….. 56

5. DISCUSSION: ASSESSMENT OF THE RESEARCH RESULTS IN THE CONTEXT OF CLASSICAL ANTIQUITY 63
6. CONCLUSION 77
REFERENCES 83
APPENDICES 89
A. FARMSTEAD CATALOGUE 89
B. PLATES 102
CURRICULUM VITAE 140
TÜRKÇE ÖZET 141
TEZ FOTOKOPİSİ İZİN FORMU 158

LIST OF FIGURES

FIGURES

Figure 2.1 Types of agricultural terraces: stepped (a,b), braided (c), pocket (d) 13
Figure 2.2 Components and stratigraphic elements of terraces 14
Figure 2.3 Plan of the Dema House 21
Figure 2.4 Plan of the Vari House 22
Figure 3.1 Map showing the scope of the study area 27
Figure 3.2 Map showing the borders of the study area and *deme* centers 28
Figure 3.3 Map showing Caria with Incorporated and Subject Peraea 30
Figure 3.4 Geology map of the Bozburun Peninsula 37
Figure 4.1 Map showing agricultural terraces and flat fields in the study area 41
Figure 4.2 Elevation map of the study area 42
Figure 4.3 Elevation difference histogram of terraces 44
Figure 4.4 Slope map of the study area 47
Figure 4.5 Slope difference histogram of terraces 47
Figure 4.6 Aspect map of the study area 48
Figure 4.7 Aspect difference histogram of terraces 50
Figure 4.8 Soil map of the study area 51
Figure 4.9 Soil difference histogram of terraces 52
Figure 4.10 Erosion degrees of terraces 53
Figure 4.11 Land-use capability of terraces 54
Figure 4.12 Ancient farmsteads detected in the survey and deme centers 56
Figure 4.13 F.18 and agricultural terraces, Taşlıca (south-west) 58
Figure 4.14 F16. and agricultural terraces, Gedikçukur, Taşlıca (south-west) 58
Figure 4.15 F.18 and agricultural terraces, Küçükdibekbaşı, Taşlıca (south-west) ... 59
Figure 5.1 Map showing Antikythera and agricultural fields and terraces 64
Figure 5.2 Classical farm estate at Aghia Photeine and agricultural terraces 68
Figure 5.3 Classical farm estate surrounded by agricultural terraces, Charaka 69

Figure 5.4 Ancient agricultural terraces, south of Hızırşah Village, Datça 71
Figure 5.5 Agricultural terraces and dried-up streams 72

LIST OF TABLES

TABLES

Table 4.1 Distribution of agricultural terraces and flat fields 41
Table 4.2 Elevation values for all area 42
Table 4.3 Elevation values of the area (100 m. intervals) 43
Table 4.4 Elevation values of terraces 43
Table 4.5 Elevation values of terraces (100 m. intervals) 44
Table 4.6 Slope values of all area 45
Table 4.7 Slope intervals of all area 45
Table 4.8 Slope values of terraces 46
Table 4.9 Slope intervals of terraces 46
Table 4.10 Aspect results of all area 49
Table 4.11 Aspect results of terraces 49
Table 4.12 Major soil type distribution of all area 51
Table 4.13 Major soil type distribution of terraces 52
Table 4.14 Erosion degrees of terraces 53
Table 4.15 Land-use capability of terraces 54

LIST OF PLATES

PLATES

Plates 1 Map showing the locations of F.1 and F.2 102
Plates 2 Plate 2: Eastern wall of F.1, Örteren, Bozburun..... 102
Plates 3 Entrance of F.1, Örteren, Bozburun 103
Plates 4 Chamber of F.1 in the north, Örteren, Bozburun..... 103
Plates 5 Niches at the inner walls of F.1, Örteren, Bozburun 104
Plates 6 Agricultural terraces in the surroundings of F.1, Örteren, Bozburn..... 104
Plates 7 Modern sheepfold near F.1, Örteren, Bozburun..... 105
Plates 8 Agricultural terraces in the area between Üçeren and Kuştepe..... 105
Plates 9 Eastern walls of F.2 and agricultural terraces, Üçeren, Bozburun 106
Plates 10 *In situ* workshop near F.2, Üçeren, Bozburun..... 106
Plates 11 Map showing the location of F.3 107
Plates 12 Remains of F.3, Yeşilova, Bozburun..... 107
Plates 13 Press-stone, in 100m west of F.3, Yeşilova, Bozburun..... 108
Plates 14 Map showing the location of F.4 108
Plates 15 Remains of F.4, located in the alluvial base valley, Selimiye..... 109
Plates 16 Entrance of F.4, faces the south, Selimiye 109
Plates 17 Eastern wall of F.4, Selimiye..... 110
Plates 18 Architectural blocks in 250m south-east to F.4, Selimiye..... 110
Plates 19 Map showing the location of F.5 111
Plates 20 Entrance of F.5, Erler Region, Selimiye..... 111
Plates 21 Press-stone, near F.5, Erler Region, Selimiye 112
Plates 22 Surface ceramics, detected at the site of F.5, Erler Region, Selimiye..... 112
Plates 23 Map showing the locations of F.6 and F.7 113
Plates 24 Agricultural terraces around F.6, Kızılköy, Selimiye..... 113
Plates 25 Entrance of F.6, faces the south-west, Kızılköy, Selimiye..... 114
Plates 26 Eastern wall of F.6, Kızılköy, Selimiye..... 114

Plates 27 Agricultural terraces in a pocket plain, Kızılköy-Söğüt border 115
Plates 28 Ruins of F.7, Kızılköy-Söğüt border 115
Plates 29 Unplastered well, near F.7, Kızılköy-Söğüt border 116
Plates 30 Map showing the location of F.8 116
Plates 31 2D view of F.8 117
Plates 32 Northern wall of F.8, Taşlıca (E) 117
Plates 33 Western wall of F.8, Taşlıca (E) 118
Plates 34 The wall split F.8 into two, Taşlıca (E) 118
Plates 35 Agricultural terraces in the north-east to F.8, Taşlıca (E) 119
Plates 36 Agricultural terraces in the north-east to F.8, Taşlıca (E) 119
Plates 37 Debris nearby the press-stone, Taşlıca (E) 120
Plates 38 Cistern in the eastern part of F.8, Taşlıca (E) 120
Plates 39 Surface ceramics detected at the site of F.8, Taşlıca (E) 121
Plates 40 Ancient route, Sindili depresion, Taşlıca (S-W) 121
Plates 41 Map showing the locations of F.9 and F.10 122
Plates 42 Entrance of F.9 faces the south-east, Talıca (S-W) 122
Plates 43 Remains of F.10 and surface ceramics, Taşlıca (S-W) 123
Plates 44 Architectural blocks around the site of F.10, Taşlıca (S-W)? 123
Plates 45 Map showing the locations of F.11, F.12, F.13, F.14 124
Plates 46 Remains of F.12, Taşlıca (S-W) 124
Plates 47 Remains of F.13, Taşlıca (S-W) 125
Plates 48 Partly preserved walls of F.13, Taşlıca (S-W) 125
Plates 49 *In situ* base walls of F.14, Taşlıca (S-W) 126
Plates 50 Highly destroyed building blocks of F.11, Taşlıca (S-W) 126
Plates 51 Surface ceramics around F.11, Taşlıca (S-W) 127
Plates 52 Tomb-like structure (looking outside), Taşlıca (S-W) 127
Plates 53 Tomb-like structure (looking inside), Taşlıca (S-W) 128
Plates 54 Map showing the locations of F.15, F.16, F.17 128
Plates 55 Agricultural terraces, Gedikçukur, Taşlıca (S-W) 129
Plates 56 Terrace walls embracing F.15, Taşlıca (S-W) 129
Plates 57 *In situ* base walls of F.15, Taşlıca (S-W) 130

Plates 58 2D view of F.16 130
Plates 59 Entrances of F.16, Gedikçukur, Taşlıca (S-W) 131
Plates 60 Isodomic walls of F.16, Gedikçukur, Taşlıca (S-W) 131
Plates 61 F.16 and agricultural terraces, Gedikçukur, Taşlıca (S-W) 132
Plates 62 Agricultural terraces around F.16, Gedikçukur, Taşlıca (S-W) 132
Plates 63 Surface ceramics around F.16, Gedikçukur, Taşlıca (S-W) 133
Plates 64 Remains of F.17, Taşlıca (S-W) 133
Plates 65 Entrance of F.17, Taşlıca (S-W) 134
Plates 66 Tomb-like structure near F.17, Taşlıca (S-W) 134
Plates 67 Map showing the location of F.18 135
Plates 68 2D view of F.18 135
Plates 69 Ancient route, Küçükdibekbaşı, Taşlıca 136
Plates 70 Agricultural terraces around F.18, Küçükdibekbaşı, Taşlıca 136
Plates 71 Remains of F.18 and agricultural terraces, Küçükdibekbaşı, Taşlıca 137
Plates 72 Modern port of Rhodes, viewing from F.18 137
Plates 73 Agricultural terrace wall near F.18, Küçükdibekbaşı, Taşlıca 138
Plates 74 Rock-cut stairs at the site of F.18, Küçükdibekbaşı, Taşlıca 138
Plates 75 Surface ceramics around F.18, Küçükdibekbaşı, Taşlıca 139

CHAPTER 1

INTRODUCTION

1.1. Problem Definition and Objectives of the Study

Agriculture, as an innovation, has been one of the most important subversive transformations in history. With the help of agriculture, feeding large populations could be possible since it offered different kinds of food resources. Agriculture led to a transition. People left nomadism and settled down as agricultural communities. This transformation affected economic, political, and settlement systems of ancient societies. With such a transition, human – environment interrelations also changed. In terms of the organisation system of the ancient societies, agriculture caused three important changes. Firstly, as a result of the sedentary lifestyle, population increased and people tended to live together in denser settlements. Secondly, social structures of the ancient communities started to change as a result of agricultural intensification. Agricultural intensification together with improved storage facilities brought surplus accumulation. People who controlled and managed the agricultural surplus held advantageous positions in the society, which ultimately caused the emergence of social inequalities and hierarchies. Finally, social and political organizations of the ancient societies changed (Redman 1999: 90-91).

According to Renfrew (1972: 480-482), agricultural production in the ancient Mediterranean world was one of the agents that accelerated the establishment of complex societies. The famous triad of the Mediterranean agriculture was olive, vine and grain. The accumulation of surplus, which was caused by the increased productions of these agricultural crops in the hands of some groups, created social

complexities and hierarchies. Beginning from the early 3rd century B.C., olive and vine became significant agricultural crops. Unlike cereals, olive and vine could be cultivated on the marginal lands where slopes are steep and soils are not suitable for the grain. The total amounts of production increased as a result of inclusion of the marginal lands to the agricultural system. It is very hard to talk about a thoroughgoing self-sufficiency for ancient societies. Surplus accumulation had occurred differently in different societies. Some of them had olive-oil and wine but did not have adequate grain. Reversely, some of them were able to accumulate surplus of cereals but they needed olive-oil and wine. So, an inter-regional distribution system had been established amongst the societies whose agricultural surplus was accumulated diversely.

This study proposes that the Rhodian control over the agricultural system in the Incorporated Peraea increased during the Hellenistic period and that the organization of the agricultural terraces is an indicator of her great involvement in the intensification of agricultural production. The study also takes it for granted that the vast majority of the agricultural terraces were exploited in antiquity. Many questions might be raised on the subject matter as it is still an ongoing discussion in the scholarly world, particularly geared toward ancient terrace systems and their management. However, it is quite difficult to establish a complete set of parameters in relation to dating within the whole, wide study area. For this reason, the style of architecture applied on the agrarian farmsteads, type of masonry applied on the associated terrace walls and surface assemblages in the close surroundings have been taken into account.

1.2. Significance and Limitations of the Study

The elaboration of rural localities with landscape archaeology has become vital for understanding the way of organization in the hinterlands of urban centers. Hence, the *chora,* often linkable with ancient agricultural systems, is being widely discussed amongst the scholars. The Bozburun Peninsula, which has a notable status with

regard to the ancient agricultural terraces, is a challenging region within this context. There are strong indicators that these terraces were managed successfully in antiquity, however they began to be run at the end of the Classical period and were fully exploited during the Hellenistic era.

There remain various questions to be asked as to how the land geared toward agriculture were chosen and exploited in a region which was not foreign to the Carians. Hence, the more we understand about the terraces, the better we can interpret about the man-made rustic structures out in the countryside. That the countryside was an indispensable element in antiquity has been highlighted in many works of the scholars but few of them were involved with the physical borders of the Bozburun Peninsula. Also, the study area has not been fully described regarding the ancient terrace systems. As long as we can find out the main drivers of these terraces and the relational structures in the *chora*, there is possibility that the ancient potential offered by this region can be promoted. There is also need to add to the knowledge disseminated so far in this part of Anatolia as it used to be part of the Mediterranean trade network. As a matter of fact, many regional researches in south-west Anatolia have remained incomplete as they skip the scale of economy and trade (though is often problematic) in the environs, particularly in quantitative terms. They hardly go further in seeking the role of the environmental factors on the organisation of agriculture. Therefore, the problematic left behind the scholars about the economic organisation and agricultural system of the Peraea seek further answers, starting within the environmental context.

Due to the difficulties of exploring over such a harsh terrain, certain parts of the study area could not be reached by foot. Rather, aerial views were examined in detail with the help of stereo photographs. On the other hand, the scope of survey permissions was subject to limitations by the Ministry of Tourism and Culture of the Turkish Republic. Accordingly, it was strictly prohibited to collect any type of material during the surveys, including the pottery. Hence, no drawings of the relevant assemblages could be accomplished. The ceramic evidence could only be

photographed at the field. Another limitation has been the dating of the agriculture terraces since many of them were reused over the ages.

1.3. Method of the Study

The field of landscape archaeology has become widespread to get involved with the concept of space, hence the relationship between space and place, in the past, recently. It is a tool referred to as a "backdrop" to understand the spatial setting of the archaeological data while it quite relates to the resources influencing the way of acting by the human beings in certain situations within the economic and political context (Ashmore and Knapp 1999:1). To express in a more simple way, we can state that it is centered on the notion of place or location of anything about the human past, however is not limited to a "set of physical nodes" in a certain space. It is rather a combination and interpretation of the socio-environmental and economic aspects which are inseparable from the experiences, emotional lives, know-how or the ontological problems of the human beings (David and Thomas 2008:38). In this respect, it is more than an issue of site exploration. Those who are interested in landscape archaeology need to look at the interactions between the sites and the physical boundaries which divorce them from each other, through the usage of various tools such as cartographic materials, literature review, documentation and site surveys that often require physical effort. By this way, the discipline enables the scholars to generate and interpret knowledge through the study of multiple archaeological research areas, from a broad perspective (Chapman 2006:11).

The Mediterranean region which is often acknowledged with the main players of the ancient Greek and Roman world has been quite a prolific basin for the development of landscape archaeology in the scholarly world, particularly after 1970s. The potential this basin offered for the great advances in the archaeological research also led to the expansion in the numbers of systematic surveys. Hence, creation of awareness for conducting research in broad regional survey network taking into account the significance of landscapes could be achieved. Before 1970s, the

researchers could hardly go behind understanding, e.g the terrace systems by making cross comparisons with the modern ones. Likewise, they did not take cognizance of the non-diagnostic surface assemblages or random off-site scatters. Today, many Mediterranean archaeologists, who are focused, e.g. in Greece, attach importance to the study of a wide range of sites and various contextual components with a view to explain them within the change process of these sites in the long-run. Many techniques, including some famous ones like resistivity and magnetometric study or remote sensing, are being applied nowadays, which also act as contributory methods to answering the long-term questions in any kind of survey (Witmore 2007:194-195). A good example for the success of landscape archaeology conducted in the Mediterranean following the postwar period was the South Etruria Survey (e.g. Potter 1979, Ward-Perkins 1962) which had been quite inspiring for the upcoming surveys. Also, the Minnesota Messenia Expedition (MME) which was conducted in 1950-1970s in Greece was a regional research (McDonald and Rapp 1972) and acted as a model in the whole Aegean. The potentials offered through the adoption of such a regional approach has been innovative enough since it encompassed many research questions dealing with the sites and settlements attributable to various periods including the later ones, environmental and economic aspects, natural settings and ethnographic research (Athanassopoulos and Wandsnider 2011:1-3).

As was implied, the first comprehensive method of this study has been extensive field survey which was conducted in line with the limitations posed by the Ministry of Culture and Tourism of the Turkish Republic. Additional techniques were applied soon after the field works or concurrently. With the help of aerial photographs and GIS, all agricultural terraces in the study area were mapped. Before the field works, some regions in the study are (Bozburun, Selimiye and Taşlıca) were sampled as potential localities in which the possibility of finding rural settlements is high. As a result of concentration on these areas during the extensive surveys, 18 farmsteads were detected. Collecting any type of surface material was not allowed by the Ministry of Culture and Tourism of the Turkish Republic. For that reason ceramic distributions, which were observed around the sites, were photographed for

documentation and dating. Besides, every type of archaeological remains and installations such as press-stones were recorded. Masonry characteristics of terraces in the sampled areas were noted and their relations to topography, farmsteads and the other archaeological features were investigated.

The techniques of Aerial Photogrammetry and Geographical Information Systems (GIS) were basically applied for the analyses of the agricultural terraces and tracing the potential land used. Certain parameters were taken into account during the analysis process. We mainly looked at surface and land formation processes (e.g. erosion, bedrock geology, terrace typologies (e.g. braided, stepped, earthen, stone-walled, ghost terraces) and soil types (major soil groups, land use capacity, degree of erosion) and, have come up with a set of analyses in relation to elevation, slope, aspect.

Aerial photography is a significant tool within the context of landscape archaeology. By this way, the scholars can compromise "geology, geomorphology, land use, vegetation, hydrology, etc." which help to the interpretation of man-made environments. Regardless of being small or big, the ancient habitats can be traced back to remote times involving palaeographic evidence. The importance of landscape archaeology is also owed to its exploitation from the aerial views which enable many archaeologists to grab evidence that have been destroyed due to modern public works and constructions with urbanization. Through a careful analysis of current or historical aerial views, the documentation of the exact location of archaeological evidence and palaeo-environmental elements can be made (Scardozzi 2008:1).

The technique of aerial photography began to be used beginning from the 1st world War and became widespread, particularly to understand the spatial processes in archaeology. Nowadays, sensors placed beneath air vehicles or images obtained from the satellites help the creation of aerial photographs (Bewley 2002:12-14).

The archeological features which are not visible at the ground level ease the detection of various components via this method. The appearance of soil marks and/or their textures in diverse color, can address various man-made features especially in oblique photographs. The differences created by the rate of growth in vegetation on a particular land full of earthworks can ease the recognition of "crop marks" during certain annual periods. These are not all the time reliable, though. It is often because of relief distortions (Wheatley and Gillings 2002:66-68). To remedy accuracy in spatial analyses, the distortions need to be corrected and images be improved in the course of orthophoto creation. An orthophoto is simply a "geometrically corrected" image/ photograph retaining a uniform scale. Hence, it is an integrated photo with accurate measurements.

On the other hand, GIS is a tool/software used for processing, storing, manipulating, interpreting, etc. spatial data. It enables usage with two types of data structures which are raster and vector data. With raster data, we can only use single spatial information and primary data where a unique value grid cell "which represents some basic dimension on the ground" covers a "continuous or categorical" attribute. The vector data, other contrary, relates to the codification of two coordinates. Points, lines and polygons form the three spatial data types. Both have advantages and disadvantages. People often get involved with vector data for exploring the relations and networks between a given information whereas raster data helps tackling the surfaces (Fisher 1999:5). GIS has been widely recognized amongst the scholars as it facilitates the processing, integration, interpretation and updating of data in shorter periods. One can easily display and monitor data via graphics and cartographic applications (Preysler and others 1999:133).

The reconciliation of methods, including GIS, in the process of spatial analyses, is of quite importance when working with the archaeological data. However, problems may occur when an accurate three dimensional model of a physical environment cannot be attained. Hence, thoroughly created Digital Elevation Models (DEM) are necessary (Belcher and others 1999:96). When the survey areas are too wide, it barely

gets possible to obtain accuracy in the elevation measurements. When not, the equipment like a total station or a well-functioning GPS often suffice. In any case, the archaeology world has been in a trend of exploring terrain data via DEMs which are created through topographic maps and the like. But the recent trend has been the frequent application of photogrammetry (Wheatley and Gillings 2002:101).

Under the purposes of this research, basic map operations were conducted through the use of different scale maps produced by the General Command of Mapping.

Basically, three data sets were utilized:

1. Aerial photographs: The aerial photographs in printed versions (1/15.000 scale, dated 1972) were used during the preparation process of the field surveys so that various sectors of the study area could be pre-checked. Secondly, the DEM of the region was created from the digital contour map of the region. The recent digital aerial photographs and the digital contour map (below) were utilized for the creation of a mosaic of these photographs so that an orthophoto of the region could be created. By using the DEM so created, elevation, slope and aspect maps were generated. With the help of GIS (ESRI-ArcGIS-Desktop10), vector data of terraces, flat fields and farmstead were created.

2. Digital maps: The soil map (1/25.000 scale) of the study area was obtained from the Ministry of Agriculture. Subsequent to surveys, different categories and attributes of soil were studied accordingly. Additionally, the contour map having a scale of 1/25.000 was put to use in order to create the DEM the study area, as explained above.

3. Printed maps: 1/ 25.000 scale digital elevation map and 1/ 5000 scale topographical maps were studied in detail soon before the field works.

Using all those necessary material at hand, different analyses were made to understand the morphology of the terrain. The morphology analysis (in relation to elevation, slope and aspect) was made for the terraces. The soil analyses were also conducted for the same. A selection was made on certain attributes (major soil group, degree of erosion and land use capability).

1.4. Layout of the Thesis

In Chapter 2, the dynamics of the agricultural system, specific to the terraces and farmstead, in the ancient Greek world is examined. The first part seeks out the general characteristics of and approaches to the previously reported terrace studies in archaeology while it also deals with various factors (e.g. the creation of plain areas suitable for agriculture over the undulated terrains, erosion control) affecting terrace building in the ancient Greece. The types of terraces which are often come across in the Mediterranean and Aegean region are examined and; the criteria, which have been offered to attention for the dating of terraces in the course of archaeological surveys, are put in an orderly manner thereafter. In the second part, the natural factors having impact on the ancient Greek agriculture are brought forward and the strategies practiced by the Greek farmers in order to increase the agricultural efficiency are studied. Additionally, the place and function of the farmsteads, which have been detected during the surveys carried out in the Aegean world, within the ancient agricultural system and the rural settlement patterns; the management models of Greek farming; the issues of property and ownership and; the labor force used are discussed.

The first part of Chapter 3 defines the scope of study area. In the second part, the historical background on the Rhodian State and its territories on the mainland (the Subject & Incorporated Peraea) beginning with the 3rd century B.C. and; particularly the supreme role of the Island, thus the region played in the agrarian trade during the Hellenistic era are discussed. The geomorphology and physical geography of the

Bozburun Peninsula which encompasses a great part of the study area is investigated in the third part.

In the first part of Chapter 4, the data and the results attained from the GIS analyses of the agricultural terraces in the scope of study are presented. The second part inquires about the relationship of 18 farmsteads (whose attributes are detailed in the catalogue in the Appendix A) that were detected during the surveys to the agricultural terraces. A typology (on farmsteads) created according to the general characteristics of the farmsteads are also given in this part.

In the Final Chapter, a comparative study is made such that the findings of the surveys (made under the purposes of this research) relating to the agricultural terraces and the farmsteads and their results attained through the application of photogrammetric studies and GIS analyses are discussed, by presenting the main results of the regional surveys having proximity to the study area and the results of researches conducted on mainland Greece. Furthermore, the common and different aspects for both the study area and the sample surveys are laid down.

CHAPTER 2

RURAL LANDSCAPE IN ANTIQUITY

2.1. Agricultural Terraces

Agricultural terraces spread all over the Aegean region, have profound importance to understand the ancient landscapes and agriculture, and should be examined in terms of their function, scope and history. Terraces have been studied by scholars from various disciplines including geography, geology, ecology history and archaeology. Additionally, relations of terraces with geomorphology, erosion, and sedimentation processes have also been investigated. Most of the time the approaches used in various research projects were not quantitative but were further tentative (Krahtopoulou and Frederick 2008:550-551).

There can be various reasons behind terrace construction. For instance, the redistribution of arable soils might be necessary, particularly on limestone areas. By terracing, it is possible to create small pockets suitable for cultivation. Some types of sub-soils, although can well protect the plants' roots during the first stages of their growth, are too solid for the root penetration of plants such as vine and olive. The terraces ease the root penetration of the plants by recessing the necessary gaps on the rock. Steep surfaces, which are not suitable for cultivation, can be made smoother by terracing. They help to control erosion. In wet regions, terraces enhance the water absorption of the soil. Some regions, such as Limnes in the Northen Argolid, welcome terraces with extra massive blocks. The usage of such massive blocks can time to time be assessed as being unnecessary. However, Greece is a stony country and the fields need to be cleaned from the stones in order to make a proper cultivation (Rackham and Moody 1992:124). According to Frederick and

Krahtopoulou (2000:82), the main reasons of terrace construction are "erosion control, water conservation and land reclamation". He states that these factors promote the construction of terraces in the first instance but when the construction is over; the terraces begin to affect these factors, as well.

Agricultural terraces which are spread over most of the Mediterranean regions are the signs that inform us about how the landscapes have been managed effectively. Mainly, there are three functions of agricultural terracing: to create level surfaces for cultivation, to control erosion, and to maintain moisture of the soil. When compared to level-field cultivation, terrace cultivation is an intensive type of agriculture. It requires much more labor input but provides much more yield per hectare. Although there is not a consensus between the scholars about how far the origin of the terracing goes back, it is one acceptance that terracing in agriculture has been applied since the 5th century B.C. . (Petanidou, Kizos and Soulakellis 2008:251).

According to Rackham and Moody (1992:123-125) there are mainly three types of terraces in the Mediterranean region; stepped, braided and pocket terraces (Fig. 2.1). Stepped terraces, also named as contour terraces, are built as parallel to each other. Braided terraces are constructed in a shape of zigzag, and linked up by bends. Pocket terraces are built in an orderly manner to support the individual trees, especially the olives. Sometimes terraces are encircled or divided by enclosure walls in order to keep the livestock away. Enclosure walls can be distinguished from terrace walls in terms of their positioning and their shape. Enclosure walls are mostly solid and that the stones on both sides of the wall have a surface finish. It is hard to determine which crops were cultivated over some particular terraces in the past. For example in Crete, there used to be grain or vine cultivation on many terraces but now many of them are occupied by the olive trees. So, different kinds of agricultural crops could have been cultivated on particular terraces in particular periods of time. However, it is still possible to make some general assumptions. Well-built step terraces are often reserved for the profitable crops like olive and vine. It is possible to find single fruit

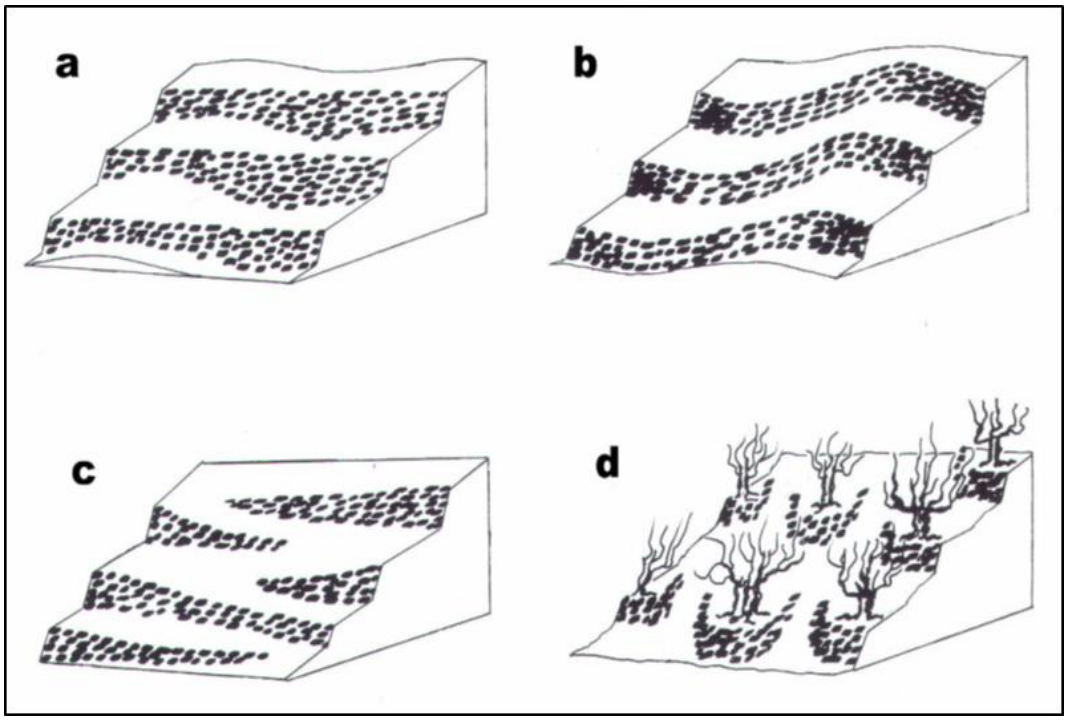

Figure 2.1: Types of agricultural terraces: stepped (a,b), braided (c), pocket (d) (Rackham and Moody 1992:124, Fig. 1)

trees like olive or fig on the pocket terraces. Braided terraces are often related to grain cultivation since their zigzag shapes and switchbacks allow for plowing (Rackham and Moody 1992:124-125).

The components and stratigraphic elements of terraces (Fig. 2.2) are the pre-existing surface, the riser, the riser fill, the tread fill, the cultivation surface and the post-abandonment fill. The pre-existing surface is most of the time a palaeosol underlying the terrace deposits. The riser is most of the time a vertical dry-stone wall or earthen bank. The riser fill is v-shaped deposits situated just behind the riser. The possible function of the riser fill related with drainage or it consists of the residuary materials placed after construction for supporting the riser. The tread consists of post-abandonment fill, cultivation surface and the tread fill. The tread fill is the deposition under the cultivation surface of terraces. It may consist of the original soil of the slope, carried soils from near regions (e.g. fertile alluvium from near valleys), other anthropogenic deposits, or three of them (Frederick and Krahtopoulou 2000:84-87).

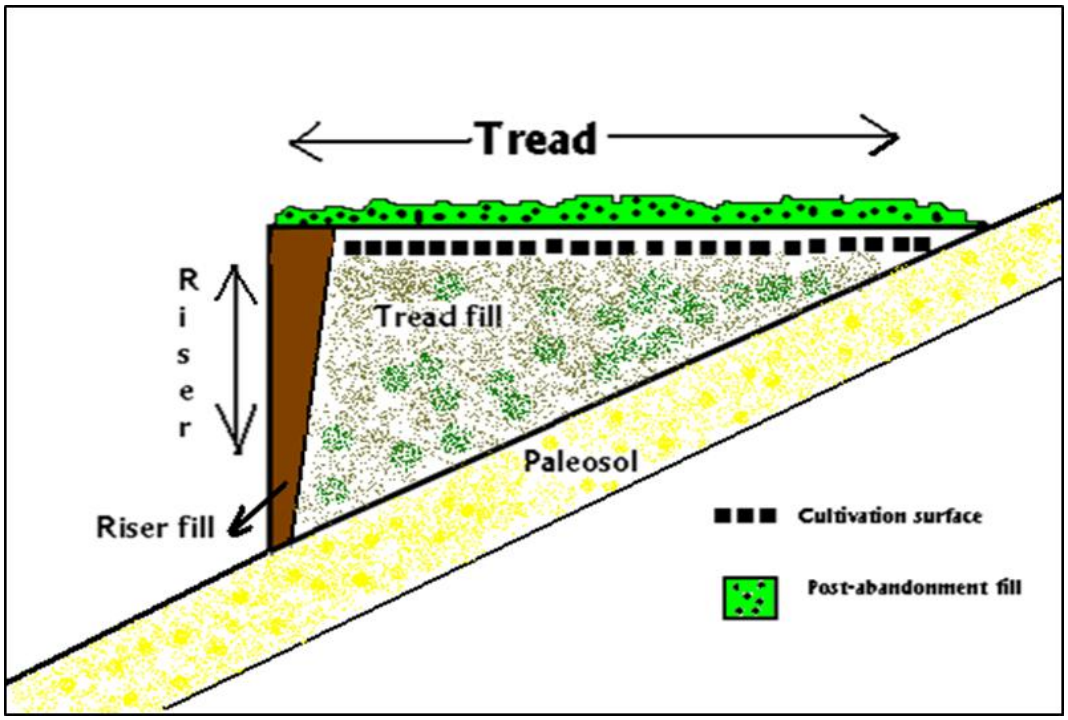

Figure 2.2: Components and stratigraphic elements of terraces (after Frederick and Krahtopoulou 2000:80, Fig. 6.1)

Price and Nixon (2005:665) stated that agricultural terraces are one of the characteristic features of the Mediterranean landscapes. However, determining the past uses of terraces in the ancient Greek or Roman World is highly problematic. According to some scholars, ancient landscapes of the Mediterranean were not that different than those of today. On the contrary, some other scholars have claimed that both the ancient Greek and Roman agriculturalists terraced their landscapes extensively. They suggested that there are two approaches for distinguishing ancient terraces from the modern ones. The first one relates to the pursuit of ancient terminology while the second one involves the designation of the archaeological field surveys with proper methods. Rackham and Moody (1992:126,128) stated that absolute dating of terraces is quite hard and that it might be possible by tracing direct evidence about one or two period settlements which were located near the terraced regions.

Although the ancient literature has not conveyed much information about the agricultural terraces, some points could be still inferred from the textual evidences.

The Greek word αίμασιά has at least three meanings. It mentions a freestanding dry stone wall, can refer to an enclosed piece of land, or to the terraces which were constructed by dry-stone walls (Price and Nixon 2005:666-670).

Since the dating of standing agricultural terraces is difficult, some criteria have been suggested through the archaeological surveys. These criteria were grouped by Price and Nixon (2005:670) under nine headings:

1. Datable material in fill
2. Age of trees on terraces
3. Construction style of terraces
4. Same construction style as adjacent ancient structures
5. Terraces built against ancient structures
6. Extent and type of lichenization of terraces in relation to the extent of lichenization of adjacent structures
7. Extent of degradation of terrace
8. System of terraces in area with ancient sites and no later constructions: "relict landscapes"
9. Antiquity likely on other grounds to be the (or a) period of greatest pressure on agricultural resources.

Altough the criteria 1 and 2 are very few, they can function separately and give exact date for the construction period of terraces. Others mostly occur together with each other. In some previous archaeological works which conducted in the Aegean, researchers tried to date agricultural terraces with help of these criteria. For example in Delos (Brunet 1990) construction styles of extensive terrace systems resemble those of ancient buildings (criteria 3 and 4). Some of them were excavated and referring to the ceramics in the depositions they were dated to the Classical and Hellenistic periods (criterion 1). 16 ancient farmsteads were related with agricultural terraces (criteria 4 and 7). It is hard to claim any time except antiquity when there was need for extensive terrace agriculture (criterion 9). Delos is a good example of an ancient "relict landscape" in which there is a system of terraces with farmsteads dated to Classical and Hellenistic periods (criterion 8). In the territory of Eresos (Lesbos island), criteria 7 and 9 were used to date ancient agricultural terraces (Schaus 1994). Firstly, terraces were mapped with the help of aerial photographs then observed in the field. Degradation degrees of terraces were compared to those of modern terraces implied that they were constructed in early periods (criterion 7).

Moreover, modern Eresos was founded in the 18th century. Old aerial photographs showed that degradation degrees of terraces were high in 1885 and there is no need for extensive terraces in any time except antiquity (criterion 9) (Price and Nixon 2005:670-671).

2.2. Farmsteads

Behind the impressive achievements of the Classical world in art and architecture, literature and political thought which much affected the European culture, there was a working countryside in which the majority of the population of the ancient Greeks was engaged in agricultural production. The city and country in the Classical world could not be thought separately from each other; because, either constructive or destructive activities of the city were based on the agricultural production of the countryside. It is highly true that the Greek cities were mainly contingent on their countryside. However, the available agricultural lands for the Greek cities were not the same. Various conditions of the nature in various places, especially the climate generated diverse situations for agriculture. Hence, special agricultural strategies were necessary in order to increase the productivity of the agricultural land. The success or the failures of these strategies were directly related to the nature and the society itself (Osborne 1987:13-27).

