

Qualitative Weighting of Environmental Impact in the Southern Levant between the 4th-c. BCE to 20th-c. CE through Culture-nature Duality

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A qualitative method is presented to explain anthropogenic impact on the environment in the southern Levant regarding ancient land-use. Three major monocultural periods between the 4th-c. BCE and 20th-c. CE (Hellenistic, Byzantine, and Ottoman) are examined as a case study. Hellenistic olive oil presses, Byzantine winepresses, and Ottoman animal pens are extracted from archaeological survey data. The high concentration of “same type” agricultural installations per period, compared to the total, attests to the monoculture which reflects agricultural intensification and industrialization. Analysis in geographic information systems (GIS) indicates that areas of cumulatively more intense monocultural land-use caused natural vegetation-cover today with a form of land-degradation called plagioclimax. A qualitative narrative is established through the pagus, a metaphor for environmental “other” and place of extending civilization, to explain. This metaphorical pagus also corresponds to that real space which is heavily impacted by the monocultural activity. Ontological independence, which challenged divine causality, is examined through Hellenistic divination texts, Byzantine church mosaics, and Ottoman Sufi texts. These expressions reflect the geopiety, or connection between people and land, and help link the monoculture, intensification, industrialization, capitalism, and plagioclimax. The pagus, as sacrificial other, concurrently enabled conservation of additional areas that even today represent nature reserves.

Introduction

The rise and fall of civilizations is attributable to a relationship between culture and nature known as duality. The ontology of that duality, or the nature of its being, is related to “observer effect”. That term, which is used in science to explain the impact of the observer on the phenomena observed, may mean much more. In history it can mean defining the relative position, or logic of culture, to reality within the duality as a relationship of self-other. Another self-other term, from geography, is geopiety which describes the relationship between people and land in cultural landscape studies (Wright, 1947; Tuan, 1979). Geopiety is used in this paper as a geographic marker to reflect the observer effect and cultural duality as it occurs on the landscape. A critical realist approach is employed to explore how

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the duality changed over time between the 4th-c. BCE and the 20th-c. CE.¹ Specifically, the Hellenistic, Byzantine, and Ottoman periods are examined in the southern Levant regarding their duality, geopiety, and observer effect based on archaeological evidence and material culture. The goal lies within a larger project in geography to understand the impact of long-term land-use on the environment. However, in this paper, the ontological changes in culture-nature duality are explained specifically through the landscape which serves as temporal canvas. A case study was established in the southern Judean foothills of Israel in the hinterland of ancient biblical *tels* (“archaeological mounds”) Maresha and Lakhish (see Figure 1).²

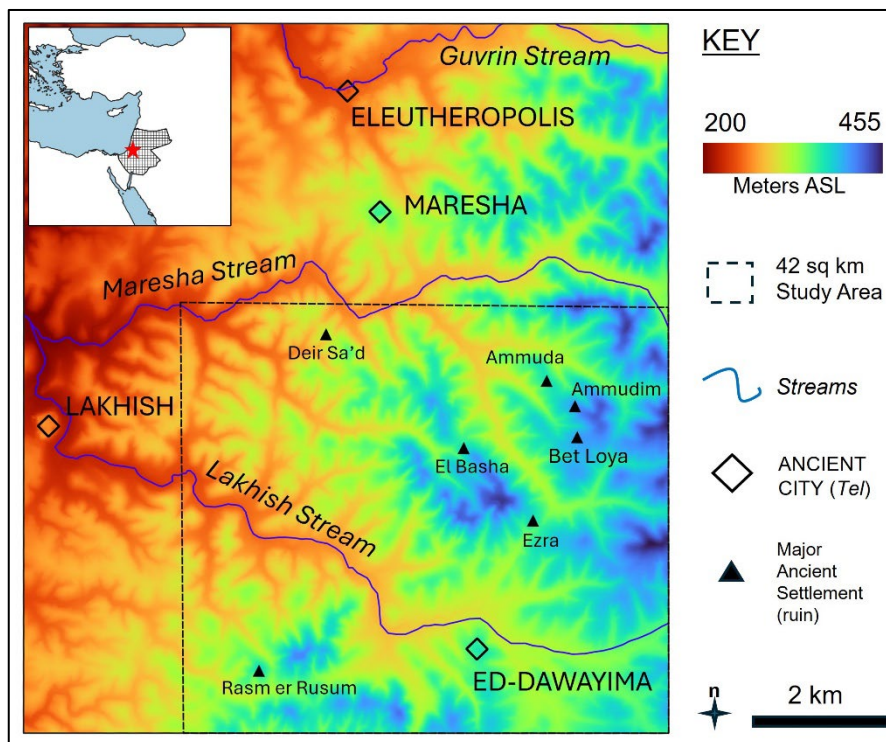


Figure 1. Elevation Map of Study Region in the Southern Levant (hatched area in inset). Ancient Cities and Hinterland Study Area (dotted rectangle) shown with Major Ancient Settlements

Source: the authors 2024.

The study was conducted in a semi-arid hinterland south of Tel Maresha and east of Tel Lakhish in the southern Judean foothills, Israel. The 46 km² study area (centered at Lat 31.553 °N / Long. 34.901 °E) is located in the southern Levant, which

1. For critical realism in the traditional sense, see: Cruickshank, J. Critical realism and critical philosophy: On the Usefulness of philosophical problems. *Journal of Critical Realism*, Vol. 1(1), 2002, 49-66.

2. This paper results from a presentation at the 22nd Annual International Conference on History & Archaeology: From Ancient to Modern of the Athens Institute for Education and Research (June 3-6, 2024).

describes a historical region in the eastern Mediterranean. The region is hilly, ranging from 200-450 m ASL, and soft chalk bedrock is predominant. Chalk rock was critical for developing cultures because it was able to hold cisterns for rainwater. The hills are overlaid by hard caliche (*nari*), a precipitate from the chalk bedrock, and brown/pale rendzina soil. Nari provides enhanced runoff into the wide tributaries and the agricultural history is associated with technologies that utilized this process, such as check dams (Ackermann, Svoray and Haiman, 2008). The tributaries drain to alluvial valleys which empty into the Mediterranean Sea. Botanically, the vegetation has been predominantly Mediterranean garrigue and maquis shrubs and trees throughout the Holocene. This region was chosen because it was surveyed extensively for archaeological remains by Dagan (2006) between 1977-1982 and the results published by the Israel Antiquities Authority (IAA). The 2300 years from the 4th-c BCE to the 20th-c. CE in the southern Levant is characterized by six periods (Dagan, 2004): Hellenistic (4th-1st-c. BCE), Roman (1st-c. BCE-4th-c. CE), Byzantine (4th-7th-c. CE), Early Muslim (7th-11th-c. CE), Middle Ages – Crusader / Mamluk (11th-16th-c. CE), and Ottoman (16th-20th-c. CE). Research by the authors (Manspeizer and Karnieli, 2023) used the published archaeological survey data and geographic information systems (GIS) to differentiate between areas more and less impacted by long-term ancient land-use. Satellite and drone imagery was used to identify the impact of the ancient land-use on the modern vegetation growth and a long-term land-use footprint was elucidated in the modern land-cover.³

More recently, Manspeizer and Karnieli (2024) concluded that there was extensive land degradation, in the form of plagioclimax, within more intensely used areas of the long-term land-use footprint. Based on the GIS analysis it was determined that more intensely used areas had been utilized repeatedly by settlement periods associated with forms of monoculture and a land-use pattern developed over time. Monoculture is an industrial use of the cultural landscape for one crop type and identifiable in the archaeological record by a high concentration of same type agricultural installations compared to the total. It became necessary to distinguish the six periods (4th-c BCE to the 20th-c. CE) based on their land-use and its environmental impact. Using the historical narrative, archaeological surveys conducted by Dagan (2006), and archaeological excavations of the region, three periods (Hellenistic, Byzantine, and Ottoman) became apparent as periods of agricultural intensification and industrial monocultural use of the landscape.⁴ The ancient agricultural installations related to the three periods, subterranean

3. For information regarding the methodology and fieldwork refer to Manspeizer and Karnieli, 2023; 2024.

4. For archaeological excavations by the IAA in the study area see: Figure 1 and Lifshits, V. *Benei Deqalim. Hadashot Arkheologiyot: Excavations and Surveys in Israel*, 2017; Gutfeld, O. *Horbat Bet Loya*. *Ibid.*, 2009; Varga, D., and Y. Israel. *Amazya*. *Ibid.*, 2014; Peretz, I., and S. Talis. *Horbat Hazzan and Horbat Avraq*. *Ibid.*, 2012; Zissu, B. *Khirbet el-Basha*. *Ibid.*, 1999; Klein, E., and A. Ganor. *Horbat Ezra*. *Ibid.*, 2016.

