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Environmental, Economic and Political Constraints on Ancient Settlement Patterns in the Wadi al-Yabis Region

Abstract

At least fifty millennia of human exploitation of the Wadi al-Yabis catchment in northern Jordan has left evidence of both shifting economic strategies, and their sometimes drastic role in the evolution of the landscape. The natural topographical and climatic variability of this wadi catchment presented diverse economic potentials as well as specific environmental constraints to ancient populations. Alternating cycles of local and external political control are also reflected in the settlement history of this area.

The Survey Area

The Wadi al-Yabis catchment includes an area of approximately 186 km², descending from the Ajlun highlands c. 1200 meters above sea level, to the Jordan River c. 300 meters below sea level in the central Jordan Valley. Annual rainfall is presently 600 mm or more in the highlands, while the lower catchment receives less than 300 mm per year. The great topographical and climatic range within the catchment's c. 18 kilometer length results in a steep ecological gradient with several distinct zones. Remnants of a dense pine, oak and pistachio forest cover the highest elevations, yielding to an open scrub oak forest in the middle reaches, which shifts to steppic grasses, weeds and Acacia species in the Jordan Valley.¹ Terra rossa soils prevail in the highlands, while colluvial and alluvial soils are common in the foothills and in the lowlands. Springs

are quite common along the eastern escarpment of the Jordan Valley, at the confluence of several small tributaries in the middle course of the wadi, and at the headwaters of the catchment.

Survey Coverage

This diversity of environmental factors makes the Wadi al-Yabis an ideal study area for an intensive archaeological survey that can recover detailed evidence of a long history of different adaptive strategies in a highly varied landscape.² During our surveys, we have visited most of the sites known from previous explorations in order to verify their reported sequence of occupation.³ In this way, we were often able to confirm the previous pottery readings, and were able to identify formerly unrecognized periods of occupation at approximately 60% of the sites.

Three transects located in each environmental zone in the wadi catchment have been intensively surveyed by foot in order to identify the patterns of small, less-visible sites, and to provide equivalent units of observation for comparison. A large number of new sites have been discovered in these transects, ranging in date from the Lower Paleolithic to the Ottoman period, and varying in size from few square meters to several hectares. This shows the potential of intensive foot coverage; one of the main results achieved by this intensive survey strategy has been to reduce the disproportion between large "urban" sites (mostly identified by Glueck and Mittmann) and less prominent village, camp and specialized sites. This allows a more balanced

¹The active floodplain of the Jordan River (the Zor) is an exception, where several tree species flourish, such as Cypress, Tamarisk and Oleander.

²The Wadi el-Yabis Survey is part of a multi-phase joint University of Arizona — Università di Roma project, directed by Jonathan Mabry and Gaetano Palumbo. This project is partially financed by the Italian Ministry of Foreign Affairs and the Italian National Research Council (CNR). The first three seasons of survey and test excavations were conducted in 1987, 1989 and 1990. An additional season is planned for the year 1991.

³Previous investigations in the area include the works of Schumacher (Steuernagel 1925:108; 1926: 11-12), McCown (1930: 23-26), Abel (1938:352) and Augustinovic and Bagatti (1952:276-299), all concerned with the history and identification of Biblical and Classical sites. The first systematic archaeological survey in the area was conducted by Glueck (1951:259-288). In the 1960's, Mittmann (1970) surveyed the most prominent tells and hilltops, and thereby identified several sites that had escaped Glueck's attention. The section of the Jordan Valley included in our survey area has been archaeologically explored several times (Glueck 1951: 210-231; Mellaart 1962; de Contenson 1964; Ibrahim, Sauer and Yassine 1976; Muheisen 1987), but none of these surveys achieved intensive coverage of the area.

reconstruction of the evolution of human settlement and land use in this area.

The high density of archaeological sites found in our intensively covered sample transects indicates that the total number of sites will certainly increase with each additional season of fieldwork; but we believe that most of the medium and large settlement sites are already known and the general demographic trends are well represented. On the other hand, identification of smaller sites provides a more accurate view of the total patterns of land use, urban-rural relationships and rural subsistence throughout the history of the wadi's exploitation.