Halstead (1987:77) stressed that climate and relief determined the features of traditional Mediterranean farming. Mild winters and hot summers are the characteristics of the coastal lowlands. Beginning from the early ages, people preferred to settle down in these areas. Fussell (1972:12) was pessimistic in terms of the climate and the relief. He mentioned that the Mediterranean climate and broken relief were the obstacles for Greek agriculture in ancient times. Both the summer and winter had hazardous effects on the agricultural products. Sudden and heavy rainfall or long time droughts during the summers could harm the crops. Besides, rugged winters and north winds also had bad effects on agriculture. He saw elevation as a handicap for the Greek farmers. Accordingly, the high hills were dangerous for the

agricultural lands in the valleys because; runoff during the spring time could ruin the fields. However, the natural conditions, climate and soils of the Mediterranean enabled the ancient Greek farmers to cultivate barley, wheat, vine and olive. All of these agricultural products were adapted to the wet winters and dry summers. The geomorphology of the land mostly formed by limestone, also enabled various agricultural lands lying close to each other, however having different micro climates in which several products could be cultivated (Burford 1993:109).

According to Osborne, the structure of agriculture and settlement patterns of the ancient Greeks was directly determined by the climate and the soil distribution. Although he accepted the possibility of some local features and small changes; he rejected the view that the climate of the Classical world was much different from that of today. To him, the recent studies have shown that general characteristics of the Mediterranean climate have not changed so much since the three or four millennia. Both the advantages and disadvantages, which have arisen from the climate, were the same for the Greek farmers in the past like today (Osborne 1987:30-31). Hanson (1999:26) emphasized the negative effects of nature in the Greek mainland but he also stressed the agricultural opportunities arising from the climate and geomorphology. Greece is a mountainous territory and is lack of big rivers while its precipitation regime is irregular. However, it is not completely incapable for agriculture. Although its soil is rocky, it can be made cultivable by the skillful farmers. It is true that the cold winters and long, dry summers cause constraints to agriculture but, they still offer the necessary conditions for growing the basic crops and fruit trees. Slopes may obstruct cultivation but they constitute micro-climates for different species.

Hanson (1999:126) stated that ancient Greeks knew the local varieties of climate, weather and soils while they were also aware that these varieties determined the agricultural production. But, he pointed out that the ancient literature did not consider too much about the natural effects and differences on agriculture. The ancient writers just described the similarities of natural conditions and cultivation

opportunities of the large areas in the ancient Greek world. Agricultural strategies of the Greek farmers were determined by various conditions regarding the climate and soil, hence their strategies were various, as well. So, it is not easy to draw a complete picture of the agricultural practices of the Classical world. However, it is possible to detect some general characteristics. Agricultural technology was not that complex when compared to modern practices. The Greek farmers used simple plows. Fallowing was widespread and fallowed lands were plowed repeatedly all year round to keep them clean and maintain moisture in the soil (Osborne 1987:40). It is difficult to state that there were revolutionary changes in the agricultural methods during the Classical period, however it is possible to catch up with some nuances. The Greek farmers in the Classical world were well aware of various soils in different landscapes and that they empirically learnt which crops to grow on which soils, regarding the micro-climates and elevation (Fussell 1972:16). They also considered the effects of precipitation, wind, temperature and aspect on the agricultural products (Toutain 1996:37).

Both in the Classical and the Modern Greek world, the yields of main crops fluctuated from one year to another. So, farmers had to consider this and develop an adaptation strategy. Otherwise, possible failures in the agricultural system would cause deficiencies in nutrition, even famine and starvation. The range of strategies in the agricultural system was wide, including crop selection, planting and harvest timing, fallowing etc. (Gallant 1991:35). As a result of experience and proficiency, Greek farmers used different lands and environments for certain crops. They reserved the valley floors and plains where the soil was rich and water retentive, for cereal cultivation and fruit garden. On the other hand, the hillsides, which can tolerate the thin soils, were used for olive and vine cultivation (Hanson 1999:76-77). Scattering agricultural lands in quite different microenvironments minimized the risk of failure but it increased the cost of labor and time (Gallant 1991:45). Garnsey (1989:49) stated that mixed cultivation or poly-cropping were the traditional strategies of the farmers in the Mediterranean region. The aim was to be self-sufficient and again to reduce the risk of failure.

Agricultural intensification in the Classical world changed according to time and place or farmers themselves. Some farmers had scarce land so they had to cultivate their plots intensively. Obviously, some territories were quite suitable for intensive agriculture in terms of natural resources and climate. When considerable population increases took place, a demand for intensive exploitation bummed up (Osborne 1987:46). Diversification of crops, isolated farmstead residence, irrigation and using slaves as labor force were the indicators of agricultural intensification (Hanson 1999:72). Diversification of crops means to cultivate various crops which have different growth-cycles and that require different soil, micro-climate, and geomorphological conditions. It is quite a powerful risk-reducing strategy to ensure that various lands can be cultivated. All over the Mediterranean, farmers cultivated cereals, pulses, vine, olive and other fruits concomitantly (Gallant 1991:36-37).

The Greeks harvested wild vines and olives in the earlier periods, before the 8th century B.C. In the 8th century B.C., they enhanced the quality of the olives and vines, which finally led to increased yields from the cultivation of such kinds of species (Woods 2000:73). Some agricultural theories have assumed that cultivation in hardly accessible and less productive lands decreases the total amount of yields, hence the profits from agriculture. However, beginning from the 8th century B.C., the Greek farmers began to invest in labor and capital for olive and vine cultivation in the marginal lands on the hillsides (Hanson 1999:81). Davies (2007:343) stated that yields from vine and olive cultivation did not just make the Greek farmers more self-sufficient but also enabled them to create a surplus value. Such cultivation continued down to the Classical period. Even, viticulture and olive cultivation in the said period was sometimes supported by the states since the profits gained from wine and olive oil export was higher than the costs of grain import (Toutain 1996:33-34).

At the end of the Dark Ages, the emergence of independent farmers with their own small plots was a new issue for the agrarian history of the Mediterranean region. This new group in the agrarian society had impacts on the establishment of the Greek *poleis* which highly affected and even shaped the Western culture (Hanson 1999:3).

The unit of production in the Classical world is generally accepted as the "farm". But there was not an exact counterpart for this term in ancient Greek language. The terms used in the Classical World relate to agriculture and farm, for instance, *agros* represented land-use and might have been equivalent to the "countryside" or "field"; *oikos* stood for the household with its land and other properties; and *kleros* corresponded to land-lots or land-portions (Davies 2007:349).

It is necessary to evaluate farming as a social and economic activity and call attention to its development over time. It is also deemed important to interpret it with its place in the socio-economic context (Osborne 1992:21). Cooper (1977:162) described the socio-economic character of the Classical family farm. It might have consisted of *kleros* which was given by a *polis* to an *oikos*, as in the case of an *apoikia* (colony). Or without a formal division, *kleros* could have been held by a family or privately acquired due to the right to ownership protected by the law or custom.

Burford (1993:110) suggested that the layouts of the farms in most of the territories in the Classical Greek World had some similarities with the agricultural practices. Each farmland was divided for cereal cultivation, vineyards and fruit trees including the olives. By plowing the land and sowing the grain, the Greek farmers continued the agricultural processes. Intensive farming required perpetual hard work. Residential structures in or near the farmlands were the indicators of high productivity and agricultural intensification (Hanson 1999:54). As well as the residential buildings, there were other basic features of the farms. These were the threshing floors and storage places. The threshing floors with hardened or paved surfaces were the permanent fixtures and were related to cereal cultivation. In the storage places, all the agricultural products (dried fruits, grain, olive oil, wine etc.) were laid down (Burford 1993:117-118). Hanson (1999:85-86) pointed out that literary evidence and archaeological studies of the ancient Greek countryside verified the existence of the threshing floors and press-stones related with farmsteads. These

artifacts indicate that there were systematic agricultural processes in the isolated farmsteads.

The Classical farmstead has been a popular subject for landscape archaeology. Identification and location of the farmsteads in the archaeological surveys (which began in the 1950s) might have determined some basic features and characteristics thereof, in the Aegean region but the debates on the issue are still continuing. One of the best preserved and published farmsteads studied by the British School at Athens were the Dema and Vari houses (Figs. 2.3-2.4) which were assessed as seasonal rural structures dated to the 5th and 4th centuries B.C. (Pettegrew 2001:189-192).

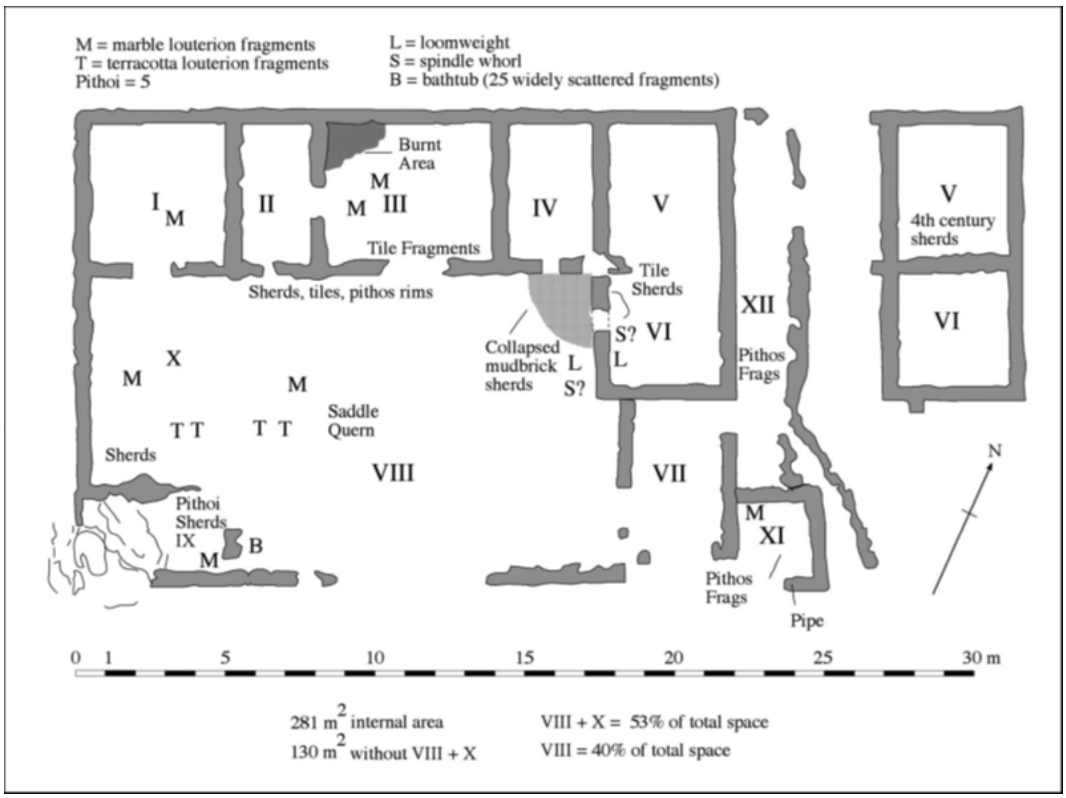

Figure 2.3: Plan of the Dema House (Foxhall 2006:260, Fig. 13.8, based on Jones *et al*. 1962:76)

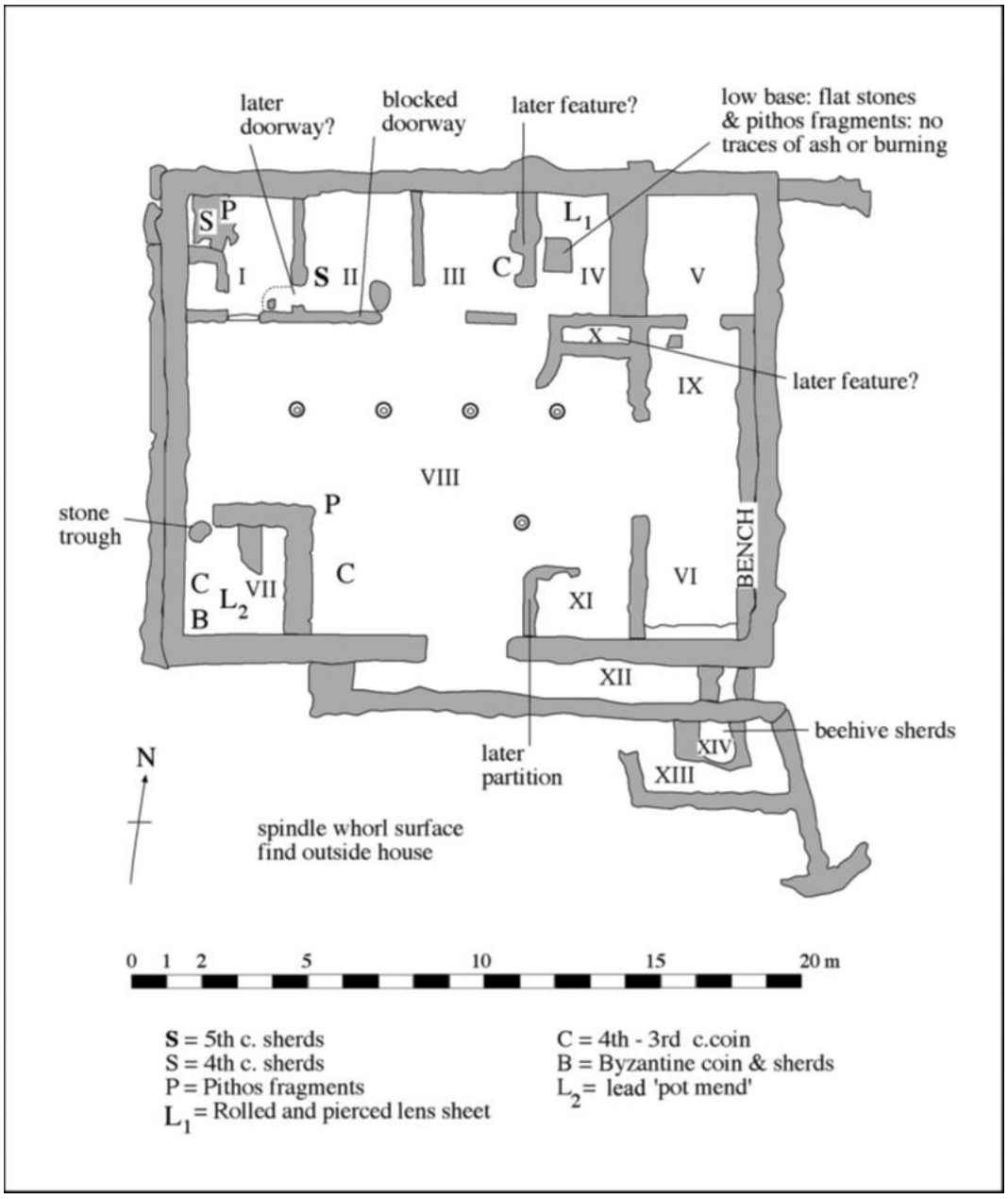

Figure 2.4: Plan of the Vari House (Foxhall 2006:262, Fig. 13.10, based on Jones *et al.* 1973:362)

Hanson (1999:52-54) stated that the farmsteads reported from archaeological surveys, that were conducted in Attica, Boeotia, Crimea, Argolid, Peloponnese, Aegean Islands, and Italy, were the important features of the ancient Greek landscape. They are the good indicators of private property and individually controlled agricultural system. Different from the nucleated settlements which mostly related to fragmented land-holdings, the farmsteads addressed the

amalgamated farmlands. According to Lohmann (1992:48-49), farmsteads were the prevalent rural elements of Classical Attica. He rejected the idea that the farmsteads were solely used seasonally. He offered the emergence of family graves as a proof of permanent usage of the Classical farmsteads.

Residential buildings in the Classical cities or rural areas were portable in character. The residential structures and related features could be carried when the owner or the farmer wanted to move to another place (Pettegrew 2001:196). According to Osborne (1987:69-70) it is hard to determine whether a rural structure was a permanent residence or was occupied seasonally. He diverted the attention to the documents which mentioned the lands leased by the public. Buildings constructed on such lands suggest seasonal residence. He stated that a decision to erect buildings on the rural land would be determined by the social and economic conditions. In the nucleated rural settlements with fragmented landholdings, a landscape was exploited in a less effective manner, however the individual farmers could get more yields from the land which belonged to the isolated farmsteads. Isolated farms had a disadvantage since they diminished the social communication of the farmers. However, various and effective labor force (slaves and family member) could be utilized in the isolated farmsteads.

During the Dark Ages, the Greeks tended to live in nucleated rural settlements. There were basically two reasons behind this. Firstly, living in the isolated farms could not be safe in case of possible assaults by the human or wild animals. Secondly, people could prefer to live together in order to get benefits from the community life and have the advantages of kinship relations, especially at times of illness, death, and failures. Moreover, before the Classical period, the distance of agricultural fields to the villages, was relatively short (Bintliff 1994:221-222). However, archaeological surveys conducted on Melos Island demonstrated that the modern farmers spent two hours by walking to go to and return from their agricultural fields (Wagstaff and Augustson 1982:108-110). Such a loss of time in agricultural productivity can be

explainable such that why some of the ancient rulers obliged people to live in the farmsteads having proximity to the cultivated areas (Hanson 1999:53).

Boeotian archaeological survey showed that in the Classical period, there was a substantial change in the rural settlement pattern. The studies have shown that before the 6th century B.C. almost all the cultivable lands in Boeotia were concentrated around the small villages near the *polis* territories. Bintlif (1994:228-230) stated that after the 6th century B.C., there happened dramatic increases in the number of dispersed rural settlements in the form of farmsteads and small hamlets. He suggested that there were two reasons behind this significant transformation. Firstly, population increase in the Classical Boeotia, as evident both from the archaeological data and historical sources, required more production to feed the people. As the seasonal or permanent residences on the rural land brought higher agricultural productivity, the number of rural farmsteads increased. In addition, since the nucleated settlements tended to extend, the agricultural exploitation in the distant fields expanded. So, the residence in distant farmsteads, which reduced the commuting time, became more attractive. Secondly, beginning from the late Archaic period, the form of the citizenship in Boeotia began to change. The power of the aristocratic oligarchy diminished, however some kind of limited democracy arose. These socio-political changes could have created the conditions of the emergence of a new smallholder class (*hoplite* farmers), which constituted the basis of the Boeotian army thereon. As a result, this new class of *hoplite* farmers had no need to live in nucleated settlements which previously ensured the community support and security. Rather, they could have chosen to live in their isolated farmsteads, having the right of holding their own properties.

Garnsey (1989:43-44) marked that most of the farmsteads in Classical antiquity were small in size. Even larger agricultural plots, which belonged to the wealthy farmers, were fragmented and dispersed. In order to propose sizes for the ancient farmlands, Gallant (1991:82) suggested using the dietary estimates and production figures. He stated that, considering the results of the production and consumption factors attained

from various places in the Mediterranean region, at least 3-4 hectares of agricultural land must have been required in order to satisfy the subsistence needs of an ancient household. Bintliff (2006:13) stated that, even in the moderate democracies of the ancient Greek world where pre-established property rights of farmers could have been there; landholding size of household was about 3.8-5.4 hectares.

Jameson (1992:135, 145-146) suggested that although various environmental, socio-economic and historical circumstances led to the creation of several types of agricultural labor in ancient Greece; some general features can still be identified. In some areas of the Greek mainland and islands such as Sparta, Thessaly, Crete and the colonies e.g. in the Black Sea region, large agricultural areas were cultivated by the serf populations which mainly produced cereals for self-sufficiency and for the elites. On the other hand, in some other areas like Khios and Kerkyra, there were large farms that were mostly worked by the slaves who made production for the market. Moreover, in Attica, there was specialized and mixed production in the private farmlands mostly conducted by the small households.

According to Carlsen (2002:117), there were three alternatives of land management both in the Greek and Roman world. The landowner either cultivated his land with his family (a bailiff could be assigned) or they could rent their land partially or completely. The decision of the landowner was determined by the size of the land or the suitability of management of the land, including the distance of the farm to the residence. Occasionally, these three alternatives could be merged. For instance, the landowner sometimes cultivated a part of the land himself and rent the rest of it. Or, he lived in the city or in his farmstead and a bailiff with slaves and/or free laborers managed the rest of the landowner's properties on behalf of him. The type of land management was directly related with the social and economic status of the landowner. The *autourgos,* which could be defined as citizen-farmers cultivating the land for themselves, were at the bottom in the social hierarchy. The rich landowners relatively had more privileged socio-economic positions, probably inherited from their ancestors. These landowners had the opportunity to employ bailiffs (*epitropos*),

laborers or even the slaves. Furthermore, some big landowners, who leased most of their agricultural lands to the tenant farmers, could be defined as landlords (Burford 1993:167-168).

The *pelatai*, were the basic source of agricultural labor for most part of the ancient Greek World. They could be defined as the neighbors who possessed no land and had to work on the lands of some others. When the *pelatai* were not accessible or were scarce, another choice of the landowner was to get slaves (Burford 1993:183-184). In the Classical period, with the establishment of the *poleis* and different from the pastoral life and cereal based agriculture of the Dark Ages, slave labor became prevalent (Hanson 1999:64). On the other hand, there was, at times, a need for extra labor force for a short period, especially during the harvest or vintage. Such a requirement for seasonal labor was mostly met by the citizens who had some land but still needed extra work to support themselves (Burford 1993:191).

CHAPTER 3

INCORPORATED RHODIAN PERAEA IN ANTIQUITY: A CASE STUDY IN BOZBURUN PENINSULA

3.1. Defining the Study Area

A field survey was conducted in 2009, in accordance with the formal permission granted by the Ministry of Tourism and Culture of the Turkish Republic. Extensive surveys continued until the end of 2012. The scope of these surveys (Fig. 3.1) encompass a region starting from the main fault line which runs across Turgut and Bayır Villages (from Delikyol Bay (immediate south of central Turgut) down to Çiftlik Bay) and passing by the ridges in the north of Gökdağ and; ending at the isthmus on the mainland.

Figure 3.1: Map showing the scope of the study area

The ancient deme centers (Fig. 3.2) which fall into the study area are pertinent to modern Bayır (Syrna), Losta (Selimiye), Tymnos (Bozburun), Thysannos (Söğüt) and Phoinix (Taşlıca). The main reason why the rest of the mainland stretching across the north of the mentioned fault line and south of the isthmus were left out of question is that the study area has been unattended in the scholarly world regarding the ancient terrace systems and the relevant rural structures.

Figure 3.2: Map showing the borders of the study area and *deme* centers

3.2. Historical Background

408/7 B.C was an important milestone in the history of Rhodes since a new state was formed above and beyond the newly founded asty in the northern tip of the Island (Papachristodoulou 1999:27). Following the oligarchic revolution which took place in the Rhodian poleis- Ialysos, Lindos and Kamiros that joined the Peloponnesian League subsequent to their break up from the Athenian Legaue in 411 B.C, these

three poleis founded the Rhodian State (whose capital became Rhodes) in 408/7 B.C (Gabrielsen 2001:177).

The new Rhodian State was founded as a result of the synoecism process of the three old Dorian poleis (Ialysos, Lindos ve Kamiros) on the island. Synoecism was a typical feature of the Greek world- a hallmark of the 5th-4th centuries B.C. The functional administration of the newly founded city of Rhodes was shared by the three old Dorian poleis on an egalitarian and democratic basis. The three poleis had a remarkable degree of autonomy in cultic terms and each had their own council and assembly. On the other hand, the central political power of the Rhodian State was vested in the city of Rhodes, being the asty. (Papachristodoulou 1999:29-30).

In 4th century B.C., the population of Rhodes (both at the island and the Peraea) was shared by the "*demes*" of Ialysos, Lindos ve Kameiros for administrative purposes. The enforcement of the *deme* system brought equal political rights to the Peraean citizens just was as valid for those living on the Island. The preference of Rhodes, also to rule its territories in Asia Minor under the *deme* system, had advantages from the point of security. For example, Rhodes could command a big and strong navy via the military ramparts in Loryma and safe harbours in Serçe Bay, during the Hellenistic period. Also, the island's strife with piracy made the Aegean Sea a safe region in terms of trade (Rice 1994:296).

The administrative center of the new Rhodian State mainly showed itself in the military sphere. Its territorium on the island and the mainland were administered by the strategoi, definable as the "higher authority governors" and by the hegemons and epistatai who were the subordinates of the strategoi. The administrative authorities on the civilian issues (other than the military matters) were the civilian officials. Many other issues were conducted in the settlement/administrative units of all sizes (within which *demes* also took part) as it used to be similar during the synoecism process. Each "*deme*" belonged to the three old poleis which formed the Rhodian State. The case was similar in the Peraea and the incorporated islands (like Chalke

and Karpathos). As a geographical unit, each *deme* was composed of more than one settlement having their own necropolis. The major subsistence of many *demes* was dependent on agriculture and maritime affairs involving the transportation of agricultural products. The demographic and social composition of the *demes* was almost the miniature of the Rhodian society. Totally, 33 *demes* were situated on the Island of Rhodes while 13 of them were in the Peraea and 7 in the incorporated islands (Papachristodoulou 1999:30-32).

The territories of Rhodes were categorized into two as the "Incorporated" Peraea and the "Subject Peraea" (Fig. 3.3). The "Incorporated" Peraea was limited with the beginning of Kallipolis in the north, Kaunos in the east and Knidos in the west while it encompassed the whole region of Loryma (Bozburun) Peninsula in the south.

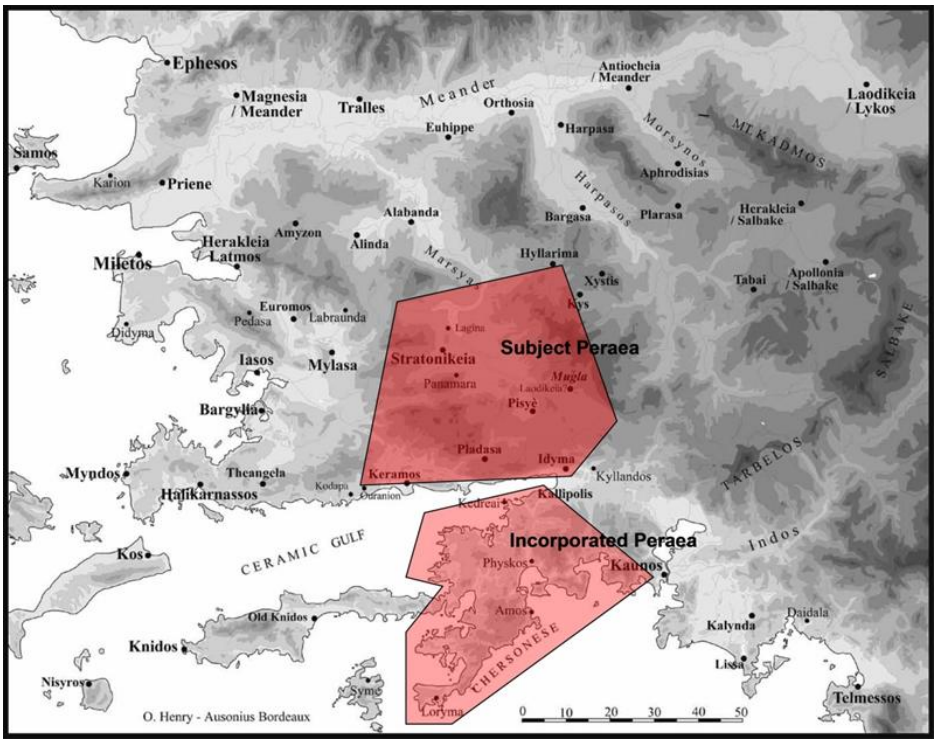

Figure 3.3: Map showing Caria with Incorporated and Subject Peraea (after van Bremen 2007:114, Fig. 1)

A great possibility is that this region was subjugated by Rhodes at the end of the 5th century B.C. The *demes* in the Incorporated Peraea were shared by the poleis of Ialisos, Lindos ve Kameiros at the Island before their synoecism (van Bremen

2007:113). The impact of Hellenism, especially in the Incorporated Peraea, was quite strong in antiquity. The status and rights of citizenship were possibly similar to those of the Island (Papachristodoulou 1999:41). As it was understood from numerous epitaphs, many Peraean citizens or Peraean women lived at the city of Rhodes through marriage, in the Hellenistic period. The situation had, undoubtedly, a direct relation with the opportunities offered by the wealthy city of Rhodes. Besides, it is an indicator of social mobility in the Peraea (Rice 1999:51).

When the topographical characteristics of the Peraea and the results of archeological research are assessed, various type settlements attract attention in the region. There are plenty of small scale settlements in the Bozburun Peninsula as well as comparatively big "*demes*" like Phoinix and Casarae. Innumerable archaeological ruins and fortress settlements in the Rhodian Peraea address settlement activity and that it sustained a notable population during the Hellenistic era (Rice 1994:297).

Amos, a *deme* in the Incorportaed Peraea, lay in the south-west of Marmaris Bay and was the nearest Peraean *deme* to the city of Rhodes. The *deme* of Amos, which was founded on a hilltop surrounded by ramparts, had importance in respect of possessing one of the three theatres of the Incorporated Peraea. What also makes Amos of value for us is that it was a significant place of agricultural activity. This point was also emphasized in the ancient epigraphical resources (e.g. Fraser and Bean 1954:6-20). Remarkable information about the Rhodian agricultural system in the Hellenistic period (particularly the terms and conditions of doing agriculture in the leased lands) were attained from such resources which have been dated to the end of 3rd-beginning of 2nd centuries B.C (Papachristodoulou 1999:41-43). The resources mentioned above have proven parallels with the agricultural expansions and developments of the federative state of Rhodes in the same periods (Rice 1999:48).

The territories forming the Subject Peraea lay along the Ceramic Bay, encompassing Idyma and Keramos in the south. It covered Stratoniceia in the north, Hyllarima in the north-east and modern Muğla in the east. The data at hand is unfortunately

inadequate to interpret how the Subject Peraea was captured by Rhodes. However, the date of Rhodian domination was possibly around mid-3rd century B.C (van Bremen 2007:115).

According to Reger (1999:77), there were three aspects of policy pursued by Rhodes in the Aegean world during the Hellenistic period. Firstly, Rhodes did not desiderate the existence of a single hegemony in Caria. Caria was a conflictual region between the Ptolemies and Seleucids beginning from the end of 4th century B.C. The third power was Rhodes in the region. Rhodes was endeavoring to promote a policy of balance between these two powers, in order to ensure and keep up with its territorial integrity. Secondly, Rhodes aimed at expansionism just like the other states in the region; however, the Island tried to pursue her objectives only at times of political instabilities. Finally, the main reason behind the occasional support that Rhodes gave to the struggles of Greek cities for their independence was the desire to design a suitable position for her interests.

Rhodes comes up as a figure of political and economic attraction in the Hellenistic era Aegean. The major reason was possibly the commercial contacts of Rhodes with Egypt (especially in the field of grain trade) (Rostovtzeff 1959:226). The reason why Rhodes had a superior political status in the Hellenistic period was that it had a strong and well-organized navy. Such a navy also brought a control mechanism on the marine bases in the Aegean, thus hegemony over the sea trade. In addition, amicable relations and alliances with Rome and the Ptolemaic Kingdom in Egypt strengthened the economic power and impact in the Aegean world (Archibald and others 2001: 166).

That Rhodes had military marine bases spread over a wide area in the Aegean brought advantages in the ancient period. In the first place, the harbours and settlements (which often had suitable lands for agriculture) in the surroundings were the supportive elements for the Rhodian navy, both in military and logistic terms. Secondly, Rhodes had an influential control in the Aegean via such marine bases.

Therefore, she could get rid of the pirates in the Aegean and become able to restore the security of the trade routes (Gabrielsen 1997:42-43).

The chief reason for the Rhodes' robust and prosperous economy based on trade in ancient times was the presence of a well-organized aristocratic administration. Within such context, "aristocracy", though not being formal, stands for the influential elites in the system of citizenship (Gabrielsen 1997:15). For Aristotle (Politics 1291b14-30), these kinds of elite groups who are influential in the administrative matters should have peculiarities which are wealth (ploutos), esteem gained through the family circle/ancestral ties or inherently (eugenia), education (paideia) and behavioural codes shared pursuant to ideal moral values (arête).

Gabrielsen (2001:166) suggested four indicators of the superior role that Rhodes played in the eastern Mediterranean trade in the Hellenistic era can be drawn up as the following: Rhodes was an important trade center for the foreign merchants and brokers beginning from 4th century B.C. The records of great amounts of turnovers from the custom duties until 167 B.C. The Island kept huge amounts of credit funds in 160 B.C. The great volume of amphorae trade conducted in almost the whole Mediterranean was an indicator of the enormous achievement of the Rhodian State in the economic sphere during the Hellenistic period.

Besides, the Rhodian State was a center of culture where the artists, scientists and philosophers gathered in the Hellenistic period. The reason behind being the center of attraction and the success either in the cultural and economic world, was the administrative structure which was made up of a strong aristocracy. The mental and physical strength of the free citizens could be used effectively in such a medium (Gabrielsen 2001: 167).

Perhaps, a best indicator for the Island's being a significant trade center during the Hellenistic period was a series of events following the destructiveness of an earthquake that occurred in 227/6 B.C. External aids from the Mediterranean, Egypt

and Asia Minor for the recuperation of the Island were not merely for humanitarian purposes. The aiders all had trade networks with Rhodes; it was urgent that the Island had to pull through so that the trade system could continue to function smoothly again (Rostovtzeff 1959:230).

Rhodes gained an important seat in the Mediterranean trade traffic via well-established relations and alliances with Rome. It was only after the eradication of destructiveness caused by the Persian Wars that things began to count against Rhodes. Rome declared Delos a "free port" in 167 B.C. Delos was, henceforward, on the scene with its assertiveness for being the center of trade in the Aegean world. It became attractive for the merchants by getting the support of Rome and rejecting any custom duties from the docking ships. Despite all, it cannot be claimed that the Rhodian trade ceased all of a sudden after 167 B.C. Although the volume of trade decreased thereafter, the importance of the broad trade network she established in the Aegean and Mediterranean could be maintained, at least until the end of 1st century B.C. Such a case could be verified archaeologically. The Rhodian stamped amphora datable to the end of 1st century B.C were recorded in many cities in the east. Also, the trade relations that were geared toward grain export between Rhodes and Crimea in the mid-2nd century B.C. is conspicuous. This case can perhaps be construed with the strategy Rhodes opted vis-a-vis the growing influence of Delos as a free-port in the Mediterranean in 167 B.C. Consequently, Delos could never supersede Rhodes completely. Despite the dominance of Rome, Rhodes carried on being an important center in the Aegean trade (until the end of 1st century B.C.) arising from the experience and accumulation of wealth she had in commerce (Rostovtzeff 1959:776-777, 1267).

Studies on the amphora handles with Rhodian stamps found in the Mediterranean and Black Sea have offered information about the Rhodian trade from 300 B.C. to the beginnings of the 1st century A.D. Seven (7) chronological sequences of the mentioned time span draw attention in the graphics prepared by Etienne (1990:216, Fig.4). The quantities of stamped Rhodian amphorae handles made a peak during the

dates corresponding to the IIIrd period (210/205 – 175 B.C). The following IVth period (174 – 146 B.C) has revealed a dramatic decrease in the quantities of amphorae handles. The sudden increase in period III can be accepted to be a reflection of the political power of the Rhodian State with the support Rome gave beginning from 200 B.C., and of the commercial supremacy gained in the Mediterranean. On the other hand, the decrease in period IV is explainable with the declaration of Delos as a free-port by Rome in 167/6 B.C and alteration of the steadiness against Rhodes (Gabrielsen 1997:66).