Hellenistic olive oil presses, surface rock-hewn Byzantine winepresses, and stone constructed Ottoman animal pens, attest to the industrial monoculture. The other periods demonstrate either periods of agricultural extensification (i.e., Roman) or fallow (i.e., Early Muslim and Middle Ages). There arose two objectives within the historical context to examining cultural duality relative to landscape: (1) differentiate between periods of intensification (industrial monoculture) and periods of extensification or fallow; and (2) recognize the similarity and potential differences between those monoculture periods. The industrial methods of the Hellenistic, Byzantine and Ottoman periods were very different. However, their cultural ontologies were similar and explainable along a qualitative narrative.

This approach is predicated on cultural ontology as the best indicator of observer effect and geopiety, the relationship between self and other. In this narrative, monoculture defines the cultural position toward nature within the duality which is consistent despite the historical changes. This is an innovative method to examine material culture derived from archaeological sources. The work is divided into five main sections: (1) an Introduction with background concepts and general hypothesis presented for the research; (2) a Literature Review of the culture-nature duality in the three periods relative to historical context, philosophical literature, and monoculture. Specific attention is paid to the link through the Hellenistic, Byzantine, and Ottoman periods regarding the development of ontology from the Hellenic period. That provides a context to understand the historical geopiety and observer effect transitions over 2300 years and gain appreciation of its relationship to landscape; (3) a qualitative case study from the southern Judean foothills of Israel is presented in the Methodology section. The case study is described with examples from the three periods including Hellenistic divination texts, Byzantine church floor mosaics, and Ottoman Sufi text; (4) In the Results section, duality is traced from the Hellenistic to the Ottoman period, plagioclimax is explained in its geographic context, and the validity of the qualitative model is examined; and (5) a Conclusion reviews the importance of relating ontology with landscape for environmental impact.

Literature Review

Review of the historical periods demonstrates how forms of expression, such as divination, artwork, and text become indicators of the observer effect. Together, the connection between observer effect and geopiety provides a context for study as cultural ontology and landscape interact. Our story begins with the succession of Alexander the Great of Macedon (356-323 BCE) and the Hellenistic period in the Near East. Beyond liberation for the Greeks from the Persians (Walbank, 1981), this paper concentrates on a more transcendental theme within that context of landscape, namely *pagus*. One may ask, how the Latin word *pagus*, associated with rurality and paganism, could drive Alexander the Great to conquest in the 4th-c. BCE?

Loanwords in linguistics can describe a root for pagus in the ancient Greek *ge / gios* or “earth”. We know *gios* from other words in Greek, such as *Pangaea* (“all land”), *Gaia* (“mother earth”), and *epegios* (“terrestrial” or “on earth”). Another similar word in Greek is *panagia* (“all holy”) which is derived from two words, *pan* (“all”) and *hagios* (“holy”). Here we may complicate matters by demonstrating use of the Greek word *gios* with the Hebrew article *ha* (“the”). This forms the word *ha-gios* which is familiar as “holy” in Greek but could also be a fusion of the two languages meaning, “the earth” as a sacred term. The Hebrew word, “ha”, is known to emphasize the singularity of the sacred word, for example, *ha-shem* (“the name”) which is used for G-d. Thus, a connotation exists that there may have been a connection between “the earth” and “the holy” in ancient Greece. The special association of a similar earthly term is known from *Prometheus Bound* by the tragedian Aeschylus (525-455 BCE). Depending on the translation (e.g., Aeschylus, ca. 460 BCE), a *pagon* is described as a mountain peak, the edge of the world, or this rock at Earth’s end.

Was Alexander driven to conquer the Persian world in a sacred crusade to conquer the Earth’s known end? The answer is yes if we visualize the pagus as a space of nature between the settled *polis* (“city”), and the gods who resided beyond the edge of the world. Then, that pagus would drive Alexander to liberate nature for the polis as he challenged the g-ds with his own divinity (Bamm, 1968). These notions are familiar to American environmental philosophies regarding wilderness and settlement in North America. That is also exciting because it reflects wilderness, beyond the edge of the known world, as a divine space.⁵ Settlement occurs first in the polis, which is conquered space, and draws from the pagus for resources. In North America, the pagus lay between the already conquered polis and the divine wilderness as nature’s environment. Thus, in America, the environment became a space to build civilization, derive subsistence, and promote permanency.⁶ But, most importantly, environment as pagus is also a metaphorical space (an “other”) in which cultural logic toward nature and survival is constructed. Here we may turn to Greek for the word *pagos* (“fix” or “build”), as certainly their intention for the environment or nature was a place for civilization to extend and build the polis. This process of building, or constructing cultural survival, is seen in the material culture of the three periods examined as monocultural installations in-situ. The remains are associated with extending the polis into the pagus other and fixing it

5. This concurs with the 19th-c. American environmental movement, Transcendentalism. See Emerson, R.W. *Self-Reliance and Other Essays*. (Dover Thrift, New York, 1993).

6. Notions that geopiety helps to derive identity in America adjudicates well with American ethos and environmental history, see: Williams, M. The relations of environmental history and historical geography. *Journal of Historical Geography*, Vol. 20(1), 1994, 3-21.

in place.⁷ While each period's form is different, they all reflect monoculture intended to that accomplishment. This process of fixing becomes imbedded in the geopiety of each culture as place identity and genre de vie (Manspeizer, 2006). As such, all three periods (Hellenistic, Byzantine, and Ottoman) became associated with pagus, as an environmental space and real metaphorical other in which logic occurred through the observer effect and geopiety.

Before beginning with the case studies, the connection between development of pagus in the Hellenistic period and the culture-nature duality must be tightened throughout the three periods. This is a significant connection because it describes the birth of duality and helps to define ontology. Juxtaposing culture and nature, as was accomplished in the Hellenistic period, set the stage for some of history's more important debates (i.e., the state of nature and the social contract in the 17th-c.). However, the move toward that perspective first required a separation between the self and other to allow the observer a new view to nature. Hellenic period philosophical texts describe the intent to deconstruct the ontological notion of *ousia* ("being") into self and other (Aristotle, ca. 350 BCE Meta1003b5). Today, the term "other" is well known in philosophy, describing anywhere from a distinct part of the self and one's self-consciousness to a definitive alternate physical reality.⁸ The Hellenistic period further enabled that ontological separation between the self and the other which would lead to discovery of culture-nature duality and eventually even questions of causality. A philosophical term that is applied to this separation is ontological independence (see Corkum, 2008). The awareness of the distinction between self and other defines "independent being" and is typically associated with independence from g-d. It is not coincidence that Hellenism and secularism (even paganism) are associated because they question the causality attributed to divine g-d(s) through ontology.

Stoicism, the Hellenistic school, distinguished between traditional "rhetoric" regarding the other and a "dialectic" by which causality was examined through propositional logic (Algra et al., 2008). The result surpassed Aristotelian term logic and enabled scientific advance because conclusions could become more complex as phrases were analyzed together for their cause and effect rather than as simple terms. There were two consequences to the Stoic use of propositional logic: (1) concepts regarding natural and human induced change could be developed within worlds ruled by the divine; and (2) the dialectic was developed as a method to understand causality as a true and false process, (Ebenstein and Ebenstein, 2000). For example, Dicaearchus of Messana (350-285 BCE), who was Aristotle's student, began the Hellenistic debate of fate within the divine world through argument

7. For discussion of the development of man as distinct from nature see: Desta, D. The Transition from 'Mythos' to 'Logos': The Case of Heraclitus. *Athens Journal of Philosophy*, Vol. 2(1), 2023, 9-24.

8. For discussion of "the other" in philosophy, see: Sarukkai, S. The 'Other' in anthropology and philosophy. *Economic and Political Weekly*, Vol., 1997, 1406-09; Staszak, J.F. Other/otherness. *International encyclopedia of human geography*, Vol. 8, 2008, 43-47.

regarding cause and effect. Under Chrysippus of Soli (279-206 BCE), the school of Stoicism developed logic as a form in which the basic material and soul that comprises the earth could be studied. He concluded that the world was divine but causes had chain-like dependence within that logic. Posidonius of Apameia in Syria (135-51 BCE), a late Hellenistic Stoic from the Seleucid world, wrote *Histories*. This 52-volume work gave detailed account by which events are caused by human psychology and part of the larger cosmos rather than isolated by political forces. Stoicism, despite its efforts at ontological independence, remained short of completion because their dialectic, which derived true from false, only reached fate.

According to Sharples (2014), this left a troubling question among Stoics as they struggled with their ontology. This question regarded the contradiction between a divine repetitive world, and reality in which cycles were observed as different from one another. The Hellenistic conclusion was that, "one cycle can be said to be different from another...but not enough to make any real difference" (Sharples, 2014). One noticeable change that occurred in the school of Stoics, perhaps in response to this dilemma, was a move from the propositional to conditional clause in the dialectic. According to Hankinson (2008: 537), that move was necessary to find a more, "...'middle ground' between the hard determinism of the dialectic (true/false) and an Epicurean swerve that enabled freewill within fate". A proposition is a statement that proposes an idea, generally deterministic, which can be true or false (if-then). The proposition is compared to a conditional clause in which a hypothetical situation is presented with a consequence (either-or). Brennan (2000: 154) remarked that Stoic logic is, "...ideally suited to formulate a theory of conditional impulses". The Stoics, it seems, improvised a way to continue arguing for secular causality, through the conditional clause, despite efforts to restrict the logic to the repetitive divine. This is described in the Methodology and Data section (Content I) using Aramaic divination texts excavated at Tel Maresha. The texts, while addressed to the divine, ensure that ontological independence is preserved through the conditional clause. The form is intended to break the chains of causal explanation that inevitably repeated themselves and enable more favorable human fates.

