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TOWARDS AN ARCHAEOLOGY OF SUSTAINABILITY: RESOURCE PACKAGES AND LANDSCAPE MANAGEMENT IN SPHAKIA, SOUTH-WEST CRETE

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Using evidence from the Sphakia Survey, a multiperiod archaeological project in south-west Crete, this article has two goals. The first is to contribute to a newly emerging field, the archaeology of sustainability. The investigation of sustainability in Sphakia uses five main kinds of evidence: environmental, archaeological/material, textual, oral, and patterns of activity that seem 'difficult' or 'inconvenient'. Sphakia is a large area of highly dissected terrain with a wide altitudinal range – in many ways, a 'tough' landscape, where agropastoralism has been its main economy. The second goal is to introduce the concept of a Resource Package (RP), a combination of perceived resources in an area, as an analytical tool for landscape study. Evidence for identifying agropastoral RPs of various scales, used at a particular time, includes imports, such as pottery and obsidian, which can suggest exchange for a local resource or product; sacred sites; coins; texts and inscriptions; place-names and other toponyms; and maps. The concept of RPs can usefully be applied synchronically and diachronically to multiperiod projects like this, as well as more generally to other landscapes, 'tough' or not. Sustainable strategies (that is, maximising resources and RPs without exhausting them) were used in the Prehistoric, Graeco-Roman and Byzantine–Venetian–Turkish epochs in Sphakia; some may be relevant for the future.

INTRODUCTION

The goals for this article are to contribute to a newly emerging field, the archaeology of sustainability, and to introduce Resource Packages (RPs) as an analytical tool for the study of landscapes, using selected evidence from the Sphakia Survey, an archaeological project in south-west Crete.

Survey archaeology in general is potentially of great value for detecting ancient approaches to sustainability. Survey projects, which typically have much larger areas and longer time periods than most excavations, enable archaeologists to look at a landscape both diachronically and synchronically to see how people in the past chose and managed resources.

The Sphakia Survey

The Sphakia Survey is a particularly good case study for investigating sustainability. Sphakia is a former eparchy, now deme, with a large area (466 km^2) of highly dissected terrain and a wide altitudinal range—in many ways, a 'tough' area where resources, particularly agropastoral ones, are more constrained (Fig. 1). Within a distance of 16 km, the landscape changes from palm trees on the coast to elevations of approximately 2400 m at the top of the White Mountains, where there is some snow even in summer. Sphakia is dissected by some 15 gorges running south to the Libyan Sea, including the famous Samaria Gorge. The Survey covers three main epochs: Prehistoric (PH), 3500–900 BC;[1] Graeco-Roman (GR), 900 BC–AD 961; and Byzantine–Venetian–Turkish (BVT), AD 961–1898. Information was also collected for the

[1] The date of 3500 BC refers to work done by the Sphakia Survey; cf. Nixon et al. 1990 and Mortensen 2008. Strasser et al. (2018) give a Palaeolithic date to decoration in a low cave in the Asphendou area of Sphakia. Kopaka

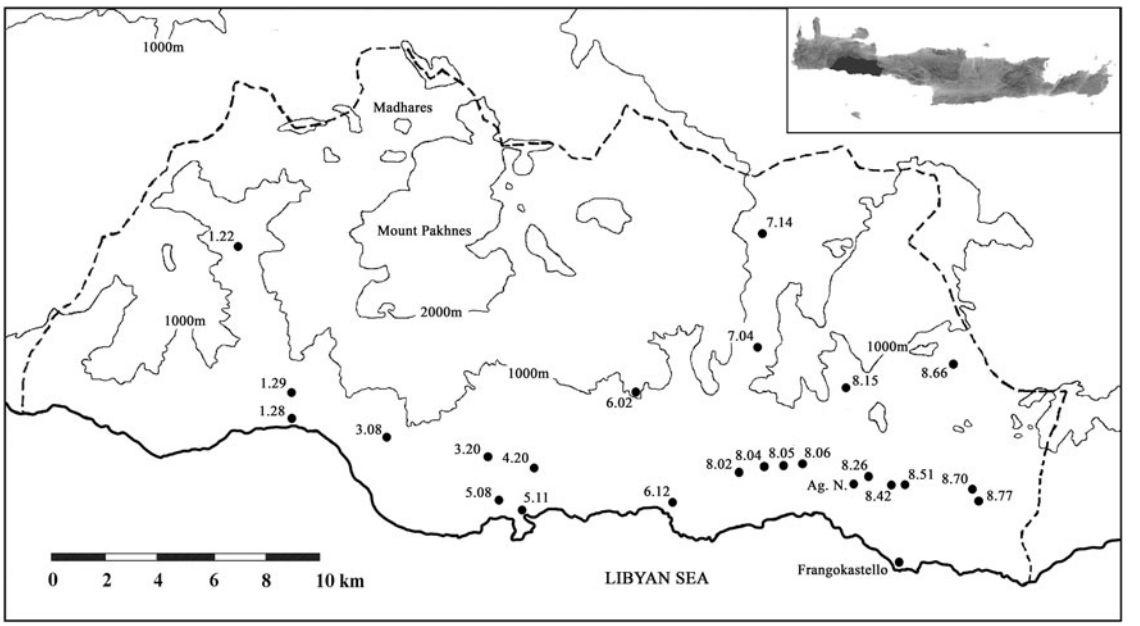

Fig. 1. Sphakia settlements in 1898.

twentieth and twenty-first centuries. A key part of the Survey's approach has been, wherever possible, to collect and compare environmental, archaeological/material, textual, and ethnographic/local evidence for the three epochs of the Survey.

The project's main research focus was investigating how people used this rugged landscape over the last 5000 years or so. In general, people in Sphakia tended to live in more-or-less sedentary agropastoral communities. Having located the best areas for agriculture and shepherding in the later Stone Age, Sphakiote agropastoralists could have lived in or near those same places until the end of World War II, when there was especially large-scale emigration. But staying in those places is exactly what they did not do; even this 'difficult' landscape offers more flexibility than one might expect.

Assessing sustainability in the past

The archaeology of sustainability is in its infancy. Turner et al. (2020) note how important landscape archaeology can be for future sustainable strategies, using three case studies concerning water management, terracing and woodland preservation. Yet there are no generally accepted methods for investigating and assessing intentional sustainability in the past. This article, therefore, offers the methodology used here to look at possible sustainable practices in the region over a long period, which is based on two assumptions. The first is that we are largely dealing with agropastoral economies usually made up of free land-owners.[2] I focus here on agriculture, pastoralism, bee-keeping and, where possible, the use and management of cypress timber. These four activities, particularly the first three, occurred in at least two of our three epochs, and in most parts of the area, thus making both synchronic and diachronic comparisons possible within Sphakia.

and Matzanas (2009) report Palaeolithic material on Gavdos, south of Sphakia. Strasser et al. (2010) found Palaeolithic and Mesolithic material in the Plakias area, east of Sphakia.

[2] Broodbank and Strasser (1991, 236–7, 241) suggested that people brought a package of crops and animals to Crete in the Neolithic period. In this package, agriculture and pastoralism were inextricably entwined. The arrival of people on Crete before then, as suggested by Strasser et al. (2018), need not preclude a later arrival of the 'Neolithic package'.

The second assumption is that free agropastoralists would instinctively want to be sustainable, with a keen interest in using resources without using them up, especially if they wanted to produce above subsistence: if they managed resources poorly, they were the ones who would starve. Sustainable strategies thus would enable people in Sphakia to manage predictable risks such as crop failure and unusual pasturage scarcity.

There are obvious indications of agropastoral sustainability in dissected terrain. First, because animals must not be allowed to browse on agricultural areas before crops are harvested, planted arable needs to be as separate from pasturage as possible. Second, in hilly areas (most of Sphakia), it is likely that people will use terracing to maximise slopes with enough soil for planting, and to prevent soil erosion. Third, bees do not require arable; it therefore makes sense to put larger numbers of beehives in stonier places on which enough plants will grow to provide bee fodder. People who separate arable and pasturage, terrace slopes to create 'extra' arable and place larger numbers of beehives away from arable spreads are likely to be deliberately employing strategies for sustainability. Fourth, it is likely that people will attempt to make use of all altitudes available to them.

This article uses five main kinds of information in an investigation of sustainability in Sphakia: environmental, archaeological/material, textual, oral, and a fifth discussed below. Archaeological/material evidence includes two main categories of information. One category is direct: the presence and location of infrastructure (terracing, milking-pens, bee enclosures) and other special equipment (potter's discs). The other material category is indirect: signs of 'wealth' (imported items, sacred spaces), because 'wealth' often means successful resource management, and in some cases, may correlate with production above subsistence (e.g. for exchange) requiring sustainable strategies over time. Textual evidence includes documents with an awareness of particular resources, such as tax and census records and maps, especially those relating to territorial boundaries that are often directly keyed to resources. Oral (and sometimes textual) evidence includes systems for making resources memorable, using toponyms – *topothesies*, 'place-puttings' – for landscape features outside settlements, as well as for and within them. *Topothesies* often refer to potential resources such as water, particular plants and productivity, and are good indicators of landscape knowledge and the agency that can result from using that knowledge.

The fifth kind of information for Sphakia can also be useful, if sometimes less precise: patterns of activity that seem 'difficult', 'inconvenient' or in some way 'discrepant'. As Sphakia is an area of highly dissected terrain with dispersed resources, it would not be surprising to find 'difficult' strategies here, for example those involving the use of resources in areas that might elsewhere be described as marginal, or at a distance from settlements, or both. These 'difficult', 'marginal' areas might be used on a seasonal basis and might sometimes also involve movement of people, as well as animals.

We divided Sphakia into eight geographical regions, numbered from west to east and grouped into three areas: West (Region 1), Central (Regions 2–6), and East (Regions 7–8). Our sites were numbered by regions (e.g. 1.19 is in Region 1, 8.05 in Region 8: Fig. 2).

We also stratified our sampling strategy by eight environmental zones defined during our first field season (Fig. 3). A minimum of 5 per cent of each zone was surveyed, though two areas were intensively sampled because they have, for Sphakia, relatively extensive amounts of arable land: the Anopoli Mountain Plain and the Frangokastello Coastal Plain. Within Sphakia, there are three main altitudinal bands labelled Down (0–250 metres above sea level [masl]), Middle (250–1200 masl), and Up (>1200 masl, highest point 2452 masl). We sampled all regions, areas, environmental zones and altitudes.

Sites were usually identified after field-walking. The main site classifications are small (2–9 houses), medium (10–19 houses), and large (20+ houses). We defined the term 'site' flexibly, as a place with evidence for significant localised human activity. Our sites include loci marked by a handful of sherds; two large PH sites with multiple discrete pottery scatters (8.53, 8.78); complex multi-phased GR settlements with standing architecture such as Ancient Anopolis (4.21) and Phoinix-Loutro (5.11); and a flourishing BVT multi-neighbourhood village such as Khora Sphakion (6.12). Some sites, like the quarry at the mouth of the Aradhena

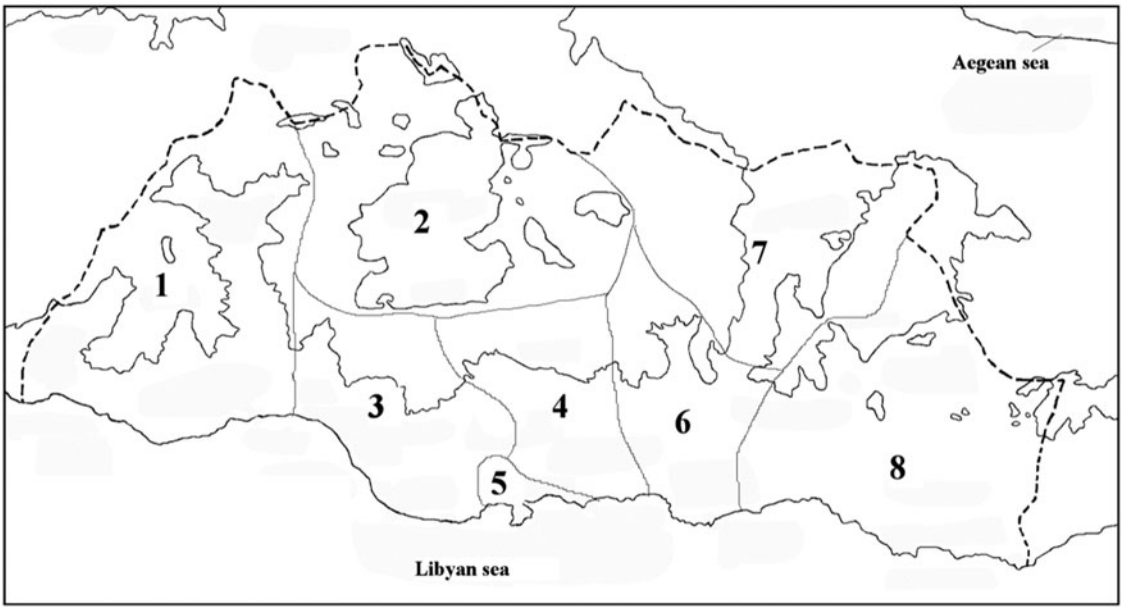

Fig. 2. Regions of Sphakia.

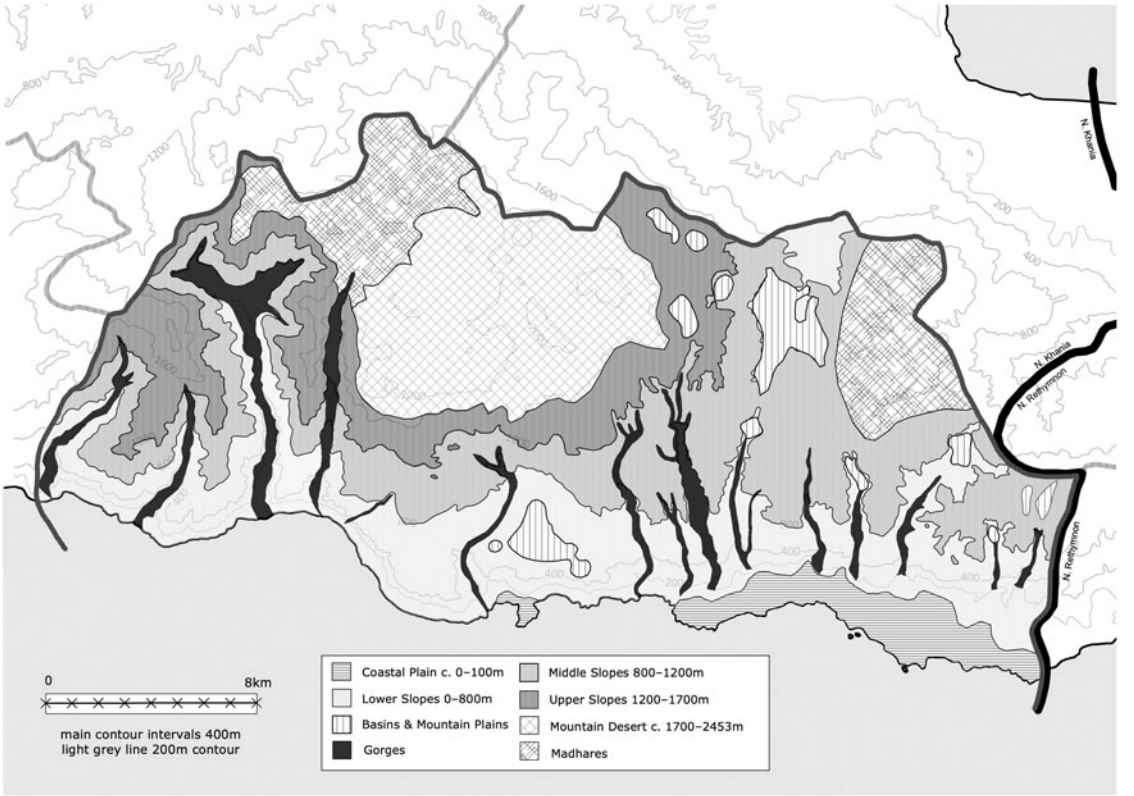

Fig. 3. Environmental zones.

Gorge (5.02A), are not marked by portable artefacts or building stone. One site (2.27) had only stone tumble. Most of our sites are pottery scatters, with or without remains of structures, and settlements of the Venetian–Turkish (VT) periods. We found no lithic-only sites, presumably because local stone resources are not concentrated for exploitation, and because the earliest Sphakia Survey sites date to Final Neolithic (FN), when pottery was already in use (cf. n. 1).

As with all archaeological survey projects, visibility in Sphakia affects almost all periods in some ways. For example, Basins and Mountain Plains can be incredibly difficult for PH and GR information, except for the largest, the Anopoli Plain (Region 4). Paradoxically, as it is the most recent epoch, BVT evidence can also be difficult.

The concept of RPs

The concept of RPs for reading the landscape of Sphakia was mainly developed and applied after fieldwork began, when I conducted a subsidiary study of BVT outlying churches and icon stands in 2006 (Nixon 2006). My original aim in looking at outlying churches (*exokklisia*) was to understand how they related to the landscapes of BVT Sphakia. Both *exokklisia* and village churches were integral parts of the BVT settlement pattern from its earliest beginnings in the tenth/eleventh century. Outlying churches were and are often built in areas with specific resources, at the time when those resources come into economic use. These resources include arable land and crops, pasturage and herd animals, water or the means of procuring/managing it, and connectivities of various kinds (networks and connections inside and outside Sphakia, both by land and sea; visibility and intervisibility of locations).[3] Accessible areas with sufficient vegetation will support bee-keeping as well as agriculture and pastoralism.