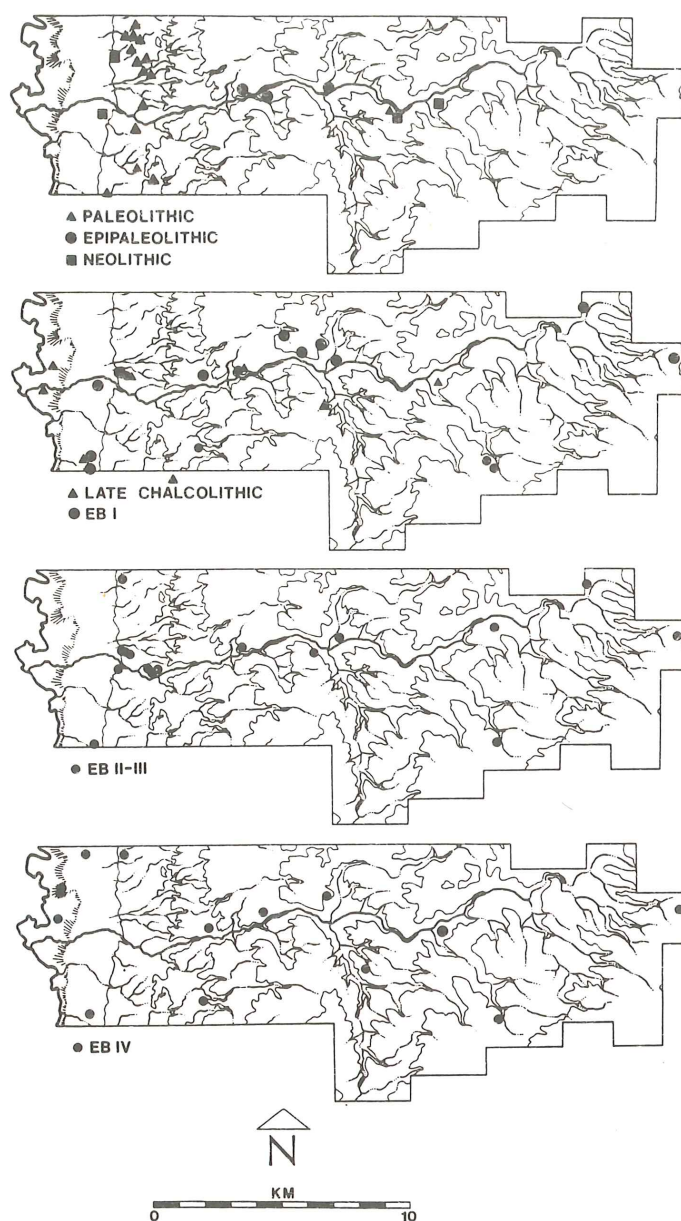
The following sections of this paper will discuss the main demographic trends and the shifting patterns of settlement and land use in this area, attempting to identify both the impact of human activities upon the landscape, and the environmental and political constraints upon human exploitation of this area in northern Jordan.

Prehistoric Patterns (FIG. 1)

The oldest evidence for human utilization of the Wadi al-Yabis catchment (and perhaps in northern Jordan) is provided by a Lower Paleolithic handaxe and flint tools found in a wadi bank near Tell Abu al-Kharaz, in the Jordan Valley (Palumbo, Mabry and Kuijt 1990: 97, 99). A large number of Middle Paleolithic sites have been also identified in this transect, immediately above the Jordan Valley. They represent Middle Paleolithic exploitation of the margins of the late Pleistocene Lake Lisan, which filled the Jordan Valley until late Epipaleolithic times. The Middle Paleolithic stone tools found among the flints cemented in the conglomerate of a collapsed cave in the middle course of the Wadi al-Yabis (site WY183) is an indication that this area, and possibly the upper catchment, were also used during this period.