This major advance in ontology is summarized as a dialectic where nature is fundamentally independent from culture and dynamic. At the same time, culture (as a divine creation) repeated itself continuously despite nature's independence. These beliefs spread through the Hellenistic world, syncretized (merged) with the local cultures, and were instrumental in breaking cultural fate loops. We hypothesize that the difference between nature-centered Hellenistic dialectic and culturally dominant argumentative polemics, such as Roman ethics (Romanitas), would eventually widen into the origins of the Great Schism in Christianity. Early Christianity would emerge as one rational response to these differences and became a suture for the nascent schism. The Hellenistic world was active in conquering the pagus for the polis and held on to the state of Nature. On the other

hand, cultural domination over Nature became the Roman Empire's ontology.⁹ It was a teleological (purposeful) moment in history, and the world was divided between the political realism of Athens as a reflection of the ancient past, and the political reality of Rome as a reflection of the future antiquity. Eventually, the Holy Roman and Byzantine Empires tore apart, but the Christian suture and signs of that schism, are still visible. One logic we followed during the Hellenistic period as it developed through the Stoic conditional clause that promoted degrees of freedom and ontological independence. The second logic is ontological dependence, in which nature and culture are one, unified, and holistic. The evidence suggests that these two logics were represented by two languages respectively (Greek and Latin), two regions (east and west), and involve dispute over secular power (Louth, 2007). Hellenism united the Eastern Mediterranean, amenable to secular ontological independence, and Romanitas united North Africa and Western Europe, where ontological dependence assisted church dominance (Bryant, 2023). In the Methodology and Data section (Content II), church floor mosaics at Hurvat Bet Loya from the Byzantine period (324 – 640 CE) are shown to demonstrate motifs from both logics. Generally, the distinction is visible through secular mosaic carpets with geometric shapes and figurative subjects, juxtaposed with inspirational religious scenes.

There is an inherent sense of political expression by which the ontological independence of the local peasantry carried over to the Islamic period in the form of geometric motifs. We allude to the notion that ontological independence represents a secularism which arose from Hellenism, while ontological dependence reflects holism associated with the Holy Roman Empire. The differences are identifiable in the logic, relationship to the culture-nature duality, attribution of causality, and languages used. Thus far, the connection between the Hellenistic and Byzantine periods appears logical. But that connection becomes more complicated relative to the changes between Antiquity and the Middle Ages, and its connections to Islam are not as apparent. However, the reason to make the connection is important because highlighting the potential secular roots in Islam may point to its ontological correctness as a form of political realism. The emphasis of revelation and spirituality in Islam moved the observer effect from its Hellenistic location, where it had been grounded in earth nature, to that of cultural realism. For example, this is visible in Islamic art which, according to Nasr (1987: 8), "...is of a spiritual nature, a knowledge referred to...as *hikmah* or wisdom". In other words, spirituality became reflected as knowledge separate from earth. This theme is familiar in Islamic landmarks, such as the Dome of the Rock, one of the first Muslim architectural projects, which distinguishes between earth and heaven as a reflection

9. In ancient Rome, the gods were responsible for nature, as their own abode, which led to resource exploitation and eventually strict rules of environmental regulation. See: Kahlos, M. "Who Is a Good Roman? Setting and Resetting Boundaries for Romans, Christians, Pagans, and Barbarians in the Late Roman Empire." *The Faces of the Other: Religious and Ethnic Encounters in the Later Roman World*. Ed. Kahlos, M. (Brepols, Turnhout, Belgium, 2011, 259-74).

of the hikmah. Islamic expression advanced the Hellenistic dialectic as the hikmah which transcended above nature but without destroying the state of nature. This metaphysical exercise was similar to the Byzantine approach to mosaics in which geometric earth and heavenly religion appear side by side.¹⁰

Yet, Islamic progress in its relationship to ontological independence from the Byzantine period became more sophisticated in its transcendentalism (Acim, 2022) as earthly realities were separated from the heavenly sphere. Sufism, a form of post-structural deconstruction or emptiness/nothingness in the western philosophical tradition (Sidiropoulou, 2011), was instrumental in development of this concept which spread during the Mamluk period (13th – 16th-c. CE). Mysticism enacted by asceticism and retreat, and devotion to Sufi texts helped to establish the self-other relationship that was practiced through *ain al-jam* (“the absolute essence of union with g-d”) (Sidiropoulou, 2011). Absolute essence has several connotations, although to our discussion it refers to the condition by which independence of being is necessary for man to achieve union with G-d. As the Sufi became aware, through *ain al-jam*, of the earthly and heavenly duality, the concept of community or *mujtamae* (“society”) became apparent. New political views of society, such as individualism, occurred as a result linked to economic processes such as capitalism (Hayek, 2000). The development of Sufism relative to the High Middle Ages in Europe speaks to a period in which capitalism in the Islamic world found fertile ground. In the Islamic world, Sufism enabled capitalism to resolve the structure-agency debate (Chouinard, 1997) within the context of ontological independence. We examine this in the Methodology and Data section (Content III) through the relationship between Ottoman period Sufism, the *Wird al Sattar Sufi* text, and the pastoralist system identified in the study area at Ed Dawayima.

Methodology and Data

The archaeological survey was completed in 10x10 km quadrants (Dagan, 2006), and the Amazyra and Lakhish (1:20000 scale) map sheets were part of the result. These sheets contain information organized as “sites” where surface material remains (e.g., pottery) were collected and sorted according to period. Surface surveys are used in archaeology to understand periodization in spatial settings and through collection of surface material, differentiation between finds within sites, and typology of finds, settlement patterns can be approximated accurately (Bintliff, 2000). In the study area were 196 relevant survey sites that were described by Dagan (2006) in detail and categorized based on: (1) type find; and (2) pottery scatter per period per type. Type finds included settlements, farmsteads, buildings,

10. Byzantine influence in early Islamic art and architecture commonly appeared. One example are Byzantine octagonal structures that would become known through Islamic architecture such as the Dome of the Rock.

agricultural terraces, winepresses, oil presses, animal pens, orchards, other agricultural activity, limekilns, churches, mosques, and forts. The sites were digitized and stratified in a GIS database according to period of find and sorted in a statistical spreadsheet. The integration of mapping survey assemblages with GIS is one of the greatest challenges and opportunities to deciphering the archaeological record (Haiman, 2022). The data were analyzed in conjunction with a review of agricultural intensification literature (e.g., Turner et al., 1990; Manspeizer et al., 2020). Monoculture agriculture is described as a cultural endeavor in which a single agricultural product is industrially produced on a landscape maximized to this effort. The three periods of most intensive monoculture agriculture were chosen based on a high concentration of 'same type' installations compared to the total. The Hellenistic, Byzantine, and Ottoman periods represent the major historical anthropogenic landscape disturbances to the environmental substrate.

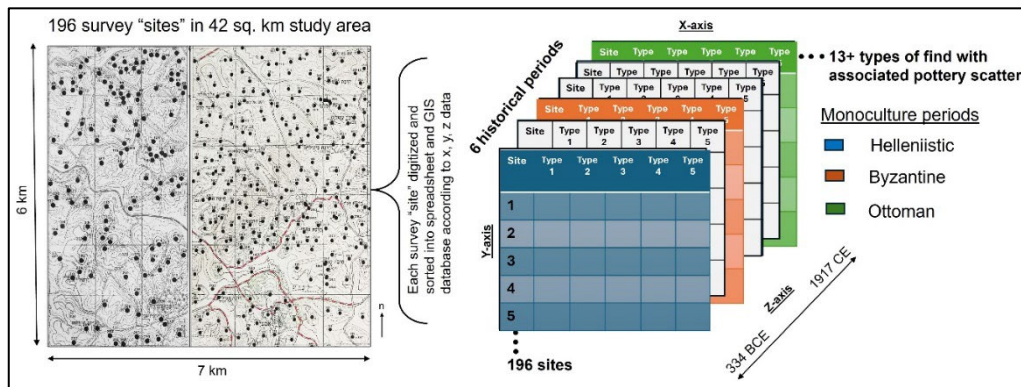


Figure 2. Deriving a GIS database from archaeological survey data. 196 sites were digitized and sorted into site ID, type of find, and period based on the associated pottery scatter. Monoculture periods identified by high concentration of 'same type' agricultural installations Source: Israel Antiquities Authority maps 109 (Amazyia) and 98 (Lakhish) (Dagan, 2006).