In spite of the fact that there occurred dramatic decreases in the volume of exports involving many places within the commercial network of Rhodes at the end of 2nd century B.C, the commercial relations with Egypt continued. Many goods but particularly wine and olive oil were conveyed by ships from Rhodes to Egypt and the eastern cities and, grain and cereals were received in return. Part of the grain which was received as a result of barter trade was consumed by the Island's own population while the rest was marketed to the Greek poleis. The right to grain trade at Rhodes was vested in the hands of private entrepreneurs who were granted with the status of citizenship. However, Rhodes could take an active role in certain cases (Gabrielsen 1997:71-80).

Anyone who is interested in the 5th century B.C Greek world can find out that the grain trade dealt with Sicily, Egypt, Cyprus and Black Sea was controlled by Athens. The main actors of trade were: the ship owners (naukleros), merchants and, bankers financially supporting them with funds. When we turn an eye to the 4th century B.C. Athens, we can see that these people were the foreigners travelling to Athens from abroad (Casson 1954:169).

The Greek world faced political and economic crisis at the end of the 4th century B.C. The newly founded city-states on mainland Greece, at the islands and Asia Minor were striving for their self- organizations within their political, cultic, artistic and economic realms. Self-sufficiency in the economic terms had always been

longed and aimed by the Greek poleis but this ideal could never be realized out rightly (Rostovtzeff 1959:232).

The Hellenistic period economy was based on trade and commerce arising from agricultural production which was geared towards a very well-organized market (Rostovtzeff 1959:249). In this period, Athens once again appears to be the greatest grain importer in the Aegean world. In addition to Athens, many cities in the Aegean Islands and the coasts of Asia Minor turned onto grain imports in order to sustain their growing populations. The grain imports, as it used to be in the antecedent centuries, were conducted from centers like Sicily, Crimea and Egypt. The imports sent from such centers were tried to be counterbalanced with the exportation of valuable products (mostly wine, olive oil, fine-pottery) of the Greek world. The most important figure of the Eastern Mediterranean grain trade was Rhodes in the Hellenistic period. That Rhodes occupied the center of trade had a direct relation with the island's geographical positioning. It stood in the midst of Egypt and Crimea which were the two great suppliers of grain. Also, the Island had physical proximity to the Cycladic Islands and the coastal cities of Asia Minor which were good markets at all times. Additively, Rhodes had the capital and ships necessary for such a trade (Casson 1954:170-172,187).

3.3. Physical Setting

The Bozburun Peninsula is a steep, mountainous, region where Mesozoic age limestones are widely exposed (Fig. 3.4). It is split by Hisarönü Bay (lying in the north) from Datça Peninsula while the head of the land is separated from Sömbeki Bay in the west. The isthmuses in Datça and Bozburun Peninsula have hilly topographies whose elevations do not exceed 1000 m and that serpentine and peridotites are widely seen in these isthmuses (Darkot and Tuncel, 1978).

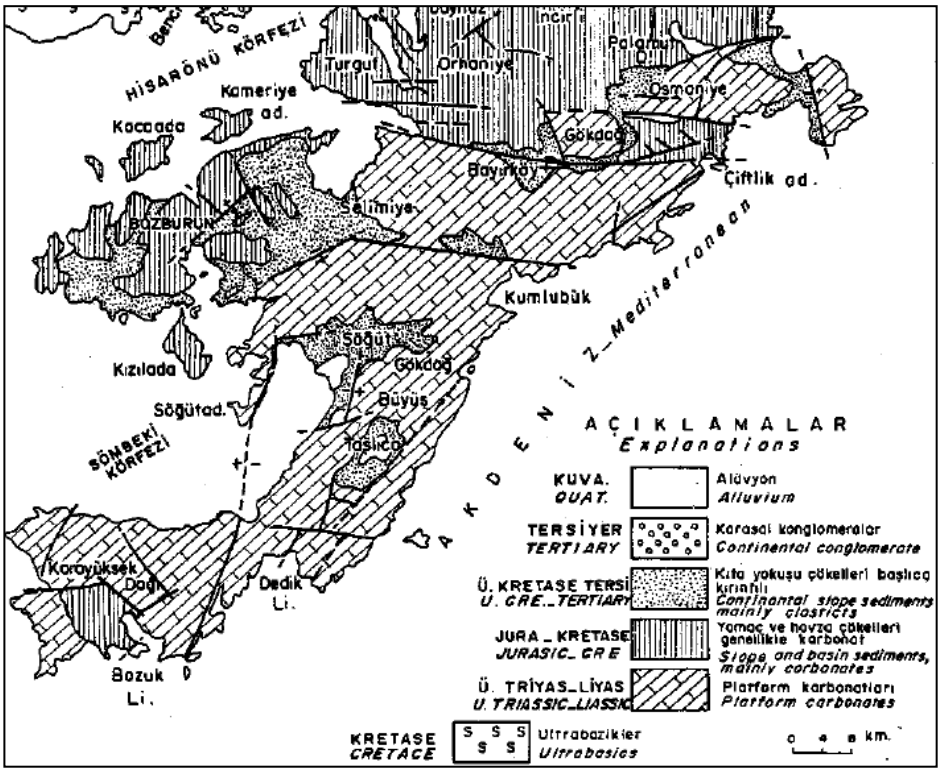

Figure 3.4: Geology map of the Bozburun Peninsula (Ersoy 1993:172, Fig. 1)

In respect of chronology and lithology, 5 diverse lithostratigraphic units can be seen in the Bozburun Peninsula (Bilgin and others 1997).

Güverdağı Formation: is formed by megalodon ve algal limestones units that are evaluated within the structure of Bodrum Nappe. It is made up of massive and thick layered, grey tone dolomite-dolomitic limestones at the bottom. The unit is irregularly covered by Karanasıflar Formation. The unit contains extreme concentric folds, ruptures and karstic cavern systems, also due to tectonism. The possible thickness of the unit has been determined as 800 m by the former researchers. The age of the unit is given as Upper Triassic-Liassic in the literature.

Karanasıflar Formation: The unit is rated within the Bodrum Nappe and is formed by the rock units like breccia, sandstone in small ratios, siltstone, mudstone, micrite, split, basalt, etc. It might well be defined as the “Complex Series”. The lithological units forming Karanasıflar have irregular and heterogeneous dispersions. The age of

the formation which is free of fossils has been assigned as the Late Senonien by the former researches, because of its geological position.

Orluca Formation: The formation which is made up of rock types of sandstone-mudstone-limestone, etc. is evaluated within the structure of Gülbahar Nappe. It has a tectonic relation at the bottom while it offers a transition with Orhaniye Formation at the top. The age of the unit is set to the Middle-Late Triassic.

Orhaniye Formation: The unit is assessed within the structure of the Gülbahar Nappe. Structurally (tectonic), it lies above the Karanasıflar Formation. The unit is formed by thin-medium-thick layered, gray-beige colored micrites and cherty micrites (limestone). In the Upper Jurassic old sections (bed zones), thin-medium-thick layered, red-brownish scarlet, gray, green and blue colored radiolarite, chert and shale type lithologies are found. Due to excessive abrasion, this layer is overbended and fragmented. The unit is accepted to be of the Jurassic-Cretaceous age by the former researchers.

Alluvium: is formed as a result of irregular dispersion and deposition of clay-sand-gravel type components in pocket plains topographically, depending upon the carrying capacity of surface water. The thickness of the unit is 7-10 m at the maximum while the unit is of the Quaternary age.

The typical Mediterranean climate prevails in the Bozburun Peninsula. The summers are hot and dry; the winter time is mild and wet. The average temperature is 19° C and the average precipitation is 752.5 mm (Taşlıgil 2008:75). As the Bozburun Peninsula is mountainous, the inner parts are not convenient for the settlement units. Syrna, Phoinix (Fenaket) and Kasara were settled in modern Bayırköy, Taşlıca Village and Asardibi Location, respectively, in the inner parts. Syrna kept contact with the coastal area through İncedere Bay while Phoinix did the same with Bozuk Bay and Kasara via Serçe Bay. The coastal settlement areas were not only preferred to settle across the bays that are suitable for the ships to stay away from the high sea winds and for easy anchorage, but also over the strategic hilltops near the bays due to

defensive concerns. In the east of the Peninsula, high coasts make a steep descend toward the sea and there are few coves which are windproof. The most suitable area for settlement on the eastern coasts is Bozuk Bay which enables the ships and sea vessels to anchor in case of the high sea winds. The steep hill in the southwest of this bay was the area where the town of Loryma with its suitable positioning for the construction of a fortress with a profound visibility of the surrounding area, was founded. From a strategic point of view in the historical background, the bay was used as a naval base due to its physical proximity to Rhodes, its width that enables a vast number of ships for harboring and the secure conditions arising from the mountainous area at the back side. On the eastern coasts towards the north, the ruins of Amos lie on top of Asarcık Tepe (on Hisar promontory in the southern tip of Kumlubük Bay) which was used as the hilltop mastering the bay and for establishing the place of settlement as Loryma did the similar. On the isthmus, Physcus, which is situated on top of Asar Tepe and masters a bay almost having the characteristics of a natural harbour, was one of the most important *demes* of the Peraea and attached to the polis of Lindos. The southern coasts of the Peninsula are not suitable for settlement as these coasts face the open sea winds. In the wide bay (Yeşilova-Sömbeki Bay) falling to the west beginning from Kızılburun, there lies the ancient settlement of Thysannos in the Quarter of Saranda in Söğüt Village, and Tymnos in Bozburun District. Another ancient settlement on the western coasts, Hydas, was founded where modern Selimiye lies. The delta formed by Ergüs Stream in Hisarönü Bay at the beginning of the Peninsula in the west, was the place where the *deme* of Bybassos, which was connected to the polis of Rhodes, was founded (Doğaner 2012:31-32).

CHAPTER 4

ANALYSIS OF THE DATA ON AGRICULTURAL TERRACING AND FARMSTEADS

4.1. GIS Analysis of the Agricultural Terraces

The analysis of the data sets and their results are explained hereunder:
Basically, three data sets were used in the study: (1) Vector Data, (2) Topographic Data: Elevation, Slope and Aspect, (3) Soil Data: Major Types of Soil, Degrees of Erosion and Land-use Capability

1. Vector Data

By using the orthophotos covering the study area, the physical boundaries of the agricultural terraces and flat fields (that were observed/ detected during the field studies) were drawn as polylines through GIS work and the relevant vector map was created (Fig. 4.1).

As a result of the areal calculations that were made by using the vector map, it was understood that out of 15.873,64 ha study area, 3.297,82 ha (20,78 % of the total area) of land was terraced. The plain areas which could be cultivated without terracing occurred as 544 ha which corresponds to only 3,43 % of the total study area (Tab. 4.1).

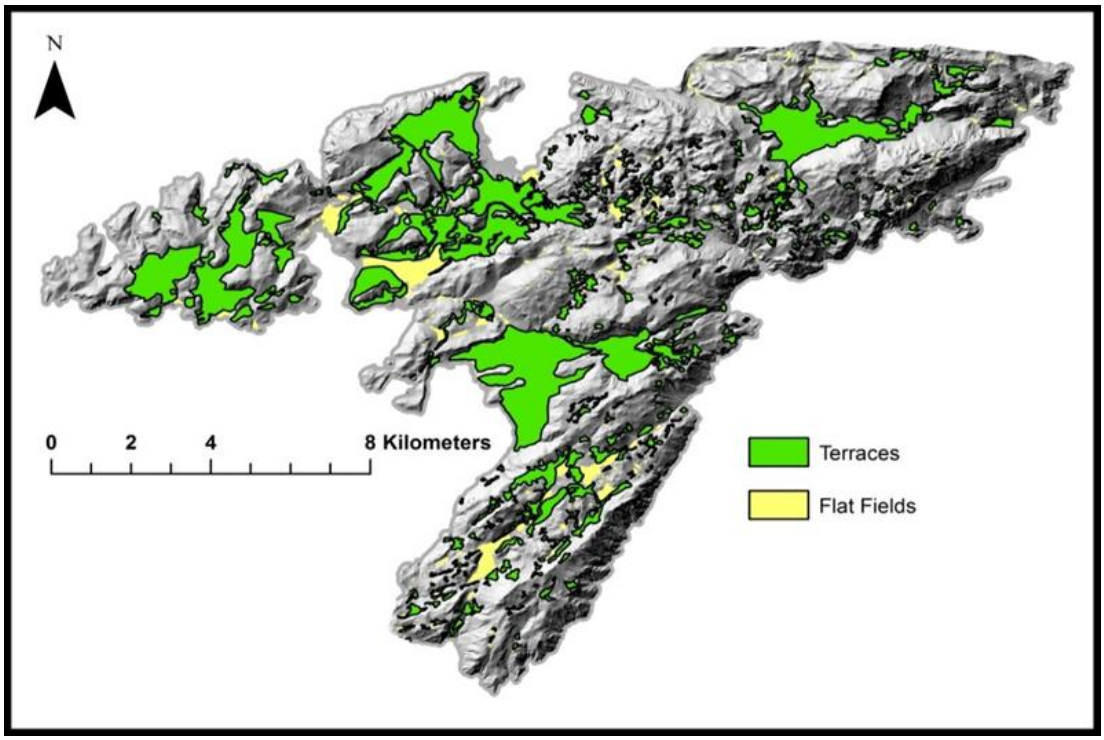

Figure 4.1: Map showing agricultural terraces and flat fields in the study area

Table 4.1: Distribution of agricultural terraces and flat fields

All Area (ha)	Terraces (ha)	Terraces/ All Area (%)	Flat Fields (ha)	Flat Fields/ All Area (%)
15.873,64	3.297,82	20,78	544	3,43

2. Topographic Data

Elevation:

As is seen in Fig. 4.2, the elevation range of the study is 0-780 m. The average elevation, on the other hand, measures 236,04 m (Tab. 4.2).

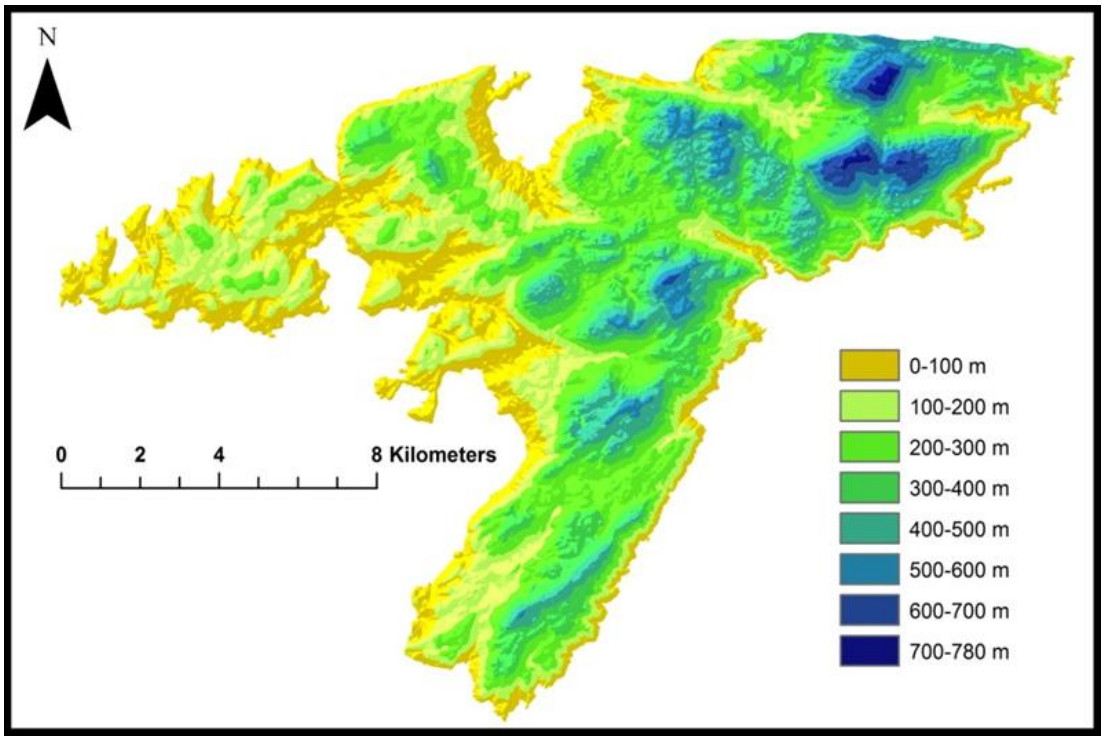

Figure 4.2: Elevation map of the study area

Table 4.2: Elevation values for all area

All Area (ha)	Minimum Elevation (m)	Maximum Elevation (m)	Mean Elevation (m)
15.873,64	0,00	780,00	236,04

Table 4.3 shows the categorization of elevation values (pertinent to the all-area) in 100 m intervals. Accordingly, the percentage of the areas ranging between 0-400 m appears as 84,72 %.

Table 4.3: Elevation values of the area (100 m. intervals)

Elevation Intervals (m)	All Area (ha)	Percentage (%)
0-100	3.551,57	22,37
101-200	3.522,96	22,19
201-300	3.650,97	23,00
301-400	2.724,65	17,16
401-500	1.547,40	9,75
501-600	626,85	3,95
601-700	206,58	1,30
701-800	42,67	0,27

This study also tried to understand the range of elevations on which the terraces were built, by overlapping the elevation map of the study area and the vector data of the terraced areas, through GIS work. The analysis showed that the elevation of the terraced areas range between 0-661,21 m. The average value occurred as 191,91 m. (Tab. 4.4).

Table 4.4: Elevation values of terraces

Terraces (ha)	Minimum Elevation (m)	Maximum Elevation (m)	Mean Elevation (m)
3.297,82	0,00	661,21	191,91

Table 4.5 shows the categorization of elevation values (pertinent to the all area) in 100 m. intervals. Accordingly, the percentage of the terraced areas ranging between 0-400 m .appears to be as 97,03 %.

Table 4.5: Elevation values of terraces (100 m. intervals)

Elevation Intervals (m)	Terraces (ha)	Percentage (%)
0-100	991,88	30,08
101-200	1.007,12	30,54
201-300	883,18	26,78
301-400	317,68	9,63
401-500	78,78	2,39
501-600	16,67	0,51
601-700	2,51	0,08

The elevation difference histogram of terraces (Fig. 4.3) was created by subtracting the elevation percentages of terraces from the elevation percentages of the total area. The positive sector in the histogram means that the percentages of terraces are greater than the percentages of the total area. Accordingly, these elevation intervals were preferred for terrace construction. In the same way, elevation intervals in the negative sector of the histogram indicate that these elevations were avoided for terrace construction.

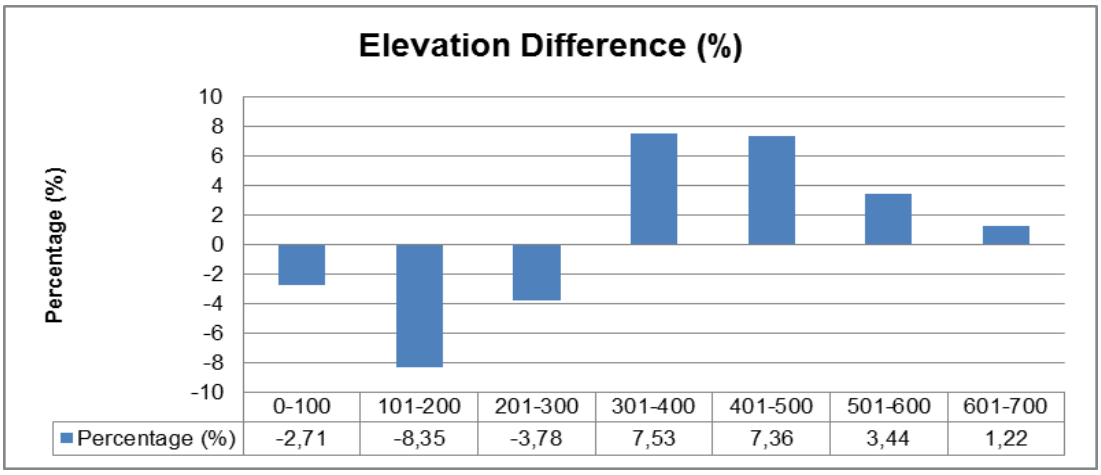

Figure 4.3: Elevation difference histogram of terraces

The positive range between 300-800 m indicates that this elevation interval was preferred for terrace construction. The histogram clearly shows that the intervals of 300-400 m and 400-500 m are the most preferred intervals.

Slope:

The slope values in the study area change between 0-85.99 degrees. The average slope value is 22.21 degrees (Tab. 4.6). The slope values were categorized in intervals and grouped (Tab. 4.7). Almost 80 % of the all area has slope values measuring over 12 degrees.

Table 4.6: Slope values of all area

All Area (ha)	Minimum Slope (degree)	Maximum Slope (degree)	Mean Slope (degree)
15.873,64	0,00	85,99	22,21

Table 4.7: Slope intervals of all area

Slope Interval (degree)	Meaning	Total Area (ha)	Percentage (%)
0-2	Flat or Nearly Flat	1.186,54	7,47
2-6	Slight-Slope	551,97	3,48
6-12	Middle-Slope	1.525,75	9,61
12-20	High-Slope	3.604,32	22,71
20-30	Steep-Slope	4.974,68	31,34
> 30	Very Steep-Slope	4.030,38	25,39

The slope degrees of the terraced areas range between 0 and 72.08 degrees. The average slope value is 14.82 degrees (Tab. 4.8). The slope values were also categorized at intervals for the terraces and were grouped (Tab. 4.9, Fig. 4.4).

Table 4.8: Slope values of terraces

Terraces (ha)	Minimum Slope (degree)	Maximum Slope (degree)	Mean Slope (degree)
3.297,82	0,00	72,08	14,82

Table 4.9: Slope intervals of terraces

Slope Interval (degree)	Meaning	Terraces (ha)	Percentage (%)
0-2	Flat or Nearly Flat	342,33	10,38
2-6	Slight-Slope	207,93	6,31
6-12	Middle-Slope	662,96	20,10
12-20	High-Slope	1.129,60	34,25
20-30	Steep-Slope	834,89	25,32
> 30	Very Steep-Slope	120,11	3,64

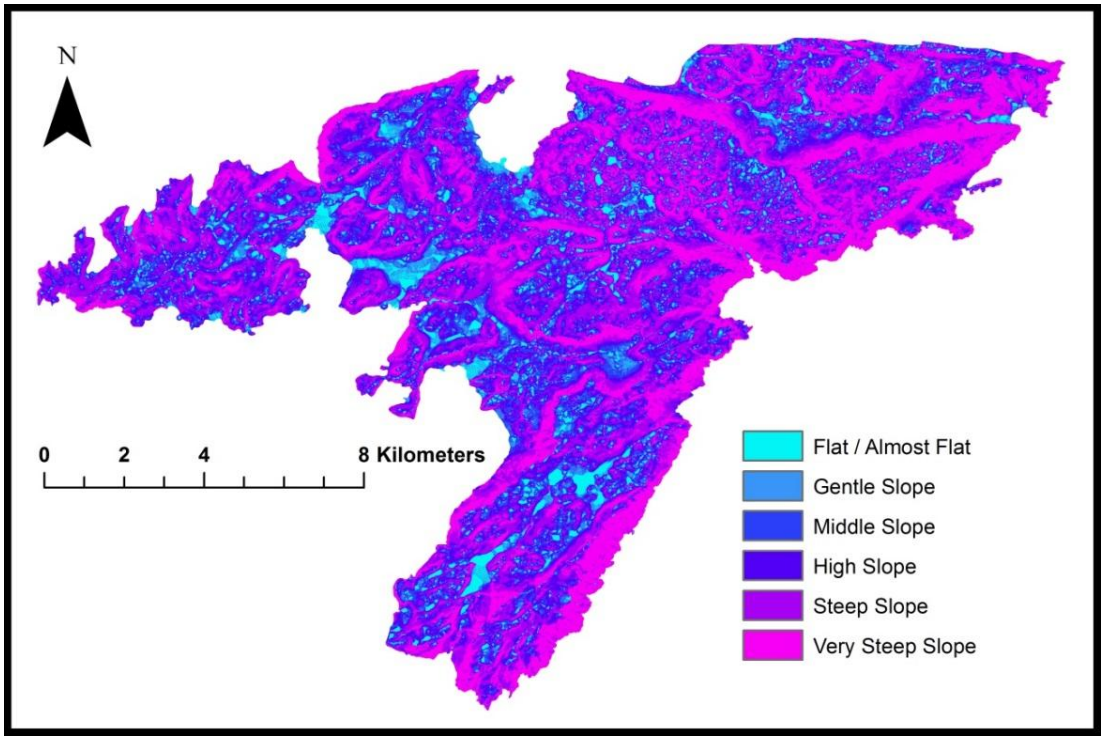

Figure 4.4: Slope map of the study area

The slope difference histogram of terraces (Fig. 4.5) was created by subtracting the slope percentages of terraces from the slope percentages of the total area. The positive sector in the histogram means that the percentages of the terraces are greater than the percentages of the all area. Accordingly, these slope intervals were preferred for terrace construction. In the same way, the slope intervals in the negative sector of the histogram indicate that these slopes were avoided for terrace construction.

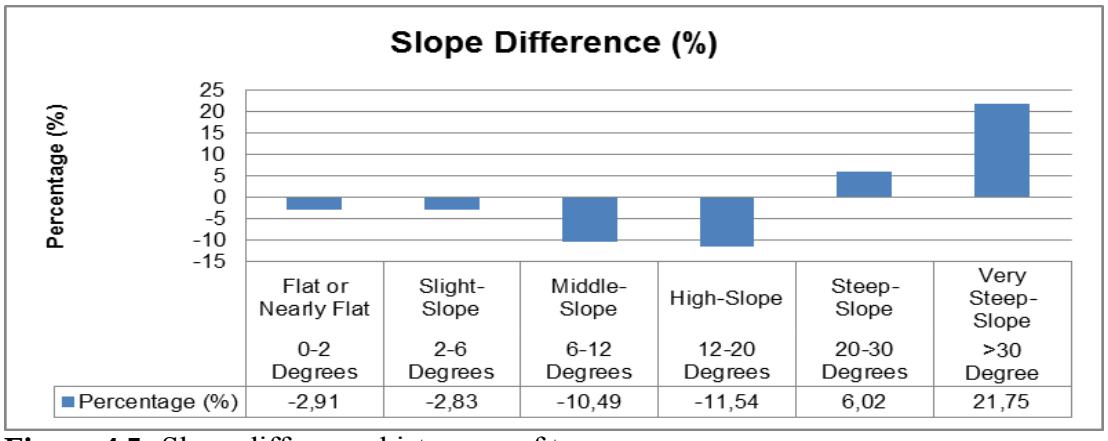

Figure 4.5: Slope difference histogram of terraces

The positive range starts with 20-30 degree intervals. This indicates that the slope values above 20 degree were preferred for terrace construction. The most preferred areas for terrace construction have slope values greater than 30 degree.

Aspect:

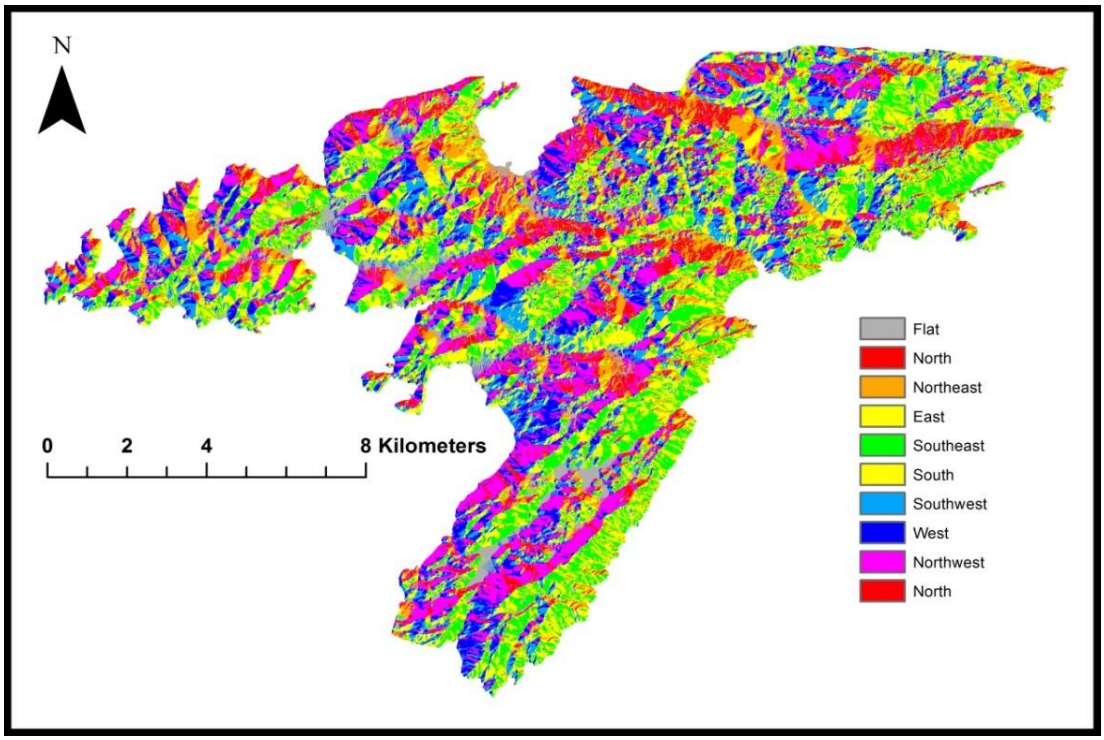

Figure 4.6: Aspect map of the study area

The aspect map of the total area was created in order to understand how the terraces in the scope area were positioned in respect of the sunlight (Fig. 4.6). Then, the aspect of the terraced areas was determined by overlapping the aspect map and the terrace map. The results are given in Table 4.10 and Table 4.11.

Table 4.10: Aspect results of all area

Aspect (Direction)	All Area (ha)	Percentage (%)
Flat	1007,18	6,34
North	1931,61	12,17
Nort-East	1343,46	8,46
East	1439,58	9,07
South-East	2326,73	14,66
South	2221,74	13,40
South-West	1696,56	10,69
West	1622,07	10,22
North-West	2284,71	14,39

Table 4.11: Aspect results of terraces

Aspect (Direction)	Terraces (ha)	Percentage (%)
Flat	292,14	8,86
North	388,85	11,79
Nort-East	285,54	8,66
East	265,36	8,05
South-East	389,89	11,82
South	417,81	12,67
South-West	372,30	11,29
West	365,86	11,09
North-West	520,07	15,77

Aspect difference histogram (Fig. 4.7) was generated by subtracting the “direction” percentages of terraces from the “direction” percentages of the total area. The positive sector in the histogram means that the percentage of terraces is bigger than the percentages of the total area. Thus, the directions in the positive sector were

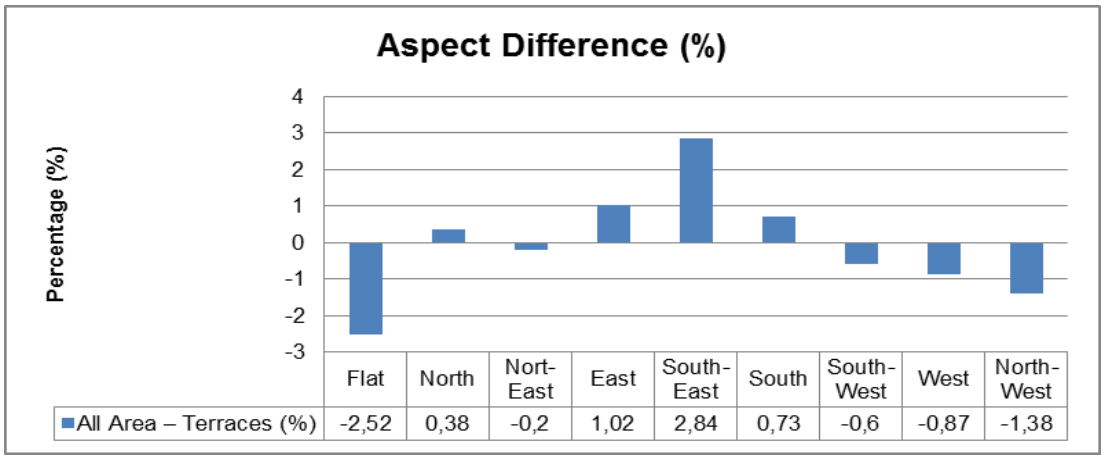

Figure 4.7: Aspect difference histogram of terraces

preferred for terrace construction. When the directions stay in the negative sector, it means that they were not preferred for terrace construction.

The histogram shows that South, South-east and East are the preferred directions for terrace construction. The most preferred direction is South-east whereas the most avoided direction is North-west.

3. Soil Data

Figure 4.8 shows the major types of soil within the study area. Red-Brown Mediterranean soil makes up ca. 40% of the whole soil group while Terra Rosa soil cover constitutes ca. 45% of the total area (Tab. 4.12). Terra Rosa is the dark red soil cover formed over limestone blocks in the Mediterranean climate regions. It can be formed in the areas which get 600 mm annual rainfall or more. The natural vegetation cover over these type soils is made up of the maquis and various forest tress. The major mineral for the formation of these type soils is hard calcareous, but can also be characterized with limestone, dolomite, calcareous sandstone, calcareous sandstone, calcareous conglomerate and partly volcanic rocks. Red-Brown Mediterranean soils can be seen in arid seasons, humid and sub-humid climatic zones. They are formed in areas exposed to 400-1000 mm annual rainfall rates. The main element acting in the formation of Red-Brown Mediterranean soils is hard

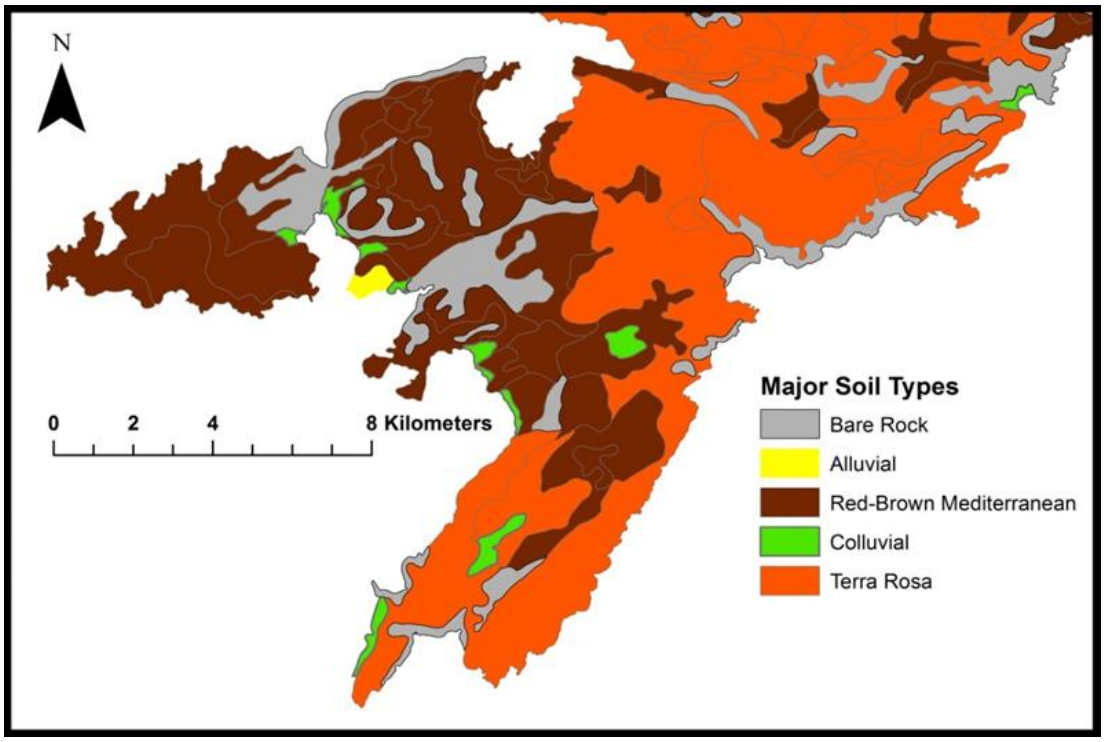

Figure 4.8: Soil map of the study area

calcareous, granites in mountainous regions, mudstone and various metamorphic crystal rocks (T.C. Köy Hizmetleri Genel Müdürlüğü 1998: 20).