Dating churches inside and outside settlements makes it possible to suggest when certain economic activities might have begun. Most churches are architecturally simple, and therefore hard to date precisely, but some can be dated using frescoes and architecture (Gerola 1905–32; Lassithiotakis 1971). The late seventeenth-century register of churches in Venetian Crete gives a terminus ante quem for those included (Khaireti 1968). Large numbers of churches ('hotspots') in an area, whether outlying or inlying, usually indicate a large amount of economic activity based on certain resources.

The concept of RPs also used earlier work outside Sphakia. Nixon and Price (1990) showed that resources, rather than assumed population levels, are useful for understanding different levels of contributions to the Delian League, as recorded indirectly in the fifth-century BC Athenian Tribute Lists (Merritt, McGregor, and Wade-Gery 1939–53). This 'follow-the-money' approach suggests that resources, however defined, are the key to economic success and wealth. The example of Kea is instructive. This small island (129 km^2) had four poleis, and its later fifth-century contribution to the Delian League, deduced from the Athenian Tribute Lists, was 4 talents; Keos was therefore one of the 'Big Spenders' contributing more than one talent (Nixon and Price 1990, 143). Two resources brought wealth to Late Archaic and Classical Kea: harbour dues and *miltos*, a red ochre which Athens clearly viewed as a strategic material (Nixon and Price 1990; Cherry et al. 1991; Photos-Jones et al. 1997; Lytle 2013). Big spenders like Kea were more likely to mint their own coins; three of the four Keian poleis minted coins in the fifth century (Nixon and Price 1990, 154; cf. Papageorgiadou-Banis 1997). Thus minting was a sign of wealth and 'resource-fulness' (Nixon and Price 1990, 152–8).

Like BVT churches inside and outside settlements in Sphakia, GR sanctuaries are more likely to occur in wealthy places, however that wealth is defined. On Kea, Karthaia and Koressos, both coin-minters, certainly had stone temples (Whitelaw and Davies 1991; cf. Lauter 1979; Østby 1980; Cherry, Davis and Mantzourani 1991b, with summaries of historical and epigraphic evidence for Keian poleis).

[3] Gaignerot-Driessen (2016, 43) later used an identical list of basic resources in her work in Mirabello Bay.

Detecting and defining resources and RPs

The eight environmental zones defined by the survey are crucial for assessing the resources of Sphakia, particularly those necessary for agriculture, pastoralism and bee-keeping (Fig. 3). The altitudinal range of Sphakia means more terrain variety and less overall availability of agropastoral resources. Nearly 20 per cent of Sphakia (Mountain Desert and the Madares) is over 1700 masl (92 km^2, 19.7 per cent); nearly 40 per cent (Mountain Desert, the Madares and part of the eastern Madares Upper Slopes) is over 1200 masl (176.7 km^2, 37.9 per cent) and basically above the tree-line. Within Sphakia, these higher altitude areas are mainly in west and west-central Sphakia (Table 1). The best agropastoral areas are at lower altitudes, where connectivity by sea and by land is available in the two Coastal Plains (Loutro Peninsula, Frangokastello), largest Mountain Plain (Anopoli), Lower Slopes, and sometimes Gorges.

The Madares (high-altitude pastures) have sufficient vegetation for ovicaprid browsing and occur in two main areas within Sphakia (Fig. 4). In this article 'the Madares' means specifically the area north of Anopoli village, in west-central Sphakia. There is now a vehicular road from Anopoli to the southern edge of the Mountain Desert, and then it is still several hours' walk to the Madares. The Mountain Desert has no connected vegetation and cannot really be used for agriculture, pastoralism or bee-keeping (Fig. 5). The Madares are accessible only from snowmelt in late May or early June until snowfall in October at the latest.

Though much of the Upper Slopes (1200–1700 masl) is also above the tree-line, there is the possibility of pasturage here. The zones with the most obvious agropastoral potential are Coastal Plains, Lower Slopes, Basins and Mountain Plains, and parts of Gorges and Cliffs, that is, those Gorges with 'floors' and their lower slopes (e.g. Trypiti and Samaria; Figs 6, 7). Middle Slopes may also have something agropastoral to offer. These four (or possibly five) environmental zones could provide the larger and more accessible areas of arable, pasturage, and bee fodder needed to support substantial settlements. Because the terrain of Sphakia is dissected by multiple Gorges and Cliffs, resources are also 'dissected' (discrete rather than continuous) in some areas; most Basins and Mountain Plains, except for Anopoli and Askyphou, are small and scattered. The Ts'Assi Basin, the smallest Mountain Plain, is a classic example of a 'dissected' resource: a small patch of arable in a sea of limestone, just west of the Anopoli Plain, ringed by sites 4.01, 4.02, and 4.03 (Figs 8, 9).

Agriculture, shepherding and bee-keeping activities all require vegetation. Archaeological evidence in a specific place suggests human activity at a particular time. The environmental zones described above, in turn, suggest which resources might have been available for that place. These are mostly very general suggestions ('agropastoral'), but more specific evidence can suggest more specific activities. Datable trees, e.g. olives, can add to a resource picture, mostly for VT. In some later periods, written evidence will add to the archaeological evidence.

Table 1. Sphakiote *koinotites* ('communes').

Koinotis	Total area (km^2)	Number of BVT villages (Stavrakis 1890/2002)	Area >1200 m (km^2)	Land >1200 m (per cent)	Area >1700 m (km^2)	Land >1700 m (per cent)
Anopoli	100.3	1	67.8	67.6	57.9	57.7
Ag. Roumeli	93.8	2	34.7	36.99	8.1	8.6
Askyphou	64.4	1	31.7	49.2	10.8	16.8
Ag. Ioannis	59.7	2	21.3	35.7	9.5	15.9
Khora Sphakion	46.2	3	15.1	32.7	5.7	12.3
Skaloti	30.2	3	0.01	0.03	0	0
Patsianos	29.1	2	4.9	16.8	0	0
Asphendou	24.5	4	1.01	4.1	0	0
Imbros	18.0	2	0.2	1.1	0	0
Total	**466.2**	**20**	**176.7**	**37.9**	**92**	**19.7**

Fig. 4. Katsiveli Mitato (2.19) between two enclosures.

Fig. 5. Mountain desert north of Anopoli. June 1987.

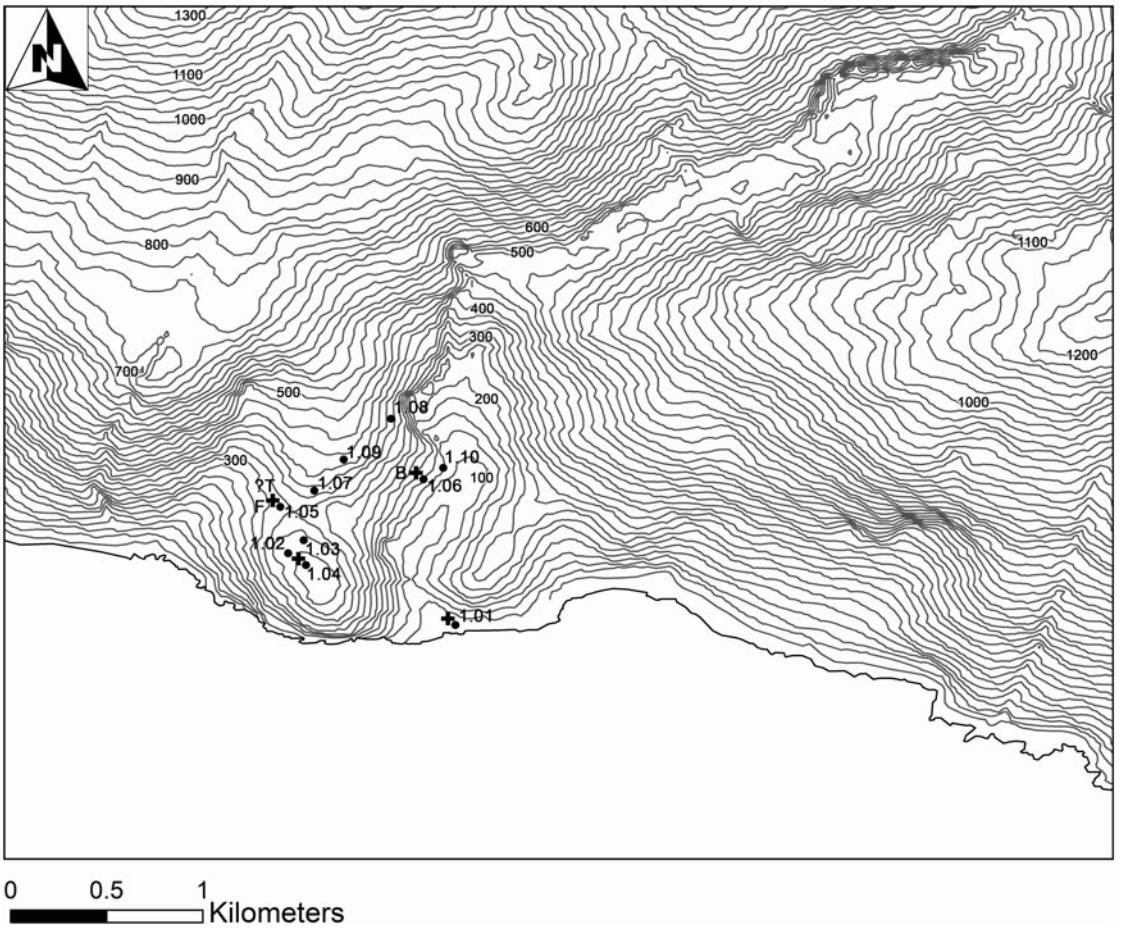

Fig. 6. Trypiti Gorge (M. Buell).

There are several types of resources: settlement, optional and contingent. Settlements must have good agropastoral resources in their immediate area or very nearby. Agropastoral resources are those requiring vegetation, essential for the three major activities investigated here. Optional resources include less strictly agropastoral resources, at or near settled areas. One example is wood used for fuel and construction. Sphakia now has more cypress than any other part of Crete, up to the tree-line (Rackham and Moody 1996, fig. 6:8*a*). Another optional resource is potting clay. A third is medicinal herbs, e.g. dittany (*Dictamnus origanum*), generally more common in western Crete, and available in Sphakia (Rackham and Moody 1996, fig. 6:2*b*). So far we have only textual rather than archaeological evidence for its use.[4] Finally, there are contingent resources, whose use depends entirely on settlements elsewhere, usually at some distance, but accessible via regularly used routes by land or by sea. The most notable Sphakiote example of a contingent resource is the Madares. People using this area for seasonal pasturage will always need to use arable somewhere else, and the distance from the Madares to arable resources means a major commitment in terms of organising labour and time. Despite the 'inconvenience' involved, there is evidence that the Madares were used frequently in all three epochs.

What is a resource, therefore? A resource, as defined here, can be anything in an environment that people choose to include in their strategy at a particular time.[5] The presence or availability of a resource in a particular place is important because you cannot use a resource that you do not have.

[4] On Cretan dittany, see Hippocrates IX.516, X.348, 448; cf. Theophrastus *Historia Plantarum* IX.xvi.1.

[5] In this case, resources are land resources; marine resources were and are important (Mylona 2020) but are beyond the scope of this paper.

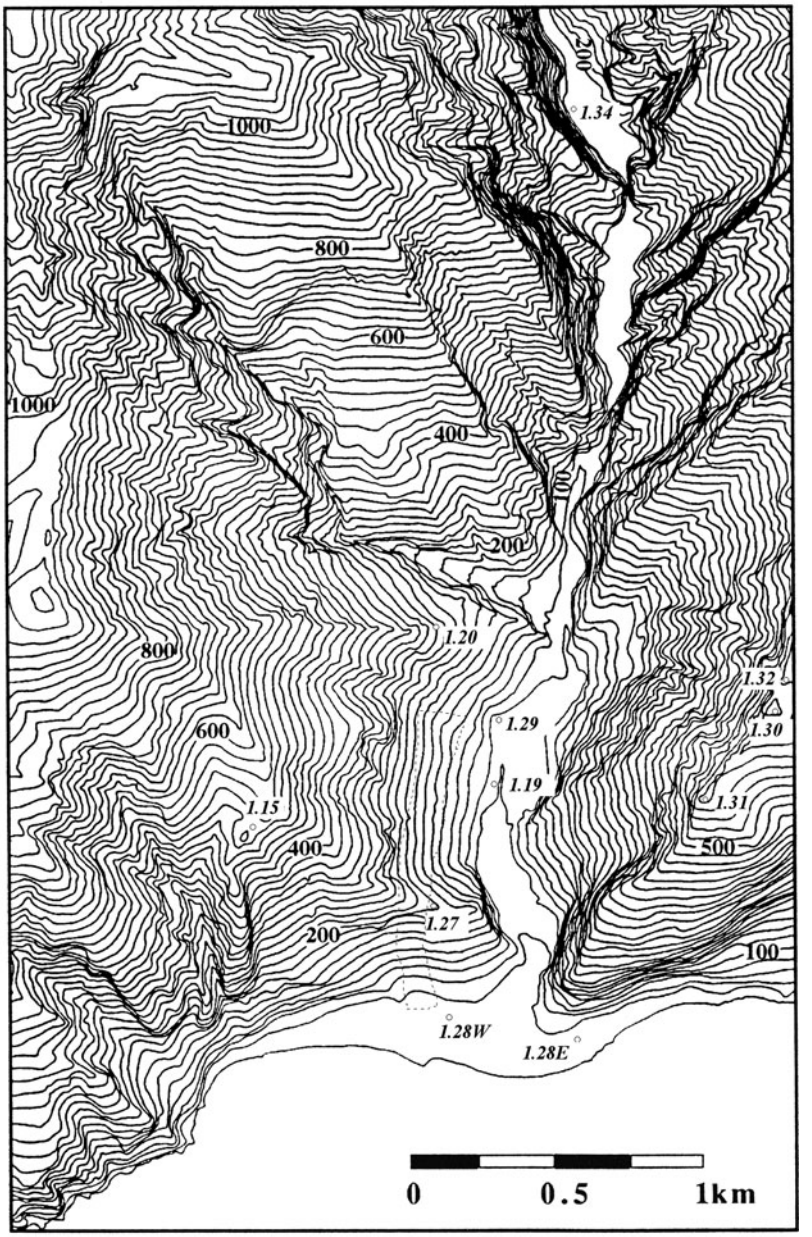

Fig. 7. Samaria Gorge South.

But an available resource does not always mean a perceived, let alone a used, resource: sandy beaches could have been used for swimming in all epochs, but people in Sphakia, as elsewhere in the Mediterranean, did not exploit this resource on any large scale until the advent of mass tourism in the twentieth century.

A Resource Package, then, is a combination of one or more perceived resources in an area or areas, used by people in a particular way at a particular time. People change resources into RPs by using them in a particular way. An RP can include one or several resources (arable, bee fodder, pasturage), plus the routes to reach that RP. Some RPs, for example areas with sloping rather than flatter ground, may require adaptations such as terraces. In some cases it is possible to see how people use an assemblage of several RPs (villages and seasonal settlements used by the same people). Thus people's definitions of RPs in any given period will be the result of a

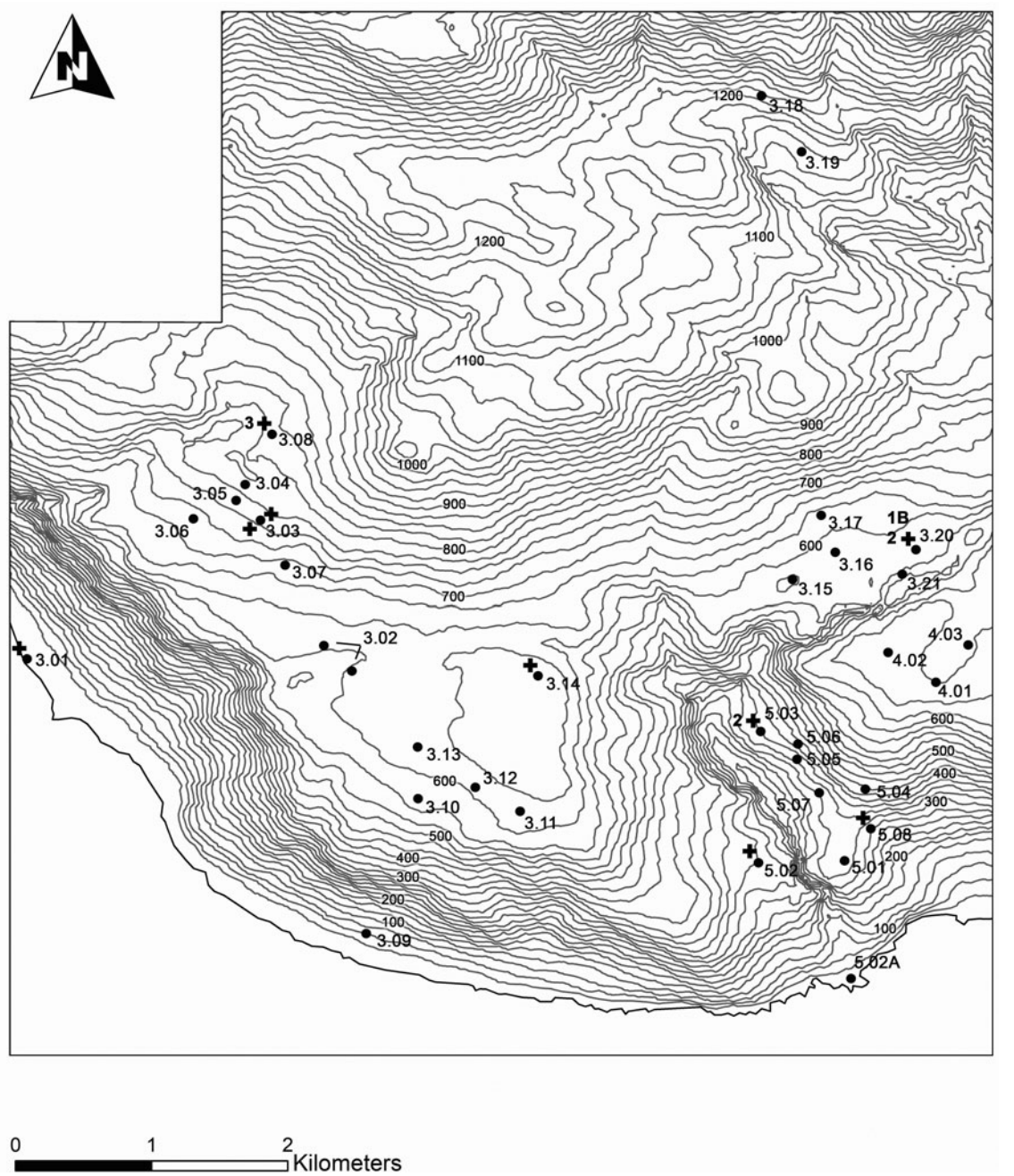

Fig. 8. Region 3 and Ts'Assi Basin (M. Buell).

particular strategic approach to the landscape of Sphakia. The notion of RPs is flexible in terms of scale and chronology. The main principle is that in a specific period, people will have strategies for selecting a part or parts of the landscape for activities such as settlement, cultivation, pastoralism, or bee-keeping (or some combination of these, and sometimes other, activities), according to the presence of the right RP(s). This approach is in line with cultural or human ecology, rather than environmental or economic determinism (Steward 1977, 173; cf. Butzer 1982; Barrett 2021).