Other methods of studying past environmental impact would require detailed archaeological information that does not exist or experimental botany to measure the effect of crops on the substrate. GIS offers a spatial perspective from which qualitative narratives can develop. This type of meta-synthesis (Boeije, van Wesel and Alisic, 2011) of history, philosophy, archaeology, and geography, conforms to work in qualitative GIS (Cope and Elwood, 2009; Kwan and Ding, 2008). The approach using cultural ontology as geopiety in conjunction with spatial data was previously used by one of the authors to examine land-use changes in the American West (Manspeizer, 2007). Regarding material culture, the connection between cultural ontology and cultural ecology is a major effort and innovative (Haenn and Wilk, 2006; Manspeizer, 2006). The insight is worthwhile, as follows in the content section, because the narrative grants agency to the material culture. As such, it becomes possible to follow ontological paths through the geopiety of different historical periods despite the radically different land-uses. Also, it becomes

possible to differentiate the monoculture periods from the periods of extensification or fallow. The archaeological record of the study region within the context of the southern Levant is well documented (see Stern, 2018). Following the Babylonian conquest in 586 BCE, in which Lakhish was destroyed, the southern Judean foothills were invaded by Idumeans from Edom (southern Jordan). After the Near East was conquered by Alexander the Great (334 BCE) the region was referred to as Idumea and a Hellenized Maresha emerged as its northern capital. Following the Hasmonean Revolt against the Greek Seleucid Empire, in 106/7 BCE Maresha was finally abandoned. In 63 BCE, with the Roman invasion by Pompeii, the region began a period of Roman rule which included the Christianization of Byzantine Palaestina. Byzantine rule lasted until the Muslim invasion of the 7th-c CE after which there was an almost continuous period of Muslim rule until the 20th-c with exception of the Crusader period (11th-13th-c CE).

Hellenistic Period (333-63 BCE)

Archaeological excavations at Tel Maresha, and its hinterland to the south (Figure 3), revealed a large-scale olive oil industry from the Hellenistic period (333–63 BCE). Twenty-seven ‘Maresha type’ industrial-scale olive oil presses were carved underground into the bedrock at Tel Maresha and at fifteen / sixteen hinterland sites (Kloner and Zissu, 2013). At its peak during the Hellenistic period, 10,000-12,000 people lived at Maresha. Based on the archaeological survey, an additional 1500 lived at fifteen settlements in the hinterland (Dagan, 2006).¹¹ According to the number and size of oil presses, estimates indicate that 450 mt of olive oil, or 500,000 l, could have been produced annually by this region known as northern Idumea (Kloner and Sagiv, 1989). Based on traditional low-density Mediterranean olive systems (Vossen, 2007), 8000 t olives/yr were necessary to produce this amount of oil, which required between 76,800 and 200,000 olive trees.¹² Egypt was known for not producing olive oil because their climate was not conducive to olive trees. Northern Idumea was relatively close to Egypt and capable of olive oil production. The economic mainstay at Maresha and the surrounding hinterland, and the source of their geopiety, was industrial olive oil production associated with the Ptolemaic dynasty in the 3rd-c. BCE (Lender and Ben Ami, 2018). The large number of Ptolemaic coins found at Maresha and mercantile information from the Zenon papyri (P. Cairo 59006, 59015, 58537), which mention Maresha, indicate that trade with Egypt by the 3rd-c. BCE was substantial (Kloner, 2008).

11. Rural population in the Levant can be calculated as three to five people per 0.1 ha and a settlement is akin to a hamlet which today is defined as maximum 100 people.

12. For metric abbreviations: t = tons, l = liters, mt = metric tons, ha = hectare.

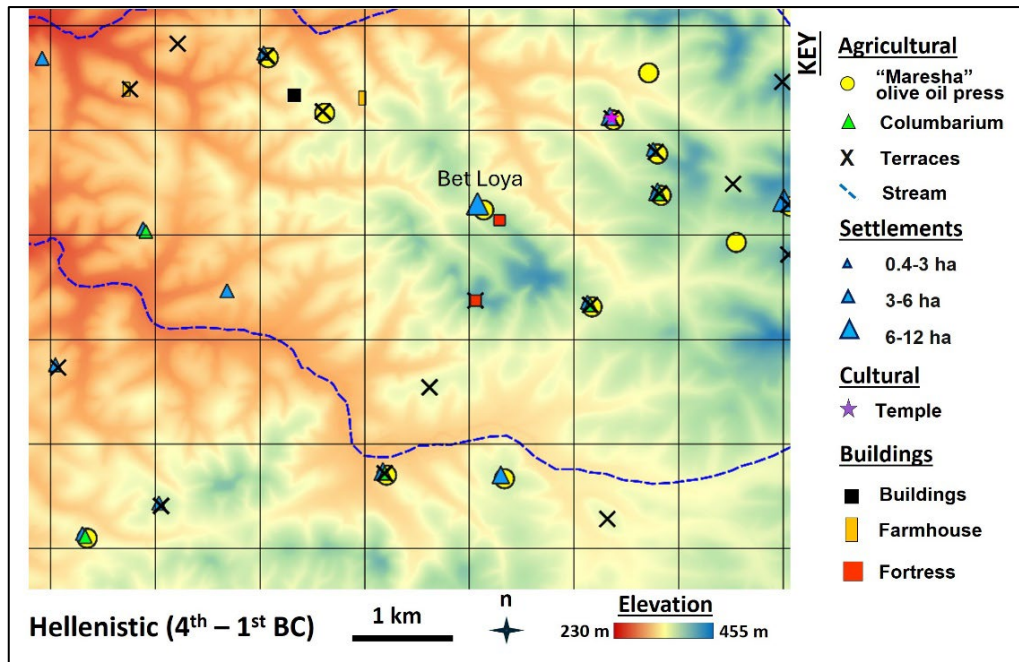


Figure 3. Hellenistic Period in the Study Area with Relevant Data from the IAA Archaeological Survey and displayed with GIS

Source: Y. Dagan 2006, and the authors 2024

However, in 200 BCE the Seleucid dynasty in Syria defeated the Ptolemies at the Battle of the Panias and forced a treaty. This coincides with a major 'crisis' identifiable at Maresha during the 2nd-c. BCE in which the olive oil-industry began to be phased out (Kloner and Sagiv, 1989; Stern, Sagiv and Alpert, 2015). The assessment is based upon deliberate conversion of one third of the subterranean oil presses and half of the columbaria to cisterns or quarries before 106/7 BCE, the terminal date of Maresha. Kloner et al. (2010) also suggests that the Maccabean Revolt may have resulted in a Judean boycott of Idumean sacrificial doves due to Idumean assistance to the Seleucids. This would account for the sudden reduction of the number of columbaria in Maresha as well as the subsequent increase in the number of columbaria built in Judea at this time. The transition and the diminishment of the olive oil industry at Maresha may be described in stages: (1) from 201 BCE (after the Battle of Panias), the Syrian based Seleucids had a steadier source of olive oil than the Ptolemies due to their climate but allowed continued trade between Alexandria and Maresha in olive oil; and (2) from 169 BCE (the failed Seleucid invasion of Ptolemaic Egypt) and 167 BCE (the Maccabean revolt), the Seleucids severed economic ties between Maresha, Alexandria and Jerusalem (Berlin, 1997). According to Marciak (2020: 59), by the Maccabean revolt during the reign of Antiochus V, there was a Seleucid garrison at Maresha.

Between 201 and 107/6 BCE, the loss of the olive oil economy with Egypt and quartering the Seleucids was undoubtedly a great crisis in geopiety for the inhabitants of Maresha. That crisis is preserved in material culture discovered at or

near Maresha, including the Heliodorus Stele and more than 1200 Greek and Semitic divination texts.¹³ Of these divination texts, 127 were written in Aramaic on ostraca (Eshel and Langlois, 2019; Eshel and Stern, 2017) and date to the 3rd-2nd-c. BCE. These share similar written structure which contain conditional clauses as divinations. This refers to a phrase, “either...or”, and regards scenarios such as health, death, marriage, property, astrology, and the gods. These texts are typically compared to Akkadian omen texts from Mesopotamia which share a similar structure. However, as noted in the literature review, conditional clauses are also familiar from Stoic dialectics. Chrysippus, the second Stoic leader, argued that divination enabled a view to the process by which the world works because the future is not accidental (Zeller 1880). Posidonius saw diviners as part of the cosmos who could see the future through cleromancy (a formal description for divination). From the few texts that have survived, researchers have concluded that divination ‘theorems’ in the Stoic tradition were also sometimes written as conditional clauses (i.e., Sharples, 2014; Brennan, 2000; Hankinson, 2008). The result is the Stoic ‘soft determinism’ that would encourage degrees of freedom for individuals and groups in the pagus. It is this freedom that would enable response to the crisis of the 3rd-2nd-c. BCE within the constraints of Hellenistic causality. According to Eshel and Langlois (2019) a group of divination texts appear among the 1200 discovered that include both propositional and conditional logics. Stern (2018: 942) states that material finds at Maresha reflect “syncretism of cultures” which corresponds to descriptions of the Hellenistic world as heterogeneous (Walbank, 1981).