Table 4.12: Major soil type distribution of all area

Major Soil Types	All Area (ha)	Percentage (%)
Bare Rock	2.215,34	13,96
Alluvial	58,45	0,37
Red-Brown Mediterranean	6.228,59	39,24
Colluvial	292,45	1,84
Terra Rosa	7.078,81	44,59

Table 4.13 shows the distribution of major soil types for the terraces. 68,22 % of the terraced areas rest over Red-Brown Mediterranean soil cover; 23.31 % lies over Terra Rosa type.

Table 4.13: Major soil type distribution of terraces

Major Soil Types	Terraces (ha)	Percentage (%)
Bare Rock	0	0
Alluvial	157,78	4,78
Red-Brown Mediterranean	2.249,76	68,22
Colluvial	121,51	3,68
Terra Rossa	768,77	23,31

Major Soil Types (MST) difference histogram (Fig. 4.9) was generated by subtracting MST percentages of the terraces from the MST percentages of the total area. The positive sector in the histogram means that the percentage of terraces is bigger than the percentages of the total area. Thus, MST in the positive sector were preferred for terrace construction. MST in the negative sector of the histogram means that they were avoided for terrace construction.

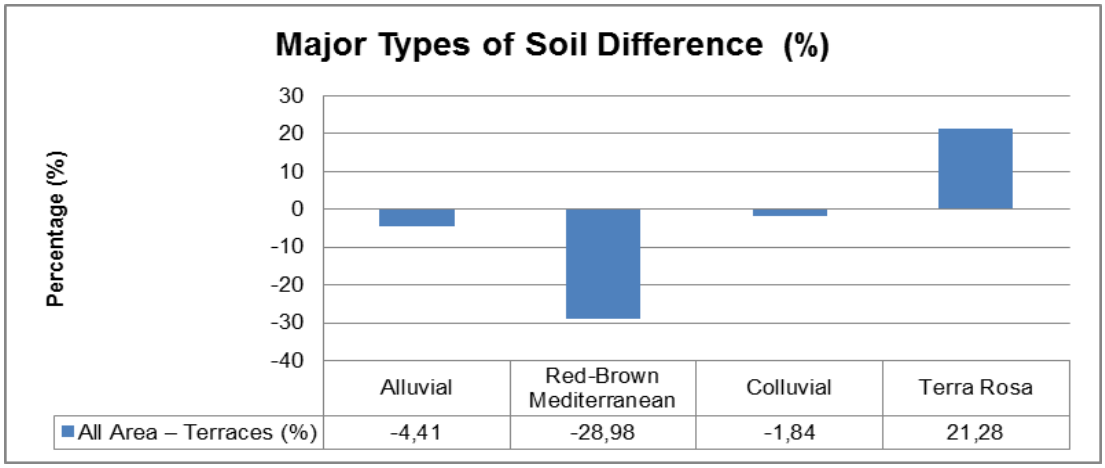

Figure 4.9: Soil difference histogram of terraces

Table 4.14 and Figure 4.10 show the degree of erosion over the terraced areas. Accordingly, more than 78 % of the terraced areas were exposed to severe erosion.

Table 4.14: Erosion degrees of terraces

Erosion	Terraces (ha)	Terraces (%)
0 (None)	157,78	4,78
1 (Minimum)	73,19	2,22
2 (Moderate)	474,05	14,37
3 (Severe)	1583,65	48,02
4 (Maximum)	1009,15	30,60

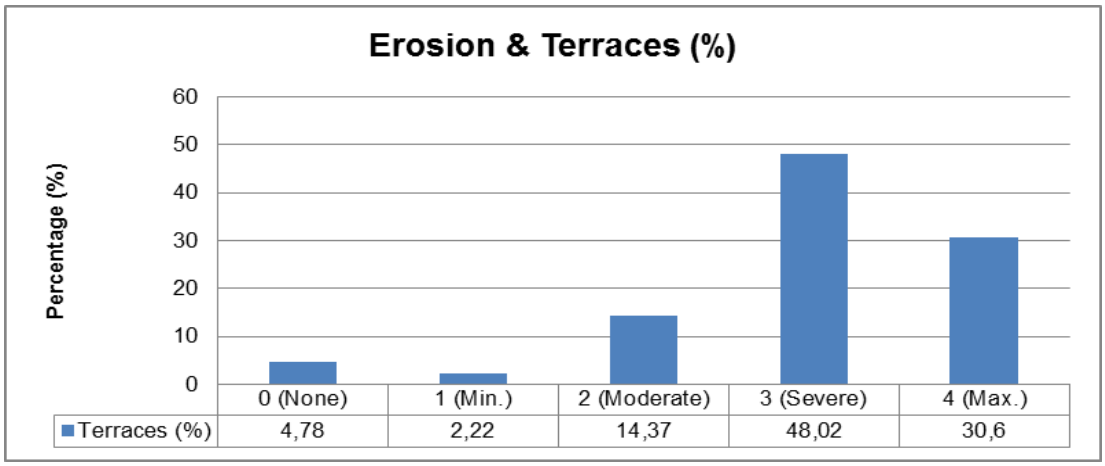

Figure 4.10: Erosion degrees of terraces

Table 4.15 and Figure 4.11 show the land-use capability of the terraced areas. Class V lands cannot be found in the study area. About 70 % of the terraces rest over Class VII agricultural lands.

Table 4.15: Land-use capability of terraces

Land-use Capability	Terraces (ha)	Terraces (%)
I	73,19	2,22
II	71,21	2,16
III	333,33	10,11
IV	157,29	4,77
VI	199,41	6,05
VII	2.275,08	68,99
VIII	188,31	5,71

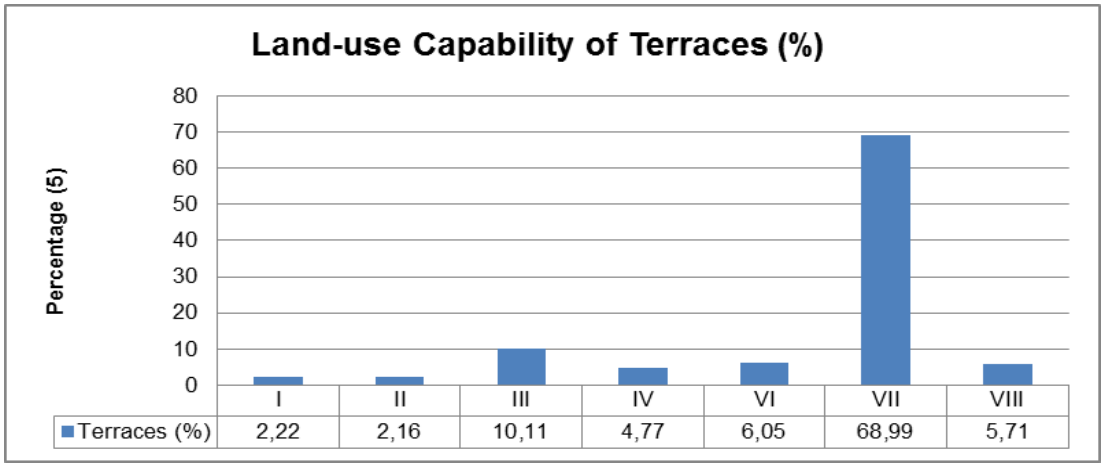

Figure 4.11: Land-use capability of terraces

There are eight (8) classes of land-use capability. Soil damage and their categorization gradually increase from Class I to Class VIII. The first four (4) classes of land are suitable for growing culture plants which can adapt to the region and, growing forest, meadow and pasture plants, under a well-managed agriculture authority. Class V, VI and VII lands are suitable for growing adapted aboriginal plants. Some special plants can be grown on Class V and Class VI lands as long as necessary measures are taken for the preservation of soil and water. Class VIII

agricultural lands can yield provided that very effective and costly improvements are made (T.C. Köy Hizmetleri Genel Müdürlüğü 1998: 23).

To sum up; due to the undulated character of terrain and the great majority of elevation values (ca. 85% of the whole area) ranging between 0-400 m, we see that a very small percentage of land could be used for plain agriculture when compared to cultivation of any type products all over the terraces. Obviously, the terraces determined the model of agrarian production in the Peraea. This case is also vindicated by the greatest share of terraces (97%) built between 0-400 m. However, the most preferred ones were built between 300-500 m., having slope values of over 30 degrees. Although 30 degree is the most preferred, the values between 20-30 degrees also suggest an outstanding decision for creating the fair conditions of terrace compatible products. That South, South-east and East were the most preferred aspect value directly relates to the positive effect of solar radiation for any crop plantation compatible with the Mediterranean climatic zone. The reason of positioning also has to do with avoiding the negative effects of the windy conditions in the contra-directions.

The soil type seems to have had no less effect on the choice of terraces. Despite the dominancy of the Red-brown Mediterranean soils all over the study area, typical Terra-rosa soils were the most preferred during the construction of the terraces. However, the high erosion rates over the terraced land must have been an inevitable result of the prevailing conditions in the region. Although a reason behind terracing is to avoid erosion at the maximum, the region seems to have minimized this effect at the minimum extent since the rest of terraced land is also seen to have been exposed to moderate erosion rates. Such a situation can also be explained by the slope effect as the terraces could have been built on higher slopes up to 72 degrees. Nevertheless, the disadvantage of erosion seems to have been overcome by the choice of places in relation to land-use capability, hence places suitable for doing agriculture with the adapted aboriginal plants.

4.2. Typology of the Farmsteads and Their Relations to the Agricultural Terraces

Obviously, the ancient farmsteads are basic indicators of the operation of an extensive terrace system in the Peraea (Fig. 4.12). Various data on these agrarian structures and associable remains have been recorded during the surveys carried out in 2009-2012. Referring to the farmstead data presented in Appendix A-B, a simple typology has been created with respect to the Peraean farmsteads. Accordingly, there are two major groups of farmsteads based on size. The first group covers the small scale farmsteads while the second group might the characterized with the large size category. As the size of big farmsteads also has to do with their potential workforce and ability to master wider terraced areas, they are hereinafter referred to as the "large operation" structures.

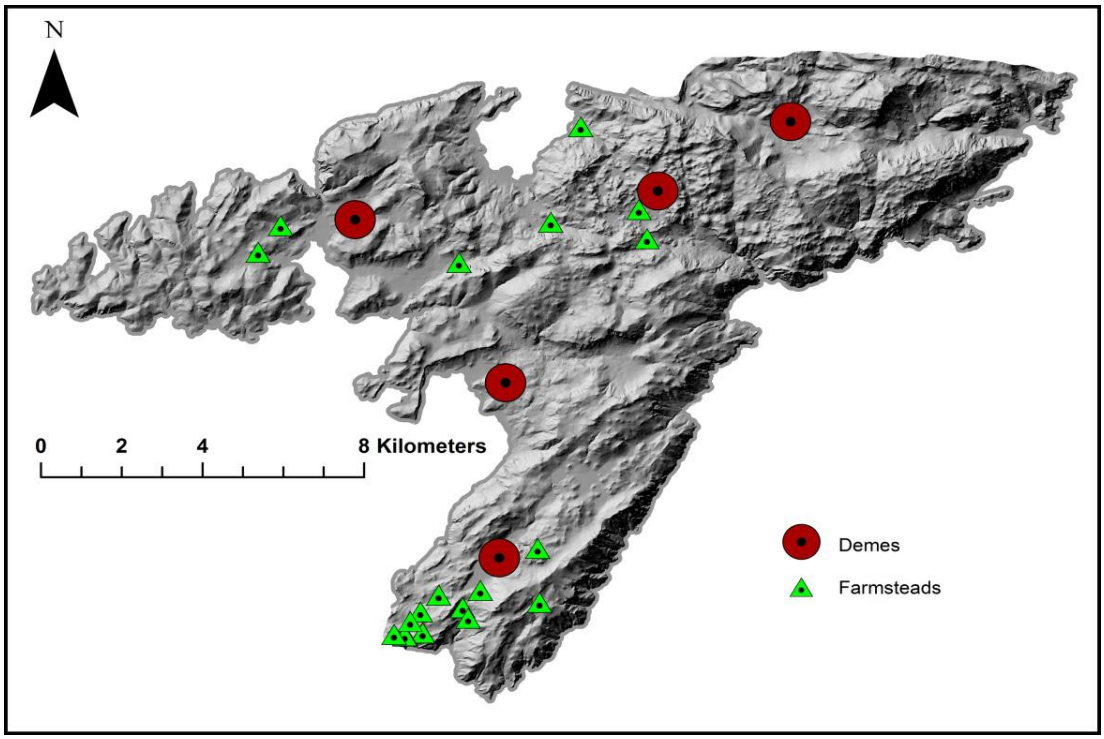

Figure 4.12: Ancient farmsteads detected in the survey and *deme* centers

The first group was categorized under two sub-categories: (i) isolated/ individual farmsteads, (ii) small scale clusters. The first sub-group is made up of a total number of 11 (eleven) "isolated/individual farmsteads" spread over the study (F.1, F.2, F.3,

F.4, F.5, F.6, F.7, F.8, F.9, F.10, F.15, F.17). The size of these farmsteads falls into a range of 0,1-0,3 ha when considered with their smaller catchment areas.

On the other hand, we only have 3 big farmsteads recorded in the territorium of the deme of Phoinix in the south. These are F.8, F.16 and F.18 which were found in the NE (east of Burgaz Tepe), SW (Gedikçukur Location) and SE (Küçükdibekbaşı Location) of the Acropolis, respectively (Figs. 4.13, 4.14, 4.15). The common thing about all of them is the type of masonry applied on the huge, polygonal terrace walls and their positioning near an ancient route. Moreover, all were recorded to have mastered wider agricultural catchment areas and enclaves in proximity. The workmanship of these farmsteads is remarkable enough to attribute them a distinguished status. They highly seem to denote the agrarian potential of a small deme and indicators of a well-established distribution economy and market-oriented strategy in the Peninsula. On the other hand, not all of them revealed traces of pressing platforms inside or nearby the terrace walls. All of the three farmsteads are still in use for stockbreeding by the locals of modern Taşlıca Village. The potsherds recorded around these structures would be dated to the late Classical/early Hellenistic and Roman periods. Apart from the large farmsteads, the W and SW of the Acropolis are quite representative of small scale inland farmsteads and associated ruins (including the cisterns and wells). Many of them are situated nearby terrace formations, and the ancient route reaching the plain area of Hisardibi on the isthmus. The reason of their positioning in the southernmost part of the Peraea must have had close relation with the geographical position of the Island of Rhodes. Although there still remains the possibility that similar farmsteads were situated in the territorium of other demes of the Peraea, our samples appear to be quite meaningful when limited to a single deme. That the small scale farmsteads outnumber the large operation ones might point to the potential created by the small ones to be managed by some superior land authorities.

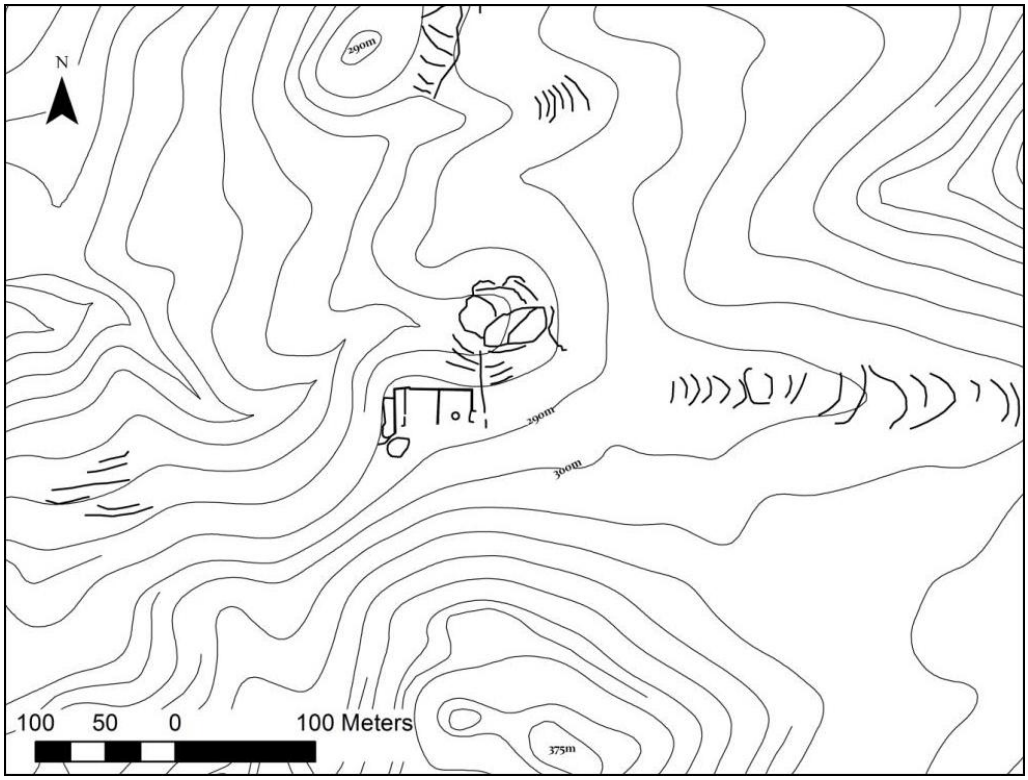

Figure 4.13: F.18 and agricultural terraces, Taşlıca (south-west)

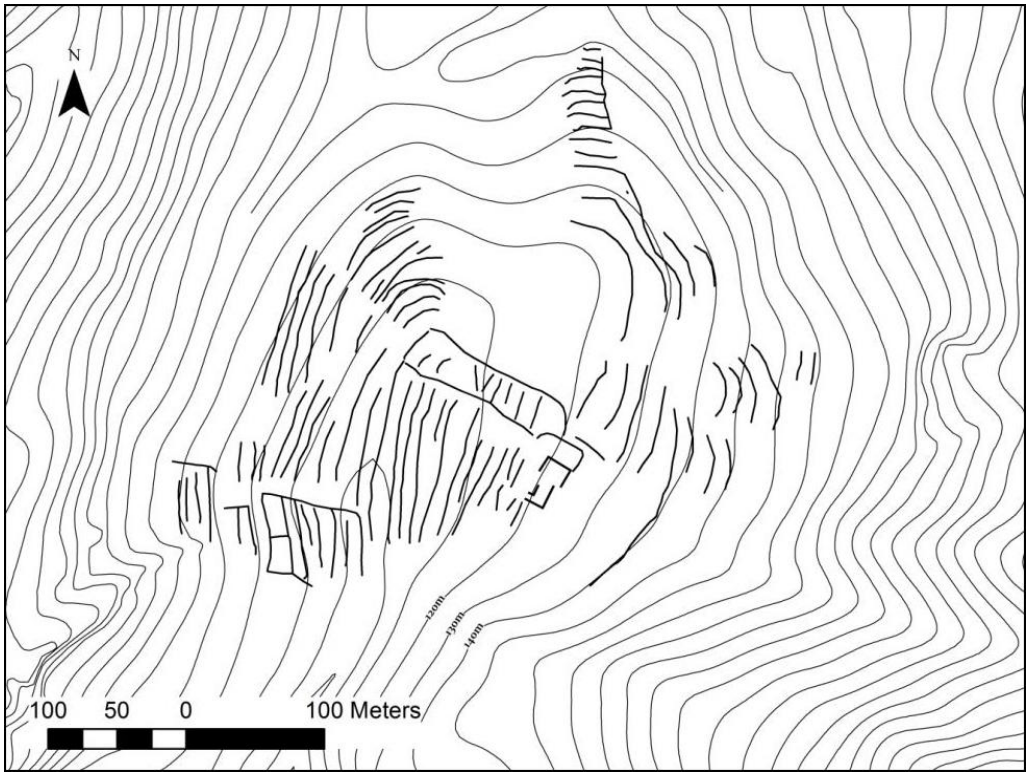

Figure 4.14: F16. and agricultural terraces, Gedikçukur, Taşlıca (south-west)

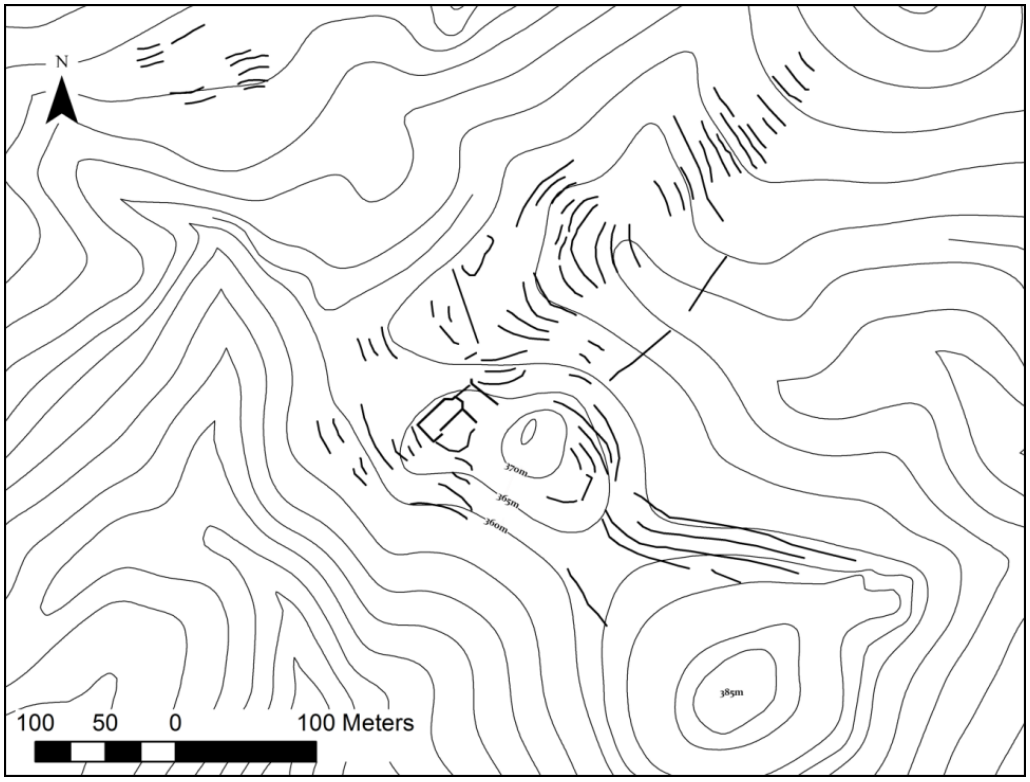

Figure 4.15: F.18 and agricultural terraces, Küçükdibekbaşı, Taşlıca (south-west)

The second sub-category was created according to the organization of farmsteads in a closed environment where the only example is the cluster formed by the small scale farmsteads (F11, F12, F13, F14) in the SW of the Acropolis of Phoinix (Taşlıca). On average, these farmsteads are situated at regular intervals, reveal similar techniques of masonry (coarse polygonal) applied on the outer walls and retain typical block scatters in their close surroundings. The potsherds suggest the Hellenistic and Roman periods, however the architectural technique often denotes a continuous flow from the Hellenistic period. They make up an enclave (in the *chora*) in a pocket plain which is naturally restricted by the surrounding hills. This sub-group possibly addressed self-sufficiency but as it also gives way to an ancient road travelling down to the isthmus, they could have acted as the caravan spots for the transmittal of certain goods and products.

No less important for a discussion on tracing the original terrace walls in relation to the Hellenistic farmsteads in the Peraea, F.17 (SE of lower Sindili) might be a good case. This is a small scale isolated farmstead whose inner and outer boundaries are

clearly visible and terrace walls are seemingly ancient when compared to the late works. It overlooks the plain area of Sindili at the deme center and seems to be associated both with this area and the agricultural terraces on its east.

If we turn back to the second group, we see that the man-made drivers of the agrarian economy were the big size large operation farmsteads in the Peraea. Blocked by Karayüksek Dağ but having physical proximity to the Island of Rhodes, F.18 (the NE of the Acropolis) and its catchment area is remarkable enough to be nominated as a production / storage / redistribution centre. When the size and extent of F.8 (the site on the NE of Acropolis) is taken into account, it is understood that this structure was also one of the focal points of product accumulation and processing during the Hellenistic period when intensive agriculture was realized.

Although not categorized in the "large operation" category, an exception with respect to size is F.15 which is also striking with its walled courtyard, very clear points of entry and multi-chambered plan, and prefect visibility as far as the coastal area of Gedikçukur. Seemingly, it had a good master of the plain area on its north while it lies high above the wide terraced agricultural area which was most possibly controlled by the large farmstead (F.16) in the SW of the Acropolis. This farmstead might be nominated as a "supporting" structure serving the interests of F.16.

The analyses given in part 4.1 well show that the morphological structure of the land is determinant on the construction of terraces. Topographic character of the area has determined the form and shape of these terraces around the farmsteads. The majority of the farmsteads in the Peraea are situated on or near the most suitable land for terracing. A good case is F.3 (in Yeşilova, Bobzurun) which reveals a close relation with the terraces resting over the low slope alluvial deposition and having wider treads (ca. 10-12 m). As the terraces reach the limestone blocks, the treads become tight and narrow and that we can barely state the availability of farmsteads nearby such treads.

The central part of Bozburun Peninsula which rolls around the modern District of Bozburun is quite yielding in respect of the agricultural terraces. Bunch of agricultural enclaves revealing farmstead data were recorded between Burgaz-Kireçlik-Örteren-Kuştepe sites and Yeşilova Quarter. The surface materials grabbed throughout these sites are datable to the Classical, Hellenistic and Roman periods.
The environs of Selimiye as far as Kızılköy Village is also informative on the matter of ancient terracing activity and relational agrarian structures. It is yet difficult to fix the chronology as we are relatively poor of surface assemblages. However, by looking at the type of masonry, they were possibly of the Hellenistic period origin. An exception for an unusual location is F.5 which is almost the only farmstead built very close to the coastal area. In general, the farmsteads of the Peraea are situated at inland coordinates, often in fan-like or flatter small pocket plains (e.g. F.7). The vast majority of them have a very good master of the surrounding terraces. The placement of cisterns nearby the farmsteads points to the vitality of water which is quite scarce in the Peraea. The cisterns are the good indicators for dependency on underground water due to the karstic characteristics of terrain.

A topic of discussion about the farmsteads is linkable with the GIS analyses of terraces. As explained above, the aspect results of terraces are the most desired for any type of land where intensive agriculture is applied for some special products like wine and olive oil. Such products were widespread in antiquity. Surface assemblages previously reported by many scholars in the Peraea and many parts of the Mediterranean reveal a cross compliance with the type of products transported in these assemblages but mainly the amphorae. The point is that although the aspect results of the majority of the agricultural terraces (“preferred”) do not show a strict parallelism with the positioning of all the farmsteads throughout the study area, the aspect results are worth discussing for the farmsteads themselves. Obviously, out of 18 farmsteads, 8 of them are directed toward (including and in between) the Southern and Eastern sectors. Also, it is not interesting to find out that about 6 of them were situated on the flat grounds as the sloping character of terrain is an important determinant for many settlement structures. The remaining 4 faced either the North

or North-west. Regardless of all these directions, it is a reality that the vast majority of the farmsteads are situated near these terraced areas. Hence, it was simply not the concentration of the terraces often facing the S, SE and E directions which seem to have affected the choice of location of the farmsteads in the study area. These farmsteads were possibly designed on the most suitable land for settlements (regardless of aspect) while their designation and planning process was not a random idea. The basic idea must have been to keep a maximum proximity to the agricultural terraces for easy mastering. Furthermore, in line with the idea of non-randomness, the type and technique of masonry applied on the terrace walls and walls of the living spaces and, the plans of the two large farmsteads (the plan of F.16 is hardly perceptible due to disturbance) prove to be very similar. As well as the utilitarian assemblages like the stamped amphora, they are the best indicators of a pre-planned and well-established economy greatly controlled by Rhodes in the early Hellenistic period. However, in light of the late assemblages recorded during field studies, this does not necessarily mean that they were serving for a particular span of time as they could have continued to be used in the upcoming periods. An additional perspective can be brought such that they could even be active from the beginnings of the late Classical period as relational potsherds were also grabbed. Hence, the beginning of a well-organized economy is also attributable to the earlier stages of the Peninsula and that the case might be returned to the original "owners" of the Peraea before the "full" infiltration of the Rhodian politics into the mainland.

CHAPTER 5

DISCUSSION: ASSESSMENT OF THE RESEARCH RESULTS IN THE CONTEXT OF CLASSICAL ANTIQUITY

In this part, samples of surveys in relation to the agricultural lands, farmsteads and their place within the geoarchaeological context are given in order to make further discussions about the Peraea. The core of comparative data comes from Kythera, Argolid, Boetia, Attica, Knidos and Loryma. As a start and regarding the GIS context, a basic study comes from an Aegean island, Kythera.

The spatial pattern of the late settlement (post-Medieval) and associated agricultural areas on the island of Kythera in Greece was studied by Bevan, Frederick and Krahtopoulou (2003) through the application of GIS. Although the history of occupation on the island dates back to the Neolithic, the settlement remains present a continuous inhabitation up to the present day. The size of the island, which lies in the southern part of the Peloponnese (Fig. 5.1), is ca. 278 km2. The GIS results of the post-Medieval settlement has shown that the concentration of the terraces are attributable to the close surroundings of the residential areas whether they be the villages or isolated farmsteads as well as some public buildings like monasteries and chapels. The point is that these terraces were those built on the steep slopes of the hilly grounds and were cultivated regardless of product type (fruits, cereals, olive oil, grapes, etc). About 28% of the land was identified to have been terraced. Interestingly, almost half of them (ca. 44%) were situated over the slopes having degrees over 12°. An inspiring result under the purposes of this research relates to the aspect analysis for the terraces at the island. Accordingly, the agricultural terraces of Kythera were preferred to be constructed over the slopes facing the southern direction. The reason is most possibly owed to the mild atmospheric conditions in

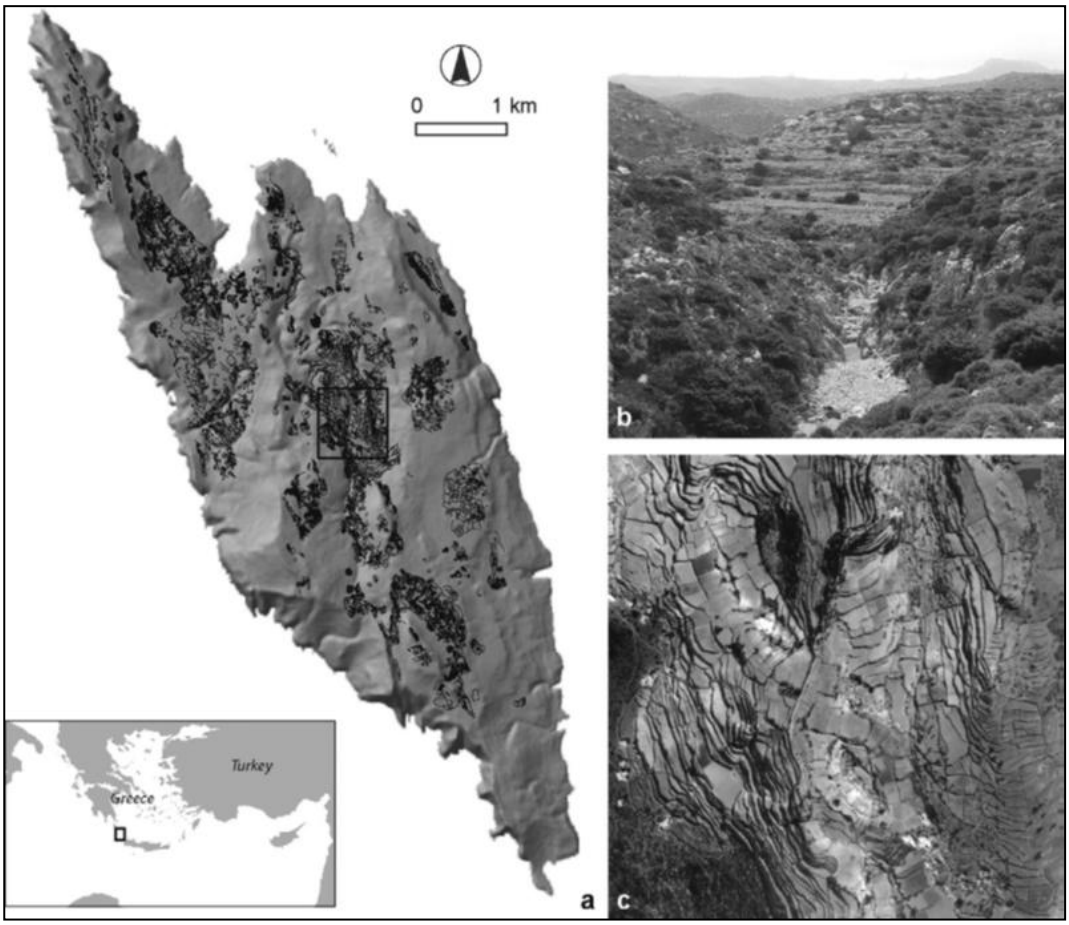

Figure 5.1: Map showing of Antikythera and its extant systems of agricultural fields, (b) terraces on the north side of the island, (c) an aerial photograph of terrace systems in the centre of the island (Bevan, A., Conolly, J. 2011:1304, Fig. 1)

winter times and the greater amount of sunlight at any time. On the other hand, it was understood that the least preferred slopes for terrace construction were those facing the north-west due to poor sunlight, thus solar radiation and exposure to more windy situations leading to colder currents (Bevan and others 2003:217-224).

Although it involves the later periods, GIS has highlighted the effective utilization of the countryside via terraces. 28% of Kythera was reserved to terraces while this figure occurred to be as 20% in the Peraea in which case both suggest a considerable percentage for agrarian way of living. The slope values occurring to be over 12 degrees for half of the terraces in Kythera has comparative grounds with the case of the Peraea in that ca. 80% of the study area (obviously including the terraces) has

slope values over 12 degrees, although the positive range for the terraces in the Peraea start from 20 degrees which is not that far from the value stated for Kythera. But a close comparison is to be found in the aspect results of the terraces, expressible in a common direction- the south which was definitely an issue about maximization of sunlight and avoidance of adverse climatic conditions.

A referable study is the Southern Argolid Survey which was conducted in 1972-1983 and aimed to determine the settlement pattern beginning from the Stone Age to the later periods. It has become evident that there were two essential groups of the surveyed sites according to their functions regarding habitation and special purpose. Small single sites with the remains of a rectangular building (measuring less than 0.5 ha) were identified as farmsteads. Pertinent to the late Classical Period, the size of single component sites measured as 0.11 ha on average. Similarly, the size of sites equipped with a tower like structure and identified as farmsteads was 0.16 ha on average (Jameson and others 1994:215-254).

The alluvial soils were preferred for the construction of the majority of the small-size sites detected during the Argolid surveys. It was understood that such sites were not only advantageous for olive plantation but were also sufficient for mixed cultivation of grain and vine. Pertinent to the surveyed area of Flamboura, ca. 17 small sites were recorded. Except three of them, these sites were identified as farmsteads most of which were dated to as late as the 4th century B.C. These farmsteads revealed inter-connectivity and proximity to the ancient stream beds. They also called attention to the approximate size of their land properties in which case the smallest one was measured to be 5.5 ha while the largest as 22.5 ha. When their property size and the agricultural intensification (specifically in olive production) are reconsidered, it is possible to suggest that in the 4th century B.C, this type of an agricultural system would have necessitated much more labor force (hired workers or slaves) than those provided by a nuclear family (Jameson and others 1994:385-388).

When the question of period is left out, the small scale farmsteads of the Peraea present similarities with the farmsteads determined in the Argolid survey. The average size for both is ca. 0.5 ha or less, for the mentioned typology. Although, we have no towered structures in the Peraea, the larger farmsteads exceed 1 ha which means that as they get complex, their size increases. That the positioning of such farmsteads on or very near the alluvial grounds and their proximity to a stream bed, also light the way for understanding further about the choice of location and the vitality of soil type for growing a variety of products. As we also understand, the size of the farmsteads provides hints about the recruitment of a greater labor force needed for an average size construction which ultimately denotes some kind of professionalism in agricultural production.