Epipaleolithic use of the catchment is represented at Tell al-Maqlub West (site WY164), where a Kebaran site was identified in 1990, and at Jabal al-Mustah (Mabry and Palumbo 1988: site 24), where a typical late Natufian lithic assemblage was found. Several other probable Epipaleolithic sites have been located in the Wadi al-Yabis catchment, attesting to an intensive use of this area during the period.

Before the beginning of the present survey project, Neolithic use of the Wadi al-Yabis catchment was only represented along the eastern edge of the Jordan Valley (Kirkbride 1956). The identification, in 1989 and in 1990, of two important Neolithic sites dated to the main Pre-Pottery phases of that period (PPNA and PPNB) in the middle course of the Wadi al-Yabis gives a better perspective on the evolution of human settlement in this area. The early PPNA cave site of 'Iraq ad-Dubb, found and test excavated in 1989, and more extensively excavated in 1990, is the best preserved PPNA site found in Jordan so far (Palumbo, Mabry and Kuijt 1990; Kuijt *et al.* forthcoming). The newly found PPNB site of ar-Rahib is a large (3



1. The Wadi al-Yabis Survey: Paleolithic to Early Bronze Age sites.

hectares) flint scatter only two kilometers east of 'Iraq ad-Dubb. Prehistoric sites, however, may be under-represented in the regional archaeological record because of the combined action of erosion and colluviation, which may entirely destroy or hide the surface assemblages.

A settlement shift occurred in the wadi catchment during the fourth millennium BC. Before this survey, early fourth millennium (Late Chalcolithic) sites were only known in the lowlands. The 1989 discovery of two large Late Chalcolithic sites in the highlands near Tell al-Maqlub modified this perspective. Late Chalcolithic sites are also known now in the area of Jarash and along the Zarqa River (Hanbury-Tenison 1986). These sites probably represent the first successful dry-farming and olive tree domestication

on the highlands. The presence of large early fourth millennium villages in the Wadi al-Yabis area, near large dolmen fields, may be an indication for dating those enigmatic megalithic structures to the Late Chalcolithic period (Palumbo, Mabry and Kuijt 1990: 101).

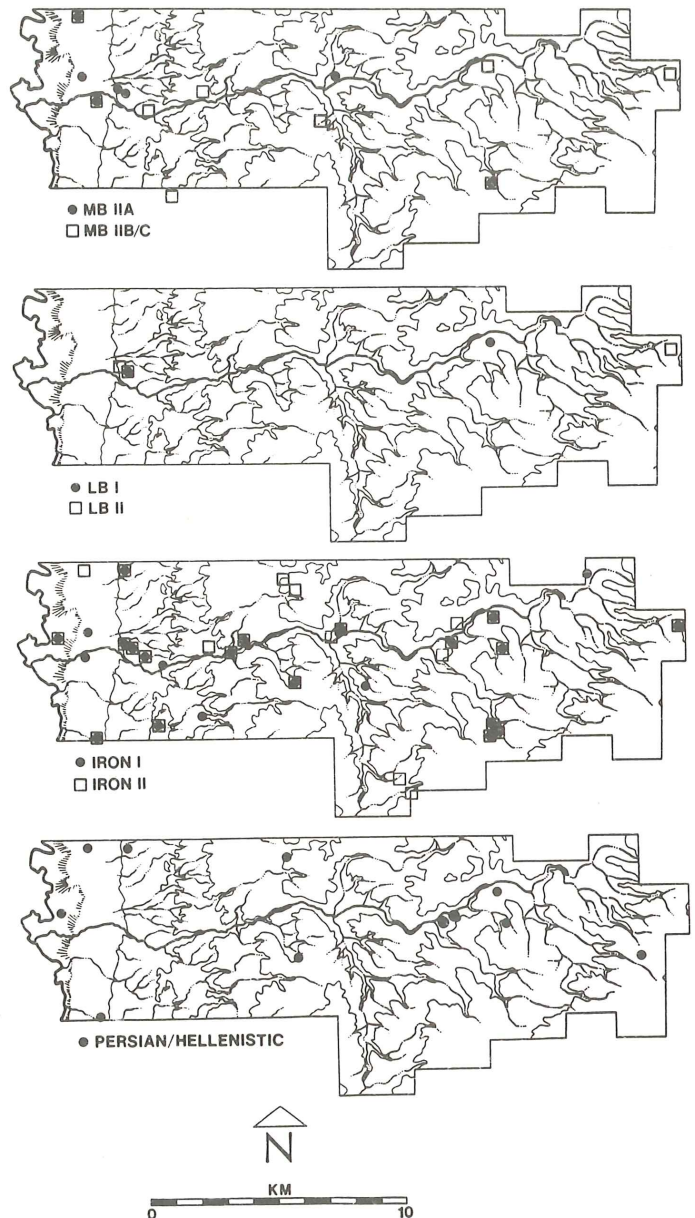
It is only during the late fourth millennium (Early Bronze Age I), however, that village sites were established throughout the Wadi al-Yabis catchment. This change in settlement may reflect both a shift in subsistence from lowland flood irrigation to highland rainfall farming (Mabry and Palumbo 1988), and the first substantial clearing of the highland forest. Progressive phases of deforestation since this first large-scale movement into the highlands led to cycles of severe erosion upstream and destructive floods downstream. These processes significantly affected subsequent potentials for land use, as well as preservation of the archaeological record.