It is possible the Maresha Aramaic divination texts, as one collection, are an example of that syncretism and reflect local development of conditional clauses in the local vernacular. They may relate to either Mesopotamian omens or Stoic divination. Based on further analysis by Eshel and Langlois (2019: 220), the Aramaic group at Maresha is distinct from Mesopotamian omens based on the form, structure and material remains. The Mesopotamian structure is described as clear and complete compared with the elliptical and obscure Maresha form. For example, the Maresha Aramaic “either-or” inscriptions begin with *Hen* which translates as the affirmative statement “it is” and may refer to *elohin* (“g-d/s”) (Eshel and Langlois, 2019). If ontological independence was the hallmark of the Stoic move to conditional clauses than the affirmative “it is!” could also be read as the question “it is?”. This type of opening question would enable more degrees of freedom for the divination, turn it into a more hermeneutic loop of ‘soft determinism’ and liberate cultural possibilism. That would explain the elliptical form while the obscurity is explained by the inherent question regarding divine causality. This aligns with the Stoic arguments regarding causality posed by

13. The Heliodorus Stele was discovered at Tel Maresha circa 2006. It describes taxes imposed by Seleucus IV, ruler of the Seleucid Empire, in 178 BCE. The stele is an example of archaeological find that validates the hardships described in the Second Book of the Maccabees in which Heliodorus is mentioned.

Dicaearchus, Chrysippus, and Posidonius that dealt with explanatory chains and political forces. In crisis, the Idumean Maresha sought escape from the fate of Seleucid rule and the loss of their economic wealth through divination. Interestingly, these concepts return in the modern discipline of geography as political ecology, a field that has examined human-environmental processes as causal chains (Blaikie and Brookfield, 2015; Rocheleau, 2008).

Byzantine Period (324-640 CE)

After the abandonment of Maresha in 106/7 BCE, the main regional settlement moved two km north to Betaris, which would become Eleutheropolis (city of the free) in 200 CE (see Figure 1 for locations). In general, the Roman period (67 BCE—324 CE) saw rural repopulation and land-use extensification. However, a more significant change, i.e. land-use intensification, occurred during the Byzantine period (324—640 CE) as a vast and organized Christian population inhabited the rural study area (Gutfeld and Ecker, 2013). Approximately 5000 people lived in forty-seven hinterland settlements and twenty farmsteads, with ten churches and chapels. Seventeen olive oil presses, nineteen limekilns, and agricultural terraces at 100 sites were found with Byzantine period pottery. The monocultural intensification included a leap from thirty-seven winepresses found with Roman period pottery to 183 winepresses with Byzantine period pottery (Dagan, 2006). Wine making, even industrially, is evident in the southern Levant since 4000 BCE (Harutyunyan and Malfeito-Ferreira, 2022). But Byzantine Palaestina was a major producer of wine (Mayerson, 1985) which concurs with the notion that Palaestina flourished as a wine producer within the larger Byzantine context (Seligman, Haddad and Nadav-Ziv, 2024). The genre de vie of viticulture and the industrial geopiety is clear in a landscape filled with rock-hewn winepresses used during this period. Based on 183 winepresses and ancient methods of viticulture (Weber, Hirschfeld and Smith, 2009), the volume of wine produced then are calculated at 2 t of grapes per hectare and 230 l of wine per ton of grapes. 2667 mt of wine may have been produced per year in the study area based on maximum utilization of 32 km² available land in the hills for vineyards.

The industrial monoculture left an impression of the regional rural settlement pattern and political economy. On the one hand, there was organized effort with settlement hierarchy visible through building sizes, groupings and types ranging from hamlets, to farmsteads, and individual buildings. The settlement concentrated around rock-hewn surface winepresses, the vineyards, and labor for wine production. This pattern and process is noted in traditional Byzantine rural studies that depict law and order in Christian landscapes (Piccirillo, 1985; Lefort, 1993; Fischer, Taxel and Amit, 2008). On the other hand, within the hinterland there is a significant difference between the more settled spaces and those areas describable as more rural (Figure 4).

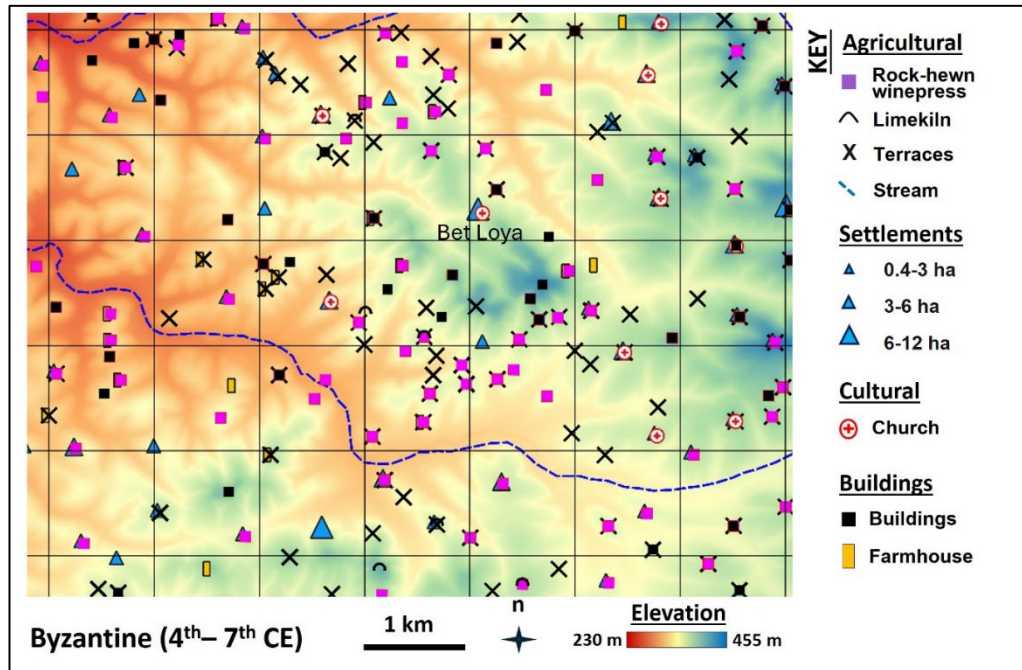


Figure 4. Byzantine Period in the Study Area with Relevant Data from the IAA Archaeological Survey and displayed with GIS

Source: Y. Dagan 2006, and the authors 2024.

This may lend credibility to the interpretation that a rural pagus remained intact throughout the Byzantine period. That conforms to descriptions of the rural populations in Byzantine Palaestina, notably near Eleutheropolis, as “predominantly” pagan (Taxel, 2008; Seligman, 2011). It also supports work that notes a continued pagan population elsewhere in Byzantine period Christian regions (Karaulashvili, 2024). According to (Taxel, 2008), “the spread of Christianity into the rural hinterland of...Eleutheropolis was probably a somewhat slower process, not significantly felt until the fifth century...However, by the end of the Byzantine period this area was dotted with numerous Christian settlements (villages, farmhouses and various monastic sites).” The church at Khirbet Bet Loya (see Figure 4) has been attributed as a monastery by Patrich and Tsafir (1985) which is logical given the pagan population and attempts to Christianize the area (Bar, 2005). Yet, the three floor inscriptions in the monastery mosaics describe donations from the village. Based on that attribution, and a lack of monastic dwelling cells, Gutfeld and Ecker (2013: 173) concluded that the church was private.

If it was private or industry related, then the floor mosaics (Figure 5) may reflect local sentiments of a pagus that was never fully conquered. This schism also reflects the different geopieties associated with pagan and Christian populations. Only at Khirbet Bet Loya, of the ten churches identified in the study, has the excavation provided enough information to describe that social schism through mosaics (Gutfeld and Ecker, 2013). As discussed in the literature review, the appearance of polemical mosaics in the Byzantine period was manifested in two

ways: (1) differentiation between Hellenistic and Roman inspired mosaic; and (2) through earthly patterns and heavenly motifs. The Hellenistic period floor mosaics are known to have contained edge frames within frames and often included a center figure.¹⁴ As Figures 5 (a-e) demonstrate, the nave, chapel, and subsidiary chapel at Bet Loya contained a style typical of Hellenistic architecture and reflect argument through their earthly and heavenly themes.