When it comes to the Boeotia Survey, we see that the relevant sites were dated to between the 6th to the 3rd centuries B.C. and were grouped together as "Archaic to Early Hellenistic" periods. Evidence is weak about the occupation of these sites earlier than the 6th century B.C. As the archaeological evidence suggests, the majority of them were occupied after the mid or late 5th century B.C. and continued to be used through the 4th and the 3rd centuries B.C. An important thing about these sites is that they have relatively smaller sizes. Out of 66 sites, 45 of them were measured to be ca. 0.50 ha or less hence they were possibly individual farmsteads, also understandable from the associated archaeological materials (e.g. the roof tiles, household potteries). The dramatic increase in the number of settlements discovered during the archaeological surveys conducted after 1950s (also verifiable through the ancient sources) have shown that the population of Greece increased considerably in the course of the Archaic and Classical periods. Almost 90% of the sites detected during the Boeotian Survey have proven that occupation took place from the late Archaic to the early Hellenistic periods. The archaeological evidence also suggests that the certain periods of the 4th century B.C. was the intersecting span of time when most of these sites were occupied. Therefore, it represents the zenith of a dispersed settlement pattern throughout the region (Bintliff and Snodgrass 1985:139-141).

The results of Boetia Survey has more to say since the periods questioned more or less overlap with the transition process of the Peraea during the 3rd-2nd centuries B.C. The dispersed settlement pattern dominated by a greater number of relatively small size farmsteads in Boetia paves the way further to understand the reason why the small scale farmsteads were so active in the Peraea during the Hellenistic period. This must have been owed to the flexibility in the agrarian type production and the emergence of population pressures in the countryside.

During the surveys conducted by Lohmann between 1981-1989 in Southern Attica, an area measuring 20 km2 was studied in detail. More than 250 sites which survived from the Neolithic to the 20th century were determined in the course of these surveys. The findings grabbed in the South Attica have addressed a well-developed agrarian economy and high population rates during the 5th-4th centuries B.C whereas they have also indicated a decrease in the density of population at the end of the 4th century B.C. Despite an upward (relatively small) trend in the region, it was quite unimportant when compared to the Classical era since the vast majority of the archaeological debris (including the farmsteads and agricultural terraces) have been dated to the said period (Lohmann 1992:30).

The results have also shown that out of 33 farmsteads (that have been dated to the Classical period), 8 or 9 of them were large size constructions which managed an agricultural area of about 25 ha. Another result was attained on the close relationship between the large size farmsteads and large terraces complexes. The surface materials recorded around the terraces and the similarities in respect of the plan of the farmsteads have further revealed that these large terrace complexes were of the Classical period (Figs. 5.2, 5.3). According to Lohmann, intensive terracing activities took place in the Classical Attica and that two major reasons are subject to discussion. The first one must have come along with the dramatic population

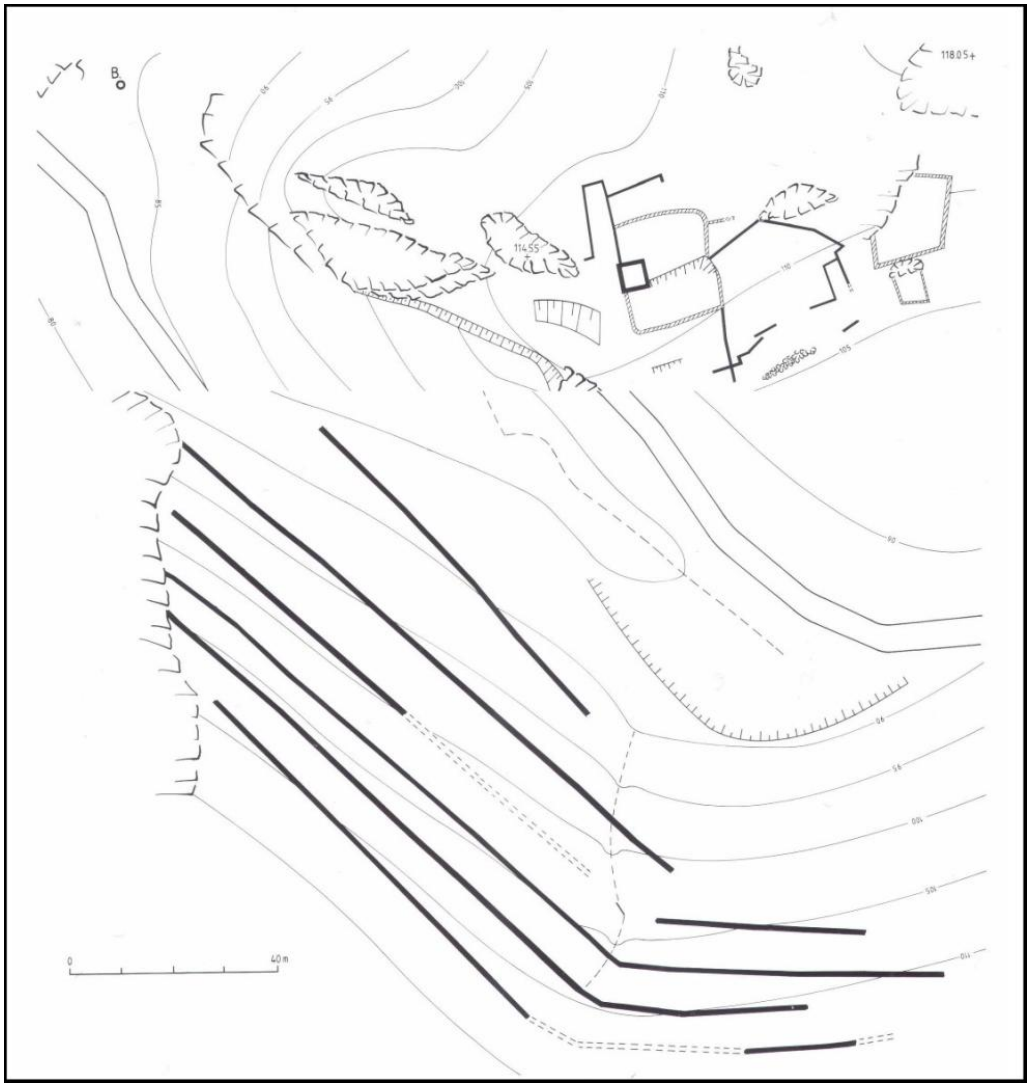

Figure 5.2: Classical farm estate at Aghia Photeine, Attica and agricultural terraces (Lohmann 1992:52, Fig. 26)

increase in Attica during the same period. Concordantly, the terracing of the "marginal slopes" enabled the enlargement and exploitation of the limited areas suitable for agriculture. Secondly, olive oil produced in Classical Attica was a high quality and profitable product. The enlargement of the agricultural areas via intensive terracing must have geared Attica toward the foreign markets in terms of olive oil production (Lohmann 1992: 51).

Figure 5.3: Classical farm estate surrounded by agricultural terraces, Charaka, Attica (Lohmann 1992:54, Fig. 28)

The agrarian practices of South Attica have many to say regarding the case of the Peraea and its dependency on the terrace systems. Particularly, the large size farmstead having catchment areas of ca. 25 ha verify the importance of large operation lands in the Mediterranean and the Aegean, as an expression of the growing importance of agriculture. In both, dramatic increases in the population (again regardless of period) caused a pressure to open up new lands of cultivation and creating unusual spaces to get more yields for the growing number of people. But, as they were created on the most suitable soils, we can make a mark to a

constructive mind about the choice of place for terracing as well as a choice on growing the most profitable products in the long-run.

Under a comparative approach, we can also understand further by referring to some previous surveys conducted in the vicinity of Loryma and the neighboring region of Knidos.

The factors affecting the dispersion of terraces in the southern part of Hızırşah Village in Knidian territorium were studied with the help of 1/20.000 scale maps and the plans of these terraces were prepared at the end. Accordingly, the agricultural terraces lie over Karaböğürtlen Formation which is made up of sandstone, mudstone and siltstone and was/which were formed in the upper Senonian period. The reason is that this formation is cultivable and the soil cover is rich. Hence, it enables easy terracing. On the other hand, the terrain resting over the limestone blocks is not suitable for terracing. It was observed that the land which lack terracing is dominated by the limestones. As the slope degrees are very high, the terraces were built according to morphology in narrow strips (in a width of 5-6 m). The terrace walls were worked with the limestone and sandstone carved out of the surroundings. Furthermore, the dispersion of terraces has parallels with the dispersion of the springs (Fig. 5.4). Hence, it is not extraordinary to see that proximity to water resources was considered for deciding on the places of terraces. There lies the biggest amphora manufacturing center in Kiliseyanı location which is very close to the agricultural terraces (Tuna, Empereur and others 1991). The presence of such a workshop strengthens the idea that the terraces in this region were primarily cultivated for wine production in the ancient period (Tuna, Türkmenoğlu and others 2003: 33-34).

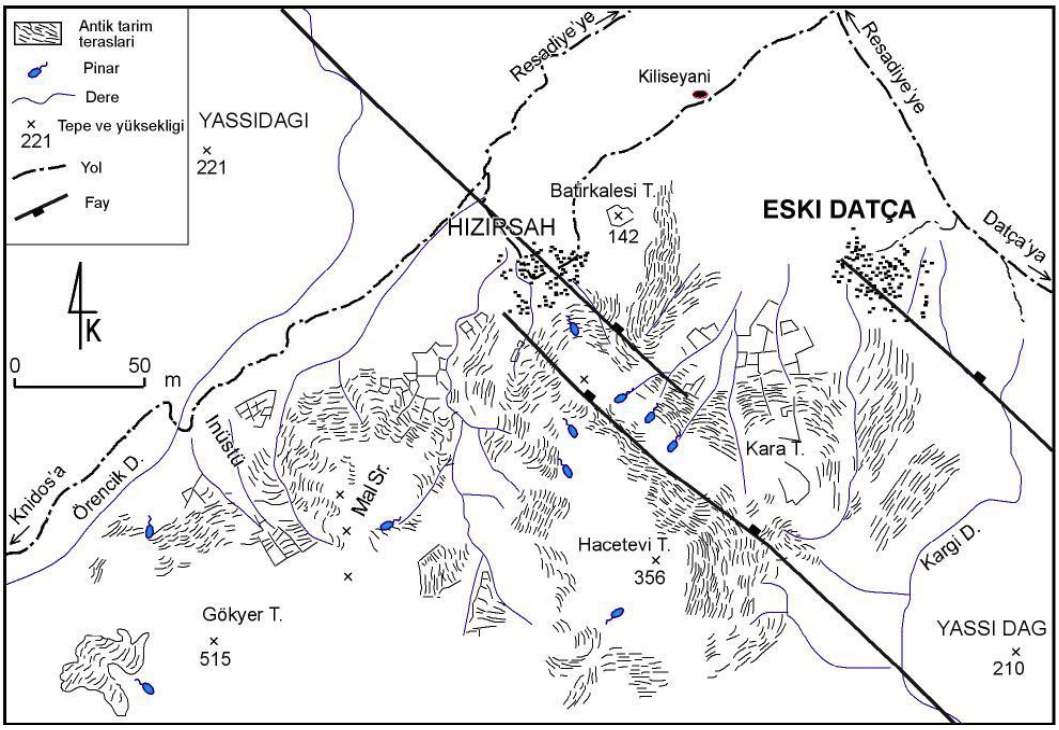

Figure 5.4: Ancient agricultural terraces, south of Hızırşah Village, Datça (Tuna *et al.* 2003:34, Fig. 5.1)

On the issue of morphological factors, the Peraea is quite familiar with what is mentioned for the Knidian Peninsula above. The terraces walls were also built with local stones, most possibly to reduce the costs of construction. Visible on Figure 5.5, a great majority of the terraces have proximity to a dried up stream. Although no a large workshop was recorded within the study area, the previous reports on a workshop where numerous amphorae discards were found in Hisarönü and the workshops reported from Orhaniye and Çamlıçınar (Tuna 1990: 371; Doğer 2004: 179), seem to back up a similar function of the whole Peninsula serving the "wine" sector on a great extent.

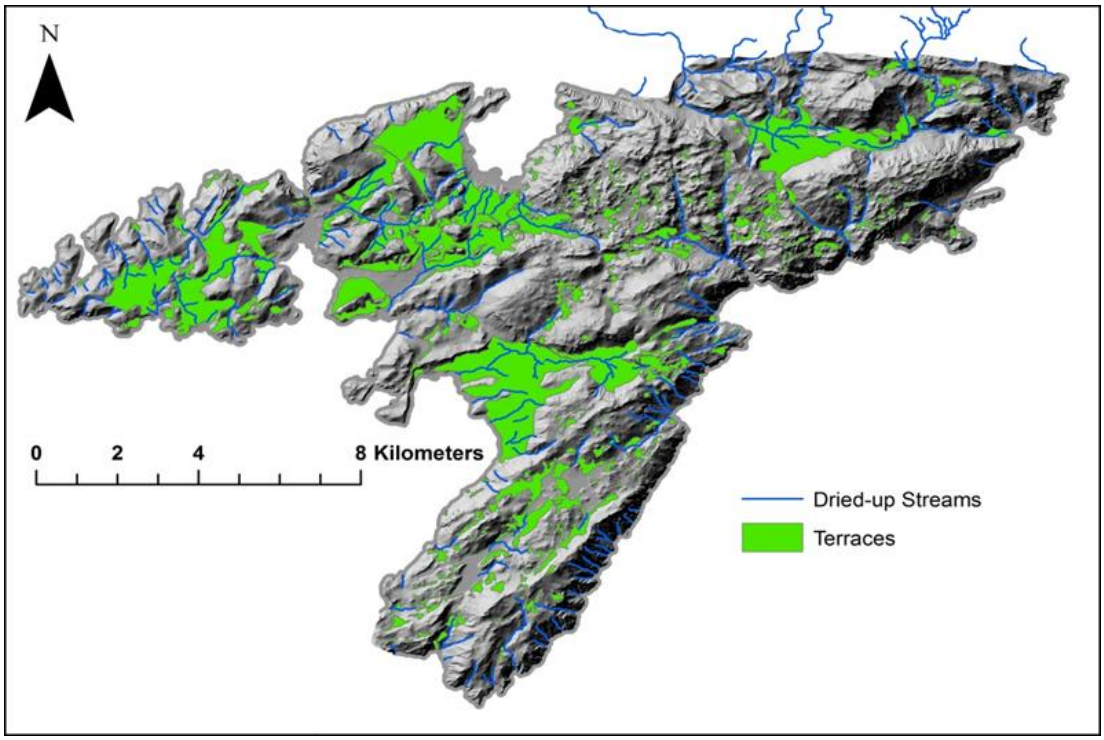

Figure 5.5: Agricultural terraces and dried-up streams

Another study relates to the Peraea, from a more technical side. Satıcı (2012). investigated the geomorphological relations of terraces in Bozburun Peninsula using the data from 10 sampled areas. He stated that the geological parameters were seen to be the most determinant such that the terraces over alluvium and clastic units were preferably cultivated whereas the upper boundaries where limestone is dominant were generally avoided.

Despite high erosion rates for the Peraean terraces, the choice of location on the terrace construction was not only an issue of finding the suitable soil cover (basically terra-rosa) but also a concern of making a decision on the type of earth- geology in modern terms, dominated by the alluvium and clastic bedrock units. The avoidance of limestone areas simply indicates a profound level of agricultural knowledge, reminding a similar case related to the agricultural preferences of Knidos. That the width of terraces designed more or less in similar sizes in Knidos and the Peraea; their proximity to water sources; the availability of press stones nearby the terraced lands and their association with “wine” and similar terrace products’ sector; and the

usage of the local stones to reduce the transportation costs all indicate the vitality and extent of an agrarian economy based on terracing.

The surveys conducted by Held and his team in 1995-2000 also focused on the Hellenistic farmsteads and agricultural terraces in the vicinity of Loryma. It has been reported that the majority of the farmsteads were built in the Hellenistic period and abandoned in 1st century B.C. while some of them were still in use during the early Byzantine period and later periods. A common thing for many farmsteads was that they had their own wine pressing platforms. The size of the press stones revealed that they were preferably used for pressing vines rather than olive oil. In line with the dating of farmsteads, the surrounding agricultural terraces were possibly cultivated in the Hellenistic era. They can be differentiated from the modern ones by looking at the quality of the ancient terrace walls and the size of stones used up on these walls. When the extensity of the terraces and the size of the farmsteads are considered, they address a large scale economy based on agriculture. Such a case is explainable with the role Rhodes played in trade and the production of wine. It is to say that the potential of the Peninsula must have experienced a peak in the production of wine and that this kind of production took the form of an industry in the beginning of the 2nd century B.C. (Held 2001: 195-196).

As Loryma has proven so far, the intensification in terracing and construction activity geared for the farmsteads during the Hellenistic period have indications for more than a small scale production in the region. The size of the press stones had close relation with the type of products preferred in the Peraea, overwhelmingly being wine and possibly olive oil that are both and often attributable to an export-oriented economy.

What Held stated relates to many common aspects with the data presented in this study. The ancient agrarian potential offered by the study area is quite compatible with the suggestions made on an ancient, large-scale economy, mainly driven with the large size farmsteads that are situated nearby the agricultural terraces. A slightly

different discussion might be brought on the role of pressing platforms found in the small size farmsteads recorded in the study area. That is to say, the size of the pressing stones may not be directly proportional to the size of the farmsteads. Hence, these could also have been used for pressing olive as the agricultural farmsteads also had to function for many type products to meet the demands of the local population. Although Held draws attention the importance of the agricultural terraces from the point of a large-scale economy based on agricultural industry, thus rightfully addresses the widespread usage of the wine presses in the first place, we may also need to pay attention to and reconsider an undeniable fact. Olive oil could have taken the second place in terms of agricultural production. Hence, there is need for systematic future surveys which may focus on the various type presses.

GIS analyses have shown that out of 15.873 ha of land, 3297,82 ha formed the terraced areas (ca. 20,75 % of the whole study area) while this number is only 544 ha (ca. 3,43 % of the whole study area) for the flat agricultural fields. To come up with some estimations and understand whether the Peraea was a self-sufficient economy, we choose to explore the potential of production within the study area. Hence, we take this opportunity by referring to and utilizing some main figures given by Tuna (1990) and a recent case study made by Oğuz (2013).

Relevant to the grain potential, let's assume that 750 kg/ha (a mean value taken by Oğuz (2013:291) considering the annual production for the good and bad years was produced. For the total area of 544 hectares attained from GIS, we get a figure of 408.000 kg grain production. Let's also assume that the consumption per capita was 200 kg of grain. We then calculate the number of people to be fed with grain (408.000/200) as 2040 people. Based on the tributes paid to Athens in the Classical period, Tuna (1978:170-171) shows that the population of the Carian Chersonesos was possibly below 2000. Oğuz (2013:284) also takes this figure as the base population for the same period. Taking into account the increases in the volume of agrarian production, hence the population during the Hellenistic period, the later figures must have been over 2000. However, there exists no exact figure relating to

the Hellenistic population. Hence, it is risky to come up with a statement about self-sufficiency for the time being.

When we make a move toward olive oil, we can also state some figures on the production potential of the Peraea. Tuna (1990: 350) states that 1.603.411 lt. of wine could be produced with the ancient potential at hand in Knidos. He attained his results on wine by taking the unit- "iugerum" (1/4 hectare) for the upcoming explanation on amphora yields.

Oğuz (2013: 293) accepts 25 lt. as the average the capacity of a Rhodian type amphora in the Hellenistic period. Leaning on these parameters, the potential of wine production is calculated as 6.595.640 lt (20x4x25x3297,82) which is a remarkable figure for a remote, comparatively more neglected countryside in the urban hinterland of South-west Anatolia. It also appears to be a large figure when compared to the production potential of a famous polis- Knidos.

An additional estimation is endeavored below, in order to understand the feeding potential of one of larger farmsteads within the territorium of Phoinix, as the sampling case. We opt to make a computation about the capacity of the farmstead numbered as F.16 in Gedikçukur Location. The vector data put to use in GIS has revealed that the total terraced area in the close vicinity of F.16 rates about 18 ha while the land suitable for plain agriculture does not exceed 2 ha. Based on the given data and the reference values used for the study area given above, the annual production of grain in the catchment area of F.16 in Gedikçukur (in the south of Phoinix) must have occurred to be as 1500 (2x750) kg. Based on 200 kg of grain consumption per annum, the feeding potential of the complex appears to have sufficed to ca. 8 people.

Prior to her estimations relating to the deme of Phoinix, Oğuz (2013:288) postulates a number of ca.10 people who could have resided in a large operation farmstead. The number of 8 capita calculated herein, for the household of F.16, does not

dramatically contradict with the given figure of 10 capita when some other constraints are also reconsidered. Presumably, the grain produced in the catchment area was used to meet the demands of the household of the said complex.

If we assume that the whole of the terraced areas were reserved to wine production, then we get a figure of (20x4x25x18) 36.000 lt. annual production by F.16. Even if these terraces were not solely cultivated for wine production (let's assume that half of them were preferred for wine), we find out that approximately 18.000 litres of wine is the figure which is supposed to have produce a surplus in the surrounding area.

Regarding the olive oil and taking into account some further figures given by Osborne (1987: 44-46) for the annual yields (400 kg/ha for the good years, 150 kg/ha for the bad years whereby the average rate might be given as 400+150/2= 275 kg/ha), we may propose a minimum value produced in the catchment area of F.16. Oğuz (2013:292) refers to the value of ca. 20 lt. of olive oil production per capita. Accordingly, if half of the terraces were reserved to olive oil, then 9 ha of the terraced areas could feed about (9x275/20) 124 people, which denote a high number for a single household. The excess production of wine and olive oil was possibly sent to export in any case.

CHAPTER 6

CONCLUSION

This research has endeavored to bring new explanations to the ancient terrace systems and agricultural farmsteads in one of the countrysides of the Carian culture, namely the modern Bozburun Peninsula. The ancient Peninsula/Peraea (though is often acknowledged as an unattended countryside when compared to many ancient regions in SW Anatolia) which is supposed to have made great attempts in the management of terraces, thus the economy in antiquity, is of attraction with many aspects to be found in its remote history. Driven from the relevant data and analyses given throughout the text, the following items have been concluded:

On the Agricultural Terrace System and Environmental Drivers of the Bozburun Peninsula:

The terraces, which can be perceived as the "marginal lands" from place to place and time to time, were the main drivers of the ancient economy of the Bozburun Peninsula. They can be come across around all of the ancient demes despite a harsh topography dominating the vast majority of the region. Although many were exposed to degradation over time, late usage until 1950s reveals that the terraces formed the backbone of the ancient economy of the Peninsula as far back as the late Classical period.

The environmental sources and topographical constraints were quite determinant on the formation of agricultural terraces in the Peraea. As of the geological characteristics (similar to what has been stated for a neighboring region, Knidos) and soil type, we can safely allege that the boundaries resting over the limestone blocks

were not preferred for terrace construction. However, terrain having Terra-rosa soil cover must have been preferably used for intensive agriculture in the ancient period, as well.

Quantitative methods have helped to explore further about the morphology of the Peraea which have shed light on our understanding of the ecological dynamics. Although a main reason for the successful management of the terraces was due to their exploitation at the full extent and wherever possible, the pre-established criteria must have been put to the agenda before their designation. Hence, many of them must have been built on purpose, taking into account all the potential constraints.

Elevation, slope and aspect had great impact on the formation of terraces. As such a case is valid for the vast majority of them; there seems no hindrance to a similar statement on behalf of the ancient terraces many of which have been still in use until recently. As a general conclusion, terraces between 300-700 m., those having slopes greater than 20 degrees and facing the South (as in the case of Kythera), Southeast and East were preferably cultivated. Their positioning seems to imply that the crops and plants which need more solar radiation might have been cultivated to a great extent and that a preferable product seems to have been the vine, and possibly the olive.

Terraces were built for the full exploitation of land in a harsh topography. This could only be possible by successful control of erosion. Constructing 78 % of the terraces on the lands which are subjected severe erosion would be explained by the great effort of the people to make cultivation in the most efficient way. Proximity to the water sources, as in the case of Knidos, was possibly a preferred situation for the construction of the terraces.

Due to great variations in relief and the sloping character of the terrain, the terraces were built in narrower forms like those of Knidos, according to the morphology of

terrain. The ancient terrace walls were worked in coarse masonry and with local limestone and occasionally sandstone to reduce any type costs.
On the Farmsteads of the Bozburun Peninsula:

Being the "units" of production, the farmsteads (possibly explainable with the ancient "oikos") were usually designed near the most suitable land for agriculture suggesting easy access to the fertile land, in the first place. Factors like precipitation, wind or temperature seem to have had little impact on the formation of terraces and farmsteads in the Peraea. Likewise, e.g. climate seem to have had little impact (perhaps none) on the choice of location of the farmsteads. Their plans also show skillful designs attributable to their constructers in that some sort of specialization in rural planning must have been there in antiquity.

The processing platforms, mainly the press stones found in the *chora*, near the agricultural terraces address a "fast" production process and "reduction" in the transportation costs. The farmsteads of the Peraea highlight the socio-economic character based on agrarian way of living. The "pelatai" and "slaves" side by side the landlords must have been the most important actors of the social network. These farmsteads could also have been the main supporters of the hinterland of the demes.

The large operation farmsteads were probably the centers for the accumulation of "wealth" within the economic context. The layouts of these structures may verify the potential they offered for the functioning of redistribution/ collection/ export-oriented centers. However, they must have been supported by no less important actors of a broader agricultural network- the smaller farmsteads mostly having sizes of 0,1-0.2 ha. These farmsteads have common, in terms of size, choice of location (on alluvial grounds) and dispersed pattern, with those reported from mainland Greece (particularly Classical Southern Argolid and late Classical/ early Hellenistic Boetia). They could have been used individually (on a family basis) as the leased domains, reminding those reported from the Classical landscapes, e.g. Attica, Boetia, Peloponnese.

The Peraean farmsteads must have been the permanent rural elements within the settlement context. The isolated farmsteads could have aimed at reducing the need for labor in a particular land which served a greater network. On the other hand, the size of large scale farmsteads having catchment areas as much as (e.g. the case of Gedikçukur) 18 ha have common with the samples reported from mainland Greece (e.g. Classical South Attica), regardless of period. The rationale behind constructing such structures must have had absolute relation to the potential of agricultural land on which these farmsteads had control and to the value attributed to agro-economies.

We have limited information on the type of products cultivated in the Peraea. However, the foremost products were possibly vine (as has also been put forward in the case of Loryma) and perhaps olive as the surface assemblages and press stones in or nearby the farmsteads verify the case.

On the Relations with Rhodes and the Peripheral Context:
The Peraea was a suitable land to be exploited as a "dominion", serving the interests of Rhodes in 3rd- 2nd centuries B.C. Physical proximity to Rhodes and its suitable situation to be used in the profitable business of the great power of Rhodes in the Mediterranean must have been the basic idea behind the policies of the Island.

Intensification of agriculture via terracing systems must have been triggered by Rhodes through various policies. From a psychological perspective, the Peraea could have ensured prestige with the potential it offered in the Mediterranean basin, as well. Obviously, an important part of the wealth of Rhodes came from the "successful" management of these terraces under the control of large size "authorities"/ farmsteads which are occasionally found in the neighborhoods. The knowledge such farmsteads have promoted is now quite inspiring for the unattended regions of Caria.

The smooth functioning of the terraces and activation of the farmsteads were possibly determinant on the economic strength of Rhodes. A well-established

economy was a must for Rhodes to restore her power. It is perhaps why we do not see some very good examples of large operation farmsteads in the North Caria. The well-established aristocratic administration of Rhodes could have controlled the Peraea also by appointing the military personnel- namely the strategoi to ensure economic security in the region. The elites were possibly the drivers of the Rhodian economy while the terraces must have been the main drivers of these elites.

It is also likely that the Peraea could have contributed to the compensation of losses of Rhodes (after the declaration of Delos as the free port after 167/6 B.C) through the extensive and successful operation of the terrace systems.

Although the Peraea could have served an inter-regional distribution system under the control of Rhodes beginning with the early Hellenistic period, she must have inevitably aimed at self-sufficiency before the creation of a surplus economy to meet her deficiencies in terms of basic food supplies (especially grain) and accumulation of wealth thereafter.

On the Issue of Self-sufficiency and Export-oriented Economy:
The wine production in huge amounts (6.595.640 litres- at the full extent and much more than a competent polis in wine production- Knidos) increases the market value of the ancient Peraea itself in the Aegean and that this was possibly the main driver for Rhodes to have continuous interests on the mainland which was an important "dominion" in the Hellenistic era. The numbers attained for a possible grain production is insufficient to come up whether the Peraea was self-sufficient economy which had a hypothetical capacity to feed ca. 2040 people. However, we can also put forward that it was an export-oriented economy regarding wine and olive oil production.

Based on a single case, Gedikçukur which was studied in order to have a minimum idea about its feeding potential in the catchment area, a large farmstead in the Peraea could have produced grain for self-sustaining purposes as a household. Although we

remain sceptical about this issue, the estimated figures of wine and olive oil potential in the worst cases suggest an excess production which must have ultimately been sent to export, presumably under the control of Rhodes.

The ancient terraces of the Peraea must have been run with a considerable number of labor. But the reason was not merely based on the giant workforce (when compared to the rural status of the Peraea); the managerial policies must have been strict enough to ensure the economic prosperity of Rhodes in the regional network and the Mediterranean.

REFERENCES

Archibald, Z. H., Davies, J., Gabrielsen, V. 2001. *Hellenistic Economies*. London: Routledge.

Aristotle. 1944. *Aristotle in 23 Volumes, Vol. 21, (Politics, Book IV, 1291b)*. Translated by H. Rackham. London: Harvard University Press.

Ashmore, W., Knapp, A. B. 1999. "Archaeological Landscapes: Constructed, Conceptualized, Ideational." In *Archaeologies of Landscape: Contemporary Perspectives*, edited by W. Ashmore, Knapp, A. B., 1-30. Oxford: Blackwell.

Athanassopoulos, E. F., Wandsnider, L. 2011. "Mediterranean Landscape Archaeology Past and Present." In *Mediterranean Archaeological Landscapes: Current Issues*, edited by E. F. Athanassopoulos, Wandsnider, L., 1-13. Philadelphia: University of Pennsylvania Press.

Belcher, M., Harrison, A., Stoddart, S. 1999. "Analyzing Rome's Hinterland." In *Geographical Information Systems and Landscape Archaeology*, edited by M. Gillings, Mattingly, D., vanDalen, J., 95-101. Oxford: Oxbow Books.

Bevan, A., Frederick, C., Krahtopoulou, A. 2003. "A digital Mediterranean countryside: GIS approachces to the spatial structure of the post-medieval landscape on Kythera (Grecee)." *Archeologia e Calcolatori* no. 14:217-236.

Bevan, A., Conolly, J. 2011. "Terraced fields and Mediterranean landscape structure: An analytical case study from Antikythera, Greece." *Ecological Modelling* no. 222 (7):1303-1314.

Bewley, R. H. 2002. "Aerial Survey: Learning from a Hundred Years of Experience." In *Aerial Archaeology: Developing Future Practice*, edited by R. H. Bewley, Raczkowski, W., 11-18. Amsterdam and Washington DC: IOS Press.

Bilgin, Z. R., Metin, Y., Çörekçioğlu, E., Bilgiç, T., Şan, Ö. 1997. *Bozburun-Marmaris-Köyceğiz-Dalaman (Muğla) Dolayının Jeolojisi*. Ankara: Maden Tetkik ve Arama Genel Müdürlüğü.

Bintliff, J. L., Snodgrass, A. M. 1985. "The Cambridge/Bradford Boeotian expedition: the first four years." *Journal of Field Archaeology* no. 12 (2):123-161.

Bintliff, J. L. 1994. "Territorial behaviour and the natural history of the Greek polis." *Stuttgarter Kolloquium zur Historischen Geographie des Altertums* no. 4:207-249.

Bintliff, J. L. 2006. "Issues in the Economic and Ecological Understanding of the Chora of the Classical Polis in its Social Context: A View from Intensive Survey Tradition of the Greek Homeland." In *Surveying the Greek Chora: Black Sea Region*

in a Comparative Perspective, edited by P. G. Bilde, Stolba, V. F., 13-26. Aarhus: Aarhus University Press.

Brunet, M. 1990. "Terrasses de cultures antiques: l'exemple de Délos, Cyclades." *Méditerranée* no. 71 (3-4):5-11.

Burford, A. 1993. *Land and Labor in the Greek World*. Baltimore and London: Johns Hopkins University Press.

Carlsen, J. 2002. "Estate Managers in Ancient Greek Agriculture." In *Ancient History Matters: Studies Presented to Jens Erik Skydsgaard on His Seventieth Birthday*, edited by K. Ascani, Gabrielsen V., Kvist, K., Rasmussen, A. H., 117-126. Rome: L'Erma di Bretschneider.

Casson, L. 1954. The grain trade of the Hellenistic world. In *Transactions and Proceedings of the American Philological Association*: The Johns Hopkins University Press.

Chapman, H. 2006. *Landscape Archaeology and GIS*. Stroud: Tempus.

Cooper, A. B. 1977. "The family farm in Greece." *The Classical Journal* no. 73 (2):162-175.

Darkot, B., Tuncel, M. 1978. *Ege Bölgesi Coğrafyası*. Vol. 99. İstanbul: İstanbul Üniversitesi Coğrafya Enstitüsü Yayınları.

David, B., Thomas, J. 2008. "Landscape Archaeology: Introduction." In *Handbook of Landscape Archaeology*, edited by B. David, Thomas, J., 27-43. Walnut Creek: Left Coast Press Inc.

Davies, J. K. 2007. "Classical Greece: Production." In *The Cambridge Economic History of the Greco-Roman World Vol. 1*, edited by W. Scheidel, Morris, I., Saller, R. P., 333-361. Cambridge: Cambridge University Press.

Doğaner, S. 2012. "Bozburun Yarımadası: Coğrafi ortam ve insan." *Coğrafya Dergisi* no. 7:29-56.

Doğer, E. 2004. *Antik Çağ'da Bağ ve Şarap*. İstanbul: İletişim Yayınları.

Ersoy, Ş. 1993. "Transgresif platform karbonat istifine Bozburun (Marmaris, Muğla) yarımadasından bir örnek." *Türkiye Jeoloji Bülteni* no. 36:171-177.

Etienne, R. 1990. *Ténos II : Ténos et les Cyclades du milieu du IVe siècle av J.-C. au milieu du IIIe siècle ap. J.-C.. Bibliothèque des Ecoles françaises d'Athènes et de Rome ; fasc. 263 bis.* Athènes: Ecole française d'Athènes.

Fisher, P. F. 1999. "Geographical Information Systems: Today and Tomorrow? ." In

Geographical Information Systems and Landscape Archaeology, edited by M. Gillings, Mattingly, D., vanDalen, J., 5-11. Oxford: Oxbow Books.

Foxhall, L. 2006. "Environmets and Landscapes of Greek Culture " In *A Companion to the Classical Greek World*, edited by K. H. Kinzl, 245-280. Oxford: Blackwell Publishing.

Fraser, P. M., Bean, G. E. 1954. *The Rhodian Peraea and Islands*. Oxford: Oxford University Press.

Frederick, C. D., Krahtopoulou, A. 2000. "Deconstructing Agricultural Terraces: Examining the Influence of Construction Method on Stratigraphy, Dating and Archaeological Visibility." In *Landscape and Land Use in Postglacial Greece*, edited by P. Halstead, Frederick, C., 79-94. Sheffield: Sheffield Academic Press.

Fussell, G. E. 1972. *The Classical Tradition in West European Farming*. Rutherford: Fairleigh Dickinson University Press.

Gabrielsen, V. 1997. *The Naval Aristocracy of Hellenistic Rhodes*. Aarhus: Aarhus University Press.

Gabrielsen, V. 2001. "The Rhodian Associations and Economic Activity." In *Hellenistic Economies*, edited by Z. H. Archicald, Davies, J., Gabrielsen, V., Oliver, G. J., 163-184. London: Routledge.

Gallant, T. 1991. *Risk and Survival in Ancient Greece*. Stanford: Stanford University Press.

Garnsey, P. 1988. "Mountain economies in southern Europe: thoughts on the early history, continuity and individuality of Mediterranean upland pastoralism." *Pastoral economies in Classical Antiquity, The Cambridge Philological Society* no. 14:196-209.

Garnsey, P. 1989. *Famine and Food Supply in the Graeco-Roman World*. Cambridge: Cambridge University Press.