Many of the Early Bronze Age I villages developed into fortified towns during the early third millennium BC (Early Bronze Age II). Their even distribution four to five kilometers apart throughout the catchment indicates efficient exploitation of the various ecological, centered around politically autonomous towns. This network of defended settlements lay in between fortified centers in the Jordan Valley and their counterparts on the plateau. This nucleation process peaked in the mid-third millennium BC (Early Bronze Age III), when only a few towns continued to grow.

Almost all these towns were abandoned during the late third millennium BC (Early Bronze Age IV), when settlement dispersed into seasonally occupied camps and smaller sedentary villages, concentrated in the Jordan Valley. While many villages in the Jordan Valley were undefended, enclosure walls may have protected settlements at Abu an-Ni'aj in the Jordan Valley, and at Khirbet Abu aş-Şalih and at Khirbet Umm al-Ghozlan in the uplands of the wadi catchment. The meager assemblages of this period found on the surface of several other sites probably represent only sporadic encampments.

Early Historic-Early Classical Patterns (FIG. 2)

Near the beginning of the second millennium BC (Middle Bronze Age IIA) a new pattern of settlement developed. Only a few Early Bronze Age IV settlements survived into the Middle Bronze Age, while several permanent settlements were re-established on the locations of the abandoned Early Bronze Age towns. The overall pattern resembled that of the Early Bronze Age II/III, with settlements evenly spaced along the wadi course. Defensive walls are evident, however, at only a few of these new settlements. In fact, this whole region may have been a rural hinterland of more important urban centers such as at Pella. Excavations at Tell al-Hayyat (Falconer and Magness-Gardiner 1983; 1984; 1989) have revealed a typical early second millennium BC rural village near Wadi al-Yabis in the Jordan Valley. The number of settlements



2. The Wadi al-Yabis Survey: Middle Bronze Age to Hellenistic sites.

in the catchment even declined during the Middle Bronze Age, as only about half of the settlements lasted until the mid-second millennium BC (Middle Bronze Age IIB/C), and very few new settlements were established. This trend continued during the late second millennium BC (Late Bronze Age), when settlement in the wadi catchment was only sporadic.

On the basis of his extensive surveys during the 1940's, Glueck postulated a nearly total break in occupation of northern Jordan during the Late Bronze Age (1951:423). Mittmann (1970) followed this interpretation on the basis of his non-intensive surveys during the 1960's. The new data from our fieldwork and from other surveys in the area do not support such a drastic break. In the central hill

country of Palestine (Gonen 1984) and in the Jordan Valley (Bienkowski 1986; Tubb 1988), small, unwallled settlements occupied small areas of the built-up Bronze Age tells, but only a few settlements were occupied in the Ajlun highlands and on the Jordan Plateau. The cause of this abandonment is not well understood yet, but it is probably connected to the chaotic political situation of the time. Being a border area between the Egyptian Empire and the Hittite Kingdom, northern Jordan probably suffered from the confrontation of these more powerful military opponents.