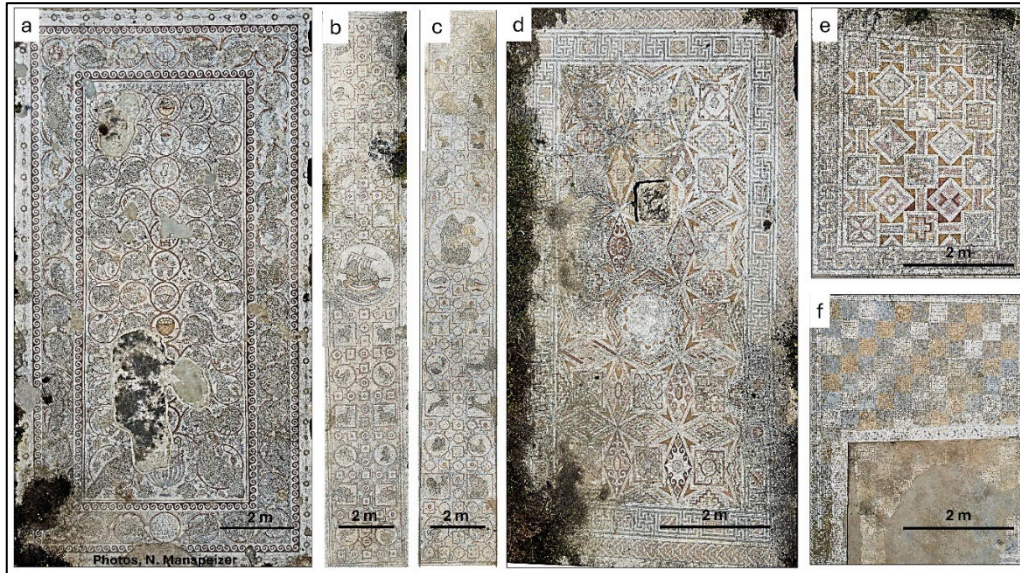


Figure 5. Framed Mosaic Carpets from the Khirbet Beit Loya Monastery influenced by the Hellenistic Period: (a) Nave, (b & c) Aisle, (d) Chapel, and (e) Subsidiary Chapel. Carpet (f) from a Subsidiary Chapel is Roman Style with Color

Source: N. Manspeizer drone photos 2024.

The Hellenistic influence speaks to a secularism which is promoted by scrolls and medallions populated with animal figures and agriculture products.¹⁵ The majority of depictions at the Bet Loya monastery reflect the earthly category, however, religious scenes are also embedded in several locations (see Figures 5 & 6). Figures 6 (a & b), for example, show scenes that may represent the life of Jesus from the aisle carpets, and Figure 6f includes medallions on the nave carpet with sacramental items such as chalices that were not damaged by iconoclasm. The dominance of the secular Hellenistic form is telling regarding the schism between

14. RA Evyasaf, Technion Israel Institute of Technology, Faculty of Architecture and Town Planning, lecture on the architecture of the Herodian period at the Bible Lands Museum, Jerusalem (4/19/2024).

15. Technical terms for mosaics after Habas, L. "Mosaic floors of the monastery in Sede Nahum." *Cities, Monuments, and Objects in the Roman and Byzantine Levant: Studies in Honor of Gaby Mazor*, Oxford. Eds. Atrash, W., A. Overman and P. Gendelman. (Archaeopress Publishing Ltd., Oxford, 2022, 221-33).

the local pagan population, to whom geopiety defined their genre de vie, and the way the church spread in the hinterland pagus.

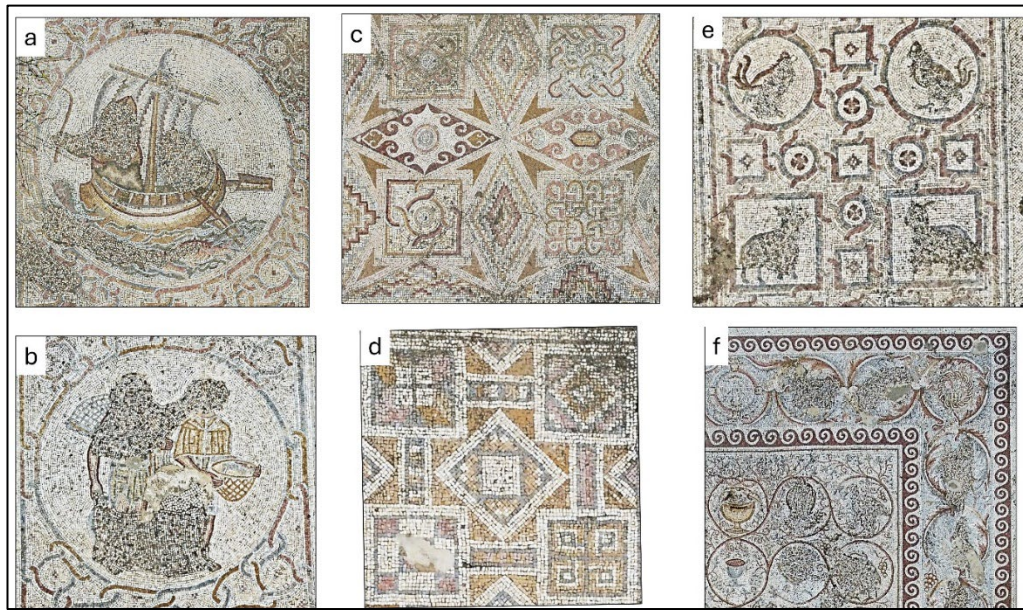


Figure 6. Mosaic Details at Beit Loya: (a & b) Heavenly Figures in aisles with Iconoclasm, (c & d) Geometric Patterns in Chapel and Subsidiary Chapel, (e & f) Iconoclasm in Aisle and Nave

Source: N. Manspeizer drone photos 2024.

Almost all the mosaics have iconoclastic damage which includes rearranging the tesserae of the figures rather than complete destruction. Therefore, it is not clear who the iconoclasts were and dating iconoclasm is problematic (Ribak, 2012). Pagan iconoclasm is one possibility, indicating that when Islam spread, the local population had been divided. Local pagan sentiment that opposed the presence of Christianity, or centrality of the viticulture industry may explain the predominance of earthly themes in the Bet Loya mosaics. We discussed some of the more ontological reasons for this affinity based on the pagus and the centrality of nature within the duality. But there is also evidence in Christian history, specifically the debate over monophysism, that the notion of *physis* (“nature”) was known. This was a subject we describe earlier related to the essence of subjects regarding metaphysics and the self-other. We hypothesize that the notion of multiple “natures” was more familiar to the local population and carried through to the pagans during the Byzantine period as dyophysitism. This discussion suggests that the debate over monophysism during the Byzantine period related to the essence of natures beyond the religious connotations. Based on the duality of the Hellenistic dialectic, and ontological independence, it would seem the local population focused on their genre de vie and the pagus within the industrial monoculture to survive. This approach helped them to intensify the land-use for industrial monoculture as a cultural exercise of genre de vie. Their geopiety,

reflected in the monastery mosaics, became a driver for investment in landscape which concurs with notions of *landesque* capital in geography (Blaikie and Brookfield, 2015).

Ottoman Period (1516-1918 CE)

After one thousand years of intensive agricultural use described above, the region became characterized by a sparse population during the Early Muslim (640–1099 CE) and Medieval periods (1099–1516 CE). There is significant archaeological evidence of renewed land-use during the Ottoman period (1516–1917 CE). This coincided with the spread of Qalwati Sufism to the region from Egypt, beginning in the 15th-c. (Weigert, 1999). The study area had twelve permanent Ottoman period settlements with two mosques, four sheikh's tombs, a *khan* ("inn"), and one Muslim cemetery (Varga and Israel, 2014; Peretz and Talis, 2012; Lifshits, 2017). According to Dagan (2006), Ed Dawayima was the site of a Sufi center in the tradition of Tariqa al Qalwatiya, which emphasized both individualism and participation in community. Ed Dawayima grew as a village agriculturally with thirty-nine orchards and agricultural terraces at thirty-one sites that contained Ottoman period pottery. Victor Guerin (1869) noted a population of nine hundred people there.

Significantly, several pastoralist movements were identifiable within the archaeological remains from the Ottoman period (Dagan, 2006; Frantzman and Kark, 2011) including: (1) seasonal grazing from the Hebron mountains; (2) temporary occupation by Bedouin from the south; and (3) grazing by local villagers of the region. Twenty-six Ottoman period animal pens are found throughout the study area connected to these pastoralist movements that range regionally in size from 5 x 4 to 15 x 15 m (see Figure 7). Based on an average 9.5 x 7.5 m per pen and two-three sheep or goats per 1 m² (USDA, 2006), average carrying capacity of the study area was between 3705 to 5558/yr. That number is consistent with studies in historical Palestine (Namdar, Gadot and Sapir-Hen, 2024) and the modern Mediterranean (Giourga, Margaris and Vokou, 1998). We know that animal grazing (pastoralism), as a form of monoculture, when practiced in one area over time, requires two types of change: (1) movement of the animals; and (2) seasons. Attachment (geopiety) to place becomes critical for cultural survival (Manspeizer, 2007) and is similar to the wisdom of sessility in vegetation (immobility). However, grazing systems can also develop mobility and demonstrate flexible geopiety in more advanced cultures. That functional explanation is known from grazing system theories in which sustainable environmental management and carrying capacity of the land are related (Heitschmidt and Stuth, 1991; Galaty and Johnson, 1990). As such, connection (geopiety) between pastoralist and environment includes change (nomadism), and a comprehensive understanding of the dynamic nature of the system (Khazanov, 1983).