Halstead, P. 1987. "Traditional and ancient rural economy in Mediterranean Europe: plus ça change?" *Journal of Hellenic Studies* no. 107:77-87.

Hanson, V. D. 1999. *The Other Greeks: The Family Farm and the Agrarian Roots of Western Civilization*. Berkeley and Los Angeles: University of California Press.

Held, W. 2001. Forschungen in Loryma 2000 (2000 Yılı Loryma Araştırması), 28 Mayıs - 1 Haziran 2001, at Ankara.

Jameson, M. H. 1992. "Agricultural labor in ancient Greece." In *Agriculture in Ancient Greece: Proceedings of the Seventh International Symposium at the Swedish*

Institute at Athens, 16-17 May, 1990, edited by B. Wells, 135-146. Stockholm: Paul Aströms Förlag.

Jameson, M. H., Runnels, C. N., Van Andel, T. H. 1994. *A Greek Countryside. The Southern Argolid from Prehistory to the Present Day*. Stanford: Stanford University Press.

Jones, J. E., Graham, A. J., Sackett, L. H. 1962. "The Dema House in Attica." *Annual of the British School at Athens* no. 57:75-114.

Jones, J. E., Graham, A. J., Sackett, L. H. 1973. "An Attic country house below the cave of Pan Vari." *Annual of the British School at Athens* no. 68:355-452.

Krahtopoulou, A., Frederick, C. 2008. "The stratigraphic implications of long-term terrace agriculture in dynamic landscapes: Polycyclic terracing from Kythera Island, Greece." *Geoarchaeology* no. 23 (4):550-585.

Lohmann, H. 1992. "Agriculture and Country Life in Classical Attica." In *Agriculture in Ancient Greece: Proceedings of the Seventh International Symposium at the Swedish Institute at Athens, 16-17 May, 1990*, edited by B. Wells, 29-57. Stockholm: Paul Aströms Förlag.

McDonald, W. A., Rapp, G. R. 1972. *The Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*. Minneapolis: University of Minnesota Press.

Oğuz, E. D. 2013. *The Rural Settlement Pattern of Bozburun Peninsula During Classical and Hellenistic Periods*. Ph.D., Middle East Technical University, Ankara.

Osborne, R. 1987. *Classical Landscape with Figures: The Ancient Greek City and its Countryside*. London: George Philip.

Osborne, R. 1992. "Is it a Farm." In *Agriculture in Ancient Greece: Proceedings of the Seventh International Symposium at the Swedish Institute at Athens, 16-17 May, 1990*, edited by B. Wells, 21-27. Stockholm: Paul Aströms Förlag.

Papachristodoulou, I. 1999. "The Rhodian Demes within the Framework of the Function of the Rhodian State." In *Hellenistic Rhodes: Politics, Culture, and Society*, edited by V. Gabrielsen, 27-44. Aarhus: Aarhus University Press.

Petanidou, T., Kizos, T., Soulakellis, N. 2008. "Socioeconomic dimensions of changes in the agricultural landscape of the Mediterranean basin: a case study of the abandonment of cultivation terraces on Nisyros Island, Greece." *Environmental Management* no. 41 (2):250-266.

Pettegrew, D. K. 2001. "Chasing the Classical farmstead: assessing the formation

and signature of rural settlement in Greek landscape archaeology." *Journal of Mediterranean Archaeology* no. 14 (2):189-209.

Potter, T. W. 1979. *The Changing Landscape of South Etruria*. London: Paul Elek Ltd.

Preysler, J. B., Blasco, C., Espiago, J., Rio, A. 1999. "Geographical Information Systems and Archaeology: Methodological Aspects of Presentation and Display Results." In *Geographical Information Systems and Landscape Archaeology*, edited by M. Gillings, Mattingly, D., vanDalen, J., 133-137. Oxford: Oxbow Books.

Price, S., Nixon, L. 2005. "Ancient Greek agricultural terraces: evidence from texts and archaeological survey." *American Journal of Archaeology* no. 109 (4):665-694.

Rackham, O., Moody, A. 1992. "Terraces." In *Agriculture in Ancient Greece: Proceedings of the Seventh International Symposium at the Swedish Institute at Athens, 16-17 May, 1990*, edited by B. Wells, 123-130. Stockholm: Paul Aströms Förlag.

Redman, C., L. 1999. *Human Impact on Ancient Environments*. Tucson: University of Arizona Press.

Reger, G. 1999. "The Relations Between Rhodes and Caria from 246 to 167 B.C." In *Hellenistic Rhodes: Politics, Culture, and Society*, edited by V. Gabrielsen, 76-97. Aarhus: Aarhus University Press.

Renfrew, C. 1972. *The Emergence of Civilisation: the Cyclades and the Aegean in the Third Millennium B.C.* London: Methuen.

Rice, E. E. 1994. "Settlements and fortifications in the Rhodian Peraia in the Hellenistic age." *American Journal of Archaeology* no. 98 (2):296-297.

Rice, E. E. 1999. "Relations Between Rhodes and the Rhodian Peraia." In *Hellenistic Rhodes: Politics, Culture, and Society*, edited by V. Gabrielsen, 45-54. Aarhus: Aarhus University Press.

Rostovtzeff, M. I. 1959. *The Social and Economic History of the Hellenistic World*. Oxford: The Clarendon Press.

Satıcı, S. 2013. *Lithological and Morphological Control on the Agricultural Terraces in Bozburun Peninsula, Turkey*. M.Sc., Middle East Technical University, Ankara.

Scardozzi, G. 2008. Old high resolution satellite images for landscape archaeology: case studies from Turkey and Iraq. Paper read at Proc. SPIE 7110, Remote Sensing for Environmental Monitoring, GIS Applications, and Geology VIII, 71004 (October 10, 2008); doi:10.1117/12,799997.

Schaus, G. P., Spencer, N. 1994. "Notes on the topography of Eresos." *American Journal of Archaeology* no. 98 (3):411-430.

T.C. Köy Hizmetleri Genel Müdürlüğü, 1998. *Muğla İli Arazi Varlığı*. Ankara: Köy Hizmetleri Genel Müdürlüğü Yayınları.

Taşlıgil, N. 2008. "Datça - Bozburun özel çevre koruma bölgesi ve turizm." *Ege Coğrafya Dergisi* no. 17 (1-2):73-83.

Toutain, J. 1996. *The Economic Life of the Ancient World*. London: Routledge.

Tuna, N. 1978. *Antik Devir Batı Anadolu Kıyı Yerleşmelerinde Mekansal Örgün*. M.Sc., Middle East Technical University, Ankara.

Tuna, N. 1990. *Datça Yarımadası'nda Hellenistik Dönem Amphora Üretim Merkezleri*, *Türk Tarih Kongresi Bildirileri 10 (1)*. Ankara: Türk Tarih Kurumu Basımevi.

Tuna, N., Empereur, J. Y., Doğer, E., Desbat, A. 1991. "Rapport sur la première campagne de la fouille franco-turque de Reşadiye (péninsule de Cnide)—juillet 1988." *De Anatolia Antiqua* no. 1:38-49.

Tuna, N., Türkmenoğlu, A., Dirik, K., Dirican, M. 2003. *Datça Yarımadası'nın Neotektoniği, Jeomorfolojisi ve Bunların Eski Medeniyetlerin Yerleşimi ve Gelişimi Üzerindeki Etkisi, METU-AFP (00-07-03-13)*. Ankara: Middle East Technical University.

van Bremen, R. 2007. "Networks of Rhodians in Karia." *Mediterranean Historical Review* no. 22 (1):113-132.

Wagstaff, M., Augustson, S. 1982. "Traditional Land Use." In *An Island Polity: The Archaeology of Exploitation in Melos*, edited by C. Renfrew, Wagstaff, M., 106-133. Cambridge: Cambridge University Press.

Ward-Perkins, J. B. 1962. "Etruscan towns, Roman roads and medieval villages: the historical geography of southern Etruria." *Geographical Journal* no. 128:389-404.

Wheatley, D., Gillings, M. 2002. *Spatial Technology and Archaeology*. London: Taylor & Francis.

Witmore, C. L. 2007. "Landscape, Time, Topology: an Archaeological Account of the Southern Argolid, Greece." In *Envisioning Landscape: Situations and Standpoints in Archaeology and Heritage*, edited by D. Hicks, McAtackney, L., Fairclough, G., 194-225. Walnut Creek: Left Coast Press Inc.

Woods, M., Woods, M. B. 2000. *Ancient Agriculture: from Foraging to Farming*. Minneapolis: Lerner Publications Company.

APPENDICES

A. FARMSTEAD CATALOGUE

Site No: F.1

Site Name: Bozburun / Örteren

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 591635, 4060902 / O20-d-1

Elevation & Aspect: 72 m / East

Physical Environment: An ancient road travels from a location locally called as Burgaz which falls to approximately 1 km southwest of the modern settlement of Bozburun. At the end of this road, there lies another location known as Örteren where F.1 was detected right near the abandoned terraces in the southeast of Kuştepe. (Plate 1). Here is a sub-region, basically exhibiting three geomorphological units: limestone, clastic rocks and alluvium. A dried up stream bed which possibly caused the alluvial deposition all over Burgaz and Örteren locations when it was active, is soon visible about 50 m south of the mentioned farmstead.

Period: Hellenistic / Roman

Site Description: F.1 is a two-chambered structure with an oblong plan whose alternate sides measure 5.6 m and 3.5 m, respectively. The thickness of the walls is 50 cm. On average, the height of walls is constant, however occasionally measures up to 1 m while the eastern wall is badly destroyed. The entrance of the building, which has a width of 80 cm, faces the west. Two niches catch the eye at the inner walls in the north and south, in both of the chambers (Plates 2,3,4,5). The stones of the ancient terrace walls and techniques of bonding in the surroundings of the farmstead are distinguishable from those of the modern terraces (Plate 6). The agricultural terraces which lie in the southern slope of Kuştepe and north of F.1 can be characterized in the “stepped” category. Those having higher elevations were built where the clastic units fuse with the limestone whereas the lower code terraces were cultivated over the alluvial strata.

Archaeological Features & Surface Material: It is possible to see the frequent occurrences of modern sheep-folds throughout the sub-region. One example is situated about 20 m south of F.1. The sample case, which was most possibly active until the recent times when agrarian activities declined but sheep and goat breeding continued, was built by the reused stones grabbed from the ancient terraces and F.1 (Plate 7). The density of surface material datable to the Hellenistic and Roman periods is conspicuous around the farmstead and the agricultural terraces in the vicinity while it was observed that the degree of disturbance of the potsherds is quite high. In view of the type of masonry and ceramic findings in the near environs, the farmstead was most possibly built in the early Hellenistic period.

Site No: F.2

Site Name: Bozburun / Üçeren

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 592183, 4061600 / O20-d-1

Elevation & Aspect: 59 m / Flat

Physical Environment: F.2 was found in the north of Üçeren location which faces the northern slopes of Kuş Tepe. The area between Üçeren and Kuş Tepe draws attention with agricultural terraces (Plate 8) whose northern sector begins with a dried-up stream bed extending far as the modern center of Bozburun (Plate 1).

Period: Hellenistic

Site Description: F.2 lies over a shallow terrace of limestone. The entrance of the structure is from the east, the terrace walls were built with slightly bossaged polygonal masonry (Plate 9). Few building blocks are scattered over the terrace walls and the vicinity.

Archaeological Features & Surface Material: In the east of F.2, there lies an *in situ* workshop (Plate 10) which appears with a niche up on the northern façade. As per the surface material ceramic pieces (particularly of Hellenistic amphora) are visible scattered over the terrace walls of F.2.

Site No: F.3

Site Name: Bozburun / Yeşilova

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 596606, 4060636 / O20-d-1

Elevation & Aspect: 46 m / North

Physical Environment: A farmstead numbered as F.3, was found in 350 m southwest of Örenyaka Tepe which lies about 2 km northwest of Yeşilova Quarter (Plate 11). This area is almost identical to Örteren location as of geomorphological characteristics. It is an alluvial base valley formed by a dried up stream making its direction in the northeast-southwest axis. The alluvial deposition spreads out like a fan in the south-north direction whereby creates wide areas suitable for agriculture. Even, Yeşilova Quarter where the density of dwellings is the highest is the place throughout which large plots of land having the lowest slopes is observable. F.3 was built in the north-eastern end of where the valley gets narrow, in 40-50 m north of the mentioned stream bed.

Period: Hellenistic

Site Description: The entrance of the structure that has a width of 90 cm faces the west. The southern wall is quite destroyed. The wall facing the north is 8.95 m long. The eastern wall is semicircular reaching up to 1.5 m. The average thickness of walls is 50 cm. (Plate 12) in the north and northwest of F.3, the limestone blocks soon begin in the south of the farmstead and the stream bed where the sloping character of land increases. Such a morphological structure has determined the form and shape of the terraces around the farmstead. On the other hand, the terraces lying in the north and northwest of the farmstead appear with the alluvial deposition where the slope is low and continue up to the boundaries of the limestone. The terraces resting over the low slope alluvial deposition have wider treads (ca. 10-12 m) whereas the treads become tight and narrow as they reach the limestone blocks. Oppositely, the southern terraces of the farmstead have narrower treads (ca. 7-8 m) due to increasing slope and sudden appearance of limestone blocks. Part of the northern terraces of the farmstead were disturbed in later periods and converted to an oval sheep-fold with a size of 0.6 ha. Due to late disturbance and being covered by the alluvial agglomeration, the ancient terraces cannot be continuously traced all over the valley.

Archaeological Features & Surface Material: The ruins of buildings that were possibly used as a workshop for winemaking; and an associated press-stone having a diameter of 120 cm and two spilling canals, were observed in 100 m west of the farmstead (Plate 13). It is hardly possible to fix a thorough chronology with the coarse body pieces of sherds observed in the surroundings of the farmstead and the terraces, however, it is deemed that the press-stone and ruins of buildings which probably belonged to the workshop and found near F.3 address an intensive agrarian activity beginning from the Hellenistic period.

Site No: F.4
Site Name: Selimiye / Center
Function & Size: Farmstead / ~0,1 ha
Coordinate & Map Code: 598881, 4061691 / O20-d-1
Elevation & Aspect: 82 m / South-east
Physical Environment: A farmstead (F.4) was detected in an alluvial base valley formed by a dried up stream, namely Çaykuru Dere which falls to 1.5 km southeast of modern Selimiye and 1.5 km west of modern Kızılköy (Plate 14). The valley which is situated between the massive limestone blocks of Göktepe (in the north) and Çelek Tepe (in the south) extends to Selimiye widening in the northwest.
Period: Hellenistic
Site Description: F.4 is in a badly destroyed condition (Plate 15). The entrance of the structure faces the south (Plate 16). Only two rows of the eastern walls made of ashlar (40X60 cm) are visible today (Plate 17). The density of agricultural terraces increases in the southern slopes of the valley; they begin from the alluvial base of the valley and continue up to the boundaries hard limestone blocks. The alluvial base extends toward the northwest and forms low sloping lands suitable for agriculture.
Archaeological Features & Surface Material: In approximately 250 m southeast of F.4 lie the architectural blocks which seemingly belonged to a bigger structure which is totally demolished (Plate 18). No ceramic evidence could be found for dating in the area but the masonry technique applied on the eastern wall of the farmstead and some other architectural blocks suggest the Hellenistic period.

Site No: F.5

Site Name: Selimiye / Erler Region

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 599633, 4064195 / O20-d-1

Elevation & Aspect: 5 m / Flat

Physical Environment: In the northeast of modern Selimiye, a farmstead (F.5) was recorded to be situated on a shallow hill of limestone, near a dried up stream bed running across the middle of a pocket plain near the coastal area (Plate 19).

Period: Hellenistic

Site Description: The entrance of the structure (Plate 20) which face the east is welcome by the column remains (partly preserved) which have clear signs of niches probably carved for the wooden gates.

Archaeological Features & Surface Material: Nearby the farmstead, up on a rocky platform, there lies a big press stone (broken in the middle) whose inner diameter must be about 80 cm (Plate 21). The spilling canals (with a width of 5 cm) have connection to another rock-cut platform which is badly destroyed. The total length of the connection is 130 cm. As the surrounding area is highly disturbed due to modern fields and terraces, only a pithos rim, probably dating back to the Hellenistic period and a few amphora handles (of the same period) one of which is clearly visible with a stamp were recorded at the site (Plate 22).

Site No: F.6

Site Name: Selimiye / Kızılköy

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 601069, 4062039 / O20-d-2

Elevation & Aspect: 240 m / Flat

Physical Environment: F.6 was recorded in the fields lying about 300 m southwest of Ensecik Tepe within the borders of Kızılköy Quarter (Plate 23). The structure is traceable in the northwest of a 10 ha area which was formed by a valley-floor deposit embraced with limestone blocks. No agricultural activity takes place in the modern

fields today except for the olive groves cultivated in the north the subject area. The morphological structure of the area did not enable the formation of an uninterrupted terrace system, also definable with "non-discreteness". The terraces (Plate 24) were built in a fragmentary manner over the clastic strata which could infiltrate the limestone.

Period: Hellenistic

Site Description: The farmstead is a single chamber structure which faces the south-west (Plate 25). The length of the northern wall measures 2.87 m, the eastern side is 3.86 m (Plate 26).

Site No: F.7

Site Name: Kızılköy – Söğüt Border

Function & Size: Farmstead / ~0,1 ha

Coordinate & Map Code: 601286, 4061252 / O20-d-2

Elevation & Aspect: 243 m / South

Physical Environment: At the junction of modern Kızılköy and Bayır road (Plate 23) which is also accessible from Söğüt Village in the southwest, F.7 was noticed and recorded accordingly. The location of the structure is seemingly safer when compared to the coastal samples or those very nearby, throughout the Peraea. Here is a site which reveals the typical characteristics of a fan-like pocket plain (Plate 27) mastered by the agricultural terraces in the east of Eren Tepe which is situated in the south of Kızılköy Village. Due to the fragmented nature of the environment which is almost in the middle of the Peraea, there are plenty of small pocket plains and valleys around this site. The terraces embracing the farmstead stretch far as the location called as Hayıtlık.

Period: Hellenistic

Site Description: The base walls of the farmstead (Plate 28) which was obviously used in the later periods due to traces of mortar usage up on the disturbed walls.

Archaeological Features & Surface Material: Four un-plastered wells (built with the bonding technique with dry rubble masonry but designed with regularly cut rectangular stones at the openings, (Plate 29) nearby the farmstead, highly disturbed

potsherds whose profiles are barely diagnosable in favor of the Hellenistic style, and modern/partly ancient? small scale field boundaries all suggest that the site must have been a suitable inland for agrarian activity.

Site No: F.8
Site Name: Taşlıca / Fenaket (East)
Function & Size: Farmstead / ~1,8 ha
Coordinate & Map Code: 598575, 4053092 / O20-d-4
Elevation & Aspect: 283 m / East
Physical Environment: F.8 was recorded in the northeast of Lower Taşlıca; about 500 m southwest of the western peak of Top Tepe, lying in the beginning of the steep valley resting in the east of Gökseriç location (Plates 30,31).
Period: Hellenistic
Site Description: The northern-outer wall of the farmstead has a length of 55 m while the western-outer wall is 31 m long (Plates 32,33). The southern-outer wall of the structure is destroyed. It was also observed that the wall stones were worked as the reused material for the construction of the sheep-fold in the south-west corner. The length of the western-outer wall is preserved up to 14 m. The entire structure is split into two, about 30 m east of the northern-outer wall (Plate 34). The wall whose southern tip is totally destroyed can be tracked as long as 20 m. The terraces are concentrated in the northeast of the farmstead (Plate 35).
Archaeological Features & Surface Material: In the north-west corner lie an in-situ press stone (Plate 36) with a diameter of 75 cm and a rock-cut collecting tank. The debris (Plate 37) nearby the same spot must be the remnants of a (wine/olive oil) workshop relevant to the noted press stone and the collecting tank. A cistern with a diameter of 1.5 m appears in the eastern part of the farmstead (Plate 38). The ceramic findings on the surface are dated to early Hellenistic period (Plate 39).

Site No: F.9, F.10
Site Name: Taşlıca / Fenaket (South-west)
Function & Size: Farmstead / ~0,1 ha; ~0,1 ha

Coordinate & Map Code: 596125, 4051854; 595668, 4051428/O20-d-4

Elevation & Aspect: Flat, North-west / 120 m; 129 m

Physical Environment: An ancient route (Plate 40) starts from the southern sector of Sindili Depression in the Lower Fenaket area. The ancient route makes its way toward the eastern part of Badrık Tepe where a pocket plain appears soon before the modern highway. There stands a farmstead (F.9) in the northeast of the pocket valley; however has a good master of the agricultural terraces stretching down to the said valley. Following the route in the southern direction (parallel to the modern highway), a highly destroyed farmstead, F.10 was detected (Plate 41).

Period: Hellenistic

Site Description: The base walls (Plate 42) of F.9 are clearly visible but the upper walls are totally destroyed. The entrance of the structure faces the south-southeast. The positioning of the farmstead is meaningful when the route passing by this structure and running toward Yeşilgelme Bay direction in the west is reconsidered. The base walls of F.10 are partly traceable was recorded (Plates 43,44). The southwestern sector of Lower Taşlıca is rich with farmstead ruins many of which are situated nearby terrace formations.

Archaeological Features & Surface Material: In front of F.10, there lies a large cistern (possibly used in the later periods, as well) which exactly lies on the ancient route. The debris observed around F.10 mostly belonged to the roof tiles of the ancient structure.

Site No: F.11, F.12, F.13, F.14

Site Name: Taşlıca / Fenaket (South-west)

Function & Size: Farmstead / ~0,1 ha; ~0,1 ha.; ~0,1 ha., ~0,1 ha

Coordinate & Map Code: 595019, 4050828; 595283, 4050794; 595303, 4050784; 595723, 4050865 / O20-d-4

Elevation & Aspect: 81 m; 90 m; 91 m; 194 m / South-east; North; North-west; South-west

Physical Environment: As a matter of fact, F.9 and F.10 are the two isolated structures in the near southwest part of Phoinix. On the other hand, a small cluster of

farmsteads were recorded in the southwesternmost part of the Lower Fenaket. By following the ancient route until Yelkaya Tepe and turning to the east in the counter-clockwise direction (Plate 45), a farmstead (F.11) can be seen in the first pocket plain whose southern sector appears with a terraced area overlooking a small dried up stream running down to Karagelme Bay. Toward the beginning of another terraced area in the east, there are two farmsteads (F.12 and F.13) also watching over Karagelme Bay (Plates 46,47,48, respectively). The ancient route passing from the middle of the modern fields leads the way to another farmstead (F.14) whose in-situ base walls are partly preserved (Plate 49).

Period: Hellenistic / Roman

Site Description: Although highly destroyed, the structure (F.11) is recognizable with plenty of sherd scatters (Plates 50,51). Presumably, there were some more neighboring farmsteads at the opposite side of the plain but the ruins of walls are misleading due to late use. Although their boundaries are barely recognized, the building blocks (F.12 and F.13), some base walls can be traced for both. It gets quite difficult to sketch the plan of F.14. All we can say is, the bases are comparatively preserved when compared to the former ones making up the cluster of farmsteads throughout this area.

Archaeological Features & Surface Material: The second and third pocket plains are poor of evidence in terms of man-made structures. Interestingly, the ruins of a possible tomb-like structure (perhaps a modern granary built by the re-used blocks of the neighboring farmsteads so stated) catch the eye in the middle of the plain area (Plates 52,53). Numerous ceramic scatters around the farmsteads are suggesting the Hellenistic/ Roman era.

Site No: F.15

Site Name: Taşlıca / Fenaket (South-west)

Function & Size: Farmstead / ~0,9 ha

Coordinate & Map Code: 596716, 4051527 / O20-d-4

Elevation & Aspect: 151 m / East

Physical Environment: Toward the site of Gedikçukur, the traces of the ancient route disappear due to the harsh topography of land around the skirts of Akgeri Tepe, but takes the form of a modern pathway. As this path runs down to a pocket plain in the southern edge of Gedikçukur Location (Plate 54), the remains of F.15 whose outer and inner entrances can be easily seen. The ancient route becomes clear as it remakes its route toward F.16 described below. F.15 has a profound vision of the terraces stretching until Gedik Bay (Plate 55).

Period: Hellenistic / Roman

Site Description: The large terrace walls embracing the farmstead in the east and west were worked with coarse polygonal masonry (Plate 56). The farmstead was at least three chambered all of which reveal the traces of in-situ base walls (Plate 57). Obviously, the second chamber is opened to the third one (possibly an inner courtyard) through an inner entrance whose length is about 3 m. The height of the entrance is 55 cm and 70 cm in the west and east, respectively. The difference must be owed to the ground level filled with earth over time.

Archaeological Features & Surface Material: There lies a large cistern in the southwest of the structure, and a depot or a tomb-like structure directly facing the north in the possible walled courtyard (reminding the positioning of a Roman atrium).

Site No: F.16

Site Name: Taşlıca / Fenaket (South-west)

Function & Size: Farmstead / ~1,7 ha

Coordinate & Map Code: 596853, 4051252 / O20-d-4

Elevation & Aspect: 121 m / Flat

Physical Environment: The farmstead (F.16) was found in Gedik Çukur Location in Lower Taşlıca, at the starting point of the valley formed by a dried up stream named as Karahorata Deresi which falls to 500 m southeast of Akgeri Tepe (Plates 54,58).

Period: Hellenistic

Site Description: The walls of the farmstead are highly destroyed and the plan thereof cannot be determined exactly. However, the two entrances of the structure

facing the north-south have remained up to today (Plate 59). The walls dressed with large quadrilateral stone blocks (approximately 50X70 cm) were worked with isodomic masonry technique (Plate 60). The farmstead is surrounded by the terraces which are occasionally interrupted by limestone formations but continue until Gedik Bay in the south (Plate 61). It is recognizable that the terraces were in use by being restored in the later periods. The ancient terraces which were dressed with huge stone blocks built with the polygonal technique (Plate 62) can easily be distinguished from the late ones. In respect of the plain agricultural area of about 2 hectares in the north and the terraced area extending over about 18 hectares of land throughout the inner valley, one may realize that the farmstead established the core of the large scale agricultural organization in the Hellenistic period. It seems that the Gedik Bay at the end of the valley was used as a small harbor where the agricultural products gathered from the surrounding land were embarked.

Archaeological Features & Surface Material: The sheep-folds built near the farmstead are still in use while re-used blocks are observable on the walls of the farmstead. Looking at the ceramic scatters, the farmstead dates back to the Hellenistic period (Plate 63).

Site No: F.17

Site Name: Taşlıca / Fenaket (South-west)

Function & Size: Farmstead / ~0,2 ha

Coordinate & Map Code: 597145, 4051991 / O20-d-4

Elevation & Aspect: 187 m / East

Physical Environment: F.17 was detected in the southeast of Sindili Plain (Plate 54). This structure lies nearby an ancient route which travels the lower slopes of Karayüksek Dağ until the Acropolis of Phoinix in Hisartepe.

Period: Hellenistic

Site Description: Its plan (currently under a big quercus tree) is almost clear with the inner and outer boundaries (Plates 64,65), the terrace walls are seemingly ancient when compared to the modern samples at the Sindili level.

Archaeological Features & Surface Material: A tomb-like/ possible depot is located to the west of F.17 (Plate 66). Surface ceramics around the farmstead are suggesting the Hellenistic period.

Site No: F.18
Site Name: Taşlıca / Küçükdibekbaşı
Function & Size: Farmstead / ~1,8 ha
Coordinate & Map Code: 598625, 4051669 / O20-d-4
Elevation & Aspect: 365 m / Flat
Physical Environment: Recorded as one of the gigantic farmsteads within the borders of Phoinix, F.18 was found in the southeast of Lower Sindili (Plates 67,68). The position of the structure is comparatively interesting in view of the topographical constraints caused by the rising hill- Karayüksek Mountain which almost acts as a partition at the hearth of the deme of Phoinix. The site is accessible through the ridges of the said mountain. An ancient route (Plate 69) travelling from Dağ Yeri Location or Sarıyurdu Tepe leads the way to this site. It is at a distance of ca. 1.5 - 1.7 km from the Acropolis. The farmstead is absolutely located in Küçükdibekbaşı Location which, by definition and name addresses a spot for agricultural / pressing activity.
Period: Hellenistic / Roman
Site Description: The structure has a good master of the agricultural terraces the vast majority of which must have been used during the ancient periods (Plate 70). Part of the terraces is already spoilt due to human effect as modern practices verify the case (Plate 71). The thing is, the farmstead whose size is notable directly faces the northern part of Rhodes (Plate 72), can even see the modern port. The northern terrace walls (built with large stones in the polygonal technique) are partly preserved (Plate 73) but all the other sides were apparently exposed to human intervention. Two entrances from the southwest and northeast give way to a modern sheep-fold built in the middle of the farmstead. Traces of rock-cut stairs again in the middle, near the modern sheepfold (Plate 74) are in a bad situation.

Archaeological Features & Surface Material: Stamped / unstamped amphora handles, roundish bases, a red paste and glazed rim, probable pithos rims and numerous body pieces (datable to the Hellenistic and Roman periods) were recorded within the borders of the farmstead (Plate 75).