In all three epochs it is rarely possible to quantify RPs, except to describe them as smaller or larger. Until the end of BVT, we do not have precise RP boundaries, and then after, only for larger RPs. In Sphakia, over the long period of time examined by our survey, people tended to live in sedentary agropastoral communities. An agropastoral community needs a minimum RP

Fig. 9. Ts'Assi Basin, looking west-south-west from 4.03. June 1990.

kit including arable; pasturage; water, however procured; and connectivity. In an area like Sphakia, with its highly dissected terrain, it is impossible to overemphasise the importance of connectivity as a resource.

Finally, the Sphakia Survey looked carefully at climatic fluctuations during the three epochs, including episodes in FN–Early Minoan (EM) I, Late Bronze Age–Archaic, and VT (Rackham and Moody 1996, xvi–xvii, 38–41, 123–39). Nonetheless, human agency remains important: though there may have been fluctuations in climate, people still had choices about their approach to resources, such as whether to reconfigure their use of specific RPs.

THE PREHISTORIC EPOCH

During the PH epoch there were fluctuations in Sphakia site sizes: small in Final Neolithic–Early Minoan I (FN–EM I), larger in EM–Middle Minoan (MM); largest in MM–Late Minoan (LM) IIIA/B; smaller again in LM IIIC–Early Iron Age (EIA). In FN–EM, the largest PH sites known to us are in the south-east Anopoli Plain; later, the largest PH sites were mainly to the east. In MM–LM IIIA/B the difference in land use between east Sphakia and other parts of the area becomes even more accentuated. While site numbers increase in every part of Sphakia, the number, size and complexity of MM–LM IIIA/B sites (particularly coastal sites) all increase markedly from west to east, culminating in two major sites at 8.53 and 8.78 (Fig. 10). It seems that the preferred RP for lower altitudes in this period was a combination of larger, connected areas of arable (and pasturage) with direct coastal access.

Smaller PH RPs

Some smaller RPs were repeatedly used throughout the PH epoch, such as the Madares; some clay sources were also repeatedly used. At site 8.78, we found solid evidence of pottery manufacture,

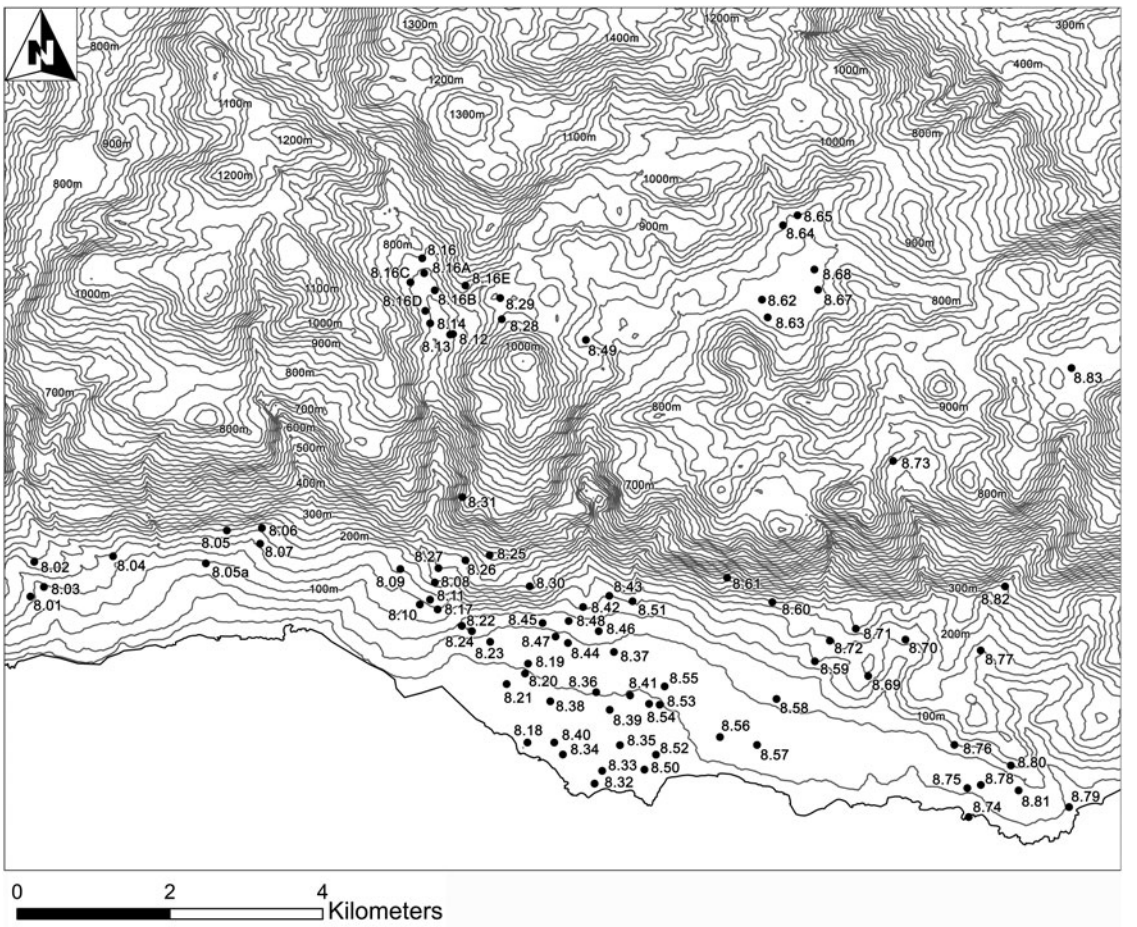

Fig. 10. Region 8.

including several potter's discs and wasters (Fig. 11). We located two good clay sources in this area, one red and one grey. The red clay was used for mixed metamorphic fabrics, which our work shows were produced at this site (Moody et al. 2003, 81–3, 86–9).

In the Madares (Fig. 12), there are 23 PH sites (9 sites have FN–EM, 15 have MM–LM and 14 have LM IIIC–EIA; 5 sites have EM–MM with a total of only nine sherds). Not all these sites were occupied in later epochs but in all three epochs, Madares sites are discrepant from those at lower altitudes in three main ways: site size (almost always smaller), function (represented in ceramic assemblages), and chronological variance. The smaller size range of Madares sites is part of the argument for seasonal use of this area for summer pasturage rather than year-round settlement. The Madares are a contingent resource; they also lie on important routes linking Sphakia with areas to the north. It is interesting that strategic use of these upland pastures began early in the PH epoch, when we assume the population was much lower than in later periods. PH ceramic assemblages from the Madares have a much lower proportion of Cooking/Preparation sherds (26 per cent) compared with the rest of Sphakia (59 per cent), suggesting that there were not typical domestic sites. We recognised no shapes or fabrics specialised for pastoralism.

The percentage of FN–EM I sherds is slightly greater in the Madares than elsewhere in Sphakia. But Madares sherd numbers declined dramatically by 79 per cent in EM–MM, while elsewhere in Sphakia they increased by 27 per cent. PH Madares activity peaked in MM–LM IIIA/B, as it did in the rest of Sphakia. Pottery increased by 2189 per cent here (partly because of low EM–MM sherd numbers) and by 501 per cent elsewhere. By LM IIIC–EIA, sherd numbers declined by 56 per cent; by contrast sherd numbers elsewhere in Sphakia fell by 95 per cent.

Fig. 11. Potter's disc from 8.78 (K. May).

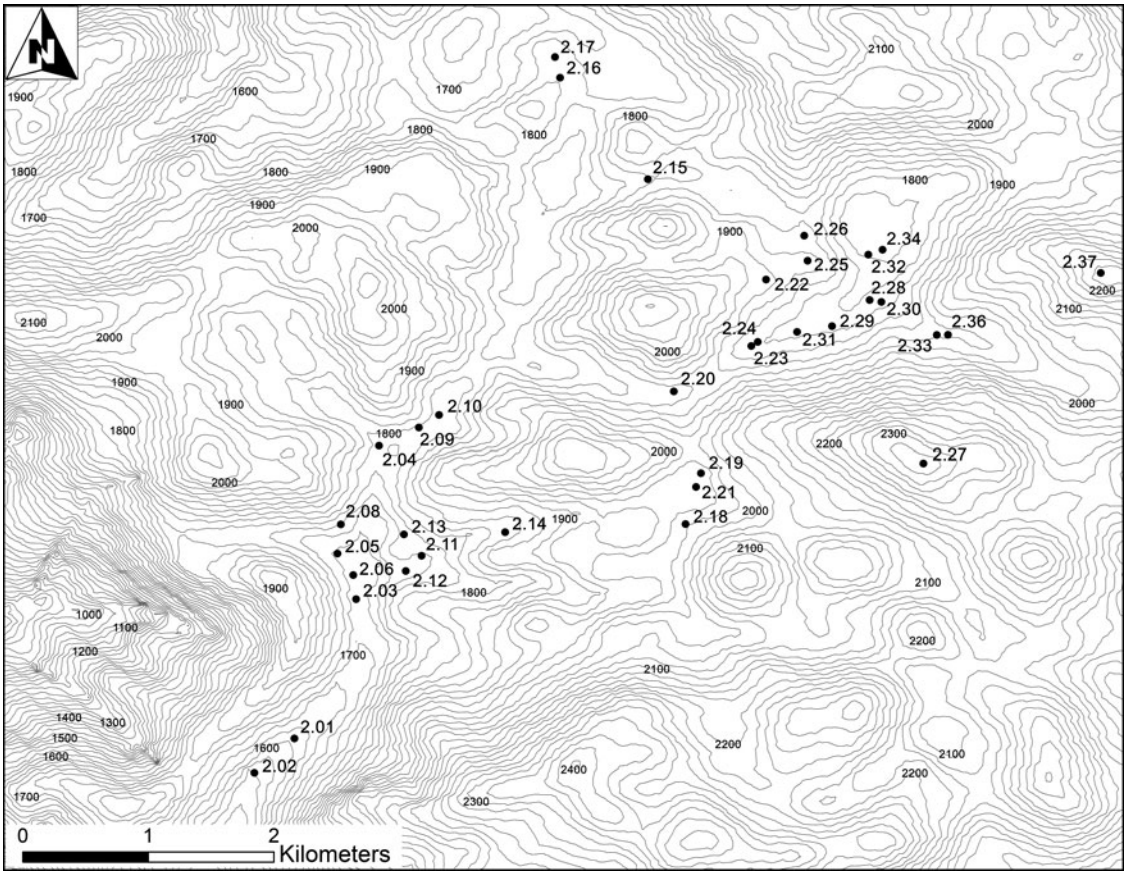

Fig. 12. Sites in the Madares.

In MM–LM and LM IIIC–EIA the number of ceramic imports, especially but not exclusively at site 2.29, suggests some additional activity. The Madares were definitely connected with other areas. Obsidian occurs at four Madares sites (2.05, 2.10, 2.31, 2.32), mostly associated with FN–EM pottery. At site 2.31 obsidian debris with cortex was found, suggesting that people brought the raw material with them and worked it on-site.

How to interpret the unusual dip in EM–MM material? There are two possibilities: either a change in climate (lower temperatures, higher rainfall) made it possible to use more pasture at lower altitudes in the summer; or people simply preferred not to use the Madares in this period.

Larger PH units/RPs

The largest PH sites are settlements in east Sphakia, where abundant arable may suggest larger RPs. Site 8.72 in EM–MM and sites 8.53 and 8.78 in MM–LM are the best examples.

The Samaria Gorge is definitely used in the two later Bronze Age periods. Pottery from site 1.19 near the Gorge mouth (Fig. 7) has a higher percentage of later Bronze Age ceramic imports than the much larger potting site 8.78 in MM–LM IIIA/B. We assume that site 1.19 controlled access to the Gorge and therefore any exchange going out or coming into it, whether cypress timber, honey or imported goods.

PH sacred sites

The strongest evidence for a PH sanctuary comes from site 1.18 in the northern part of the Samaria Gorge, located among cypress trees, and near water. The assemblage here consisted mainly of MM–LM conical cups including non-local examples. The combination of location plus specialised assemblage suggests that this may be a small Minoan spring sanctuary (Nixon and Moody 2017, 491). Possible evidence for some kind of sacred space also comes from the large MM–LM I potting site 8.78 in east Sphakia: a bull figurine that could indicate a Minoan domestic shrine (Fig. 13).[6]

Boundaries of PH Sphakia?

We can suggest PH territories within the area of modern Sphakia, without precise boundaries for them. The largest PH sites are the two MM–LM sites in east Sphakia (8.53, 8.78; Fig. 10), which may or may not have represented a single territorial unit. Tripod cooking pots in the MM II–LM III cooking fabric ('Hamburger'), made at site 8.78, were found everywhere in Sphakia except Region 7 (Moody et al. 2003, 81–3), but this distribution cannot be used to support the idea of a large, unified territory. Generally, average PH Sphakia site size increased from FN–EM and EM–MM, with largest site sizes in MM–LM, followed by a drop in LM IIIC–EIA. Largest sites are seldom in isolation but rather are surrounded by smaller sites, below them in hierarchical terms.

I defined two main kinds of PH site groupings: clusters (at least two sites of the same PH period within 500 m of each other) and groups (at least two sites of the same PH period within 750 m of each other). Most site groupings include three or more PH sites; groups of only two are typically in areas with known visibility issues. Some sites were not necessarily close to others but acted as nodal points on or near the coast (1.19) and/or on important land routes (2.01).

I suggest that each site grouping uses an RP. Community members selected resources that, taken together, made settlement (or seasonal use) a viable option. All large PH sites (e.g. 8.53, 8.78) are either in a site grouping or are nodal sites. Many site groupings demonstrated definite settlement hierarchy within them; nodal sites may also in some cases be important to local hierarchies.

The recurrence of site groupings and nodal sites at certain locations suggests repeated use of that specific RP. PH site groupings almost always correlate with other factors: larger site sizes and site numbers in that area, higher sherd numbers and the presence of imports (ceramic or lithic, such as obsidian), and sometimes suggestions of production/industry beyond subsistence (MM–LM 1.19; the Madares in MM–LM and LM IIIC–EIA; 8.78, discussed above).

[6] Peak sanctuaries are extremely scarce in west Crete. Where they occur, they are near major PH settlements, e.g. Vrysinas near Rethymnon (Tzachili 2014; Nixon 2016, 81, table 3, Vrysinas mislabelled as cave).

Fig. 13. Head of bull figurine from 8.78 (K. May).

Discussion

The eastward lean of settlement numbers is paralleled in the BVT epoch, but not in GR. Areas with good RPs were more likely to have sanctuaries or sacred areas as well as imports; 1.18 and 8.78 are the two examples.

We know that people were using the Madares throughout most of the PH epoch (Nixon and Price 2001, 398). Late-Bronze-Age Linear B tablets from Crete tell us about pastoralism specialised in wool for textiles, closely controlled at palace level (Killen 1964). We do not know what kind of pastoralism people in Sphakia were practising in the Bronze Age, nor is it possible to tell whether Sphakia was oriented toward a particular palatial centre.[7]

Cypress charcoal occurs in Minoan levels at Khania, Kommos, and Knossos (Moody 2012, 250–1). The only Linear B reference to cypress comes from Pylos on the Greek mainland (Ventris and Chadwick 1973, 135, 373, 557).

Linear B documents from Knossos (Gg series) and Khania (Gg 5) record honey, measured in amphoras, often as a religious offering. Interestingly, there is mention of 270 amphoras at Knossos (Gg 711) associated with Khania. If these amphoras contained honey, Gg 711 would be recording very large quantities of it in west Crete (Bendall 2007, 140–50; cf. Tyree, Robinson and Stamaki 2012, 229). Beeswax may also be mentioned in Linear B tablets (U436, U746) from Knossos (Ventris and Chadwick 1973, 290).