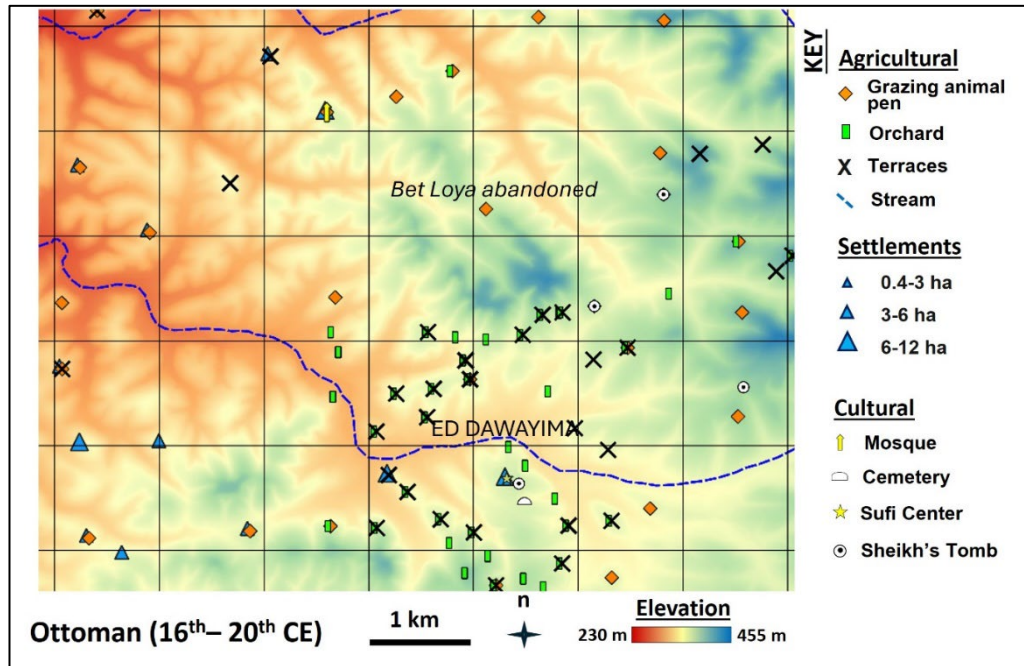


Figure 7. Ottoman Period in the Study Area with Relevant Data from the IAA Archaeological Survey and displayed with GIS

Source: Y. Dagan 2006, and the authors (2024).

These notions were described earlier regarding Hellenism, and the contradiction between the divine repetitive world and observed reality in which natural cycles were different. By the Ottoman period, the relationship between variables, such as carrying capacity, seasonal changes, geopiety and climate change, may have become more conscientious. There were three simultaneous systems within the larger pastoralist system at Ed Dawayima which required complex environmental management. The climate regime at Ed-Dawayima would mandate a northern movement from the south during the dry summer months, while the west movement would have occurred from the east during the wet winter months. Complex local to regional scale pastoralist management based on indigenous knowledge is known from other pastoralist systems around the world (Galaty and Johnson, 1990). What part did Sufism play in that process and how is this related to industrial livestock grazing as monoculture?

Such a complex pastoralist system could be attributable to the diophysitic, dualistic, ontological independence born from the Hellenistic dialectic that developed into regional Sufism. That effect however was relative to the grazing industry in Ottoman Palestine which is documented through foreign privatization (Kark, 2017) and the urban meat industry (Namdar, Gadot and Sapir-Hen, 2024). Foreign *efendi* (landlord) investment in Palestinian land, such as grazing rights, was common and the products sold for profit by the investors in urban centers such as Jerusalem, Jaffa, and Haifa. Tariqa al-Qalwatiya, the local Sufism practiced at Ed-Dawayima, emphasized individualism and community (Trimingham, 1998) which contribute

to each other in form of capitalism, such as mercantilism. In the literature review ain al-jam was described as the union with G-d, in which the relationship between self and G-d led to the transcendentalism. (Acim, 2022). The idea was acceptable within the Islamic world because of the dyophysitic nature of their duality which related to two natures (self and divine as other) (Sidiropoulou, 2011). This may be viewed relative to monophysism in which the only nature of being (and causality) was divine. The discussion becomes very complex regarding multiple natures of being or Natures.¹⁶ However, for the scope of this discussion, Sufi traditions such as Al-Qalwatiya may be described as rectifying the negative aspects of pastoralist community, such as efendi privatization, through support of more earthly solutions with their devotion (Weigert, 1999). Practices such as, *Zuhd* ("individual asceticism"), ain al-jam, and *khalwa* ("retreat") by the *dervish* ("Sufi member") led to a twofold result: (1) the connection to land, geopiety, was made stronger relative to the range privatization and grazing industry; and (2) capitalism resulted from the privatization but also the local Sufi response.

In the west, secular nationalist and Protestant forms of capitalism, such as British free trade or American colonial mercantilism, were similar to this Ottoman period development and also associated with individualism. But, in the Middle East, the ontological form of Islam enabled a foundation for capitalist success and reduced potential conflict between privatization and the peasantry. While the privatization would cause rural peasant conditions, the ontological independence offered through Sufism liberated the pastoralist community at Ed Dawayima. *Wird al Sattar*, composed in the 15th c. CE, is the main devotional text for the Tariqa al Qalwatiya order (Weigert, 1999). The title means "litany of the veiled secrecy" and speaks to the *raison d'être* of the Qalwati dervish which was to veil the community from evil. The litany is rarely discussed in Western literature although it is possible to surmise from the sacramental behavior associated with its practice that the mysticism was functionally oriented (Trimingham, 1998). According to tradition, one follower of Qalwatiya Sufism at the turn of the 16th-c. CE was Bayezid II, the Ottoman Sultan. Bayezid II turned to a Sufi sheikh, Chelebi Khalifa, to read the future so the correct path to ascend the throne could be determined. Reading the future was a metaphor for veiling the community from evil so that true path could become clear of hindrance. At Ed Dawayima, a center of the Qalwatiya order, that veil was embodied through the Sufi who separated the pastoralist community from negative influences. The Sufi approach helped reduce conflict between the local indigenous population and foreign investors by veiling the political realities.

16. The notion of multiple states of nature also conforms to theories in ecology such as multiple stable states. See: Dublin, H.T., A.R. Sinclair, and J. McGlade. Elephants and fire as causes of multiple stable states in the Serengeti-Mara woodlands. *The Journal of Animal Ecology*, Vol., 1990, 1147-64.

Results

Results are divided into three sections: (1) tracing duality within the pagus, as environmental and metaphorical other, from the Hellenistic to the Ottoman period; (2) contributions to the study of plagioclimax in the Mediterranean and southern Levant; and (3) the validity of the qualitative model to explain anthropogenic disturbances on the landscape.

First, this paper explored the development of culture-nature duality between the 4th-c. BCE and the 20th-c. CE in the southern Levant. The Hellenistic, Byzantine, and Ottoman periods are examined in detail as a case study because they reflect major monocultural land-use periods. Observer effect was interpreted as the logic by which cultures related to the environmental other and traced to early metaphysics and dialectic. The duality, as a product of observer effect, developed into ontological independence, dyophysitism and capitalism. Monoculture is thus defined as a landscape scale expression of a cultural effort through industrialism and intensification. This theme extends through the pagus during the three periods with an emphasis on industrialization and intensification. The exercise of separating intensification from extensification became significant in division between the eastern Greco and western Roman worlds. For our study, the need to distinguish spatially according to this cultural ontology is necessary because of its differential impact on the landscape. This paper concentrated on the tradition of ontological independence that developed within the pagus, as environmental space. Figure 8 represents the tradition of duality as a branching developmental tree or road map (thick blue line).

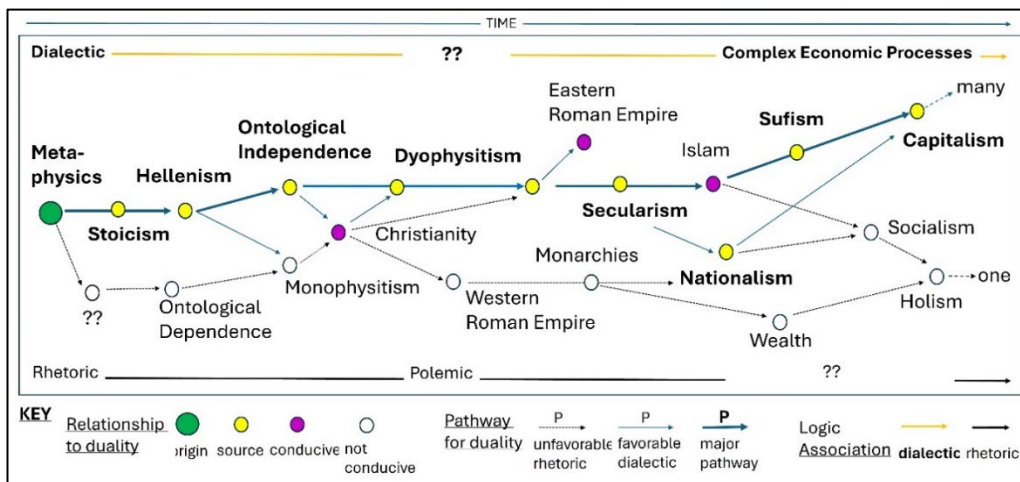


Figure 8. Schematic Road Map (broad blue line) from Metaphysics to Capitalism, with Favorable (thin blue) and Unfavorable Branches (dotted black). Work based on Major Historical Developments related to the Culture-nature Duality and Ontological Independence over Time Source: the authors 2024

In this way, capitalism became the development of dialectic / ontological independence and juxtaposed with socialism that developed from a tradition of

rhetoric/polemics. The pagus, as metaphor, is useful because it represents the position of self, relative to other, as a reflection of cultural critical realism. The difference between ontological independence and ontological dependence was defined as the distinction between secularism and religion. Thus, the tradition of capitalism may be traced to that critical realism, negation of the divine, and the subsequent intensification which resulted from ontological independence.