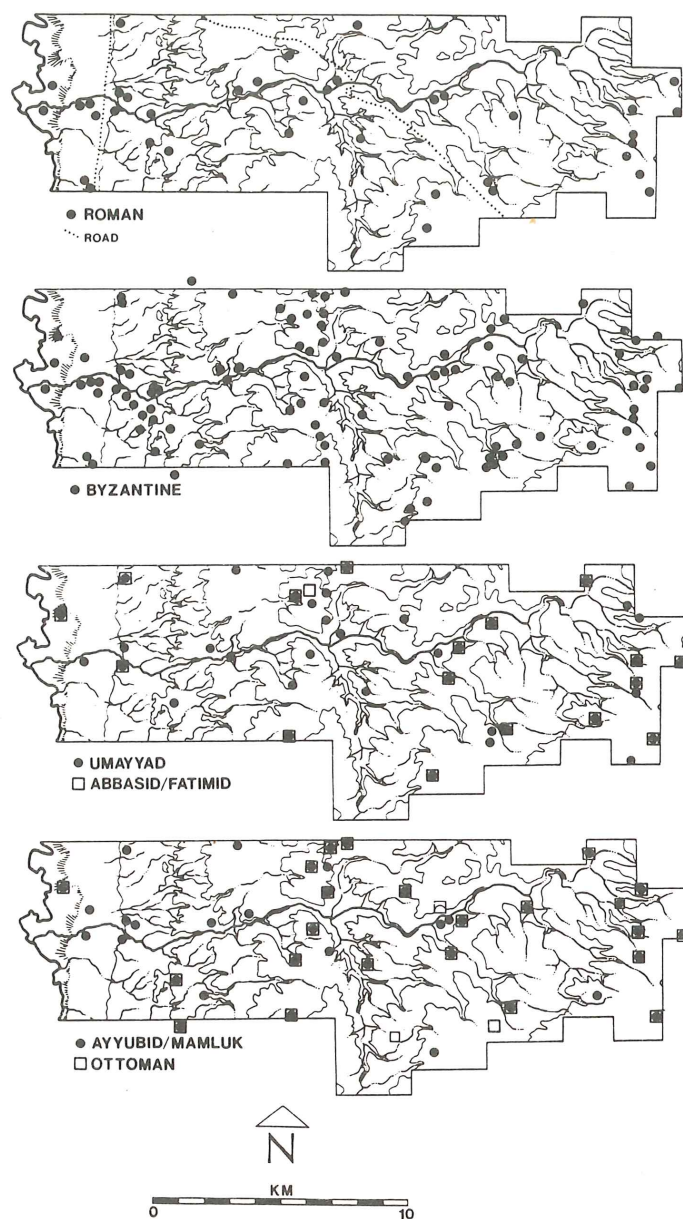
A rural level of settlement flourished again at the end of the second millennium BC (Iron Age I), when many new villages were established, often on the location of previous Early and Middle Bronze Age sites. Many of the abandoned agricultural terraces visible today were constructed during the Iron Age, which was a period of agricultural intensification, unsurpassed until the Roman and Byzantine periods. The strong continuity between the Iron Age I and II phases is evidenced by the infrequent abandonments of Iron Age I villages, and by the similar pattern of settlement distribution in the two phases. In particular, settlements clustered in the Jordan Valley and along the middle course of the Wadi al-Yabis. Most of the sites found were apparently small rural villages, as only a few of them can be identified as walled towns (Tell Abu al-Kharaz, Tell al-Maqlub).

The number of settlements decreased during the sixth to first centuries BC (Persian/Hellenistic periods), and no new settlements were established. A series of military campaigns followed by foreign rule were the likely causes of this decline. On the other hand, these rapid political events were probably not followed by drastic changes in the local material culture, such that these periods are difficult to recognize archaeologically.