Residue analyses of LM IA ceramic vessels confirm consumption of honey in Khania for cooking, eating, and possibly ritual activities (Tzedakis and Martlew 1999, 167–8). Finding archaeological evidence of Minoan bee-keeping is more difficult. Four ceramic vessels at Zakros, two dated to the Neopalatial, have been identified as bee-smokers (Tyree, Robinson and Stamaki 2012). Suggestions that MM–LM incised ceramic vats found in Crete were used as beehives are not convincing (Davaras 1989; E. Melas 1999; D'Agata and De Angelis 2014).

There is good evidence for the use of beeswax as a means of illumination from residue analysis of lamps and conical cups at LM IA Mochlos (Evershed et al. 1997). Further work may clarify the possible scale of beeswax production.

Boundaries of palace/'court complex' territories on Crete have been discussed, but evidence for smaller territories is rare to non-existent (Bennet 1990, 198–200; 2011, 148–9; Nakassis, Galaty and Parkinson 2012, 241, fig. 18:1; cf. Kyriakidis 2012, 135–6).

On a smaller scale, two sets of agricultural terraces, identified through intensive survey and dated to MM–LM and LM I, were found on Pseira; one set might have been used for olives, the other for grain. Two Minoan check dams were also located (Hope Simpson, Clark and

[7] Walking times do not help: site 8.78 is equidistant from Khania (15 hours) and Phaistos (16 hours, 50 minutes); see Noukhakis 1903 and Pendlebury 1939, 12–15.

Goldberg 2009). At Palaikastro, survey work near the Minoan town has found strong evidence for Minoan agropastoral infrastructure in 'resource-ful' locations (terracing, check dams, pit cisterns for watering animals, division walls to separate agricultural and pastoral activities, and enclosure walls), which suggests boundaries at this local scale. Datable pottery from five small sites included MM and some LM III material (with LM IIIC at one site; Orengo and Knappett 2018, 485–96). These features also suggest 'very careful management of the landscape in order to avoid erosion and the overexploitation of grazing areas' (Orengo and Knappett 2018, 502; cf. Jusseret, Letesson and Driessen 2013 on land ownership at Palaikastro) and the existence of sustainable practices.

THE GRAECO-ROMAN EPOCH

Within the GR epoch, the location of centres changes from mainly inland and upland in Geometric–Archaic–Classical–Hellenistic (GACH), to mainly coastal in Roman–Late Roman (RLR), when 5.11 was the largest site (Fig. 14).

Smaller GR RPs

Madares GR sites are often grouped on routes (Fig. 12). The chronological and functional proportions of GR pottery from the Madares differ from the rest of Sphakia, suggesting that these sites were used differently from ordinary domestic sites; we assume that the Madares were mainly used for seasonal pasturage. Shapes consist mostly of Plain Table and Cooking, Storage, some Transport, and a few Decorated Table. In this epoch, the number of storage vessel fragments from five sites makes Storage more common in the Madares (12 per cent) than elsewhere in Sphakia (7 per cent). Geometric–Archaic (GA) sherds were six times the percentage (3 per cent) of sherds identified elsewhere in Sphakia (0.05 per cent). The Classical–Hellenistic (CH) Madares sherds suggest a level of activity only half that seen in the rest of Sphakia. Roman and Late Roman pottery is about one-fourth as common in the Madares (5 per cent) as elsewhere in Sphakia (21 per cent), probably because there is little Decorated Tableware or amphoras. Perhaps, as in CH, the Madares were less used in RLR.

Contemporary with the polis at 4.21 in the Anopoli Plain were midsize sites 4.13, 4.28, 4.47, 4.41, and 4.64 and other smaller settlements (Fig. 14), usually located on south-facing slopes, not on the flatter arable below them – a sensible, sustainable strategy to maximise arable here. After 4.21 was deserted, the midsize and smaller sites continued into RLR with 11 additions.

In the Frangokastello Plain, the pattern was different. When site 8.30 was the main centre, there are traces of GACH use on the Plain, including some terracing. But near the large RLR sites at 8.38 and 8.50, there was a set of small Late Roman (LR) farms, usually 350–500 m apart, with clearer terracing. One farm (8.39) is surrounded by six other sites (Fig. 10). Using Thiessen polygons, Price (in preparation) determined that this site had *c.* 20 ha of agricultural land available to it, larger than the area assumed by other scholars for a single family. Perhaps the relative aridity and unproductivity of land here meant that a larger area was required for a single family.

Other smaller RP developments are the two LR estate centres (Fig. 8): sites 3.12 and 4.03, both within easy reach of Phoinix-Loutro (5.11), each with a halo of smaller sites, constituting a cluster. The estate centres are agglomerations of 20+ rooms unlike any other GR sites; 3.12 has terraces built into part of the site, and a cistern (Fig. 15). We suggest that these estate centres produced grain, which was transported down to the coast at 5.11 for shipment elsewhere (Price and Nixon 2005, 678–80). Grain from 3.12 may have been taken first to Ta Marmara (5.02A). Samaria Gorge North and South are used in RLR; we suggest that cypress wood and bee fodder were part of the RPs there.

Some early GR examples of agricultural infrastructure, terraces and beehive sites, were found in the Anopoli Plain. Agricultural terraces on slopes add to the amount of available arable; beehive sites suggest bee-keeping on a scale above household production of honey and wax. Possible

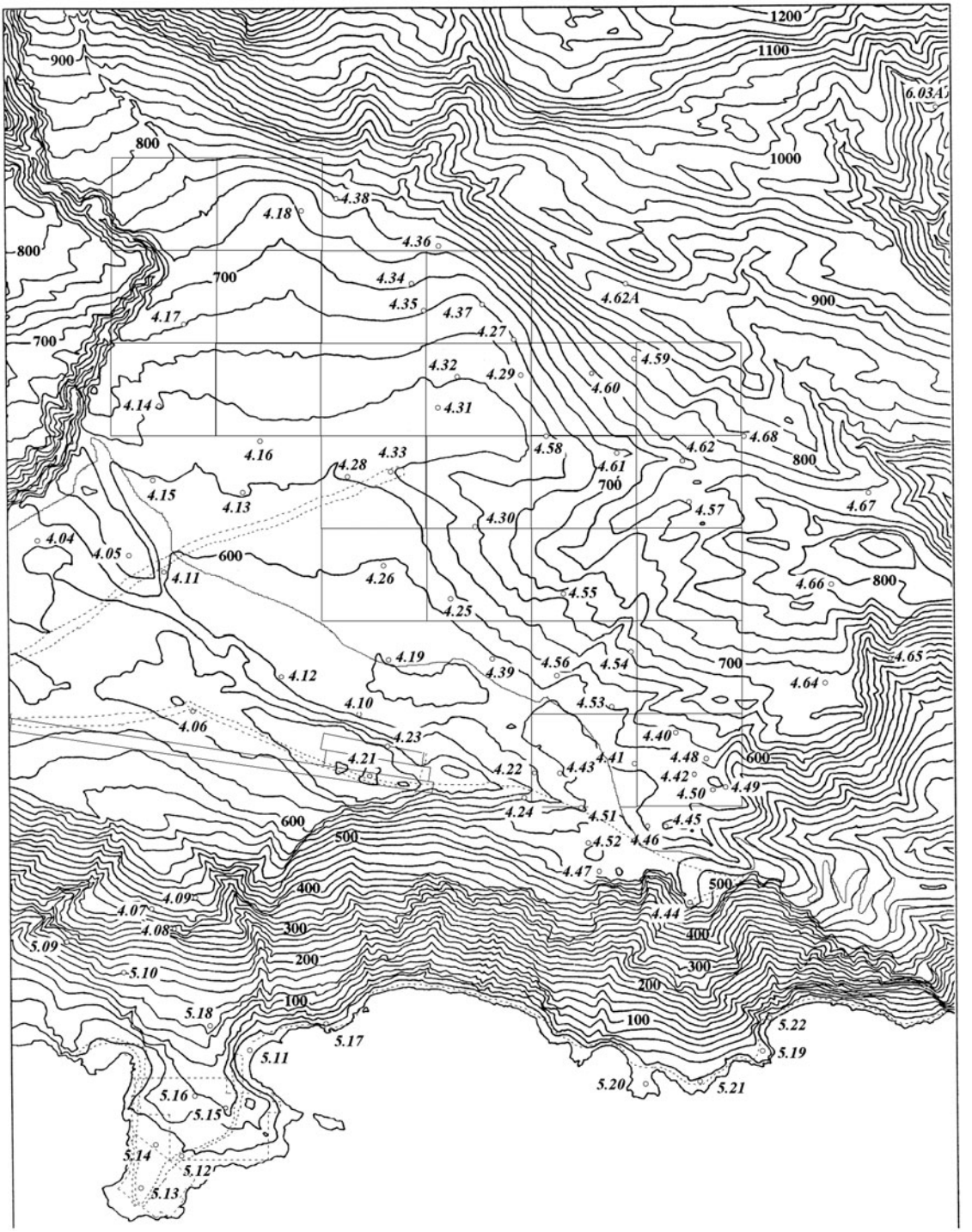

Fig. 14. Anopoli Plain and Phoinix-Loutro.

perimeter walls were noted in the Anopoli and Frangokastello Plains (Price and Nixon 2005, 672–3). Terraces can best be dated when they are associated with structures, as at 3.12. The best evidence for GR terracing in the Anopoli Plain comes from site 4.34, an RLR house with its own cistern and a peripheral structure 75 m away. It was part of an organised agricultural landscape with an RP including arable and bee fodder, given the number of ancient ceramic

Fig. 15. Plan of 3.12 (S. Price, S. Donovan).

beehive fragments found here. Crucially, the terracing abuts the walls of the main structure and must be contemporary with it.[8]

Most beehive sites are hard to date precisely.[9] Three examples outside settlements can be dated by associated amphoras: site 1.09 (Hellenistic, near 1.06), 1.20 (RLR in the southern Samaria

[8] Other GR terraces in Sphakia include one built for a now enormous Hellenistic(?) olive tree at Loutro (5.11), and others in the Frangokastello Plain; Price and Nixon 2005.

[9] Francis 2006; 2016. See Yangaki 2022 for a proposed GR apiary at Eleutherna.

Fig. 16. Beehive fragments from GR bee enclosure 6.25 (K. May).

Gorge), and 4.63 (on a route at the eastern edge of the Anopoli Plain). All three have stone enclosures and fragments of ceramic beehives usually not closely datable. Site 6.25, also on a route, has a fourth ancient beehive enclosure with beehive fragments (Fig. 16). Each beehive area plus the land around it represents a small RP. Larger groups of beehives were not always enclosed, as at site 1.07, which seems to be RLR in use. Like 1.06, 1.09, and 4.63, this site is away, but not far from, good arable, another suggestion of strategies to protect arable and to enhance agricultural sustainability.[10] Forbes (pers. comm. 2022) notes that thin soils and uncultivated areas with low-growing plants often provide better bee 'pastures' than cereal-dominated arable land. Site 4.48, on thin soil at the top of terraced slopes, is a good example of this strategy. Beehive sites are usually within easy reach of settlements. These sites, and coins with bees on them minted by Tarrha (Fig. 17), suggest bee-keeping at a scale above subsistence.

The marbleised limestone at Ta Marmara ('The Marbles', 5.02A) was cut into blocks and transported for use elsewhere. This limestone became a resource contingent on the importance of RLR Phoinix-Loutro (5.11).

Larger GR units/RPs

Large sites have been identified archaeologically for GACH and RLR, with five in use in each period. Some of these large sites are known from texts. The GACH centres are 1.19 (west); 4.21 and 5.01 (central); and 8.30 and 8.31 (east). The RLR centres are 1.28 (west); 3.20 and 5.11 (central); and 8.38 and 8.50 (east). The number of sites (though not the sites themselves) is the same for each period. All five GACH centres are inland and upland with at least some coastal access. Site 8.31 is the farthest from the coast (a 30-minute walk from the sea). In RLR, four centres are coastal: 1.28, 5.11, 8.38, and 8.50; only 3.20 is inland and upland. The large GACH

[10] Theophrastus shows some knowledge of pollination (*Historia Plantarum* II.8.4) but not of the role of bees in it. We cannot be sure if people deliberately put beehive sites near crops and trees needing pollination.

Fig. 17. Bee coin found at 1.19 between Tarrha and Ag. Roumeli, probably from Lisos (Svoronos 1890, 320–1, pl. XXX:27,28).

sites are reduced in size or deserted by the end of Early Roman (ER). Phoinix-Loutro (5.11) is by far the largest and most complex centre; the new estate centres at 3.12 and 4.03 are linked with it (Fig. 18). Site 1.16 is the only known seventh–ninth-century AD centre. Though large sites occur in west, central, and east Sphakia, they are not evenly distributed, with more in the west. There are some major potential gaps, notably Khora Sphakion and Askyphou, both on the main north–south route through Sphakia.

GR sacred sites

Sacred sites (Table 2) mirror the location of contemporary centres: GACH examples are all inland/upland except 1.28, while RLR examples are all coastal except 3.20.

Three GACH centres (1.19, 4.21, 8.30) have sanctuaries at or near them. The stone temple at 1.28, associated first with site 1.19 and then with site 1.28, is the only surviving sacred structure dated to GACH (Fig. 19). The location of this temple in west Sphakia mirrors the westward lean of GR centres. Our current knowledge suggests that it was the major sacred site in GACH Sphakia. The GACH sanctuary near 8.30 is the cave at 8.61, no longer used in RLR (Francis et al. 2000). Another sanctuary is at 1.17 in the northern part of the Samaria Gorge, where cypress trees now abound. This sanctuary begins in the sixth century BC and continues into the Roman period (main period of activity from the first to the third centuries AD). Niniou-Kindeli's suggestion that the sanctuary was dedicated to Artemis or Apollo remains unconfirmed (Niniou-Kindeli 1991–3; Sporn 2002, 316–17).

RLR sanctuaries occur in eight locations in the west (Trypiti, Samaria Gorge), central (3.20, 5.11), and east (Frangokastello Plain). The earliest definite Roman sacred site is at Phoinix-Loutro (5.11, Sector 1), where there was a concentration of pottery with an unusually high proportion of Decorated Tablewares, including abundant ER–MR Italian Terra Sigillata. The nature of the assemblage plus the absence of other ancient structures suggest that this area was a sanctuary of some kind, coinciding with the emergence of Roman Phoinix as a major centre.

Fig. 18. Loutro Peninsula with ferry at western harbour; Ag. Kharalambos on point. Arrow indicates former eastern harbour. July 1989.

Table 2. GR sacred sites.

Region/Area	GACH locations	R/LR locations
1/Trypiti	1.05, ?temple, CH?	1.06, inscription mentions Temple of Serapis (but not where), 3rd century AD; LR basilica
1/Samaria N	1.17, sanctuary, 6th century BC–	1.17, sanctuary, main period 1st–3rd century
1/Samaria S	1.28, temple, CH	1.28, LR basilica built over CH temple
2/Madares		
3/Araden		3.20, basilica
4/Ancient Anopolis	4.21, sector A1, ?shrine on route up from Loutro 4.21, sector G7, sacred structure?	4.21, sector A1, ?shrine may continue as route still in use
5/Phoinix-Loutro		5.11.1, 'Samian Enclosure', ER; 4 LR basilicas 5.11.2, LR basilica
6/Khora Sphakion		
7/Askyphou		
8/Frangokastello Plain	8.30, possible figurine? 8.61, sacred cave	8.38, basilica 8.50, basilica

Sector 1 also has four of the five Phoinix-Loutro LR basilicas plus the highest number of Phocaean Red Slip (PhRS) sherds for the site. The numbers (five total) and distribution of LR basilicas confirm the dominance of 5.11; the Frangokastello Plain comes next in this hierarchy, with two. Three other sites have a basilica each (1.06, 1.28, 3.20).

Fig. 19. Greek temple, Roman basilica, and Venetian church at Tarrha (1.28). July 1987.

Boundaries of GR Sphakia?

We have no GR evidence of any entity in Sphakia. Two areas may represent edges or borders: the sanctuary at site 1.17, and the Poikilasion area in the Trypiti Gorge with up to three sanctuaries.

Discussion

Both centres and associated sanctuaries in GACH and RLR lean westward in terms of distribution; most are in west and central Sphakia. This would be true even if there were additional centres at Khora Sphakion or Askyphou, as finds of imported PhRS in each of these places might indicate. The GR westward tendency is a different pattern from those in the PH and BVT epochs, where there are more, and larger, settlements in east Sphakia. The GR pattern of larger settlements toward the west suggests a different approach to larger-scale RPs in this epoch.

Textual evidence confirms this westward lean. The Hellenistic *koinon* (city federation) of the Oreioi ('mountain people'), a monetary union, includes Tarrha and Poikilasion, plus Elyros, Syia, Lisos, and probably Kantanos, all to the immediate west of Sphakia. Lisos was the focal sanctuary of the Oreioi. The gods of Poikilasion are also mentioned in a treaty of *c.* 220 (Polybius 4.53.6; Chaniotis 2015). Tarrha, Araden and Anopolis officially received a sacred ambassador (*theoros*) from Delphi *c.* 220–210 BC (Faure 1969, 327–32; Perlman 1995, 128–31), and these same three cities were members of another koinon, the Kretaieis, which signed a treaty with Eumenes II of Pergamum in 183 BC (*SIG*^{3} 627.7–8; *ICr* iv.179.7–8; Chaniotis 2015). Only Anopolis (Svoronos 1890, 5–6, pl. I:3–6) and Tarrha minted coins, both in the Hellenistic period. The western focus may partly explain the otherwise puzzling prominence of the small settlement at 1.06, identified by us as Poikilasion: there is a possible CH temple nearby, probably in use until Roman times; its gods are mentioned in the 220 BC treaty; a temple of Serapis is mentioned in a third-century AD inscription; an LR basilica was built here (Fig. 6).