Second, this raises a question regarding the intensification of land-use in the pagus and the land-degradation that resulted from industrialization. The critical differentiation is between intensification and extensification. Intensification led to plagioclimax yet also helped conserve those areas not used. This is juxtaposed with extensification, in which the environmental degradation may have wider spatial distribution but not result in plagioclimax. In plagioclimax regions, the substrate becomes affected by disturbance and vegetation cannot recover to a climax state. Figure 9 shows previous work by the authors (Manspeizer and Karnieli, 2024) in which the pagus is exposed through the archaeological survey data (Figure 9a) and GIS analysis. Distance to agricultural installation images (Figure 9b) were derived for each period and land-use intensity images (Figure 9c) derived using trend analysis. A cumulative land-use intensity image of the three periods was derived (Figure 9d) in which the pagus emerges in-situ, spatially and visually (Figure 9e). This digital view of the pagus is original because it reflects the historical ontology of a geographic space.

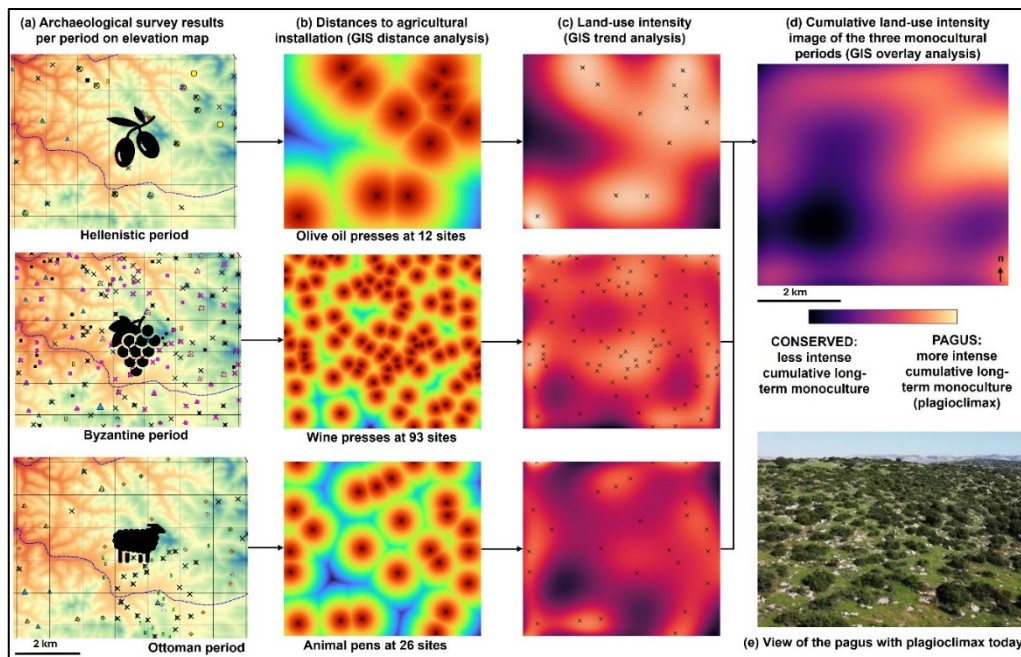


Figure 9. A View of the In-situ Pagus from GIS Analysis of Archaeological Survey Data
 Source: the authors 2024.

As geopiety gained spatial form through long-term ancient monoculture, the disturbance factor became reinforced over time. Pattern, as landscape, gained “residual” power as the landscapes was inherited (Manspeizer et al., 2020; Manspeizer, 2006). This is the case in the study area, where over 2300 years a pattern developed between areas with more and less intense anthropogenic impact which today still leaves its mark on the vegetation. Many of the areas less-used for ancient monoculture are recognized as national parks in Israel which conforms to these long-term patterns. By continuing to sacrifice the plagioclimax zones, the less-used areas become potentially richer biologically as wilderness. If the ontological logic and landscape patterns are preserved, conservation can become more effective within the same capitalist model in which it developed. In this manner, industrial intensification may have produced plagioclimax but also potential conservation areas. It is implied from this, based on the discussion of causality in the paper, that the Stoics understood that the pagus would become a sacrifice zone for the polis over time while strengthening the wilderness at the same time.

Third, regarding the validity of the model to define anthropogenic disturbances on the landscape through qualitative analysis. GIS techniques proved useful to provide a quantitative picture for qualitative analysis which appears to be relevant for archaeological sciences and history. Based on the research, there were two main groups that were distinguished by sorting the archaeological survey data and correlating the results with ancillary historical and archaeological evidence. On the one hand, the monocultural group was distinguished based on “same type” agricultural installations relative to total, and the second group were the extensification and fallow periods. Once the three monocultural periods were grouped, the study could question their similarities and differences which was largely a qualitative explanation. Further explanation may seek to fill archaeological gaps or experiment with botany to understand the impact of monocultural crops on the substrate. However, the critical piece of the puzzle lay in the cultural intention to maximize landscape production which could only be derived through the historical narrative. By establishing each period’s cultural relationship with the landscape, or ontological ecology, industrialism was identified as the driving force of environmental impact. In other words, the proximate causes of disturbance (olive trees, vineyards, and grazing animals) and their impact on the substrate, was related to the geopiety. However, for each period it was identified that the geopiety occurred as monoculture within a context of industrially related land-use. The qualitative method is validated because it helped standardize that measure through ontology as it related to the pagus to reveal the industrialism. Filling archaeological gaps and conducting experimental botany will be more accurate due to the knowledge base established in this paper.

Conclusion

In this paper we explain a critical reality of ancient monocultural impact in the southern Levant and demonstrated that ontological independence and geopiety are both contingencies for capitalism. This is logical because it means that the independence of nature and cultural relations to that independence produce an economy by which culture and nature exist as a duality. The southern Judean foothills of Israel exhibit a long-term impact from that relationship in the form of a plagioclimax. This impacts on the modern land-cover (Manspeizer, 2021; Manspeizer and Karnieli, 2024) and has widescale regional effect. This paper described a qualitative method to explore the ontological reason for this phenomena through monocultural maximization of the landscape. The paper describes the development of ontological independence between the 4th-c. BCE – 20th-c CE as an observer effect from dialectics to complex economic processes. Periods of ontological independence through the 2300 years were consistent with periods of industrialized monoculture which had consequences for the landscape. Geopiety was explored and the production of olive oil, wine, or animals were related to the agricultural installations discovered during archaeological surveys. Further work can now examine the mechanical-physical impacts of the three monocultural forms (olive oil production, viticulture, and pastoralism) on the substrate and attempt to identify plagioclimax affected areas regionally. Additionally, the difference between the agricultural intensification associated with the industrialized landscapes and agricultural extensification was noted which is important because they produce different landscape patterns.

Such “ontological ecology” can emerge as an important field of study in which cultural attitudes toward nature may be understood through practice. The ideas that were discussed represent two processes: (1) development of duality as a significant ontological foundation; and (2) changes of form by which that ontology is enacted on the landscape. The combined effect reflects the duality in which ontologically independent cultures interact with a landscape but become vulnerable to industrialization processes. One question that arises regards the constraints on dualistic/capitalistic cultures because in the modern world, capitalism and restraint are not necessarily synonymous. However, based on the study, there are two positive outcomes: (1) while leading to plagioclimax in one area, the industrialization of the pagus also led to conservation in another. This is juxtaposed with cultures of extensification which may not lead to substrate collapse but more widespread surficial damage ecologically; and (2) the ontological independence led to a relationship between the industrial investor and those who inhabited the pagus. This relationship was seen clearly in the case studies presented as was development of genre de vie through geopiety of the local populations. Cultural expressions, such as Stoic philosophy, Byzantine mosaics, and Sufi literature, helped give voice to that genre de vie. The landscape, itself material culture, helped complete the picture through its own hidden patterns and ousia (Aristotilian being).

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