Classical-Medieval Islamic Patterns (FIG. 3)

During the Roman period, rural settlement greatly expanded in the wadi catchment. This area was a rural hinterland between the large urban centers at Pella in the Jordan Valley, and at Gerasa on the plateau. The Romans built a highway connecting Pella, Ajlun and Gerasa, which crossed the wadi near Tell al-Maqlub. The need to clear new lands for agricultural use, and to supply timber for the needs of Pella and Gerasa, led to increased deforestation in the Ajlun highlands. This extensive clearing of the upland forests caused environmental degradation in some areas, such that some villages had to be abandoned by the end of the period (Sapin 1985: 227).

This rapid deforestation was followed by another phase of intensive agricultural terracing of the hillsides during the Byzantine period, when population and rural settlement in the area reached an all-time peak. The pattern of settlement on Jabal Ajlun was characterized by open villages surrounded by agricultural terraces, and by isolated churches and monasteries on strategic heights, surrounded by



3. The Wadi al-Yabis Survey: Roman to Ottoman sites.

their own terraced fields (Piccirillo 1985: 261). The "equilibrium" between the urban, rural and nomadic components of society, guaranteed by centralized administration (Piccirillo 1985: 261), was derived from the "mutualism" which developed under the Pax Romana (Banning 1986).

The conquest of Jordan by Islamic armies during the mid-seventh century AD unbalance this structure. A large number of settlements in the wadi catchment were abandoned during the period of Umayyad rule from Damascus. This decline accelerated after the Abbasids moved the center of the empire to Baghdad in AD 750, and the area became peripheral to major trade routes. Local economic stagnation during the Early Islamic periods is also evi-

denced by the abandonment of many agricultural terraces, resulting in destructive erosion in the highlands of Jordan (Vita-Finzi 1969; Beaumont 1985).

After the Ayyubid general Saladin defeated the Crusaders at Hittin in AD 1187, Christian European rules began to diminish. In a short time, Jordan was between a united Egypt and Syria. In this position, Jordan's population, agricultural production and trade increased to new heights under the Mamluk sultans between the twelfth and the fourteenth centuries (al-Bakhit 1982). Many new villages were established in the catchment during this period. Wadi al-Yabis and other tributaries irrigated large sugarcane plantations in the Jordan Valley, and powered mills which processed the sugar for export to other regions (Hamarnah 1978).

In the early phase of Ottoman rule, after AD 1516, rural settlement in the catchment was not seriously affected by the nomadic incursions which were common along the border of cultivated lands (Hütteroth 1975: 8). In order to avoid nomadic raids and harsh Ottoman taxation, a large number of villages were abandoned in these border regions, such that sedentary settlement survived in Jordan only on Jabal Ajlun. Nomadic infiltrations and abandonment of at least one-third of the villages occupied in the Early Islamic periods divided this region into smaller "islands" of settlement by the early nineteenth century (Hütteroth 1975:10-11). Most of the few remaining villages continued to be occupied until today.

Conclusions

A pattern that seems to recur throughout the long history of settlement in the Wadi al-Yabis catchment is the location of autonomous sedentary villages and nomadic camps in every potential ecological niche. This "indigenous" pattern was sometimes obscured by intervening, more powerful constraints, especially external political domination. Periods of stable centralized rule usually encouraged agricultural intensification, such as terracing of the hillsides and irrigation in the lowlands. Collapse of centralized or local political structures often led to dispersion of the population and neglect of the land. Deforestation, overgrazing and abandonment of agricultural terraces triggered cycles of erosion and flooding that permanently changed the face of the land, and limited subsequent land-use. Because of the high agricultural potential of this part of northern Jordan, nomads were excluded during periods of stable sedentary settlement. However, repeated intrusions of nomadic pastoralists in the wake of social collapse can be recognized in the settlement record as well.

Perhaps the most important lessons to be learned from the long history of human use of the Wadi al-Yabis catchment are the limited resiliency of the landscape after periods of drastic mismanagement, and the fragility of the natural equilibrium between man and land. The large scale and intensity of modern exploitation may irreversibly tip this delicate balance.

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