Price looked at centres and territories for Hellenistic Cretan poleis (Table 3; Price 2011, 26–30). He found that there was an inverse relationship between the size of Sphakiote centres and their

Table 3. Hellenistic Cretan poleis (after Price 2011, 30).

Name	Area of centre (ha)	Suggested territory area (km²)	Centre area (ha) to territory area (km²)
Gortyn	150	310	1:2.06
Kydonia	85	180	1:2.1
Phaistos	62	260	1:4.2
Aptera	45	295	1:6.3
Itanos	19	79	1:4.2
Anopolis	10	180	1:18
Araden	10	100	1:10
[Patsianos Kephala, 8.30]	6	110	1:18.4
Tarrha	6	125	1:20.8

territory sizes (smaller centres, much larger territories) – different from the relationship observed elsewhere on Crete. Similarly, comparing the average territory size for Keian and Sphakiote poleis shows that the territories proposed for the 'resource-ful' Keian poleis are far smaller than those proposed for the Sphakiote examples (Table 4).

The exact boundaries of GR Sphakiote centres are not known, but there is information for the boundaries of other Cretan poleis. The fifth-century BC boundary separating Tylissos and Knossos is expressed as a perambulation (a series of named points), which include a sanctuary and natural features (Osborne and Rhodes 2017, 150–4, no. 126B, ll. 26–8). Kyriakidis (2012, 138–9) notes that this boundary 'largely coincided' with that of the later *koinotita* ('commune'). Chaniotis, looking at Hellenistic polis treaties in Crete, gives several examples of perambulation-style boundaries, also mentioning sanctuaries and natural features named through *topothesies*. In two east Cretan cases at least part of the ancient boundary coincided with the later *koinotita* boundaries (Chaniotis 1996, 303–6, 363–5, no. 47, pls 4 and 5, 338–43, 353–82, no. 59, pls 6 and 7).

One reason for boundaries is ultimately to define which RPs belong to whom. There is a substantial body of evidence for this kind of awareness of important resources, and the need to manage and regulate their use. Chaniotis (1995; 1996; cf. Nixon and Price 2001) has gathered abundant epigraphic information for the management of pastoralism, transhumant and otherwise, in GR Crete. Of interest for west Crete are two inscriptions: the mention of magistrates at Polyrrhenia responsible for orderly flock movements (*ICr* II.xxxii.9) and the early imperial inscription recording the ownership of flocks by the sanctuary of Diktynna (*ICr* I.xxv.3; Chaniotis 1995, 46, 69, 76–7, n. 190).

Ovicaprids were not the only animals requiring rules: an inscription from Lyktos dating to *c*. 500 BC records decisions about the boundaries of an area 'where sheep, goats, cattle, and pigs are to be pooled together and sorted out', presumably for summer pasturage (Gagarin and Perlman 2016, 486–95, Lyktos inscription 1B). The boundaries are described in terms of paths which everyone presumably knew well, without lists of toponyms (Chaniotis 1995, 46).

Bee-keeping and bee products were also of economic significance: evidence includes the existence of specialised bee-keeping sites and the presence of bees on the coinage of Tarrha.

There is good archaeological evidence for bee-keeping in the GR world, including Sphakia, but few textual references to it, as there are for pastoralism. Because transhumant animals were mobile

Table 4. Sphakia and Kea poleis and territory sizes (using Sphakia boundaries; after Price 2011, 30).

Location, area (km²)	Poleis	Maximum territory per polis (km²)
Sphakia, 466.2	Tarrha, Araden, Anopolis, [Patsianos Kephala, 8.30]	116.5
Kea, 129.0	Ioulis, Karthaia, Koressos, Poieessa	32.0

and could cause damage to other people's property and crops, they more obviously needed regulation, whereas beehives were stationary, and did not.

Though there is no archaeological evidence for the GR use of cypress wood from Sphakia, textual evidence suggests that it was of economic importance here. Fifth-century BC inscriptions show that cypress wood was in demand for Greek temple construction (Cooper 2008, 250, citing *IG* I^3 1454 [= Osborne and Rhodes 2017, 208–13, no. 136] and *IG* I^3 461). In the 370s BC, Tykhamenes the Cretan won the contract to supply cypress wood for the door of the new Temple of Asklepios at Epidauros (*IG* IV^2 I, 102, l. 26); the name Tykhamenes was common in western Crete, and he may have come from one of the western Cretan poleis (Perlman 1999, 146). In the third century BC, Theophrastus mentions cypress trees growing in hilly areas above Tarrha (*Historia Plantarum* II.ii.2, V.iv.2). It is possible that the sanctuary at 1.17 was linked with cypresses; cf. a fifth-century BC inscription mentioning an Apollo sanctuary on Karpathos from which cypresses were cut for a temple of Athena in Athens (Osborne and Rhodes 2017, 208–13, no. 136, ll. 5–11, 34–9).

The importance of good resource management can be seen in other ways. On the Greek mainland, Mackil discusses the importance of resource complementarity and economic interdependence, the role of *koina* in promoting them, and decisions by poleis and *koina* to maximise trading and other relationships between them. One example comes from third-century Boiotia: an inscription from inland Akraiphia records a price list for freshwater fish from Lake Kopais and saltwater fish from coastal Anthedon. Clearly it was to the advantage of both places to have access to both kinds of fish (Mackil 2013, 267–71).

Mackil also discusses *enktesis*, which permitted property-ownership across *koina* and made it possible for agropastoralists to diversify their production (Mackil 2013, 255–7; 2015, 491–2; Economou and Kyriazis 2019, with table 1). *Enktesis* was also part of Cretan property rights, and could include access to pasturage (Ager 1994; Chaniotis 1995, 61, n. 116; cf. Mackil 2013, 260). Clear boundaries existed, as did ways of working across them to mutual advantage, resulting in a paradoxical combination of definite territorial boundaries and measures giving cross-border access to certain things. There are similar patterns in the BVT epoch.

The link between economically successful RPs and imported pottery was noted above. Twenty-nine sites had five or more PhRS sherds each. The distribution of those sites confirms the strong preference for coastal locations with good access to local and inland resources. There is a good link between RLR sanctuaries and PhRS: all 10 places with basilicas, nine of which are coastal, had five or more PhRS sherds. Moreover, the Loutro sector with four basilicas also had the highest number of PhRS sherds for a single area. Other sites with solid PhRS counts include the two RLR estate centres (3.12, 4.03) and two places with good connectivity (6.13 near Khora Sphakion; 7.25, Askyphou Plain).

The emergence of a large RLR coastal settlement with harbour facilities and five basilicas on the Loutro Peninsula at Phoinix-Loutro (5.11) had major effects on inland and upland areas: desertion of two large sites (4.21, 5.01), construction of two estate centres with distinctive architecture (3.12, 4.03), and another possible drop in Madares use. The estate centres represent an unprecedented (and never repeated) larger-scale use of their respective agricultural RPs. These two sites, on routes linked to Phoinix, must have been part of a new, extractive production system, probably driven by external (i.e. Roman imperial) factors, distorting normal resource exploitation and packaging.

The GR westward lean of sanctuaries and centres, concentrated in areas with demonstrably less arable, is a pattern showing an unusual emphasis on the more mountainous areas of Sphakia, literally going against the grain of Sphakiote agricultural resources. The larger arable areas of east Sphakia were certainly used in both GACH and RLR, but there were more centres and more sanctuaries in west and central Sphakia. This aberrant lean (compared to the PH and BVT epochs) surely involves a different approach to resources and their packaging, even if we cannot explain the reasons for it.

However boundaries for larger RPs within Sphakia were constructed, the estimated territories in Hellenistic Sphakia are much larger, and the polis centres are much smaller, compared to contemporary Cretan territories and centres; perhaps the smaller poleis of this period needed

larger territories due to more dispersed resources (Price 2011, 30). The number of centres in RLR is similar; only Roman Phoinix has a much larger centre. These fewer, larger GR polis territories would be analogous (though not identical) in terms of RPs to the phenomenon of fewer, larger BVT *koinotites*.

THE BYZANTINE–VENETIAN–TURKISH EPOCH

The BVT settlement pattern, which jelled in the fourteenth century, included churches outside and inside settlements. VT villages were located inland and upland, as in GR, though people chose different locations (Table 5; Figs 1, 20). Settlement hierarchy has at most three levels: settlements of at least 10–19 houses, smaller places, and single houses. In east-central and east Sphakia, there are also summer villages, possibly from Venetian onward. There are more settlements in east than west Sphakia.

Smaller BVT RPs

Byzantine material occurs at four Madares sites (2.13, 2.29, 2.30, 2.32), all on main north–south routes, in areas which could have been used for seasonal pasturage. Site 1.16 in the northern Samaria Gorge is still inhabited. Site 7.09 in the Askyphou Plain has a major BV phase. The twelfth-century Skordhylis Perambulation discussed below shows clear knowledge of these three landscapes.

In VT, we are confident that the Madares, accessed via the Mountain Desert to the south, were used for seasonal pasturage. Site size is still relatively small. There are 33 BVT Madares sites. Again, the proportion of Cooking/Preparation sherds in the Madares (61 per cent) is different from the rest of Sphakia (29 per cent). Byzantine pottery is about the same proportion as elsewhere in Sphakia. Venetian sherds, including some Early Venetian (EV), are all from east Madares sites. The high proportion of Venetian fine wares is unusual. Of the datable pottery, 87 per cent was VT, Turkish or Turkish–Modern, suggesting a fourteenth–nineteenth-century increase in activity. Some of the shepherd's huts (*mitata*; cf. Vallianos and Vallianos 2003) here are distinctive corbelled structures, clearly different from houses in settlements (Fig. 21).

Two other examples of smaller RPs are instructive. In 1300, early in the Venetian period, a will records the bequest of a settlement called Livadia ('meadows', a *topothesia* indicating a productive area) with land 'as far as the village of Vraskas [8.04]' (Carbone 1978, 66, no. 133). This *topothesia* is still in use, so we could locate the settlement (our 8.05A), where we found an EV church, plus remains of houses nearby, with two wells. The area is well-watered in Sphakiote terms with easy access to the coast. The actual settlement did not last long (perhaps people left for the nearest villages, 8.04 or 8.05): olive trees surviving today were planted between 1400 and 1550 (dated by their diameters; cf. Rackham and Moody 1996, 80) on new terraces overlying the houses. At around the same time, a large wall was built to enclose the church, which continued in use (Khaireti 1968, 370, no. 334). The area was also used in the Turkish period. The will's implied

Table 5. GR centres and VT villages.

GR centres	VT different	VT same
1.06		1.06
1.19, 1.28	1.29	
3.20		3.20
4.21	4.20 (non-nucleated)	
5.01, 5.11	5.08	
8.30, 8.31, 8.38, 8.50	8.42, 8.51	

Fig. 20. Patsianos village (8.42) with Patsianos Kephala (8.30) to left in the Frangokastello Plain. September 2004.

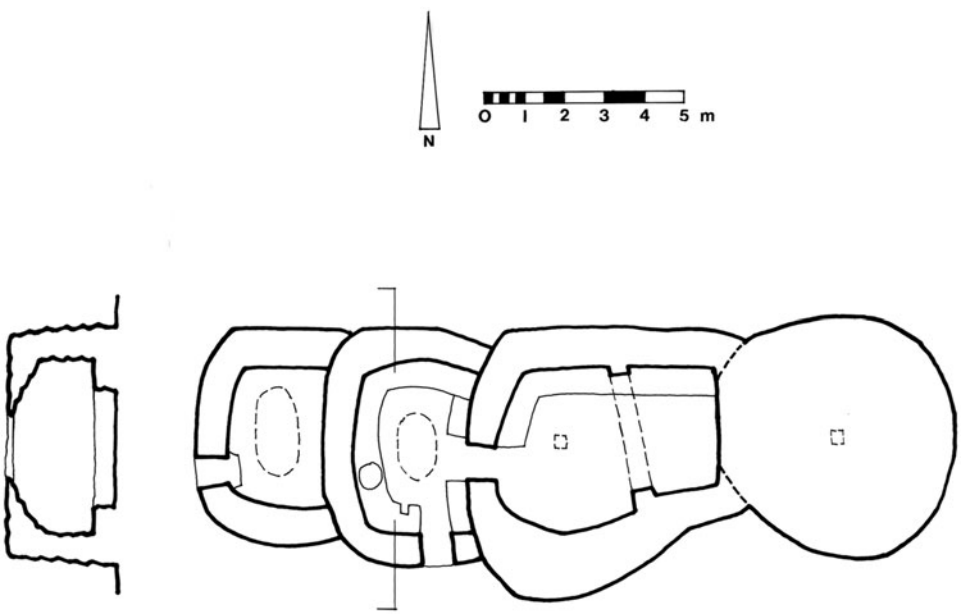

Fig. 21. Katsiveli Mitato (2.19) plan and cross-section (O. Rackham, S. Donovan).

boundary and the topography, with two converging gullies, have enabled us to suggest an area of 20 ha.

The second smaller RP involves the use of stone tumble at GR settlements for making VT lime.[11] Lime-kilns were built at four GR sites on the northern edge of the Anopolis Plain at its uppermost level (4.27, 4.29, 4.37, 4.59; Fig. 14), some distance from the nearest BVT Anopoli house-group (4.33). These sites would presumably have been overgrown with shrubs useful as fuel. Placing lime-kilns here avoided terraced arable at lower levels; lime could be conveniently transported to points of use elsewhere.

Larger BVT units/RPs

There is insufficient evidence to speak of larger Byzantine units within Sphakia. For VT the picture is clearer. We visited known larger settlements while also recording smaller ones that seldom appeared on maps or lists. The combination of fieldwork plus lists of villages gives a figure of 16–19 villages at this time, including the three easternmost villages which became part of Sphakia only in the later nineteenth century.[12] But even without these three villages, there was a clear eastward lean in settlement, with more villages in east-central and east Sphakia than in areas further west.

In the lists of 1644 and 1881, the figure of 16–19 villages is stable, but between those dates, there had been changes. Settlement desertions began in EV with smaller places like Ta Livadia (8.05A); later ones are mostly small sites in west and west-central Sphakia. Site 5.02, not listed in Trivan (1644), is a Turkish exception. Resource packages near deserted areas almost always continued in use. By the later eighteenth century, the village in the Trypiti Gorge (1.06) was deserted; newer villages, formerly seasonal settlements, were in east-central and east Sphakia (e.g. 6.02, 8.06).

BVT sacred sites

There are three, possibly four, Byzantine churches (smaller Greek Orthodox buildings instead of larger LR basilicas) in Regions 1, 3, and 7. Three of them are *exokklisia* with two known physically. Profitis Ilias (1.04) is above the coast on the western edge of the Trypiti Gorge, near GR sanctuaries at sites 1.05 and 1.06. Ag. Pavlos (3.01) is on the coast, near a route and a fresh water source. Two other churches are mentioned in the Byzantine Perambulation (Gerland 1907–8, document IIIA). Point 9, 'the saddle of Khristos', where there is a later church, lies in the Askyphou Plain near site 7.25. Point 41 is 'on the *bema* (sanctuary step) of the church in/of Ag. Roumeli (1.29)'. The three possibilities for this church lie on the western edge of the Samaria Gorge.

Venetian–Turkish churches occur in all eight regions. Unlike the Byzantine churches at 1.04 and 3.01, most Venetian and VT churches are architecturally undistinguished rectangular structures and therefore usually difficult to date with precision; others can be dated using frescoes and architecture or texts (Gerola 1905–32; Khaireti 1968; Lassithiotakis 1971).

Some Venetian-period churches have inlaid bowls (*bacini*), usually imported from long distances, and datable; there are also Turkish-period examples (Fig. 22; Armstrong, in preparation; Yangaki 2021). Turkish-period churches of the nineteenth century include free-standing churches (8.51) and additions to existing ones (8.02, 8.42), mostly in east Sphakia, often with dated lintels. Among these are the first churches in settlements which texts tell us are seasonal (8.16A, 8.66). Church numbers in different areas vary widely. Only one church occurs at the Up altitude in Region 2 (2.37). Three Venetian 'hotspots' with several churches each

[11] For Late Antique lime-kilns using stone (and/or sculpture) as fuel, see Munro 2012; 2016, 50–57; Buell in press, 160–4.

[12] Trivan 1644; Stavrakis 1890/2002. Counting villages, as opposed to seasonal settlements, is complicated. Before the later nineteenth century, the villages of Kapsodasos, Skaloti, and Argoule belonged to the Ag. Vasileios eparchy; there were only 16 villages in Venetian Sphakia as then defined.

Fig. 22. Ag. Georgios and *bacini*, Ag. Roumeli (1.29). June 2011.

emerge in the southern end of the Samaria Gorge, particularly the area of old Ag. Roumeli (1.29), Khora Sphakion (6.12; Dalidakis 2008), and the central Frangokastello Plain (Region 8).