B. PLATES

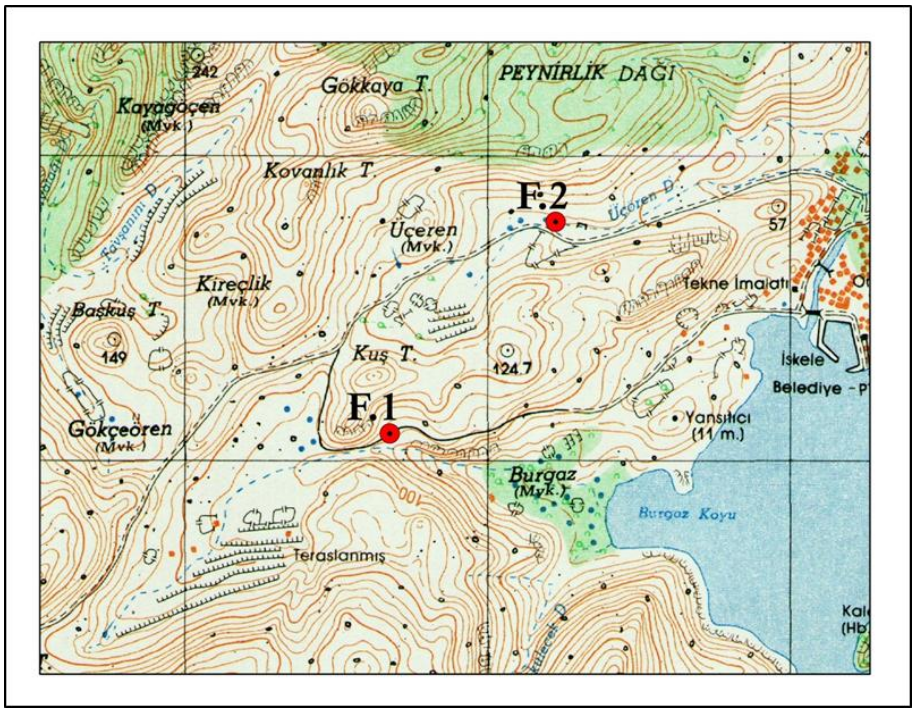

Plate 1: Map showing the locations of F.1 and F.2

Plate 2: Eastern wall of F.1, Örteren, Bozburun

Plate 3: Entrance of F.1, Örteren, Bozburun

Plate 4: Chamber of F.1 in the north, Örteren, Bozburun

Plate 5: Niches at the inner walls of F.1, Örteren, Bozburun

Plate 6: Agricultural terraces in the surroundings of F.1, Örteren, Bozburn

Plate 7: Modern sheepfold near F.1, Örteren, Bozburun

Plate 8: Agricultural terraces in the area between Üçeren and Kuştepe

Plate 9: Eastern walls of F.2 and agricultural terraces, Üçeren, Bozburun

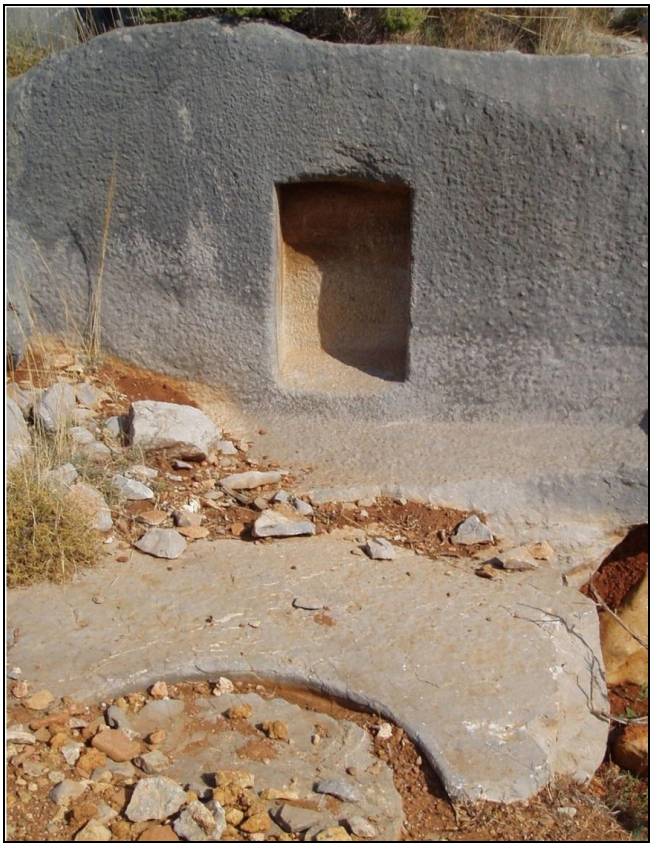

Plate 10: *In situ* workshop near F.2, Üçeren, Bozburun

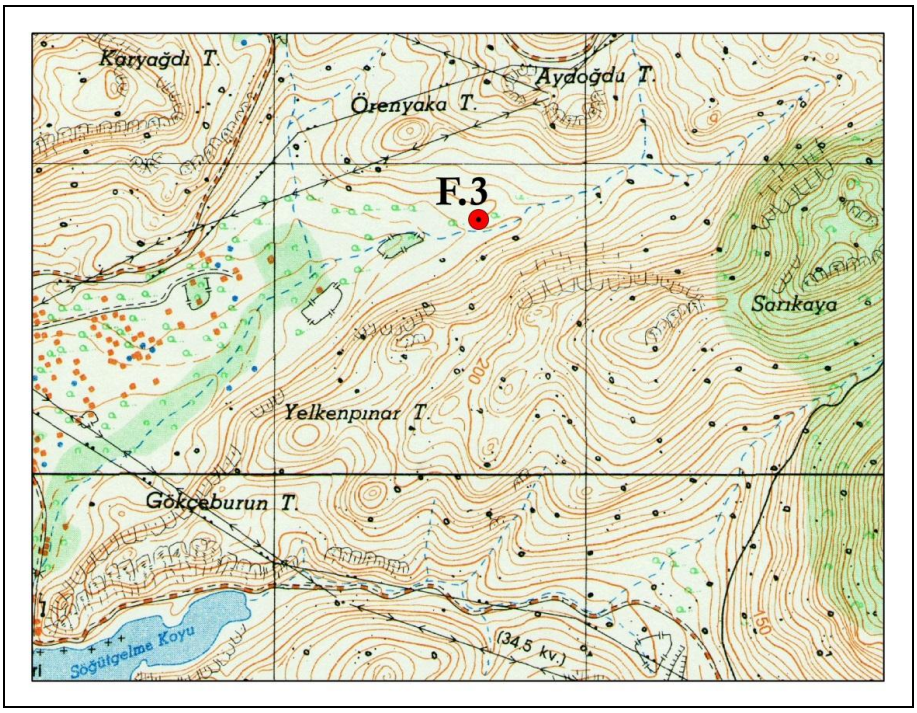

Plate 11: Map showing the location of F.3

Plate 12: Remains of F.3, Yeşilova, Bozburun

Plate 13: Press-stone, in 100m west of F.3, Yeşilova, Bozburun

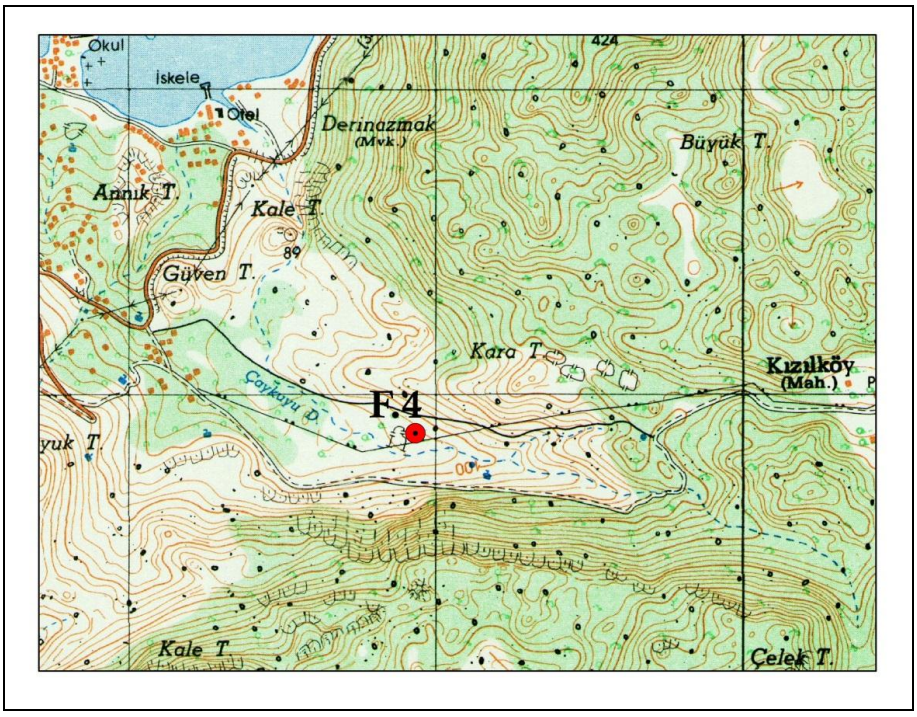

Plate 14: Map showing the location of F.4

Plate 15: Remains of F.4, located in the alluvial base valley, Selimiye

Plate 16: Entrance of F.4, faces the south, Selimiye

Plate 17: Eastern wall of F.4, Selimiye

Plate 18: Architectural blocks in 250m south-east to F.4, Selimiye

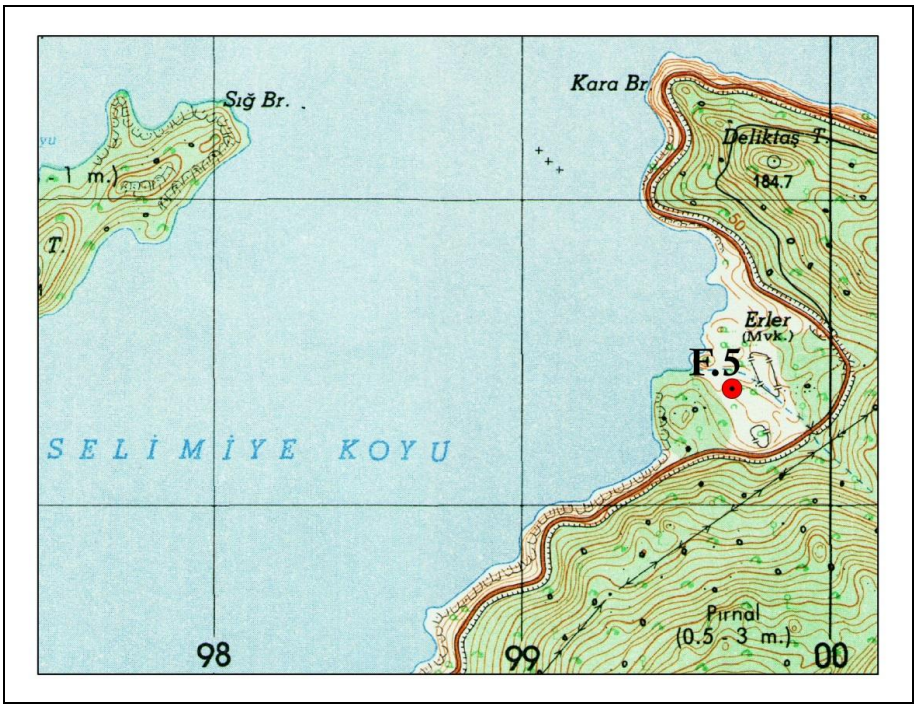

Plate 19: Map showing the location of F.5

Plate 20: Entrance of F.5, Erler Region, Selimiye

Plate 21: Press-stone, near F.5, Erler Region, Selimiye

Plate 22: Surface ceramics, detected at the site of F.5, Erler Region, Selimiye

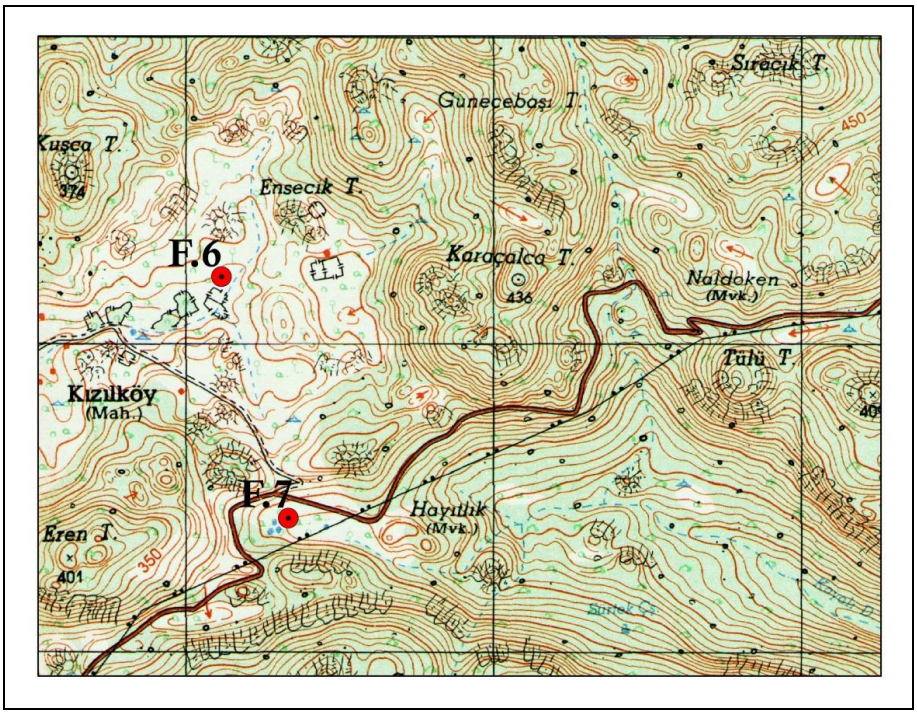

Plate 23: Map showing the locations of F.6 and F.7

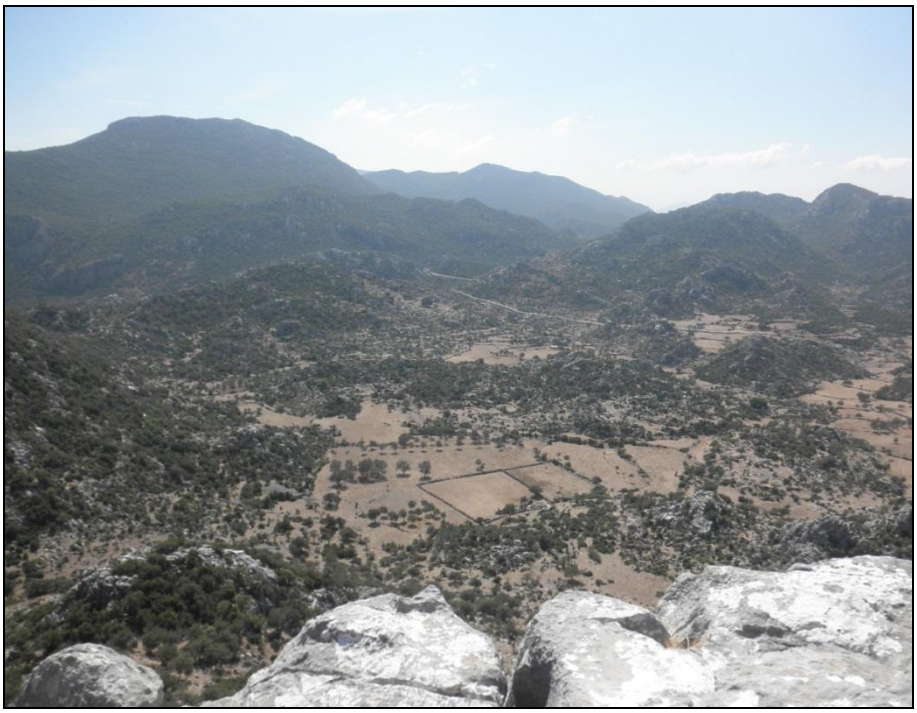

Plate 24: Agricultural terraces around F.6, Kızılköy, Selimiye

Plate 25: Entrance of F.6, faces the south-west, Kızılköy, Selimiye

Plate 26: Eastern wall of F.6, Kızılköy, Selimiye

Plate 27: Agricultural terraces in a pocket plain, Kızılköy-Söğüt border

Plate 28: Ruins of F.7, Kızılköy-Söğüt border

Plate 29: Unplastered well, near F.7, Kızılköy-Söğüt border

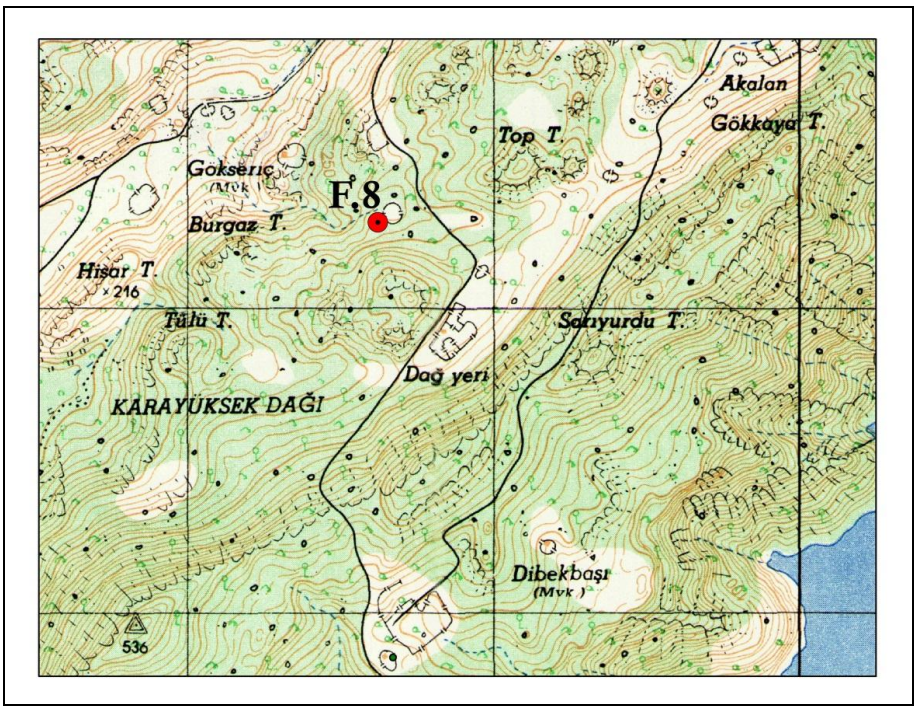

Plate 30: Map showing the location of F.8

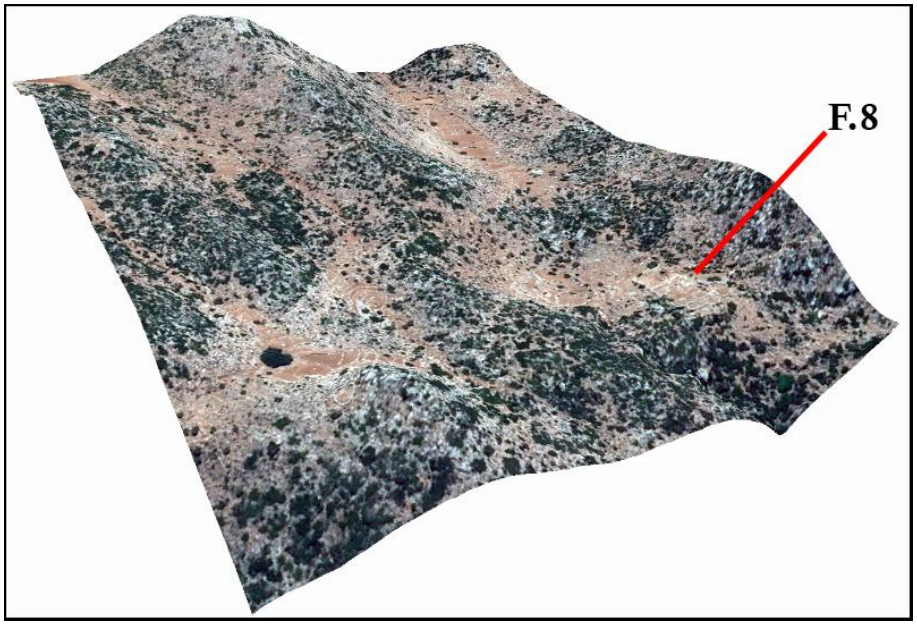

Plate 31: 2D view of F.8

Plate 32: Northern wall of F.8, Taşlıca (E)

Plate 33: Western wall of F.8, Taşlıca (E)

Plate 34: The wall split F.8 into two, Taşlıca (E)

Plate 35: Agricultural terraces in the north-east to F.8, Taşlıca (E)

Plate 36: *In situ* press-stone in the north-western corner of F.8, Taşlıca (E)

Plate 37: Debris nearby the press-stone, Taşlıca (E)

Plate 38: Cistern in the eastern part of F.8, Taşlıca (E)

Plate 39: Surface ceramics detected at the site of F.8, Taşlıca (E)

Plate 40: Ancient route, Sindili depresion, Taşlıca (S-W)

Plate 41: Map showing the locations of F.9 and F.10

Plate 42: Entrance of F.9 faces the south-east, Talıca (S-W)

Plate 43: Remains of F.10 and surface ceramics, Taşlıca (S-W)

Plate 44: Architectural blocks around the site of F.10, Taşlıca (S-W)

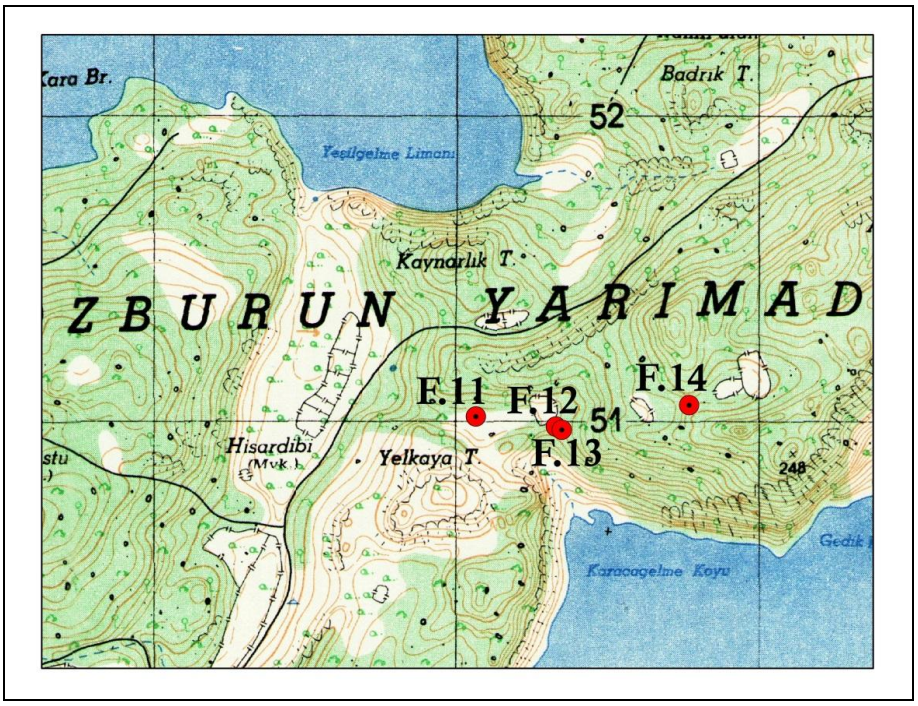

Plate 45: Map showing the locations of F.11, F.12, F.13, F.14

Plate 46: Remains of F.12, Taşlıca (S-W)

Plate 47: Remains of F.13, Taşlıca (S-W)

Plate 48: Partly preserved walls of F.13, Taşlıca (S-W)

Plate 49: *In situ* base walls of F.14, Taşlıca (S-W)

Plate 50: Highly destroyed building blocks of F.11, Taşlıca (S-W)

Plate 51: Surface ceramics around F.11, Taşlıca (S-W)

Plate 52: Tomb-like structure (looking outside), Taşlıca (S-W)

Plate 53: Tomb-like structure (looking inside), Taşlıca (S-W)

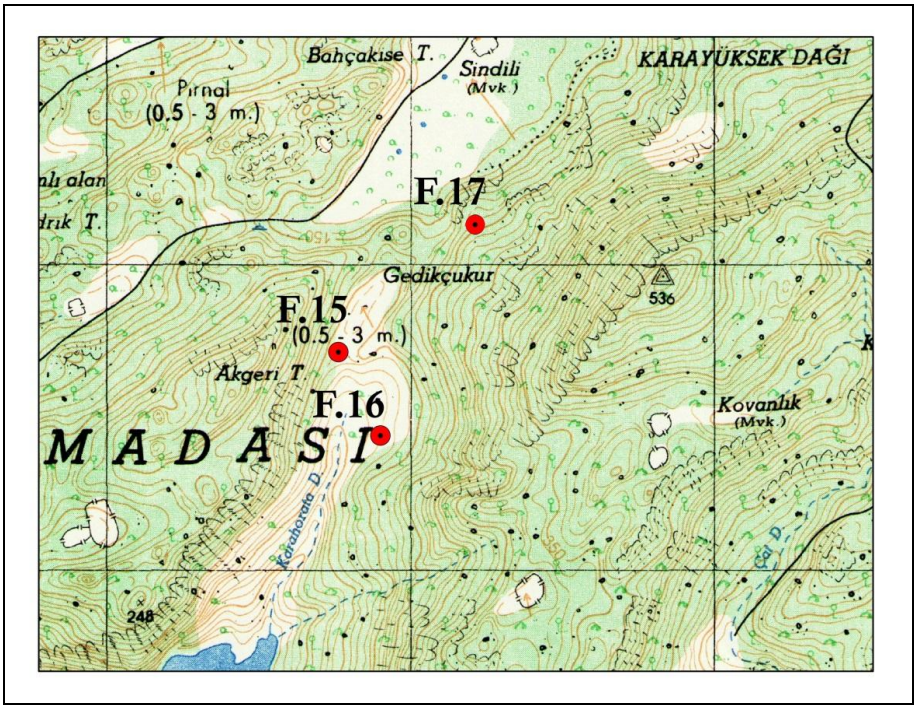

Plate 54: Map showing the locations of F.15, F.16, F.17

Plate 55: Agricultural terraces, Gedikçukur, Taşlıca (S-W)

Plate 56: Terrace walls embracing F.15, Taşlıca (S-W)

Plate 57: *In situ* base walls of F.15, Taşlıca (S-W)

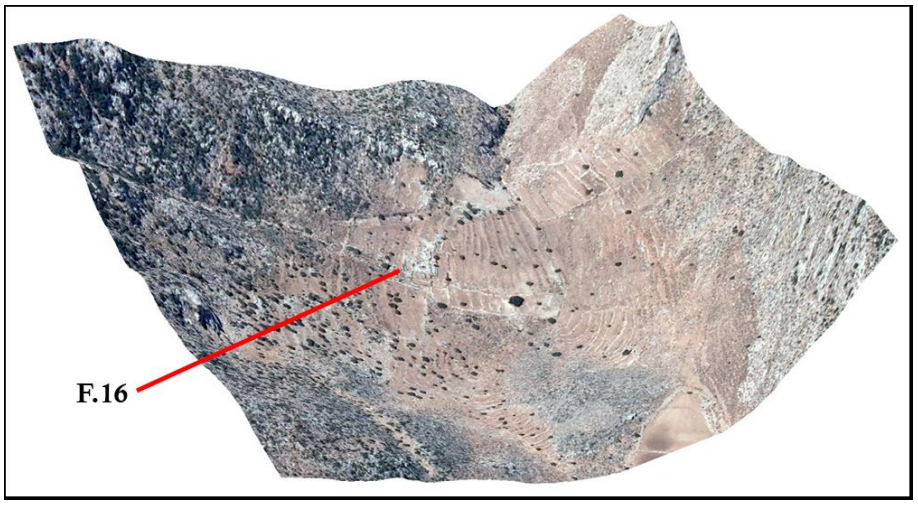

Plate 58: 2D view of F.16

Plate 59: Entrances of F.16, Gedikçukur, Taşlıca (S-W)

Plate 60: Isodomic walls of F.16, Gedikçukur, Taşlıca (S-W)

Plate 61: F.16 and agricultural terraces, Gedikçukur, Taşlıca (S-W)

Plate 62: Agricultural terraces around F.16, Gedikçukur, Taşlıca (S-W)

Plate 63: Surface ceramics around F.16, Gedikçukur, Taşlıca (S-W)

Plate 64: Remains of F.17, Taşlıca (S-W)

Plate 65: Entrance of F.17, Taşlıca (S-W)

Plate 66: Tomb-like structure near F.17, Taşlıca (S-W)

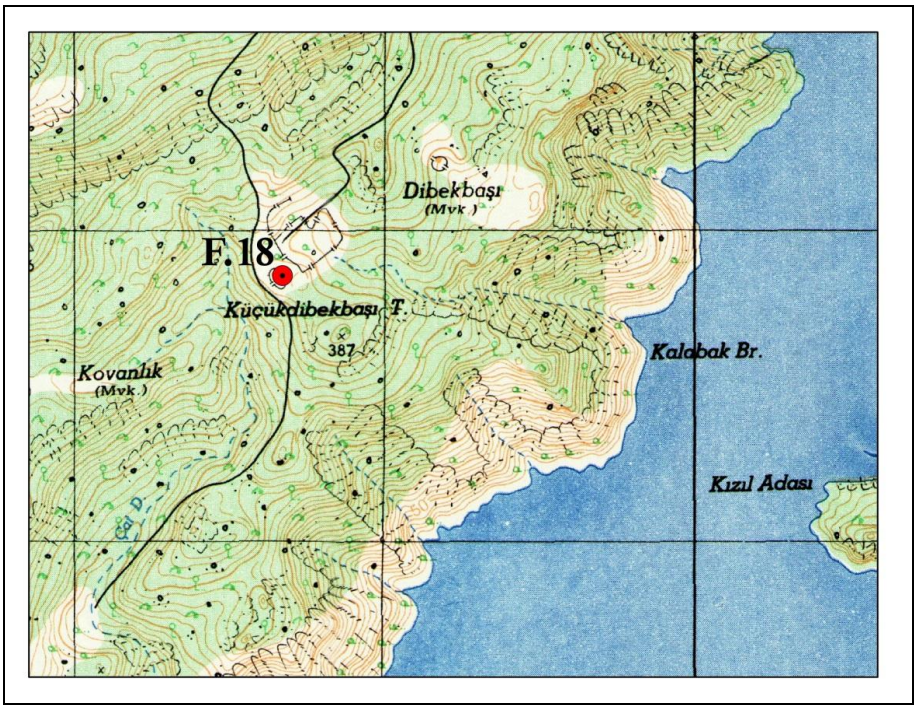

Plate 67: Map showing the location of F.18

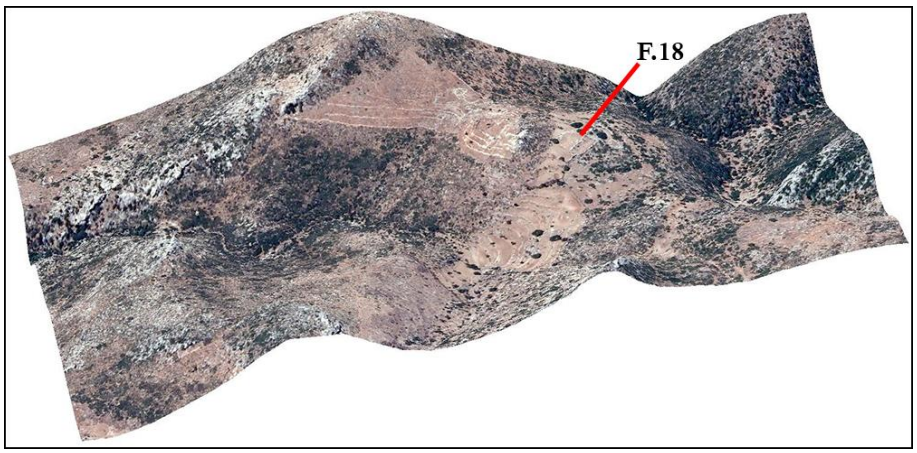

Plate 68: 2D view of F.18

Plate 69: Ancient route, Küçükdibekbaşı, Taşlıca

Plate 70: Agricultural terraces around F.18, Küçükdibekbaşı, Taşlıca

Plate 71: Remains of F.18 and agricultural terraces, Küçükdibekbaşı, Taşlıca

Plate 72: Modern port of Rhodes, viewing from F.18

Plate 73: Agricultural terrace wall near F.18, Küçükdibekbaşı, Taşlıca

Plate 74: Rock-cut stairs at the site of F.18, Küçükdibekbaşı, Taşlıca

Plate 75: Surface ceramics around F.18, Küçükdibekbaşı, Taşlıca

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: DEMİRCİLER, Volkan

Date and Place of Birth: 3.11.1977 / Pazaryeri

Email: volkandemirciler@gmail.com

EDUCATION

2007	METU, Settlement Archaeology	M.S.c
2002	METU, Sociology	BS

WORK EXPERIENCE

2003	Research Assistant	METU, Settlement Archaeology

EXCAVATION AND SURVEY EXPERIENCE

2003-2013	Burgaz Excavation (Prof. Dr. Numan TUNA)
2007-2008	Urla and Seferihisar Survey Project (Prof. Dr. Y. E. Ersoy - Prof. Dr. Numan Tuna)

FOREIGN LANGUAGES

English (Advanced)

RESEARCH INTERESTS

Settlement Archaeology, Rural Archaeology, GIS, Aerial Archaeolgy

TÜRKÇE ÖZET

"Agricultural Terraces and Farmsteads of Bozburun Peninsula in Antiquity / Antik Dönemde Bozburun Yarımadası Tarım Terasları ve Çiftlik Evleri" başlıklı bu çalışmada antik dönemde Birleşik Rodos Pera'sı olarak bilinen, günümüzde Bozburun Yarımadası olarak adlandırılan bölgedeki tarım terasları ve çiftlik evleri incelenmiştir. Çalışma alanı kuzeyde Turgut Köyü, güneyde Loryma antik kenti teritoryumunun başlangıcıyla sınırlandırılmış yaklaşık 16.000 hektar büyüklüğünde bir bölgeyi kapsamaktadır. Söz konusu bölge antik dönemde Rodos'un tarımsal üretime dayalı kurduğu ticaret ağının önemli bir parçası idi. Çalışmada, Hellenistik Dönemde bölgedeki tarımsal sistemin Rodos kontrolü altında organize edildiği ve yoğun tarımsal uygulamalar ile üretim kapasitelerinin arttırıldığı ileri sürülmektedir. Bölgedeki tarım terasları ve çiftlik evlerinin varlığı, söz konusu yoğun tarımsal faaliyetlerin birer göstergesidir.

Milattan once 408/7 yılı Rodos tarihi için çok önemli bir dönüm noktasıdır. Bu tarih önemlidir çünkü adanın kuzey ucunda kurulan yeni kentin (*the asty*) ötesinde yeni bir devlet de kurulmuştur (Papachristodoulou 1999:27). M.Ö. 411'de Atina liginden çıkıp Pelopones birliğine katılan Rodos-polisleri Ialysos, Lindos ve Kamerios'da meydana gelen oligarşik devrimin hemen ardından bu 3 *poleis* M.Ö. 408/7'de başkenti Rodos kenti olan yeni Rodos devletini, inşa etmişti (Gabrielsen 2000:177).

Yeni Rodos devleti adadaki 3 eski Dor kentinin (Ialysos, Lindos ve Kamiros) *synoicism* sürecinin bir sonucu olarak kurulmuştur. Bu yeni Rodos devletinin kurulmasına neden olan *synoicism*, antik Yunan dünyasının M.Ö. 5. ve 4. yüzyıllarına damga vurmuş karakteristik bir özelliğidir. Yeni kurulan Rodos kentinin işlevsel yönetimi 3 eski Dor kenti arasında eşit ve demokratik bir biçimde paylaşılmıştır. Bu 3 eski Dor kenti yeni kurulan Rodos devleti içinde özellikle dinsel açıdan önemli ölçüde bir özerkliğe

sahiplerdi. Ayrıca herbirinin kendi konsülleri ve meclisleri (*assembly*) vardı. Öte yandan yeni kurulan Rodos devletinin merkezi politik gücü yeni kurulan başkentte (*asty*), Rodos kentintinde toplanmıştı. (Papachristodoulou 1999:29-30).

M.Ö. 4. yüzyılda Rodos nüfusu, (hem Rodos adasında hem de Pera'da) yönetim amaçlı olarak, Ialysos, Lindos ve Kameiros kentlerine ait *deme'* lere bölünmüştü. *Deme* sisteminin Pera'da da uygulanması, beraberinde Pera yurttaşlarının da Adadakiler gibi eşit politik haklara sahip olmasını getirmişti. Rodos'un Küçük Asya'daki topraklarını da *deme* sistemi ile yönetme tercihinin güvenlik açısından da avantajları vardı. Örneğin Loryma'daki askeri kaleler ve Serçe Limanındaki güvenli limanlar sayesinde Rodos, Hellenistik dönemde büyük ve güçlü bir donanmayı yönetebilmiştir. Ayrıca korsanlıkla mücadele ederek Ege Denizini ticaret açısından güvenli bir yer haline getirmiştir (Rice 1994:296).

Yeni Rodos devletinin merkezi yönetimi daha çok askeri alanda kendini hissettiriyordu. Yeni Rodos devletinin adadaki ve karşı kıyıdaki teritoryası "yüksek yetkili valiler" olarak tanımlanabilecek *stratagos*lar ve bunların altındaki idareciler (*hagemones*, *epistatai*) tarafından yönetiliyordu. Askeri işler dışındaki birtakım sivil konularda yönetim yetkisi ise yerli sivil memurlardaydı. Diğer birçok alanda ise işler *synoikismos* öncesi olduğu gibi (*deme*lerin de içinde olduğu) büyüklü küçüklü yerleşim/yönetim birimlerinde yürütülüyordu (Papachristodoulou 1999:30).

Her *deme*, birleşerek yeni Rodos devletini oluşturan 3 eski kente aitti. Bu durum Rodos adasında olduğu gibi Pera'da ve diğer bağlaşık adalarda da (Chalke ve Karpathos gibi) aynıydı. Bir coğrafi birim olarak her *deme* kendine ait mezarlıkları olan birden fazla yerleşimden oluşuyordu. Birçok *deme*'de insanların temel geçimleri tarım ve tarımsal ürünlerin nakliyesini de kapsayan denizcilik faaliyetlerinden oluşuyordu. *Deme*'lerin demografik ve sosyal yapısı toplamda Rodos toplumunun özelliklerini yansıdan küçük birer örneği gibiydi. *Deme*'lerin 33 tanesi Rodos adasında, 13 tanesi

Pera'da, ve 7 tanesi de bağlaşık adalarda bulunuyordu (Papachristodoulou 1999:30-32).

Rodos'un anakaradaki toprakları Bağlaşık Pera ve Birleşik Pera olarak ikiye ayrılıyordu. Birleşik pera kuzeyinde Kallipolis, doğusunda Kaunos, batısında Knidos yarımadasının başlangıcıyla sınırlanıyor ve güneyde Loryma (Bozburun) yarımadasının tamamını içine alıyordu. Bu bölge büyük olasılıkla M.Ö. 5. Yüzyıl sonunda Rodos hakimiyeti altına girmişti. Birleşik Peradaki *deme*'ler adanın *synoikism* öncesi *poleis'*leri olan Ialisos, Lindos ve Kameiros arasında bölüşülmüştü (Bremen 2007:113). Antik dönemlerde, Pera'daki özellikle de Birleşik Pera'daki Hellen etkisi oldukça güçlüydü. Büyük bir olasılıkla Birleşik Pera'daki yurttaşlık statüsü ve yurttaşlık hakları Rodos adasındaki ile aynıydı (Papachristodoulou 1999:41). Ele geçen birçok mezar yazıtında anlaşılmaktadır ki Hellenistik dönemde birçok Pera yurttaşı ya da kadın evlilik yolu ile Rodos kentinde yaşamıştır. Bu durum şüphesiz zengin Rodos kentinin sunduğu cazip olanaklar ile doğrudan alakalıdır. Buna ek olarak da Pera'daki *dem*"lerde var olan sosyal mobilitenin göstergesidir. (Rice 1999:51).

Rodos Perasının topografik özellikleri ve burada yapılan arkeolojik çalışmaların sonuçları değerlendirildiğinde bölgede çeşitli tiplerde yerleşimlerin varlığı göze çarpmaktadır. Örneğin Phonix, Kasarea gibi büyük *deme* merkezlerinin yanında Bozburun Yarımadasında çok sayıda küçük ölçekli yerleşim bulunmaktadır. Rodos Perasındaki çok sayıdaki arkeolojik kalıntı ve kale yerlerşimi bölgenin Hellenistik dönem boyunca iskan gördüğünü ve dikkate değer ölçüde bir nüfusu beslediğine işaret etmektedir (Rice 1994:297).

Birleşik Pera'daki *deme*'lerden biri olan Amos, Marmaris Körfezinin güney-batısında yer almaktaydı ve M.Ö 408/7'de yeni kurulan Rodos devletinin başkenti olan Rodos kentine en yakın Pera *deme*'siydi. Etrafı sur duvarlarıyla çevrili bir tepe üzerinde kurulmuş olan Amos Birleşik Pera'da bilinen üç tiyatrodan birine sahip olması bakımından da ayrıca önemliydi.

Amos'u bizim için önemli kılan bir başka konu ise tarımsal açıdan önemli bir yerleşim olmasıydı. Bu durum çeşitli epigrafik kaynaklarda da belirtilmiştir (örneğin Fraser and Bean 1954, 6-20, nos. 8-10). M.Ö. 3. ve 2. yüzyıllara tarihlenen bu kaynaklardan Helenistik dönem Rodos tarım sistemi ile ilgili (özellikle kiralanan tarım arazilerinde üretimin nasıl ve ne şartlarda yapılması gerektiği gibi) önemli bilgiler elde edilmiştir (Papachristodoulou 1999:41-43). M.Ö. 3. yüzyıl sonları ve M.Ö. 2. yüzyıl başlarına tarihlenen söz konusu bu epigrafik kaynaklar bu dönemde federal Rodos devleti tarafından gerçekleştirilen tarımsal genişlemelerle ve gelişmelerle paralellik göstermektedir (Rice 1999:48).

Bağlaşık Pera'yı meydana getiren alanlar güneyde Idyma'yı ve Keramos'u içine alarak Seramik körfezinin kıyıları boyunca uzanıyordu. Kuzeyde Stratonikeia, kuzey-doğuda Hyllarima'yı ve doğuda bugünkü Muğla kentini içine alıyordu. Eldeki veriler Bağlaşık Pera'nın tam olarak nasıl bir şekilde Rodos kontrolüne geçtiğini açıklamakta yetersizdir. Ancak bölgenin Rodos hakimiyeti altına girdiği tarih büyük olasılıkla M.Ö. 3. yüzyıl ortalarına tarihlenmektedir (Bremen 2007:115).