In five cases, smaller Venetian churches are built over larger LR basilicas. One is in the village of Aradena (3.20); the other four are *exokklisia* (1.28, 5.11.1, 8.38, 8.50). The church hotspots in the Frangokastello Plain and the Samaria Gorge are represented; the Khora Sphakion hotspot is not.

People did not build Venetian churches over all Sphakiote LR basilicas; I suggested that the deliberate choice of locations is linked with resource use in both periods (Nixon 2006, 70–1). The Venetian RPs for the southern Samaria Gorge (cypress timber) and the Frangokastello Plain (arable) are clear. The situation on the Loutro Peninsula had changed, however. Only one of the five Phoinix basilicas had a church built over it (5.11.1); all other later churches here were constructed elsewhere. Phoinix may have been the economic powerhouse of LR Sphakia, but Venetian Loutro clearly had a different resource focus.

Monasteries, like villages, require dedicated RPs to be self-sustaining. No Venetian monasteries have been recognised in Sphakia. A Late Venetian text states that Sphakia had 28 priests, but no monks (Trivan 1644 in Manousakas 1949, 55). Most other parts of Crete do have Venetian monasteries, usually large establishments outside settlements, owning enough land to provide a living for the monks, such as Moni Preveli to the east (a double monastery) founded in the late sixteenth century. At one point, resources at Preveli included arable for olive oil, carobs, grain, garden produce, citrus fruit, and honey and pasturage to produce cheese, wool, milk, and meat. The monastery also owned productive land-parcels (*metochia*) elsewhere (Psilakis 1993, 385–418; foundation date, 386).

The only two definite Sphakiote monasteries, identified through strong architectural and/or textual evidence, are in East Sphakia at the Down elevation. Panagia Thymianis (8.01), east of Khora Sphakion, seems to be late eighteenth–nineteenth century; Ag. Kharalambos (8.50), in the Frangokastello Plain, is nineteenth century. Both have small churches with relatively few monastic cells (Psilakis 1993, 449–63), vastly different from the scale of grander monasteries like Preveli.

Boundaries of BVT Sphakia?

The earliest written record of the Sphakiote landscape is a perambulation, given in a charter seemingly of 1191. The charter was attached to a land grant current in EV times, giving jurisdiction to the Skordylis family over a territory dependent on Anopoli (Gerland 1903–4, text A; 1907–8, text B). The unnamed territory described in the Perambulation included about four-fifths of modern Sphakia, with a boundary from the coast south-east of Vouvas (8.05) to the middle of the Askyphou Plain, up to (part of) the Madares and down to old Ag. Roumeli (1.29). Excluded are the Trypiti Gorge, part of the west side of the Samaria Gorge, and the area east of Vouvas. The 42 boundary points include several resource-based *topothesies*, e.g. 'Three Olive Trees/Groves' (point 3) and the Forest of Agrales (point 8) in the Askyphou Plain, still known by that name. Three high-altitude features, a cistern and two Madares areas with *mitata*, along with Byzantine sherds found here, could suggest transhumant shepherding.

The later church on 'the saddle of Khristos' mentioned above is 200 m from the Perambulation's turn in the middle of the Askyphou Plain, near 7.25 (Fig. 23). This location was probably at the junction of lands held by three noble families, the Skordylides, Phokades, and Melissenoi (Gerland 1907–8, 34–8, document IIIB).

Information from Venetian and Turkish village lists shows that Sphakia then had boundaries like those of modern Sphakia, except for the three villages added in the later nineteenth century (Kapsodasos, Skaloti, Argoule).

Discussion

Visibility for the BVT epoch is often difficult for most areas in Sphakia. There is very little Byzantine material; phases within VT villages that are still occupied are typically impossible to track. Imported pottery, useful for assessing activity and 'resource-fulness' in the PH and GR epochs, is for the most part a less valuable source of information, especially in the Turkish period. Churches, sometimes decorated with imported pottery (i.e. *bacini*), are often the best way of detecting economic activity and 'wealth'. The BVT epoch is, however, exceptional for the abundance both of material and archaeological evidence, and of textual and ethnographic evidence.

Material and archaeological evidence

The best kinds of material evidence for BVT are settlements and settlement desertions, agropastoral and industrial infrastructure, and church hotspots; datable trees are also useful.

Settlements, distinguished by the presence of house-groups, occur at Middle and Down elevations only; there are no settlements above 1200 masl. Nucleated and non-nucleated VT settlements increase from west to east in Sphakia. Most nucleated settlements are in east-central and east Sphakia; examples are Komitades (8.02) and Patsianos (8.42). Non-nucleated

Fig. 23. Askyphou Plain looking south-south-east. Modern road on right continues route to coast. April 1989.

settlements are often in mountain plains, with house-groups (*geitonies*) on rocky lumps (Fig. 24), rather than on arable land. House styles vary somewhat by areas within Sphakia, but not by altitude.

Most settlements have at least one church, often Venetian or VT, and usually some *exokklisia*. For example, Ag. Ioannis (3.08) had three village churches, plus two definite *exokklisia* at 3.03. Some settlements acquire churches only in the later Turkish period; other settlements never have churches. Settlements with either a nineteenth-century church or no church occur in Middle altitudes in Regions 6–8, mainly in small mountain plains such as Kallikrati (8.66). Some settlements without churches are small (2–9 houses).

The main VT settlements, mostly Middle and Large, were known to us from the beginning because they were mentioned in Venetian and Turkish texts, and their names survive. Other settlements, mainly Small, were below the textual radar. Settlements deserted within VT are useful because they shed light on diachronic changes in BVT approaches to resources.

Two east Sphakia sites, deserted within the Venetian period, reveal an early malleability in the EV settlement pattern. The earliest BVT phase of site 7.09 probably dates to the time when the Askyphou Plain was divided into the three noble family areas mentioned above. This Small settlement's location on slopes in the south-west arm of the plain permitted control of the main route to the south coast; a built path ran through it. Later in the Venetian period, 7.09 was deserted, and the main (and larger) neighbourhoods were established on rocky lumps above the Plain. A big enclosure wall to keep animals out was built around the bottom of the Plain with a new path around its outer edge following a slightly different route from the older one. In 1300, it apparently made sense to have small settlements near larger ones, like 8.05A, described above, near Vraskas (8.04). Site 8.05A was deserted sometime between 1400 and 1550, but its RP with arable, pasturage, and water remained in use throughout Venetian and into Turkish times, as did the church.

Two Region 3 sites, 3.03 and 3.14, demonstrate the value of connectivity and the will to use small RPs on routes (Fig. 4). Site 3.02 is slightly earlier, with two small settlements (5+ and 3+ houses) on either side of a route. Terrace walls and enclosures suggest agropastoral activity here.

Fig. 24. Anopoli Plain from the Anopolis Ridge. Three Anopoli village neighbourhoods: left to right, edge of Kambos (4.19), Skala (4.39), Mariana (4.56). September 1996.

The route linked Ag. Ioannis village (3.08), two churches at 3.03 and 3.02, and the coast at Ag. Pavlos (3.01). Site 3.14, with a highly visible church and a house with two or three rooms and a courtyard, is on a route linking 3.08 with Aradena (3.20). Here olive trees 600–700 years old sit on terraces; small pens suggest pastoral activity. Both sites were deserted in the later Turkish period; their RPs remained in use.

The desertion of site 1.06, successor to Poikilasion, near the bottom of the Trypiti Gorge (Fig. 6), suggests that even its agropastoral RPs and nearby harbour were not enough to sustain it as a settlement after the later eighteenth century; use of the area continues to this day.

Individual items of BVT agropastoral and industrial infrastructure are usually not closely datable, though pottery and texts can provide broader date ranges. The nature and number of specific types of infrastructure often vary according to environmental zones, and from region to region.

There is a clear separation between higher- and lower-altitude areas. Region 2 has no houses. Instead it has the corbelled structures built only here in the Up altitude (Fig. 21), and the highest number of small enclosures, near or built onto them. We knew from the outset that these corbelled structures (*mitata*) were linked with seasonal rather than settled use of the vegetation here, available only as summer pasturage. The smaller enclosures were milking-pens, needed when there are larger numbers of animals to milk; smaller house flocks at lower altitudes (up to 10–12 head) do not require them. Milking-pens also occur at Middle altitudes in Regions 3–4 and 7–8.

In terms of purely agricultural infrastructure, most settlements (Regions 1, 3–8) have terrace walls and threshing-floors (*alonia*). It is possible to date terraces to Byzantine, Venetian, and Turkish; most are VT. Terraces with datable trees growing on them have helped us to locate Venetian and/or Turkish examples (Price and Nixon 2005, 674, figs 2, 4). All Middle and Down areas of Sphakia have single *alonia*, typically connected with smaller, dispersed areas of arable.

Fig. 25. Venetian bee enclosure at Ergastiria (6.25). September 2000.

Large groups of threshing-floors occur only in east Sphakia, where there are larger stretches of arable, along with most of the Sphakiote grain-mills. Two large *aloni* groups are associated with villages in the central Frangokastello Plain (8.42: 14+; 8.51: 12).

Larger stone enclosures (Regions 3–8) enable people to separate different resources, for example arable from pasturage; dried thorny shrubs often placed on top of enclosures acted as a further deterrent to ovicaprids. The largest is in the Askyphou Plain.

Smaller stone beehive enclosures (*melissokipa*) are usually away from settlements, often in sloping areas with thin soil. The highest numbers are in Regions 1, 4, and 6, with others in Regions 3, 7, and 8. Ergasteria (6.25, 'workshops') had a *melissokipo* with a stepped area for five rows of hives and a separate storeroom and cistern (Fig. 25). All these enclosures were on sloping ground often in area with thin soil. The enclosures protect bees from wind. On flatter ground, *melissokipa* are often not necessary; their absence in such areas does not necessarily mean absence of bee-keeping. Some VT beehives were ceramic, others were made of perishable materials (cypress wood, wicker; Mavrofridis 2019). Rectangular pieces of cypress bark, carefully cut from trees so as not to kill them, were used as lids for beehives made of sawn cypress wood. Some lid-cuttings are at least as early as the Turkish period. Lid-cuttings occur in Regions 1 and 3–7, with the largest numbers in the Samaria Gorge and Khora Sphakion areas (unpublished formal records by Rackham and Moody). Their absence in east Sphakia relates directly to the lesser availability of cypress

Lime-kilns occur in all regions; the Region 2 example is atypical (below the tree-line). Wells and cisterns occur in all parts of Sphakia; the Askyphou Plain has the highest number of wells (80+ at the north end), though they are difficult to date.

Watermills occur in regions 1, 5, and 8, with the highest number in the Samaria Gorge, which has most of the tall straight cypresses in Sphakia (Fig. 26). We suggest that most mills here were sawmills rather than grain mills. Ceramic evidence complements the economic picture given by the mills. Within Ano Samaria village (1.25), we found sherds from a sixteenth-century fine ware jug, identified as 'NE Italian', likely to be from the Veneto, and possibly Venice itself (Armstrong, in preparation). Venetian-period churches and tombs with imported *bacini* at sites

Fig. 26. Tall cypress trees near Ag. Nikolaos (1.17), Samaria Gorge. July 1987.

1.17, 1.28, and 1.29 also demonstrate contacts with the world beyond Sphakia in this church hotspot.

Some areas of specific large-scale activity can be correlated with the church hotspots in Samaria Gorge South and the central Frangokastello Plain. The Samaria hotspot was probably linked with trade in cypress timber; the Frangokastello hotspot with high levels of grain production. We can also suggest that the Khora Sphakion hotspot was quite simply linked with links: this area has the best connectivity in Sphakia, by land and by sea.

Textual evidence

Turkish-period texts give important information about settlements, often confirming what we had suspected from our fieldwork (Pashley 1837, 2.311; Raulin 1869, vol. 1; Papadopetrakis 1888/1971; Stavrakis 1890/2002; Noukhakis 1903, 220; Deffner n.d.?1928). First, some non-nucleated settlements made up of separate house-groups, whether contiguous or non-nucleated, were counted as individual units, as they still are. These house-groups are known as neighbourhoods (*geitonies*). Most non-nucleated settlements occur in mountain plains (e.g. Askyphou and Anopoli). Contiguous *geitonies* occur in Khora Sphakion (6.07, 6.17, 6.18, 6.19) and in old Ag. Roumeli (1.29).

Second, these texts offer crucial clarification on seasonal use of certain agropastoral resources. One aspect of Sphakiote seasonality involves the 'discrepant' settlements, those at Middle altitude in Regions 6–8 with either nineteenth-century or no churches. These higher summer settlements with cooler temperatures had different resources from those of the lower winter ones. The *alonia* tell us that grain was largely grown everywhere except at the Up altitude. In the Middle elevation summer settlements, people also grew grapes, fruit trees, and nut trees. Winter settlements had olives and carobs as well as grain. The system of seasonal summer settlements probably starts at least as early as Venetian; three small sites (6.09, 6.10, 6.26) without churches north of Khora Sphakion mentioned in a document of 1435 are among the seasonal settlements confirmed in Turkish-period documents.

The information from texts and material remains shows that the VT agropastoral system involves movement of animals as well as of people, with different patterns within Sphakia. West Sphakia has year-round villages and usually single *mitata* at a higher altitude. West-central Sphakia (Regions 2–4) has mainly Middle villages and groups of *mitata* in the Madares (Up) for summer use, plus some coastal grazing in winter. Khora Sphakion and east Sphakia have winter and summer villages with *mitata* (usually single) above them. Turkish-period texts mention *mitata* for summer use.

Two documents of 1435 show that pasturage was already a crucial resource in the Venetian period (Vourdoubakis 1939, 261). Together they record a deadly dispute between two families over pasturage for sheep and goats and a new boundary, using *topothesies* to separate their territories in the area north of Khora Sphakion (6.12; Nixon et al. 2009, 47–9).

Sheep and goats are not directly attested in the Early Turkish (ET) tax document of 1650 since they were taxed and recorded separately. The document records a grazing tax, but we do not know how it was calculated, and the amounts paid by villages seem odd (Price et al. 2008, 95; cf. Nixon and Price 2001).

There is evidence that (V)T pastoralism was specialised to cheese, which was exported to other countries (Randolph 1687/1983, 85). Vourdoubakis published two eighteenth-century documents recording the sale of *madara*-land (summer pasture) at Livada near 6.02. Land value here was measured in terms of cheese productivity rather than area.[13] Raulin (1869, 1.265–6) records that in the 1840s Sphakia produced more sheep and higher amounts of cheese and wool than its area at that time (5.5 per cent of Crete) would suggest in relation to the rest of the island. A 1788 document mentions animal theft (Nixon 2006, 76 n. 2), and later evidence that certain churches were used to deal with sheep theft.[14]

Twentieth-century information is relevant for the use of the Madares. Only men and boys over 10 went up (Nixon and Price 2001, 398). Members of the same kin group used the same *mitato* and took turns in the Madares so that they were not all absent from their villages at the same time. *Topothesies* here often reflected resources: Livada ('meadow') and Nerou Lango ('basin of water'). Fig. 27 shows how shepherding work was integrated into the annual agropastoral cycle.

[13] Vourdoubakis 1912, document I, 1714, 476–8, document XXIII, 1731, 502–3. The unit of measure is the *oka-madara*, based on the Turkish weight-unit *oka* (1.28 kg). The land going with site 2.19 is extensive (260 ha) and is valued at only 60 *oka-madares*. Site 2.06, valued at 41 *oka-madares*, has a much smaller area.

[14] Churches at 3.20, 6.03A, and 8.01, coinciding with former/current *koinotita* boundaries, plus 1.17 and 3.01 on the coast and Ag. Zoni outside Vouvas (8.05); Nixon 2006, 81–3.

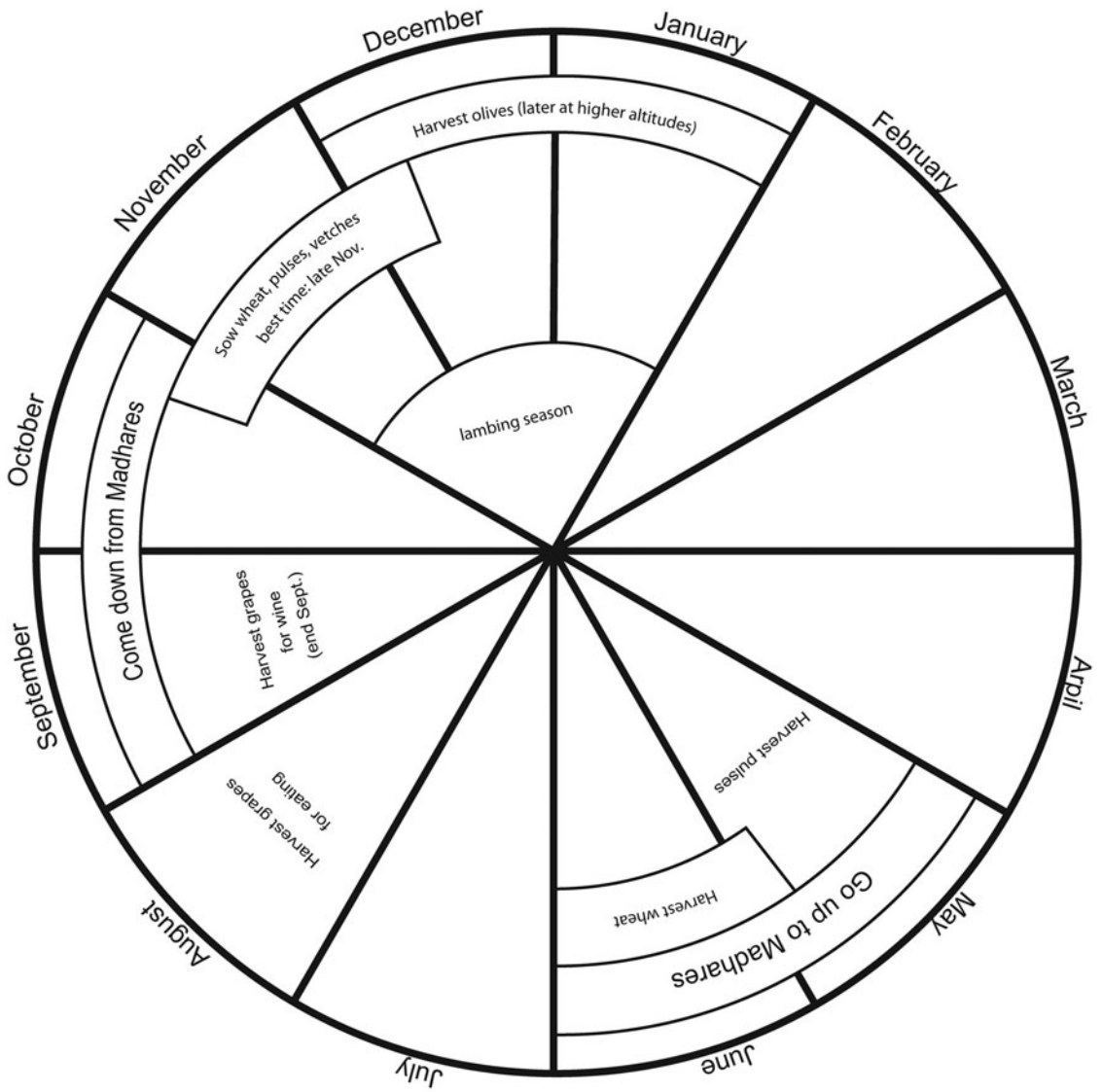

Fig. 27. Circular calendar of agropastoral activities for Anopoli area (K. Glicksman).

The Greek word for beehive enclosure, literally bee garden (*melissokipo*), occurs in the 1435 document mentioned above; Ergasteria (6.25) is one of two locations (Vourdoubakis 1939, 261). The ET tax document records a tax on beehives, but as with grazing, we do not know what its basis was. Three villages each pay the highest beehive tax: Ag. Roumeli, Kolokasia, and Patsianos, the latter two in east Sphakia.

Raulin (1869, 1.255) comments on the high reputation of honey from mountainous areas and says that both honey and wax were exported, with ten times as much honey as wax. Sphakia along with Kissamo in Khania Nome produced the highest amounts of beeswax and honey in Crete (Raulin 1869, 1.257, 289).

Early fifteenth-century documents show that the Venetians took a keen interest in Cretan cypress timber and forbade the export of unworked cypress from the island; Noiret (1892) presents three relevant documents identified by their dates: 1414 (pp. 226–7); 1415 (233); and 1416 (252). Mills are specified as 'molini' on Basilicata's 1637 map (Clutton and Kenny 1977, 141); mentioned in a report of 1639 on the coastal resources of west Crete (Semitecolo 1639/1999, 19); and repeated on Coronelli's 1690 map of west Crete (reproduced in V.T. Melas and

Tsokopoulos 2005, 128–9). These are the 13 mills in Samaria Gorge South (1.34). Sawn timber was taken to the coast not far from old Ag. Roumeli (1.29), and then transported by sea. In the Turkish period, Raulin (1869, 1.247) notes that cypress timber was used for beams in rural houses, but the wood does not seem to have been exported.

As for agriculture in general, the 1435 document mentions *alonia* at Kaloi Lakkoi (6.10), one of the summer settlements near Khora Sphakion (6.12). Threshing-floors and beehive enclosures therefore go back at least to the earlier Venetian period.

The ET tax document of 1650 notes a tax on watermills, used for grinding grain as well as cutting timber. The same document gives figures for various arable commodities (wheat, olive oil, grape must; Price et al. 2008, tables 5–7). The top producers of these commodities are all in east-central and east Sphakia. In the seventeenth century, Khora Sphakion and Imbros–Askyphou–Asphendou are the major producers. These figures shed light on Khora Sphakion as a church hotspot.

Finally, later eighteenth- to early nineteenth-century land sale documents show that women and men could own land outside (and sometimes at some distance from) their own villages, often at different altitudes within Sphakia; this is a version of *enktesis*.[15]

Conclusions

The combination of both archaeological/material and textual/ethnographic evidence provides a much more nuanced picture of how people in the BVT epoch might have packaged resources sustainably, using the environmental zones at their disposal. We located specialised infrastructure for activities including cultivation, shepherding, cypress timber, bee-keeping, and arable cultivation. Texts confirm that some of Sphakiote products were for export as well as local use: cypress timber, pastoral products, olive oil, honey and beeswax.

We had already spotted a link between churches and RPs. Fieldwork made it possible to suggest specific economic activities based on RPs in or near the three church hotspots (Samaria South, Khora Sphakion, Frangokastello Plain); the texts made it possible to confirm those suggestions. The lack of church hotspots in other areas (Ag. Ioannis, Anopoli, major pastoral areas) was surprising.

Fieldwork also confirmed the importance of knowing where (and when) all settlements are, not just those named in written documents. We might have guessed that smaller ('discrepant') mountain plains with late or no churches were perhaps seasonally used, but we would not have known for certain without Turkish-period texts making it clear that there really were villages and seasonal settlements with duplicate infrastructure, used by the same people, rather than higher numbers of settlements used by completely different people.

QUANTIFYING RPS

Quantifying RPs is potentially important for thinking about the agropastoral resources available to people living in an area. Smaller and larger RP examples are discussed here.

Site 8.39, Ta Livadia (8.05A), and Kosona

Site 8.39, an LR farm in the Frangokastello Plain, and the EV settlement at Ta Livadia (8.05A) were discussed earlier. Both lie on good arable; we do not know if people used pasturage elsewhere, but we do know that in later Sphakia, pasturage on any major scale was normally done away from good arable. These two sites are compared with the twentieth-century village of Kosona on the Methana peninsula in mainland Greece, studied by Forbes in the 1970s (Table 6).

[15] Vourdoubakis 1912, documents XIX, XX; no boundaries given boundaries for the land being sold.

Table 6. Site 8.39, Ta Livadia, and Kosona.

	Sphakia, 8.39; RLR	Sphakia, Ta Livadia, 8.05A; EV	Methana, Kosona/Kypseli; twentieth century
Households/ houses	1 house (like other RLR Frangokastello Plain farms)	est. 3–5 houses, perhaps others south; max 7	40 households (Forbes 1976, 244)
Total RP area?	*c.* 20 ha = 200 *stremmata*	*c.* 20 ha (with all associated land) = 200 *stremmata*	Unknown (Forbes, pers. comm. Dec. 2020) 40 households at 29 *stremmata* of arable (on average divided into 18 different plots; p. 242) = 1160 *stremmata* or 116 ha

Land-holdings in Kosona are fragmented rather than contiguous (a few people held land in the plain of Trizinia some distance away, living in makeshift huts; Forbes, pers. comm. August 2022). Fragmented land holding means that relatively small kin groups can harvest crops at different altitudes at different times, turning dissected terrain into an advantage (Forbes 1976, 246–7, 249, fig. 1; cf. Aschenbrenner 1972). The combination of equal inheritance with virilocal marriage and dowry practices means that land owned by a household was not only fragmented (Forbes 1976, 240, 242, 246), but could also fluctuate from generation to generation.

Forbes' study of Kosona shows that people knew precisely what agropastoral resources were available at any given time, and how to organise their work over the year to exploit them. For Kosona, the emphasis is on arable, as pastoralism seems not to have been done on any major scale; the land associated with Ta Livadia is excellent arable, as already noted. Although it was possible to calculate the average amount of arable per household, calculating the area and boundaries of the total RP for an individual village, including Kosona, proved difficult.

Forbes recalls an interview with a village secretary elsewhere in the area. Describing the annual agricultural returns to the statistical service, this man said that he met with the local agricultural officer and a couple of other people, 'and we tell lies!' In other words, official figures for the specific territory of Kosona may not be accurate (Forbes, pers. comm Dec. 2020; the new Ktimatologio [Land Registry Greece] n.d., open only to citizens).[16]

The comparison of Ta Livadia and Kosona could indicate a recurring range of figures for arable land per household, possibly around 20 to 29 ha (cf. the much lower figure for eighteenth-century Anavarin in Messenia, 6.72 ha; Davis, Bennet and Zarinebaf 2005, 194). But even if these figures are accurate, they may well not represent a settlement's total RP: other resources elsewhere may also be in use. The larger area available to the one-house farm at site 8.39 could suggest that the total RP for this single household was 20 ha; we cannot tell. Even in our own time, determining the area and/or the precise boundaries of a village's RP can be unexpectedly complicated.

Koinotites and land divisions

Until the 1990s, the basic divisions used in Greece divided the country into nomes, eparchies, and *koinotites*, places of common land, or 'communes'. In 1963 and after Greece became part of the then European Economic Community in 1981, Crete, including Sphakia, was still a largely agropastoral economy. In 1997 the Greek government adopted the Kapodistrias–Kallikratis Plan, which turned most eparchies into demes, and abolished most *koinotites* (OECD 2014; cf. Ioannidis 2016, 105, table 1).

The boundaries of the four Cretan nomes were basically determined by the later Venetian period. They divide the island into four big chunks, each with land on the north and south coasts. The 19 Venetian *turmae* (squadrons) became the 20 castellates, similar to the 20 later

[16] See also the new (2024) Ktimatologio (Land Registry Greece), available online <https://land-registry.gr> accessed January 2024).

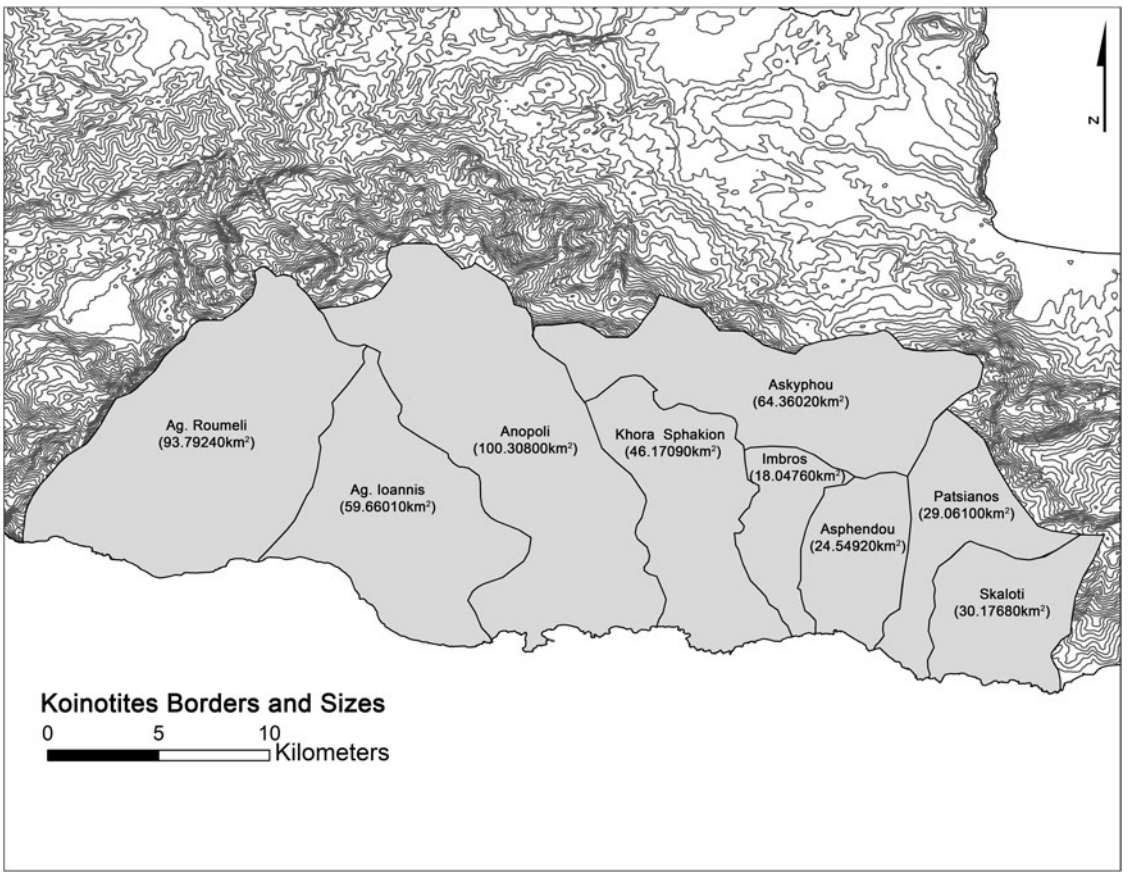

Fig. 28. Sphakiote *Koinotites* and areas (M. Buell).

eparchies. The eparchies split the island horizontally from west to east, nearly all of them running inland from the coast. Amari and Lasithi were the two landlocked exceptions (Bennet 1990, figs 3 and 4). The *koinotites* may have been defined in the Venetian period; their boundaries were known at least by the end of the Turkish period.[17] The earliest definite *koinotita* boundaries that I could find are those in the *Atlas of Greece* (1963).

Koinotita boundaries could be changed. In 1956 the boundaries of three Sphakiote *koinotites* were formally redefined by selecting different *topothesies* to mark the new boundaries in the same manner as used for the Skordylis Perambulation some 800 years earlier (Geronymakis 1996, 10). These boundary adjustments are simple because *topothesies* named many landscape features.[18] In Asphendou Koinotita there are 345 *topothesies*, one for every 0.071 km^2.[19] Ta Livadia ('the meadows') is one of many *topothesies* with resource implications.

The principle that seems to underlie the definition and boundaries of nomes, eparchies, and *koinotites* is that they must each include sufficiently varied resources – agricultural, pastoral; coastal, inland – to support the people living within them. The *koinotites* were the smallest official divisions above the level of individual settlements. I suggest that, minimally defined, a *koinotita* is an area which includes the agropastoral resources necessary to support at least one village sustainably. Evidence for this suggestion includes the following factors: size, montaneity,

[17] Gaignerot-Driessen (2016, 46) suggests that some Mirabello Bay *koinotites* are as early as the Venetian period; eparchy names in this area such as Mirabello (Lasithi Nome) and Monophatsi ('Boniface', Herakleion Nome) certainly bear the imprint of Venetian rule.

[18] Not all boundary changes were happy ones. For 1990s protests in Vrakhasi, east Crete, against proposed Kapodistrias–Kallikratis Plan changes resulting in a new local *koinotita*, see Gaignerot-Driessen 2016, 45, ill. 2.

[19] Geronymakis 1996, 10–13 (list of names, foldout map back of book); Nixon 2006, 106.

Table 7. Anopoli and Patsianos *Koinotites*. Size and montaneity: *Atlas of Greece* 1963; villages and population: Stavrakis 1890/2002, 29–30, Pinax 4 for 1881 census; cf. 71–3, Pinax 9; p. 194 for comments on low Sphakiote deme ('commune') populations; arable production: Price et al. 2008.

	Anopoli	Patsianos
Size	100.3 km^2	29.1 km^2
Land > 1200 masl	67.6 per cent	16.8 per cent
Villages by 1898	1	2
Arable wheat, kg	267/km^2	693/km^2
Arable olive oil, litres	83.7/km^2	43.2/km^2
Arable grape must, litres	188.4/km^2	324.7/km^2
Church number	16	12
Church density	1/6.2 km^2	1/2.4 km^2
Population number	756	546

village numbers, arable productivity, number and density of churches, and population figures (where known).

Size is the single most crucial variable for *koinotites*, as variation in *koinoitita* size within Sphakia shows (Fig. 28). I noted above that larger *koinotites* are in west and central Sphakia, with smaller ones east. Larger *koinotites* are more mountainous, have fewer villages, lower arable productivity, fewer churches with lower densities, and usually smaller populations with lower densities. Table 7 shows that Patsianos *koinotita* is much smaller than Anopoli but has on the whole better arable production figures, more churches, and more people. Moreover, reaching RPs in Patsianos *koinotita* is far easier; Anopoli *koinotita*, with its far more dissected terrain, could benefit from the Madares, but using them effectively for pasturage would also require major investment in terms of time costs.

Dissected terrain matters. Khora Sphakion is the fifth largest *koinotita* in Sphakia, yet it shares the highest population density with the smallest (Imbros). Khora Sphakion *koinotita* also has by far the largest number and density of churches. It has less arable than the smaller eastern *koinotites*, but it did (and does) have the best connectivity in Sphakia.

Looking at Khania Nome puts Sphakia into a wider context. Khania Nome has five eparchies, varying greatly in size (smallest: Apokoronas, 313 km^2; largest: Kydonia, 613 km^2). The number of *koinotites* within the five eparchies varies far more (Sphakia, nine; Kissamos, 60), as does their average size (Apokorona, 9.2 km^2; Sphakia, 51.8 km^2). I infer that the smaller the area of an eparchy or *koinotita*, the more advantageous the agropastoral RP within it. Because the average *koinotita* size in Sphakia is far larger than for any other Khaniote eparchy, I also infer that Sphakia was less 'resource-ful', in agropastoral terms, than most other eparchies in Khania Nome.

Later *koinotites*, valuable for their own periods, can also be useful as a starting point for investigating earlier periods. Mackil (2013, 375, table 2) used epigraphic information to suggest boundaries for economic polis communities (*koina*) in Hellenistic Boiotia; Hope Simpson (2014) compiled textual and archaeological evidence for the territory of Mycenaean Messenia. Linear B tablets from Pylos mention two big divisions of its territory, the Hither and Further Provinces, separated by the spine of Mount Aigaleon and the smaller centres associated with the two divisions (Bennet 2011, 152–5).

Archaeological research and more recent maps show that the boundary of Boiotia Nome has fluctuated many times (Mackil 2013, map 2; Fachard 2016, fig. 9:9,10; *Atlas of Greece* 1940s/50s; 1963). The boundary of Messenia Nome is more similar to those proposed for the Mycenaean Kingdom of Pylos: Shelmerdine and Bennet (2008, 299, fig. 12:2) suggest that the kingdom included much of the modern nome (Pylos: 2300 km^2; Messenia Nome: 2991 km^2). In both cases, eparchies, both their numbers and their boundaries, are irrelevant, in terms of the information we have for ancient divisions in Hellenistic Boiotia or Mycenaean Messenia.

It was useful to compare *koinotita* sizes and numbers before the later twentieth-century Kapodistrias–Kallikratis Plan (OECD 2014) in Khania, Boiotia, and Messenia Nomes. Boiotia is the largest, with fewer, larger *koinotites* (78; average size 41.2 km^2); Messenia has more, smaller

koinotites (170; average size 11.1 km^2); Khania's 170 *koinotites* are on average 13.8 km^2. Varying degrees of montaneity account for these differences: Boiotia is easily the most mountainous (Kithairon, Paliovouna, Motsara plus Lake Kopais Basin); Messenia even with Mount Aigaleon is less mountainous than either of the other two nomes; Khania has the White Mountains. This information gives an immediate idea of their contrasting agropastoral 'resource-fulnesses'.

In Boiotia and Messenia, *koinotita* boundaries and sizes are potentially more helpful than those for eparchies. While it is received wisdom that ridge lines make useful boundaries, the Bronze Age Hither/Further Province boundary dividing Mount Aigaleon in Messenia does not correspond particularly well with the 1963 eparchy boundaries. Using this information, I looked at whether centres of Hellenistic Boiotian *koina* and Mycenaean provincial centres of Pylos coincided with *koinotita* centres. Just over 50 per cent of the Hellenistic poleis and 33 per cent of the Pylian provincial centres coincided (Mackil 2013, map 9; Hope Simpson 2014, 68). These coincidences are not sufficient to generate internal boundaries for Hellenistic Boiotia and Mycenaean Messenia. But individual coincidences are interesting for local boundaries, such as site 73 (area Ib2), a district centre south of Pylos coinciding with a *koinotita* centre (Hope Simpson 2014, 61–2, 68, map 1; *Atlas of Greece* 1963).[20]

Without documents, we will never get precise boundaries for most RPs in any period. The *koinotita* sizes give us an immediate sense of three things: the degree of agropastoral 'resource-fulness' inside them; the overall resource envelope for at least one substantial settlement; and some idea of how people could package those resources sustainably. *Koinotita* boundaries were devised for the kind of dissected terrain common in most parts of Greece, and they evolved to set reasonable limits for territories of various sizes, in a basically agropastoral economy. Used with other variables, *koinotita* boundaries can suggest possible RPs for follow-up in different periods and places (cf. Gaignerot-Driessen 2016, 42–51, maps 6, 7).

CONCLUSIONS

This article had two goals: to contribute to the archaeology of sustainability, and to introduce RPs as a useful analytical tool for investigating landscapes. Using five different kinds of evidence, where available – environmental; material/archaeological, both direct (infrastructure) and indirect ('wealth', e.g. imports and sacred sites); textual; oral; and 'discrepant' – was a fruitful approach to looking at strategies for sustainability and the packaging of resources.

For the agropastoral economy of Sphakia, I predicted that if people were acting sustainably, they would have at least three sustainable strategies: separation of arable and pasturage, use of agricultural terraces to maximise the amount of arable, and careful placement of larger beehive areas to avoid encroaching on arable. Table 8 shows that these strategies were indeed part of people's approach to the Sphakiote landscape, though not observable in all three epochs. The use of all altitudes in nearly every period in all three epochs, whether the largest sites were coastal or higher up, is another more general strategy for sustainability. It was difficult to determine boundaries of smaller RPs, though we suspect from GR documents outside Sphakia and BVT documents within it that they existed. The larger-scale *koinotita* boundaries seem to have been constructed on sustainable principles.

Our work in Sphakia began with a research question: how did the people of Sphakia use their tough landscape over some five millennia? When it came to looking at sustainability, I realised that there were other questions to ask. Why did people in Sphakia use their landscape in the various ways that we have observed? Why did they use particular resources there and not somewhere else in some periods, but not in others (given that all altitudes seem to have been in use

[20] Note [ku]-pa-ri-so, Kyparissos ('cypress'; Ventris and Chadwick 1973, 148, 297, no. 187/PY Na 49; Bennet 2011, 152–5), probably Kyparissia, capital of its *koinotita*, though not a Mycenaean district centre.

Table 8. Strategies for sustainability. Square brackets indicate areas outside Sphakia.

	PH	GR	BVT
General	-use of every altitude	-use of every altitude	-use of every altitude
Infrastructure	[-Pseira: Minoan agricultural terraces [-Palaikastro area: MM–LM terraces, enclosures, and division walls to separate agriculture from pastoral activities	-agricultural terraces -perimeter walls/ enclosures -larger beehive sites, some with enclosures, often away from settlements	-corbelled *mitata* at Up elevation -agricultural terraces -enclosure walls for arable -larger beehive sites away from settlements
Texts		[-in east Crete, *enktesis*, possibly including access to pasturage [-at Tylissos and in east Crete, landscape knowledge in boundaries using *topothesies*	-land ownership at more than one altitude, often outside owners' villages (form of *enktesis*) -landscape knowledge in boundaries using *topothesies* -land valuation based on productivity
Seasonality	seasonal Madares use for pasturage, possible dip in EM–MM	seasonal use of Madares for pasturage, possible dips in CH and RLR	-seasonal use of Madares for pasturage -seasonal settlements using different RPs

throughout the long timespan of the Survey)? One answer is that people knew that sustainable strategies meant that they could use all available resources without using them up.

The Madares are a conspicuous example of a contingent RP used seasonally. Other examples of seasonality can be more difficult to detect archaeologically. We have a reasonable understanding of (V)T seasonality, materially as well as textually, but that does not mean that people in PH and GR had a similar approach. In part this is because seasonal arrangements can take many different forms (Rosen 2021). Erny's (2023) statistical finds analysis for smaller Iron Age sites on Crete found a wider variety of site functions than expected; her data were mainly from sites at lower altitudes, but this approach could fruitfully be applied to sites in areas such as Sphakia. How best to detect and understand seasonal practices is an area of the archaeology of sustainability where we await further methodological developments.

Compared to other parts of Crete and beyond, Sphakia is a constrained, even tough, landscape for agropastoralism; the more dissected the landscape, the more dissected the resources, both within the same altitude and at different ones. Given the altitudinal range of Sphakia, we might well have predicted RPs dissected by type and by altitudinal location – and we would have been correct. People living in Sphakia managed to turn possible disadvantages of dissected terrain into definite advantages, to minimise risk, and to build sustainability into the system. These sustainable strategies include using pasturage at all altitudes, which in some periods enabled pastoral production above subsistence; seasonal settlements with different crops at different times of year; and small plots of land at different altitudes which could be harvested at different times. It may be that there are more, and more complex, adaptations in Sphakia than in less tough landscapes. Further research on the archaeology of sustainability in less dissected terrain will help to test this hypothesis.

People in Sphakia may have been resource-poor in agropastoral terms, but they were strategy-rich. The basis for the strategically sustainable management of Sphakiote resources is landscape agency: familiarity with every available resource in the terrain which specific people could use, often using *topothesies* or their equivalent.

Who had the landscape agency to develop and use resource strategies? In the PH epoch we do not know. In GR there is one instance in the Roman period where external agency might have played a part: the three areas linked with the major port settlement at Phoinix-Loutro – the two grain-growing estate centres (3.12, 4.03) and the marbleised limestone at Ta Marmara (5.02A). In the BVT epoch we know of major landholders and external Venetian and Ottoman rulers. Nonetheless, the strategies observed for (V)T are based on a system where resource management is usually directly handled by free agropastoralists. The Skordylides of the late Byzantine Perambulation may have been the landowners, but they were a local family; in the Turkish period, the external rulers of Crete were content to tax producers, including those in Sphakia. In these periods, therefore, landscape agency is almost entirely in the hands of the people who owned and managed the land and its resources – the exception is cypress timber, which the Venetians controlled. The (V)T and GR systems seem to be for the most part directly accountable: the people doing the work are locals who will be the first to know if resource strategies do not work properly.

Movement was perhaps the single most important adaptation to the tough terrain of Sphakia. Movement of different kinds and timings – daily and seasonal; shorter and longer distances; whole village populations, men and older boys only – was essential for maximising RPs of different sizes in Sphakia. The example of Kosona showed that people there travelled to landholdings at different altitudes over relatively short distances. But Sphakia has a more constrained landscape, so there was more movement over longer distances, with a wider altitudinal range, often for longer times.

To outsiders, all this movement may seem 'inconvenient', but convenience is always in the eye of the resource user. In fact, as the (V)T–earlier-twentieth-century system shows, movement made it convenient to combine different tasks, on smaller and larger scales, into one overarching sustainable strategy, and to construct a predictable schedule for the agropastoral year. As Randy Newman says, 'When the going gets tough, the tough get going'.[21] The going in Sphakia was, and is, tough, but tough landscapes make for tough people, always on the move one way or another to make the landscape work for them. In the early days of our fieldwork, I was surprised that we always met people, no matter where we were working that day. Eventually I knew enough not to be surprised: in twentieth- and twenty-first-century Sphakia, 'going' is still important, even if it is mostly by truck rather than on foot or by mule.

The systems of resource management described here were usually based on the need for local self-sufficiency; if production above subsistence was a regular part of the economy, then that also needed careful oversight. The consequences of failing to apply landscape knowledge for a given area were stark: potentially lethal privation, if crops failed and/or animals did not produce/reproduce as expected, and loss of income or the possibilities of exchange, if expected production above subsistence did not happen.

Ethnographic work suggests that people therefore developed their own strategies to manage these risks (variable climate and rainfall) from year to year, typically by overproducing in good years to make it through bad ones (Forbes 1976; 2017). People knew that their resources were finite, and that all strategies for land management had to be sustainable over the long term. It seems unlikely that anywhere in Sphakia could be considered marginal: if people could find a use for land, they would use it, sustainably. I suggest that we can safely assume that these statements apply not only to the recent past in Sphakia, but also to the whole period covered by the survey.

[21] Randy Newman's 1972 'Memo for my son', lyrics available online at <www.songlyrics.com/randy-newman/memo-to-my-son-lyrics/> (accessed January 2024).

The (V)T agropastoral system, a fully integrated and sustainable way of maximising RPs, continued in Sphakia into the earlier twentieth century, with several activities producing above subsistence. After World War II (1939–45) and the Greek Civil War (1946–9), however, traditional self-sufficient village agriculture began to collapse all over Greece. In 1981 Greece joined the EU (then the EEC). By the later 1980s, when we began our work in Sphakia, there were EU subsidies for olive groves on flatter arable (i.e. not on smaller agricultural terraces), often using irrigation systems, and for imported feed for flocks. At about this time tourism began to be a serious economic activity in Sphakia. Then, from the later 1990s, the Kapodistrias–Kallikratis Plan (OECD 2014) largely abolished the old *koinotita* boundaries. The plan reflects major changes in the Greek economy and the need to manage land in different ways.

What we saw when we started our work was a deeply dis-integrated system: the old system was in pieces, with agriculture basically gone, and pastoralism and bee-keeping continuing, though differently. Movement was still part of the system, but pastoralism, once largely transhumant, was becoming more stationary (imported grain meant that flocks did not have to be moved so often or so far, with less use of high-altitude pasturage); bee-keeping was becoming 'nomadic' (moving beehives in trucks, rather than using fixed areas such as bee enclosures). New kinds of knowledge were now important, so that much of the once essential landscape knowledge, and the agency that went with it, were considered irrelevant, certainly by people outside Sphakia. People inside Sphakia were often regarded as ignorant hillbillies rather than knowledgeable problem-solvers with a strong background in sustainability (cf. Nixon 2001, 88–9; Manzano et al. 2021, 659).

The result of these changes is that pastoralism and bee-keeping are now done less sustainably. In the Anopoli area, shepherding no longer makes use of all possible pasturage locations; animals eat imported feed, sometimes in fenced areas; overgrazing is becoming a problem (Meyer et al. 2020, 18–21, fig. 19*bde*). Bees are in greater danger of disease because nomadic bee-keeping means that they are always 'working', and therefore more stressed (Bacandritsos et al. 2010, 339; cf. Simone-Finstrom et al. 2016). These changes could be seen as an affront to anyone used to the old, self-sufficient, sustainable practices.

Should the old ways simply be brought back? Of course not. Traditional agropastoralism was very hard work, and the people who did it lived on a knife-edge, hence emigration from Sphakia, as from other parts of the agropastoral Mediterranean. But some of that old landscape knowledge could perhaps be incorporated into modern production methods, with a view to restoring sustainability; this is at least an idea worth exploring. The collapse of the old agricultural system means that there are resources now not systematically used. One possibility is to find a sustainable way of using former agricultural land as pasturage for 'free'. Another is to consider a workable alternative to nomadic bee-keeping. The idea would be to keep the principles of landscape agency, while updating the strategies.

Developing modern, sustainable landscape strategies based on older practices is not a new idea. Explicitly using the results of archaeological work to improve modern food production began overtly with the Libyan Valleys Project (Barker et al. 1996, 1). Scientists and archaeologists are now beginning to realise how important archaeological work can be for suggesting new possibilities (Turner et al. 2020; cf. Valipour et al. 2020). Monbiot (2022), among others, suggests that a plant-based diet is best for our planet; others suggest that a reduced-meat diet combined with pastoralism, properly done, makes the most of land which is unsuitable for cultivation (Rebanks 2020; Manzano et al. 2021, 651; Sustainable Food Trust 2022). The archaeology of sustainability will become increasingly important given climate change and the need to support human populations with better knowledge, agency, and resource strategies.

In this article I have identified strategies for agropastoral sustainability in the dissected terrain of Sphakia for all three epochs, using a wide range of evidence; introduced the concept of RPs as an analytical tool for the study of the Sphakiote landscape; and summarised several approaches to sustainable resource packaging over the Survey's time span. I hope to have shown that looking for sustainability through careful resource management in this tough landscape is not only archaeologically valuable, but potentially useful for everyone making choices for a sustainable future.

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Προς μια αρχαιολογία της βιωσιμότητας: πακέτα πόρων και διαχείριση του τοπίου στα Σφακιά, νοτιοδυτική Κρήτη

Χρησιμοποιώντας στοιχεία από την Έρευνα Επιφανείας Σφακίων, ένα αρχαιολογικό πρόγραμμα πολλαπλών περιόδων στη νοτιοδυτική Κρήτη, το άρθρο αυτό έχει δύο στόχους. Ο πρώτος είναι να συμβάλει σε ένα νέο αναδυόμενο πεδίο, την αρχαιολογία της βιωσιμότητας. Η διερεύνηση της βιωσιμότητας στα Σφακιά χρησιμοποιεί πέντε βασικά είδη τεκμηρίων: περιβαλλοντικά, αρχαιολογικά/υλικά, κειμενικά, προφορικά και πρότυπα δραστηριοτήτων που φαίνονται «δύσκολα» ή «άβολα». Τα Σφακιά είναι μια μεγάλη περιοχή με έντονα κατακερματισμένο έδαφος και μεγάλο υψομετρικό εύρος - από πολλές απόψεις, ένα «σκληρό» τοπίο, όπου η αγροκτηνοτροφία ήταν η κύρια οικονομία. Ο δεύτερος στόχος είναι η εισαγωγή της έννοιας του πακέτου πόρων (συνδυασμός αντιληπτών πόρων σε μια περιοχή), ως αναλυτικό εργαλείο για τη μελέτη του τοπίου. Τα τεκμήρια για τον εντοπισμό πακέτων αγροκτηνοτροφικών πόρων διαφόρων κλιμάκων, που χρησιμοποιήθηκαν σε μια συγκεκριμένη εποχή, περιλαμβάνουν εισαγωγές, όπως κεραμική και οψιδιανός, που μπορεί να υποδηλώνουν την ανταλλαγή με έναν τοπικό πόρο ή προϊόν· ιερούς τόπους· νομίσματα· κείμενα και επιγραφές· τοπωνύμια· και χάρτες. Η έννοια των πακέτων πόρων μπορεί να εφαρμοστεί συγχρονικά και διαχρονικά σε προγράμματα πολλαπλών περιόδων όπως αυτό, καθώς και γενικότερα σε άλλα τοπία, «σκληρά» ή μη. Βιώσιμες στρατηγικές (δηλαδή μεγιστοποίηση των πόρων και των πακέτων πόρων χωρίς εξάντλησή τους) χρησιμοποιήθηκαν στην Προϊστορική, Ελληνορωμαϊκή και Βυζαντινή-Βενετική-Τουρκική εποχή στα Σφακιά· μερικές από αυτές μπορεί να είναι χρήσιμες και για το μέλλον.

Μετάφραση: Στέλιος Ιερεμίας