Reger'e göre (1999:77) Hellenistik dönemde Rodos'un Ege dünyasında izlediği politikanın üç temel özelliği vardı. Birincisi, Rodos Karya'da tek bir egemen gücün var olmasını istemiyordu. Karya bölgesi M.Ö. 4. yüzyılın sonlarından itibaren Ptolemies ve Seleucids'ler arasında bir ihtilaf konusuydu. Bölgedeki üçüncü güç ise Rodos idi. Rodos, Karya'daki toprak egemenliğini güvence altına alabilmek ve sürdürebilmek için bu iki büyük güç ile arasında bir denge siyaseti inşa etmeye çalışıyordu. İkincisi, Rodos'un da diğer devletler gibi bölgede yayılmacı bir amacı vardı; fakat bu amacını sadece bölgede politik istikrarsızlıkların olduğu zamanlarda gerçekleştirmeye çalışırdı. Üçüncüsü, Rodos'un zaman zaman bölgedeki Yunan kentlerinin bağımsızlık çabalarına verdiği desteklerin altında yatan sebep Rodos'un bölgede kendi çıkarlarına uygun bir durum yaratma arzusuydu.

Helenistik dönem Ege dünyasında Rodos, politik ve ekonomik olarak göze çarpan bir figür olarak karşımıza çıkar. Bunun belki de en önemli sebebi Mısır ile kurduğu (özellikle tahıl ticareti alanında) ticari ilişkilerdi (Rostovtzeff 1959:226).

Helenistik dönemde Rodos devletinin siyasi olarak üstün bir konumda olmasının en önemli nedeni güçlü ve iyi organize olmuş bir donanmaya sahip olmasıydı. Güçlü bir donanmaya sahip olmak beraberinde Ege'de önemli deniz üslerinin kontrolünü ve böylece deniz ticareti üzerinde hegemonyayı getirmekteydi. Ayrıca, Mısır'daki Ptolemaios Krallığı ve Roma ile olan ittifaklar, Rodos'un Ege dünyasındaki ekonomik gücünü ve etkisini pekiştirmekteydi (Archibald and others 2000: 166).

Antik Dönemde Rodos'un Ege'de oldukça geniş bir alana yayılmış askeri deniz üslerine sahip olmasının önemli avantajları vardı. Birinci olarak, Rodos'un sahip olduğu limanlar ve bunların etrafındaki yerleşimler (bu yerleşimler çoğu zaman tarım için uygun arazilere de sahipti) Rodos donanması için hem askeri hem de lojistik olarak önemli ve destekleyici unsurlardı. İkinci olarak, askeri ve lojistik donanımı güçlü olan böylesi yaygın deniz üslerine sahip olmasından dolayı Rodos, Ege Denizinde etkili bir kontrol gücüne sahipti. Böylelikle Ege sularında korsanları bertaraf edebilmiş ve ticaret yollarının güvenliğini sağlayabilmişti (Gabrielsen 1997:42-43).

Walkbank'a göre (1982:162) antik dönemde Rodos'un ticarete dayalı kurduğu sağlam ve başarılı ekonominin sebebi ardında çok iyi organize olmuş aristokratik bir yönetimin var olmasıdır. Böyle bir kontekst içinde "aristokrasi", var olan yurttaşlık sistemi içerisinde, resmi bir şekilde olmasa da yönetimde etkili olan elitlerin varlığını ifade etmektedir (Gabrielsen 1997:15). Aristoteles'e göre (Pol. 1291b14-30) yönetimde etkili olan böylesi bir elit grubun bir takım özellikleri olmalıdır. Bunlar zenginlik (*ploutos*), aileden gelen ve doğuştan sahip olunan itibar (*eugenia*), eğitim

(*paideia*) ve üstün ahlak normları çerçevesinde paylaşılan birtakım davranış kodları (*arête*)'dır.

Rodos devletinin Helenistik dönemde doğu Akdeniz ticaretinde oynadığı üstün rolün 4 temel göstergesini sıralayabiliriz. (1) Rodos M.Ö. 4. Yüzyıldan itibaren yabancı tüccarlar ve tefeciler için önemli bir ticaret merkezi durumundadır. (2) M.Ö. 167'ye kadar gümrük vergilerinden kaynaklanan çok büyük bir ciro elde etmiştir. (3) M.Ö. 160'da çok büyük miktarlarda kredi fonunu elinde tutmaktadır. (4) Ve son olarak, hemen hemen tüm Akdeniz'e yaptığı çok büyük hacimli amfora ihracatı, Helenistik dönemde Rodos devletinin ekonomik alanda gerçekleştirdiği devasa başarının göstergesidir. Ayrıca Helenistik dönemde Rodos devleti özellikle de başkent Rodos sanatçılar, bilim adamları ve filozofların toplandığı önemli bir kültürel merkez konumundaydı. Rodos'un ister ekonomik alandaki isterse kültürel alandaki başarısı ve cazibe merkezi oluşunun ardında güçlü bir lokal aristokrasinin oluşturduğu sağlam bir yönetimsel altyapı vardı. Böyle bir ortamda özgür yurttaşların hem fiziksel hem mental gücü efektif bir şekilde kullanılabilmişti (Archibald and others 2000: 166-167).

Helenistik dönemde Rodos'un ticari açıdan ne kadar önemli bir merkez olduğunun en iyi göstergesi belki de M.Ö. 227/6 yılında Rodos'da meydana gelen büyük ve yıkıcı deprem sonrası gerçekleşen olaylardır. Bu depremin ardından Rodos'un tekrar toparlanabilmesi için Akdenizden, Mısırdan, ve Küçük Asya'dan gönderilen yardımların nedeni şüphesiz sadece insani amaçlar değildi. Yardım gönderen devletlerin hepsinin Rodos ile ticaret ağları vardı. Ayrıca Rodos'un bir an once toparlanması var olan ticaret düzeninin devam edebilmesi için zorunluydu (Rostovtzeff 1959:230).

Rodos, Roma ile kurduğu iyi ilişkiler ve ittifaklar sayesinde Akdeniz ticaretinde önemli bir yer edinmişti. Fakat Pers Savaşlarının yıkıcı etkisi ortadan kalktığında işler Rodos aleyhinde değişmeye başlamıştı. M.Ö. 167'de Roma Delos'u bir serbest-limana dönüştürdü. Delos artık Ege

dünyasındaki ticaretin merkezi olma iddiası ile sahnedeydi. Roma'nın desteğini arkasına alan ve limanlarına yanaşan gemilerden herhangi bir gümrük vergisi talep etmeyen Delos, tüccarlar için cazip bir duruma gelmişti. Ancak bütün bunlara rağmen Rodos ticaretinin M.Ö. 167'den sonra birden bire durduğu söylenemez. Bu tarihten sonra Rodos'un ticaret hacmi azalmış olsa bile Ege ve Akdeniz'de kurduğu geniş ticaret ağı en azından M.Ö. 1. yüzyıl sonlarına kadar önemini korumuştu. Bu durum arkeolojik olarak da desteklenebilmektedir. M.Ö. 1. yüzyıl sonlarına değin tarihlenebilen Rodos mühürlü amforaları, doğudaki birçok kentte ele geçmiştir. Ayrıca M.Ö. 2. yüzyılın ikinci yarısında Rodos ve Kırım arasındaki özellikle tahıl ihracatına yönelik ticaret ilişkilerin kuvvetli olduğu göze çarpar. Bu durum belki de M.Ö. 167'de Delos'un bir serbest-liman olarak Akdeniz'de etkisini artırmasına karşı Rodos'un tercih ettiği bir strateji olarak yorumlanabilir. Sonuç olarak Delos hiçbir zaman tam olarak Rodos'un yerini alamamıştır. Akdeniz'deki Roma hakimiyetine rağmen Rhodos, (M.Ö. 1. yüzyıl sonlarına kadar) ticaret tecrübesi ve sahip olduğu sermaye birikimi sayesinde Ege ticaretinde önemli bir merkez olarak varlığını sürdürmüştür (Rostovtzeff 1959:776-777, 1267).

Akdeniz ve Karadeniz bölgesinde Rodos mühürlü amfora kulpları üzerine yapılan çalışmalar, M.Ö. 300'lerden M.S. 1. yüzyıl başlarına kadar olan zaman zarfında Rodos ticareti ile ilgili önemli bilgiler sunmaktadır. Etienne (1990:216,fig.4) tarafından hazırlanan istatistiksel grafiklerde bu dönemde 7 temel kronolojik dizi olduğu göze çarpmaktadır. III. Dizi'ye denk düşen tarihlerde (M.Ö. 210/205 – 175) mühürlü Rodos amphora kulpları miktarı pik yapmıştır. Bu dönemi takip eden IV. Dizi'de (M.Ö. 174 – 146) ise amfora kulpları miktarında önemli bir düşüş görülmektedir. III. Dizideki büyük artış Rodos devletinin M.Ö. 200'lerden itibaren Roma'nın da desteği ile elde ettiği politik gücün ve bununla birlikte Akdeniz'de sağladığı ticari üstünlüğün bir yansıması olarak kabul edilebilir. IV. Dizideki düşüş ise M.Ö. 167/6'de Roma'nın Delos'u bir serbest-liman olarak deklare etmesi ve böylece dengelerin Rodos aleyhinde değişmesiyle açıklanabilir (Gabrielsen 1997:66).

M.Ö. 2. yüzyıl sonlarında, Rodos'un ticaret ağı içerisindeki birçok yerde ihracat hacminde önemli miktarda azalmalar olmasına rağmen, Rodos'un Mısır ile kurduğu ticaret ağı hala devam etmekteydi. Rodos'dan Mısır'a ve diğer doğu kentlerine, gemilerle özellikle şarap ve zeytinyağı taşınmakta ve karşılığında tahıl alınmaktaydı. Bu takas ticareti sonucu elde edilen tahılın bir kısmı Rodos'un kendi nüfusunu beslemek için kullanılmakta bir kıs mı da diğer Yunan kentlerine pazarlanmaktaydı. Rodos'un gerçekleştirdiği bu tahıl ticareti yurttaş statüsündeki özel girişimcilerin elindeydi. Fakat bazı durumlarda Rodos devleti de ticarette aktif olarak rol alabilmekteydi (Gabrielsen 1997:71-80).

M.Ö. 5. yüzyıl Yunan Dünyası'na baktığımızda Sicilya, Mısır, Kıbrıs ve Karadeniz bölgesi ile olan tahıl ticaretinin Atina'nın elinde olduğunu görürüz. Bu ticarette rol alan aktörler şunlardır: gemi sahipleri (*naukleros),*tüccarlar ve onlara fonlarıyla destekleyen bankerler. M.Ö. 4. yüzyıl Atinasına baktığımızda bu insanların Atina dışından gelen yabancılar olduğunu görürüz (Casson 1954:169)

M.Ö. 4. yüzyıl sonlarında Yunan Dünyası politik ve ekonomik bir kriz içine girmişti. Yunanistan Ana Karasında, Adalarda, Küçük Asya'da kurulan yeni kent-devletlerinin her biri kendi politik, dinsel, sanatsal ve ekonomik dünyalarında kendi kendilerine yetecek bir düzen kurmak için çabalıyorlardı. Ekonomik olarak kendi kendine yetebilmek Yunan polislerinin her zaman ideali olmuştu. Fakat bu ideal hiçbir zaman tam olarak gerçekleştirilememişti (Rostovtzeff 1936:232)

Hellenistik Dönem ekonomisi çok iyi organize olmuş pazara yönelik tarımsal üretim temelli ticarete dayanmaktaydı (Rostovtzeff 1936:249). Bu dönemde de Atina Ege Dünyasındaki en büyük tahıl ithalatçısı olarak karşımıza çıkmaktadır. Atina'ya ek olarak neredeyse Ege Adalarının tamamı, ve Küçük Asya kıyısındaki birçok kent de artan nüfusunu beslemek için tahıl ithalatına yönelmişti. Önceki yüzyıllarda olduğu gibi tahıl ithalatı

Sicilya, Kırım ve Mısır gibi merkezlerden yapılmaktaydı. Bu merkezlerden yapılan tahıl ithalatı, Yunan Dünyasının değerli ürünlerinin (çoğunlukla şarap, zeytinyağı, kaliteli çanak-çömlek) ihracatı ile dengelenmeye çalışılıyordu. Hellenistik dönem Doğu Akdeniz tahıl ticaretinin en önemli figürü Rodos idi. Rodos'un bu ticarettin merkezinde olması coğrafi konumuyla doğrudan ilgiliydi. İki büyük tahıl tedarikçisi olan Mısır ve Kırım'ın ortasında yer alıyordu. Ayrıca, her zaman iyi birer pazar durumunda olan Kiklatlara ve Küçük Asya kıyısındaki kentlere yakın mesafede yer alıyordu. Bütün bunlara ek olarak Rodos bu ticaret için gerekli sermayeye ve deniz gücüne sahip idi (Casson 1954:170-172,187).

Bu çalışma iki açıdan önem arz etmektedir. Birinci olarak, çalışma alanı kırsal arkeoloji açısından çok fazla çalışılmamış bir bölgeyi kapsamaktadır. Bölgedeki antik tarımsal pratikleri anlayabilmek için önem teşkil eden teraslar, topografik dinamikleri araştırılarak bütünsel bir yaklaşımla ele alınmaya çalışılmıştır. İkinci olarak, arazi çalışmaları sırasında tespit edilen çiftlik evlerinin, antik tarım sistemi içerisindeki fonksiyonlarının ve teraslar ile olan ilişkilerinin belirlenmesi, bölgenin Helenistik Dönem tarım ekonomisinin anlaşılabilmesine katkıda bulunmuştur.

Çalışmanın iki temel sınırlaması vardır. Birincisi, Kültür Bakanlığı'ndan alınan izinler yüzey buluntularının toplanmasını kapsamamaktadır. İkincisi, tarım teraslarının ilk kullanım evresinden sonraki dönemlerde de onarılarak kullanılmış olmaları kesin bir şekilde tarihleme yapmayı güçleştirmektedir. Bu nedenle değerlendirmeler, arazi çalışmaları ve fotogrametrik analizler sonucu tespit edilen tarım teraslarının potansiyel olarak Helenistik Dönemde kullanılmış olduğu ön kabulünden yola çıkılarak yapılmıştır.

Bu çalışmada yöntem olarak yaygın yüzey araştırması, fotogrametri ve coğrafi bilgi sistemleri (CBS) kullanılmıştır. Yüksek çözünürlüklü sayısal hava fotoğraflarının fotogrametrik analizleri, 2009-2012 yılları arasında gerçekleştirilen arazi çalışmaları neticesinde elde edilen verilerle karşılaştırılıp birlikte değerlendirilmiş; bu veriler oluşturulan bir coğrafi

bilgi sistemi ’ne aktarılmıştır. Çalışma alanına ait sayısal hava fotoğraflarının 3 boyutlu analizleri sonucunda tüm tarım teraslarının ve tarıma elverişli düz arazilerin CBS ortamında sayısal haritası oluşturulmuştur. Böylece, tüm çalışma alanının % 20,78’inin teraslanmış olduğu; teraslama yapılmaksızın kullanılabilecek tarım arazilerinin ise tüm alanın sadece % 3,43’lük bir kısmını kapladığı anlaşılmıştır. Yine CBS ortamında hazırlanan sayısal yükseklik haritasına göre tüm çalışma alanında yüksekliklerin 0 ila 780 m; teraslanmış alanlarda 0 ila 661 m arasında yer aldığı ve ortalama yükseklik değerinin 191 m olduğu; tüm çalışma alanına ait yükseklik yüzdelerinden teraslanmış alanlara ait yükseklik yüzdelerinin çıkarılması ile elde edilen histogramda ise 300 ila 500 m aralığının teraslama için daha çok tercih edildiği görülmüştür.

Sayısal yükseklik modeli kullanılarak elde edilen eğim haritasında tüm alana ve teraslanmış alanlara ait eğim dereceleri görülmektedir. Tüm alan için maksimum eğim 85,99 derece, teraslanmış alanlar için ise 72 derecedir. Ortalama eğim dereceleri tüm alan için 22.21 derece, teraslanmış alanlar için ise 14,82 derecedir. Tüm çalışma alanına ve teraslanmış alanlara ait eğim yüzdeleri kullanılarak elde edilen histogramda, teraslama için eğim değeri 20 dereceden fazla olan alanların tercih edildiği görülmüştür.

CBS ortamında elde edilen bakı haritası kullanılarak elde edilen fark histogramında teraslama için en çok tercih edilen yönlerin güneydoğu, doğu ve güneydoğu olduğu anlaşılmaktadır. Bu durum, teraslarda yetiştirilmesi tercih edilen ürünler için (özellikle üzümün) yıl içerisinde ihtiyaç duydukları güneşlenme sürelerinin de dikkate alınmış olduğunun göstergesidir. Ayrıca, söz konusu yönlerin teras tarımı için tercih edilmesi, özellikle kuzey rüzgârlarının ürünler üzerindeki tahrip edici etkilerinden kaçınılmasını da sağlamış olmalıdır.

Çalışma alanına ait sayısal toprak verisi kullanılarak tarım teraslarının büyük toprak grupları, erozyon ve arazi kullanım kabiliyetleri ile ilişkisi incelenmiştir. Tüm alan içinde teraslama için kırmızı Akdeniz toprağının

(*Terra Rosa*) tercih edildiği görülmüştür. Ayrıca, terasların yaklaşık % 78'inin şiddetli erozyona maruz kalan alanlarda; yaklaşık % 70'inin ise erozyon derecesi çok yüksek, taşlı ve toprak derinliklerinin sığ olduğu VII. Sınıf araziler üzerinde inşa edildiği anlaşılmıştır.

Günümüzde çalışma alanının hiçbir yerinde yüzeyde akarsu bulunmamaktadır. Geleneksel olarak tarım, yeraltı su kaynakları ve sarnıçlar kullanılarak yapılmaktadır. Ancak, kurumuş dere yatakları ve teras dağılımı karşılaştırıldığında antik dönemlerde akarsu rejimlerinin günümüzdekinden farklı olma ihtimali akla gelmektedir.

2009-2012 yılları arasında gerçekleştirilen yüzey araştırmaları esnasında tespit edilen 18 adet çiftlik evi büyüklükleri göz önüne alındığında tipolojik olarak 2 grup oluşturmaktadır. Küçük ölçekli kategorisinde nitelendirilebilecek birinci grup, kontrol ettikleri tarımsal alan ile birlikte yaklaşık 0,1-0,2'şer hektar büyüklüğünde 15 adet çiftlik evinden oluşmaktadır. Öte yandan, daha büyük alanları kontrol ettikleri tespit edilen, dolayısıyla daha geniş sınırlara sahip yapıların oluşturduğu ikinci grupta ise yaklaşık 2'şer hektarlık 3 adet büyük çiftlik evi bulunmaktadır. Çiftlik evleri çevresinde gözlemlenen yüzey seramiklerinden ve yapılara ait korunmuş duvarların örgü tekniklerinden, çiftlik evlerinin tamamının Hellenistik dönemde kullanılmış oldukları sonucu ortaya çıkmaktadır. Birinci grubun, izole-münferit çiftlik evleri ve küçük ölçekli çiftlik evi öbekleri tarafından iki alt kategoriden oluştuğu anlaşılmaktadır. Birinci alt gruptaki izole-münferit çiftlik evinin toplam sayısı 11 adettir. Büyük ölçekli çiftlik yapılarına çalışma alanının güneyinde yer alan antik *Phoinix* yerleşimi içerisinde rastlanmış olup bunların ortak özellikleri çoğunlukla etraflarındaki teras duvarlarının poligonal teknikle örülmüş ve antik bir yol şebekesine yakın konumlanmış olmalarıdır. Ayrıca, bu yapıların tamamının geniş tarımsal alanları kontrol ettiği tespit edilmiştir. Yapılarda izlenen işçilik bu çiftlik evlerinin antik dönemde ayrıcalıklı bir konuma sahip olduğunun açık göstergesidir. *Phoinix* yerleşimi çalışmada saptanan ikinci alt kategoriye ilişkin bulgular sunmaktadır. Buna göre öbek halinde tespit

edilen bir grup çiftlik yapısının düzenli aralıklarla ve benzer mimari tekniklerle inşa edildiği anlaşılmaktadır. Bu yapıların inşasında kaba poligonal duvar örgüleri rahatlıkla izlenebilmektedir. Gruba özel olarak atfedilebilecek bir konu ise bunların kendi kendine yeten ekonomiler yaratmış olabilecekleri ve yarımada kıstağına kadar ulaşan antik yol üzerindeki konumlanmalarıyla bazı ürünlerin diğer başka bölgelere iletimi için karavan lokasyonlar oluşturmuş olabilecekleridir.

Antik tarım teraslarıyla ilgili olarak literatürde tartışılagelen konulardan bir tanesi tarihleme sorunudur. Özellikle çiftlik evlerinin ve yakın çevrelerinde gözlemlenen yüzey seramiklerinin söz konusu sorunun çözülmesinde büyük katkısı olduğu bir gerçektir. Çalışma alanında tespit edilen büyük ölçekli çiftliklerin ve bunlarla ilişkili tarım teraslarının arazide belgelenen Hellenistik dönem yüzey seramiklerinin ışığında önemli ölçüde örtüştüğü görülmüştür. Bu çiftliklerin antik dönemde muhtemelen üretim-depolama-yeniden dağıtım merkezleri olduğu düşünülmektedir. F.18 olarak kodlanan ve *Phoinix* Akropol'ünün kuzey-doğusunda yer alan yapı, yoğun tarımsal üretimin yapıldığı Hellenistik dönemde tarımsal ürünün biriktirildiği ve işlendiği merkezlerden bir tanesi olmalıdır.

Bozburun Yarımadası'nın orta kesimi antik tarım terasları açısından oldukça zengindir. Bu kapsamda modern Bozburun yerleşmesinin özellikle batısında ve modern Selimiye yerleşmesine bağlı Kızılköy çevresinde bazı kırsal yapılara ve tarımsal faaliyet izlerine rastlanmıştır. Bahsedilen alanlarda yüzey seramikleri Phoinix'e kıyasla daha zayıf olmasına rağmen söz konusu yapılarda izlenen duvar tekniklerinin yine Hellenistik döneme ait olduğu anlaşılmıştır. Yapıların çoğu iç kesimlerdeki yelpaze şeklinde ya da düz cep vadilerinde kaydedilmiş olup bunların neredeyse tamamı civardaki teraslara yakın bir konumda inşa edilmiştir. Yarımada genelindeki tüm çiftlik yapılarının sarnıç ya da kuyu gibi su öğeleriyle fiziksel yakınlığı dikkate değerdir. Su öğeleri yarımadanın yeraltı suları açısından ne denli zengin olduğunun güçlü göstergeleridir.

Tarım teraslarının çiftlik evleriyle olan ilişkisi, terasların CBS analizleri yoluyla mercek altına alınmıştır. Daha önce de açıklandığı gibi terasların bakı sonuçları yarımadada şarap ve zeytinyağı gibi bazı özel ürünlerin üretilmesini destekler nitelikte çıkmıştır. Tüm çiftlik yapılarının konumlanması tarım teraslarının bakı analizi sonuçlarıyla tam olarak örtüşmese de çiftlik evleri özelinde bazı yeni tartışmalar üretmek mümkündür. Açıkça görülmektedir ki 18 adet çiftlik evinin 8 tanesi güneye ve doğuya yönelmiştir. Aynı zamanda 6 çiftlik evinin düz alanlarda inşa edilmiş olması arazinin eğimli ve engebeli yapısı göz önüne alındığında olağan dışı bir durum değildir. Kalan 4 adet çiftlik evinin ya kuzeye ya da kuzey-batıya bakacak şekilde inşa edildiği anlaşılmıştır. Bütün bu yönelimler bir yana çiftlik evlerinin büyük çoğunluğunun terasların hemen yanında konumlanmış olması dikkat çekicidir. Böylesi bir planlamanın arkasındaki temel neden tarım teraslarının daha kolay kontrol edilebilmesi ve yönetilebilmesi ihtiyacından kaynaklanmış olmalıdır.

Akdeniz ve Ege coğrafyasında kırsal ve bölgesel tarım pratiklerinin anlaşılmasına dönük pek çok arkeolojik çalışma gerçekleştirilmiştir. Bunların hemen hemen tamamı mekânsal analizlerin yapılmasıyla desteklenmiştir. Söz gelimi Yunanistan'daki Kythera Adası'nda CBS uygulamalarıyla desteklenen yüzey araştırmalarında (Bevan *ve diğerleri* 2003, 2011) tarım teraslarının sarp arazilerde (terasların yaklaşık % 44'ü 12 derecenin üzerindedir) ve pek çok farklı ürünün yetiştirilmesine olanak sağlayacak şekilde inşa edildikleri tespit edilmiştir. Bakı sonuçları terasların tercihan güneye bakacak şekilde yapıldığını göstermektedir. Bozburun yarımadası göz önüne alındığında tarım terasları eğimlerinin (20 dereceden başlayan) Kythera için verilen değerlerden çok da uzak olmadığı anlaşılmaktadır. Kythera ile ortak bir özellik Bozburun yarımadasındaki terasların bakı değerleridir. Her ikisinde de terasların daha çok güneye baktığı görülmektedir. Bu durum güneş ışığından azami derecede faydalanmak ve iklimsel koşulların olası olumsuz etkilerinden kaçınmaktır.

Güney Argoid'de gerçekleştirilen çalışmalarda (Jameson *ve diğerleri* 1994), 0,5 hektardan daha küçük tarımsal alanları kontrol eden yapılar çiftlik evi olarak adlandırılmıştır. Ayrıca, kuleli çiftlik evleri barındıran alanların ortalama 0,16 hektarlık bir büyüklükte olduğu belirtilmiştir. Küçük ölçekli tarımsal alanların alüvyonlu topraklar üzerinde yer aldığı anlaşılmıştır. Bu gibi alanların sadece zeytin yetiştiriciliği için değil aynı zamanda tahıl ve üzüm üretimi için de tercih edildiği görülmüştür. Çiftlik yapılarının antik nehir yataklarına yakın bir şekilde ve aralarındaki bağlantıyı idame ettirecek şekilde tasarlandığı gözlemlenmiştir. Tarihleme sorunları bir yana, Pera'daki küçük ölçekli çiftlik evlerinin Argolid'de tespit edilen benzer yapılarla ortak bazı özellikler taşıdıkları görülmektedir. Her ikisinde de ortalama çiftlik evi boyutu 0,5 hektar veya daha küçüktür. Pera'da kuleli çiftlik evi yapıları tespit edilmemesine rağmen büyük ölçekli çiftlik evlerinin daha kompleks hale geldikçe büyüdüğü hatta 1 hektarı aştığı görülmektedir. Her iki örnekte de çiftlik evlerinin alüvyon arazilere ve nehir yataklarına yakın inşa edildikleri açıktır. Bu da bize benzer iklim koşulları altında pek çok ürünün yetiştirildiği çiftliklerin yer seçiminde de önemli ortaklıklar sunmaktadır. Büyük çiftlik evlerinin boyutları, daha fazla iş gücüne bağlı olarak artmış olmalıdır. Bu da tarımsal üretimdeki uzmanlaşmanın belirgin göstergelerinden biridir.

Boeotia yüzey araştırmasında (Bintliff ve Snodgrass 1985) pek çok kırsal yerleşim M.Ö. 6.ve 3. yüzyıllara tarihlenmektedir. Bunların büyük çoğunluğunun 0,5 hektar veya daha küçük münferit çiftlik evlerinden oluştuğu bildirilmiştir. Bölgede dağınık yerleşim dokusu hakimdir. Kırsal yerleşimler M.Ö. 4. yüzyılda daha çok dağınık ve izole çiftlik evi yerleşimlerine dönüşmüştür. Kırsal yerleşim dokusundaki benzer bir dönüşüm Pera'da M.Ö. 3. ve 2. yüzyıllara tekabül etmektedir.

Lohman tarafından güney Attica'da gerçekleştilen yüzey araştırmalarında bölgenin M.Ö. 5. ve 4. yüzyıllarda çok gelişkin bir kırsal ekonomiye bununla birlikte yüksek nüfus yoğunluğuna sahip olduğuna işaret edilmiştir. Tespit edilen toplam 33 adet çiftlik evi arasında 8 veya 9 tanesinin 25

hektarlık bir tarım arazisini kontrol ettiği görülmüştür. Lohmann'a göre klasik Attica'daki yoğun teraslama faaliyetlerinin iki temel nedeni vardır. Birincisi önemli nüfus artışlarına bağlı olarak ortaya çıkmış ve daha önceden tarım alanları dışında kalan eğim dereceleri yüksek olan arazilerin teraslanmasıyla tarımsal üretimde artış yaşanmıştır. İkinci olarak üretilen zeytinyağı çok karlı bir ürün olduğu için teraslanmış araziler daha çok zeytin yetiştiriciliği için kullanılmıştır (Lohmann 1992). Pera ve güney Attica tarım pratiklerine baktığımızda ikisinde de teras sistemlerine dayalı ekonomilere sahip oldukları açıktır. Pera'daki yoğun teraslama faaliyeti özellikle Hellenistik dönemde Rodos Devleti'nin bölgede tesis ettiği gelişmiş tarımsal ticaret sisteminin önemli bir göstergesidir.

Knidos'daki tarım terasları da tıpkı Pera'da olduğu gibi çamur taşı, kumtaşı ve silk taşından müteşekkil olup terasların bu jeolojik formasyonlar üzerinde inşa edilmeleri bunların daha rahat işlenebilmelerinden kaynaklanmaktadır (Tuna *ve diğerleri* 2003) Her iki yarımadada da terasların ortalama genişlikleri 5-6 metreyi bulmaktadır. Esasen kireç taşı baskın karstik özellikler gösteren her iki yarımadada da zengin toprak örtülü alanlar tercih edilmiştir. Satıcı (2013) tarafından gerçekleştirilen çalışmada Bozburun Yarımadası'ndaki tarım terasları jeomorfolojik bağlamda incelenmiştir. Yarımadadaki terasların alüvyon ve kırıntılı birimler üzerine inşa edildiğini; bunların kireç taşının görülmeye başladığı sınırlara kadar devam ettiği görülmüştür. Pera'daki terasların yüksek düzeyde erozyona maruz kalmalarına rağmen inşa edildikleri yerlerin seçimine sadece toprak örtüsüne değil aynı zamanda yersel-jeolojik özelliklere de bakılarak karar verildiği anlaşılmaktadır. Kireç taşı arazilerden kaçınılması tıpkı Knidos'da izlendiği gibi tarımsal bilgi düzeyine işaret etmektedir. Aynı zamanda ezme taşlarının tarım teraslarının yakınında bulunması ve terasların su kaynaklarına yakınlığı tarıma bağlı ekonominin her iki yarımada için de önemini ortaya koymaktadır. Mimari açıdan bakıldığında gerek Knidos'da gerekse Pera'da yerel taşların teras yapımında kullanıldığı gözlemlenmiştir. Bu durumun en önemli gerekçesi yapım maliyetlerinin civardan temin edilen taşların terasların duvar örgülerinde kullanılmasıyla azaltılmasıdır.

Çalışma alanında büyük ölçekli işlik alanları tespit edilememiş olmasına rağmen daha önceki çalışmalar Orhaniye ve Çamlıçınar mevkilerinde gün ışığına çıkarılan işliklere ve çok sayıda amphora çöplüklerine vurgu yapmaktadır. Knidos'da özellikle Kiliseyanı mevkiinde tespit edilen (Tuna, Empereur *ve diğerleri*) amphora üretim fırınları antik dönemde şarap üretiminin bu yarımadada büyük ölçekli üretimini ortaya koyar niteliktedir. Loryma'da gerçekleştirilen çalışmalar ise Hellenistik çiftliklerin ve tarım teraslarının özellikle şarap üretimi için faal olduğunu göstermiştir (Held 2001). Phoinix'in komşusu olan Loryma, Hellenistik dönemde Rodos'un bölgedeki büyük ölçekli tarıma dayalı hegemonyasını açık bir şekilde ortaya koyan önemli bir yerleşimdir. Her ne kadar Held Loryma'nın şaraba dayalı bir ekonomi düzeninde geliştiğini söylese de Phonix'de tespit edilen farklı boyutlardaki ezme taşları şarabın yanında zeytinyağının da ekonomik önemi haiz bir ürün olabileceğini akla getirmektedir.

Pera'daki CBS analizleri bize tarımsal potansiyel hakkında fikir verecek niteliktedir. Buna göre 1.5783 hektarlık arazinin 3.297,82 hektarında tarım teraslarının olduğu (çalışma alanının yaklaşık % 20,75'i) buna karşın teraslama yapılmaksızın tarım yapılabilecek düz tarım arazisinin yalnızca 540 hektar olduğu (çalışma alanının yaklaşık % 3,43) anlaşılmıştır. Pera'nın kendi kendine yeten bir ekonomi olup olmadığını anlayabilmemiz için daha önceden Tuna (1990) ve Oğuz (2013) tarafından verilen bazı değerlere başvurularak bazı potansiyel hesaplamalar yapılmıştır. Hellenistik dönem özelinde tahıl için Pera'nın kendi kendine yeten bir ekonomi olup olmadığına ilişkin bilimsel bir sonuç ortaya konamamaktadır. Ancak Hellenistik dönemde tarım teraslarında yıllık toplam 6.595.640 litre şarap üretimi yapılmış olabileceğine ilişkin bir tahminde bulunabiliriz. Şarap üretiminde ünlü bir kent olan Knidos ile karşılaştırdığımızda Pera'nın beklenenin üzerinde bir tarımsal potansiyeli olduğunu söylemek mümkündür.

Mikro-ekonomi ölçeğinde yaptığımız hesaplamalar sonucunda; Gedikçukur mevkiinde F.16 olarak kodlanan büyük çiftlik evinde en kötü koşullar göz

önüne alındığında şarap konusunda üretim fazlası (yıllık yaklaşık 18.000 litre şarap üretimi) gerçekleştirdiğini söyleyebiliriz. Zeytinyağı için bu figürün ortalama 124 kişiye yetecek düzeyde olduğundan hareketle (bu boyutta bir çiftlik evinin ortalama 10 kişiden oluştuğu varsayılırsa) yine zeytinyağı üretiminde de artı ürün elde edildiği tahmin edilmektedir. Şarap ve zeytinyağı üretiminde elde edilen artı ürün dış pazara gönderilmiş olmalıdır.

Sonuç olarak, Birleşik Pera Rodos'un M.Ö. 3. ve 2. Yüzyıllarda kurduğu Kırım'dan Mısır'a, Ege'den Akdeniz'e uzanan tarımsal ticaret sisteminin önemli bir aktörü olarak karşımıza çıkmaktadır. Bu durum antik dönemde intansif tarımın göstergelerinden biri olarak kabul edilen terasların ve bunların verimli bir şekilde yönetilebilmesi için gerekli olan dağınık çiftlik evi yerleşimlerinin bölgedeki varlığı dikkate alındığında kendini açık bir şekilde ortaya koymaktadır. Çalışma alanındaki tarım terasları fotogrametrik teknikler ve coğrafi bilgi sistemleri (CBS) kullanılarak bütünsel bir şekilde ele alınmaya çalışılmıştır. Elde edilen sonuçlar terasların çevresel şartlar göz önünde bulundurularak sistemli bir şekilde inşa edildiklerini göstermektedir. Arazi çalışmaları esnasında tespit edilen 18 adet çiftlik evi ve bunların teraslar ile olan ilişkileri antik dönemde çok iyi şekilde organize olmuş bir tarım sistemine işaret etmektedir. Bölgede teraslama yapılmaksızın kullanılabilecek tarım arazilerinin miktarı antik dönemde kendi kendine yeten bir ekonomi yaratabilmiş olmaktan uzaktır. Pera'da gerek küçük ölçekli gerekse daha büyük ölçekli çiftlik yerleşimleri etrafında inşa edilen tarım terasları sayesinde Hellenistik dönemde geçimlik üretimin çok ötesinde artı ürün elde edilmiş; bu da Rodos'un kontrol ettiği bölgesel ve bölgelerarası tarım ticaretine katkı sağlayarak ekonomik gücünü artırmış olmalıdır.

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : DEMİRCİLER
Adı : Volkan
Bölümü : Yerleşim Arkeolojisi

TEZİN ADI (İngilizce) : Agricultural Terraces and Farmsteads of Bozburun Peninsula in Antiquity

TEZİN TÜRÜ : Yüksek Lisans [ ] Doktora [X]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: