A Hardy People: Local Responses to Environmental, Socio-political and Economic Uncertainties in Jordan through the Millennia

A paper presented by
Oystein S. LaBianca, Ph.D.
Research Professor of Anthropology
Department of Behavioral Sciences and
Institute of Archaeology
Andrews University
(labianca@andrews.edu)

Abstract

In this paper I present an overview of the theoretical and methodological underpinnings of the Madaba Plains Project and explain how the project is attempting to advance research on Central Jordan through the millennia. I begin by discussing how concepts derived from food system theory have been used to help reconstruct changes through the millennia in local cultural adaptations and in the state of the natural environment. How analytical insights derived from botanical succession theory, landscape history, human ecology, cultural ecology, historical ecology and political ecology can help account for long-term changes in food systems is also explained. The location, objectives and field methods of the Madaba Plains Project are discussed next. The paper then goes on to describe current investigations of various multi-millennial processes involved in Central Jordan’s food system. These include the processes of sedentarization and nomadization as reflected in changes over time in the uses of habitation caves; the history and development of local water harvesting methods; the closely related processes of forest degeneration and regeneration; changes over time in local connections with the wider ancient world system; and present-day cultural values and practices as they relate to these historical processes. The paper concludes by reflecting on the challenges and opportunities of multi-millennial research in Jordan.
Recent research by prehistorians on the palaeoenvironment of the Southern Levant throughout the early Holocene has established that, in contrast to today, large portions of the mountainous highlands on both sides of the Jordan Valley were covered by Mediterranean Woodland Forests.

Having come into existence as a result of major climatic changes during the Late Pleistocene and Early Holocene, these forests apparently provided the ideal preconditions for humanity’s first successful experiments with agriculture and sedentism. These experiments were carried out by a succession of Epipalaeolithic cultures, the latest and best known being the Natufians.

Over the past three decades research by Madaba Plains Project archaeologists in the mountainous slopes and highlands of the Lower Jordan Valley Basin in Central Transjordan has been concerned with reconstructing changes over time in long-term patterns of human exploitation of this once-forested landscape in order to provide food and water. This research has resulted in demonstration of long-term multi-millennial food system cycles in the region throughout the postglacial Holocene involving periods of intense human management and alteration of the natural environment followed by periods of abatement in such activity.

In this paper I posit a conceptual framework for understanding how, when and why major alterations in these long-term food system cycles occurred and for grasping how, where and when they impacted the natural environment of Central Transjordan. To this end I begin by highlighting some of the reasons why the Madaba Plains Project has continued to rely upon food systems theory as an interpretive framework for making sense out of the archaeological record. I also describe what some of the related theoretical perspectives are on which we have drawn in order to adequately describe
and account for changes over time in this local food system.

The location, objectives and field methods of the Madaba Plains Project are discussed next. The paper then goes on to describe current investigations of various multi-millennial processes involved in Central Jordan’s food system. These include the processes of sedentarization and nomadization as reflected in changes over time in the uses of habitation caves; the history and development of local water harvesting methods; the closely related processes of forest degeneration and regeneration; changes over time in local connections with the wider ancient world system; and present-day cultural values and practices as they relate to these historical processes. The paper concludes by reflecting on the challenges and opportunities of multi-millennial research in Jordan.

**Theoretical Background**

*Food Systems Theory*  As is well known, efforts over the past two decades by the Madaba Plains Project to reconstruct the cultural and environmental history of Central Transjordan through the millennia have been facilitated by a research design derived from food system theory (LaBianca 1978, 1984, 1986 1988, 1989, 1990, 1991, 1996). Rooted in ecosystemics and human ecology, food system theory is concerned with the patterned interconnections which prevail between the wide range of activities involved in the quest for food and water, and how these activities impact and are impacted by the natural environment.

According to food systems theory, a complex unity exists between how food is produced or gathered; how it is processed, distributed and stored post-harvest; how it is prepared, presented and consumed at meals; how foods consumed impact people’s health and mortality; and how food remains and surpluses are disposed of.

The quest for food and water has been fundamental to human existence every-
where throughout every age. Indeed, it has in the past, and continues today, to struct-
ture the daily life activities of the vast majority of men, women and children on this
globe. The study of how people go about providing for their food and water, therefore,
provides a common starting point for investigating cultures in every age and every
place on the earth. Furthermore, it provides a baseline that transcends both space and
time by means of which controlled comparision of cultural practices is possible.

Basic research on food systems is being undertaken today by investigators rep-
resenting a wide range of academic disciplines including the natural sciences, social
sciences and the humanities. Applied research concerned with various aspects of food
systems is also being undertaken by various United Nations agencies, by numerous
international and national government entities, and by a host of non-governmental
organizations, especially those concerned with food aid and the environment. The level
at which food systems are being investigated by these groups range from studies of
the global to studies of the local.

Over the past two decades the Madaba Plains Project has sought to heighthen
awareness among contemporary food systems researchers and development profes-
sionals of the contribution which archaeologists can make to advancing understanding
of how particular local food systems behave over the long-term—especially with
respect to understanding the complex interactions which contribute to making such
systems sustainable—immune to sudden collapse. Just as important has been a relat-
ed effort to persuade more archaeologists to enter into serious dialogue with contem-
porary food systems researchers and thus to share what they have learned about how
food systems operate over the long-term.

Presently, the Madaba Plains Project is serving as a laboratory for developing
methods and procedures for studying long-term food system dynamics at the local
level. The central objective is to learn more about the range of natural and cultural fac-
tors which have contributed to long-term oscillations over time in the local food system
of Central Transjordan. A closely related objective is to learn more about how these oscillations have impacted the local environment and vice versa.

Because of the relatively high degree to which activities related to the quest for food are etched in the material record of the past, archaeological research can readily be designed so as to contribute to food systems research. This is because whether it be fragments of pottery or animal bones, stone tools or iron weapons, house foundations or caves, cisterns or storage pits, or whatever the find—it’s presence in the archaeological record is likely to be attributable in one way or another to the quest for food and water by some ancient people.

Furthermore, when the results of archaeological excavations are presented using food system categories and terms, they take on meaning in a much wider scientific context, i.e. archaeology moves beyond being locally relevant to becoming globally relevant. This not only increases the demand for knowledge and understanding derived through archaeological research, it also opens up new sources of funding for such research.

**Related Theoretical Orientations** Experience to date with applying food systems theory to archaeological research has revealed that its greatest strength lies in fitting together and making sense out of the many different types of finds uncovered by archaeologists from a given site or region at a various points in time. It has thus contributed greatly to the task of reconstructing and bringing into focus the salient features of local food systems at various points along the multi-millenial time continuum.

To adequately describe and account for changes over time in the distinctive features of local food systems, however, analytical perspectives elaborated by closely related theoretical orientations must be drawn upon:

As a framework for analyzing the impact of food getting activities on the vegetation cover, we have found botanical succession models to be useful. In particular, given the location of our project area, we have found **Tomasali’s model of degeneration**
and regeneration of Mediterranean forests to be helpful (Tomasali, 1977). This model posits a series of five stages in the progression of landscapes from a highly verdant, forested state, to a barren state, and vice versa. These stages are depicted in the following figure:

More generally, the perspectives of human ecology and cultural ecology are valuable for understanding how forests and other natural resources were exploited by humans. Whereas the former focuses on systematic and evolutionary aspects of human-environment interactions; the latter seeks to discover adaptive strategies developed by local populations to cope with changing environmental conditions (cf Kormondy and Brown 1998). The diachronic study of landscapes and ecosystems is the special focus of landscape history or historical ecology. Its emphasis on the diachronic study of landscapes—as manifest in spatial structures such as roads, habitations, terraces, river drainages, and soils (Crumely 1994: 9)—helps draw attention to the role of human perceptions and choices in complex human-environment interactions.
While human ecology, cultural ecology, and historical ecology help us understand how humans adapt to physical habitats, political ecology directs attention to the connectivity between cultures—to the role of communication, peace, trade and power politics in adaptations between cultures. World system theory—with its emphasis on understanding exploitive relationships between core and periphery regions—is a good example of the political ecology perspective. According to Susan Stonich (1993:25) political ecology is a concept which attempts to integrate the concern with local adaptations which predominate in human ecology, cultural ecology and historical ecology with the inter-cultural connectivity concerns of political economy.

The point of this brief review of related theoretical perspectives is to acknowledge that, while the food system perspective is central to this attempt to reconstruct the long-term culture history of Jordan, it is not sufficient by itself. To adequately describe and analyze the complex interactions which account for oscillations over time

---

**Ten Historical Ecology Questions**

from C.L. Crumbley’s *Historical Ecology: Cultural Knowledge and Changing Landscapes*, 1994, p.8

1. What was the duration and frequency of air mass patterns that characterized earlier warm episodes?
2. What spatial patterns are characteristics of biotic communities (species diversity & distribution etc.) and human communities in the earlier warm episodes?
3. How might these patterns be mapped in advance of contemporary global warming?
4. What measures could contemporary societies employ to cope with supra-annual cycles?
5. What human behaviors, attitudes, beliefs, economic strategies, and forms of governance are associated with periods of stable or unstable climate?
6. What measures could contemporary societies employ to cope with a marked increase in climatic instability?
7. What values ensure the greatest flexibility in adapting to changed or unstable conditions?
8. Can environmental flexibility be taught?
9. How can a global environmental ethic also be culturally sensitive?
10. Are some governmental structures better able than others to employ the necessary strategies of adaptation?
Figure 3. Map of Project Area
in the Madaba Plains region food system, the perspectives of human ecology, cultural ecology, historical ecology and political ecology are all needed to tell the full story.

The Madaba Plains Project

Our research on Central Transjordan through the millennia has centered on fieldwork carried out over the past thirty years in the highland territory between Amman and Madaba. Here the Madaba Plains Project, or MPP, has focused attention on three multi-period archaeological sites—Tall Hisban, Tall al-Umayri, and Tall Jalul—and their surrounding hinterlands. Between them, these sites span at least five millennia of human occupation in this region—from the Early Bronze Age to the present. Their hinterlands contain scatters of pottery and worked stone attesting human occupation of the region during the Middle Palaeolithic, the Epipalaeolithic, Neolithic and Chalcolithic.

As can be seen on the map in Figure 3, the MPP project area consists of three 5 km radius regions or study areas, each having one of the three above-mentioned tells as its center pivot. The three study areas represent significantly different ecological units in terms of landscape characteristics, as can be seen in Figure 4 on the following page.

Our objective in isolating these three study areas has been to enable controlled comparison of various food system parameters as they are manifest within each of these three different landscape contexts. To this end a number of different types of investigations have been undertaken—and continue to be mounted—within each study area. For example, Karen Borstad and Gary Christopherson of the University of Arizona have just completed digital elevation maps highlighting topographical differences between the three regions.
Figure 4. Satellite Close-up Three Study Areas
Pertinent environmental parameters which are being investigated include mean daily temperatures, annual rainfall patterns, drainage patterns, soil types and vegetation cover (Fig. 6, See also p. 10). Presently, pertinent information has been obtained primarily from published sources (Agar-Und Hydrotechnik GmbH 1977). The goal is to obtain from cooperating U.S. and Jordanian agencies more detailed and accurate data for these parameters in digitized form.

Within each of these study areas we have carried out several types of intensive surveys. In the vicinity of Hisban a range of different types of environmental surveys were carried out during the
late seventies by Larry Lacelle and Patricia Crawford, all of which have been published in *Hesban 2: Environmental Foundations* (Labianca and Lacelle 1986). These include studies of the local climate, bedrock, surficial geology and soils; studies of groundwater resources; and studies of the native flora. Similar investigations have also been carried out throughout the eighties and nineties in the Tall al-Umayri and Jalul study areas. Last summer, a study of arboreal species in the Hisban study area was undertaken as a part of a broader study of the process of deforestation in the region (For more about this see the results of the arboreal survey of the Hisban region in Appendix A).

Investigations concerned more specifically with tracing changes in the local food system throughout the millennia have relied on data collected by means of both surveys and excavations. To ascertain changes over time in settlement intensity within each study area, a type of survey we call the random square survey has been completed within each. This type of survey was developed by Jon Cole and Gary Christopherson and involves intensive collection of pottery and detailed recording of remains of any type of settlement activity occurring within one hundreded 200x200 meter squares randomly selected from within each 5 km radius study area. An example of the location of these random squares is shown in the following figure.

While our random square survey has been restricted to only five percent of the region within each study area, the judgement sampling survey begun in our area by Robert Ibach (1987) and continued by our current survey staff has assured that most features pertinent to understanding the history of the food system which were not within these random squares have been found and recorded.
One of the distinct advantages of the random square survey is that it has greatly enhanced the likelihood of new and important archaeological features being discovered. This is because the search for random square locations has forced the survey team to probe in areas away from roads and paths—in people’s back yards and in remote and often difficult terrain—where, were it not for the need to locate a particular square, the team would not have been likely to go.

When the pottery picked up by the random survey inside each study areas are plotted against a chronological time line (See Fig. 13, following page), the results point to certain periods as having been more sedentary than others—assuming that as the percentage of pottery goes up, so does the tendency for people to concentrate their livelihood activities on settled farming and village life. The peak periods for such settled farming lifestyles would be the Early Bronze Age II (ca 3000-2700 BC), the end of the Iron Age II/Persian Period (ca 750-550 B.C.), the Byzantine Period (ca AD 350-650 ), the Ayyubid Mamluk Period (ca AD 1200-1500 ), and the Modern Period (ca AD1900-2000 ).

What is notable with respect to these results is that very little has been found within these three study areas which point to their being occupied by settled farmers during the Neolithic or Chalcolithic periods. The study area in which most of the Chalcolithic remains have been found is the Tall Hisban region. This region has also produced remains of Epipalaeolithic occupation (Fig. 14).
Figure 13. Results of Three Random Surveys
While the findings of surveys such as these have played a critical role in generating information about the occupational history of the landscape surrounding each of the three major tells, the data uncovered through multi-component, large-scale stratigraphic excavations at each of the tell sites themselves have provided the backbone of chronological and cultural information on the basis of which long-term cycles of intensification and abatement in human settlement activity in these three study areas have been reconstructed.

As is well known, excavations at Tall Hisban were begun by Siegfried Horn and Roger Boraas in 1968. In 1974 leadership of the Heshbon Expedition was assumed by Larry Geraty. In all, a total of five seasons of excavations were carried out at Tall Hisban. A sixth season was undertaken in 1978 by John Lawlor, but it was limited to investigation of the “North Church.” Paul Ray and I resumed work at Tall Hisban in 1996.

In 1984 Larry Geraty and Larry Herr begun excavations at Tall al Umayri. Leadership of this excavation has since 1987 been provided primarily by Larry Herr. This summer marks the seventh season of fieldwork at this site.
Work at Tall Jalul was begun in 1992 by Randall Younker and David Merling. Here three seasons of fieldwork have been completed.

The findings produced by these excavations with respect to peak periods of occupation correspond remarkably with those of the above mentioned surveys (Geraty, Herr, LaBianca, and Younker 1991:4-5).

Together these various lines of evidence have brought to light a succession of occupational cycles accompanied by alternating episodes of intensification and abatement in the intensity of the local food system of each study area.

![Figure 17. Tall Jalul Project Site](image17)

![Figure 19. Food System Cycles](image19)
The present research agenda of the Madaba Plains Project is to deepen understanding of the multi-millennial processes that have produced these cycles. As was suggested earlier, these can be divided into two types: adaptive processes and connectivity processes (Smith and Young 1998). Whereas the former have to do with how local residents have adapted to changes in their physical habitat, the latter have to do with changes over time in their adaptations to other cultures, particularly as occasioned by changes in opportunities for trade and commerce.

**Research on Occupational Gaps** An example of multimillenial adaptive processes being investigated by our team are the phenomena of sedentarization and nomadization (LaBianca 1990). One has to do with how people alter their lifestyles to become more sedentary, the other with how they become more nomadic.

The finding which originally spurred our interest in these processes was the curious occurrence of “gaps” in the occupational history of Tall Hisban. Such “gaps” were believed to have occurred during the Early Hellenistic Period, the Abbassid Period, and the Ottoman Period (see Figure 20 below):

Beyond their appearance in the stratigraphy of Tall Hisban, such “gaps” also appeared on the original findings of the Hisban Regional Survey (see following page).

It was the challenge of trying to understand why these “gaps” existed in the archaeological record of Tall Hisban—along with the realization that the original research question which had launched the Heshbon Expedition in the first place (Was this the
Figure 21. Summary of Hisban Regional Survey

Late Bronze Age  Iron Age 1  Iron Age II-Persian

Hellinistic  Roman  Byzantine

Umayyad  Abbasid-Seljuk  Ayyubid-Mamluk

Ottoman  1961
“Heshbon” of King Sihon and the Israelite Conquest?) simply didn’t suffice as a framework for interpreting the many superimposed cultures unearthed by the excavations (cf LaBianca 19??)—which spurred this investigator to search for a new, integrative theoretical framework. Such a framework would have to be capable of making sense out of the many different lines of archaeological information from the diverse historical periods from Tall Hisban (LaBianca 19??; Joffe 1996). The outcome of this quest was the food systems approach to the cultural history of Hisban and the delineation of the related concepts of cycles intensification and abatement and sedentarization and nomadization.

### Sedentarization Involves:
- Gradual establishment of permanent settlements.
- Expansion of areas under cultivation.
- Increases in the frequency of cropping.
- Expansion of roads and marketplaces.
- Improvements in water management facilities.
- Delocalization of the food supply.
- Beaurocratization of production.

### Nomadization Involves:
- Gradual arrangement of permanent settlements.
- Return to living in makeshift stone houses, tents, and caves.
- Return to subsistence cultivation of grains and pastoralism.
- Conversion of ruins into makeshift herding stations and tool depots.
- Localization of the diet.
- Return to kinship based production units.

**Research on Habitation Caves.** More recently our investigation of these processes have begun to focus on habitation caves (LaBianca 1991). The reason for this is that habitation caves appear to have been used during all period—including the periods when occupational “gaps” were believed to have prevailed. The best evidence for this has come from our research on the Late Ottoman Period. From this period we have been able to document extensive use of caves in our project area.
The extent to which the entrances to habitation caves have been modified appears to be an especially good indicator of the process of sedentarization. As people become more sedentary, they invest more effort in building up the area in front of their caves. Eventually, they may construct a whole house on top of or in front of their cave.

There exist within our project area and in many other locations throughout Jordan numerous examples of villages and towns having begun as cave villages. For example, both the town of Madaba and Jordan’s capital city, Amman, began as cave villages in the previous century. As the settlement prospers, the original inhabitants may completely abandon their caves and build new houses in other locations. During such times, their caves are taken over by poor families.

But caves were also important to nomadic inhabitants of our project area. Typically, we find them in combination with enclosure walls and other facilities associated with pastoral nomadic life.
It is also noteworthy that throughout much of Jordan, cave villages were common during certain eras, as for example during the Ottoman Era, when there were only “three towns in Jordan”—Husn, Salt and Kerak—but there were hundreds of cave villages.

A major reason for the resumption of archaeological fieldwork at Tall Hisban and vicinity is because of the unfinished work on habitation caves at the site itself, and also in the surrounding region (LaBianca and Ray 19??). While the earlier Heshbon Expedition unearthed quite a few habitation caves, their significance for understanding the culture history of the site was not understood. Hence, there was no systematic effort to examine their role in the on-again off-again history of the site. To investigate the caves for what they can teach us about this history is a major concern of the renewed project at the site. Efforts are simultaneously being taken to clean up and restore the site’s most prominent features to make it more intelligible to visitors.
Research on Development of Water Harvesting Techniques. Another line of research being pursued as part of the effort to understand multi-millennial adaptive processes in Central Transjordan have been our investigations of the development of water harvesting for human and agriculture use. This research has sought to establish a chronological framework for the introduction and expansion of techniques such as floodwater farming, runoff farming, hillside terracing, rooftop collection, cistern and reservoir construction and, recently, the introduction of deep drilling. A tentative chronological framework for these developments is seen in Figure 30.

Research on the Process of Deforestation This episodic expansion over time in flood water and runoff farming, along with closely related episodic expansion of settlements and roads, had devastating consequences for the woodland forests which likely covered most of the hills and slopes of this part of Central Jordan until about five thousand years ago, or the beginning of the Early Bronze Age. While the exact extent of forests here during the Epipalaeolithic, Neolithic and Chalcolithic is still being studied,

| Ten thousand years ago (Neolithic) | Dry farming invented involving use of the hoe. |
| Six thousand years ago (Chalcolithic) | Floodwater farming in the Jordan Valley gets underway. |
| Five thousand years ago (Early Bronze Age) | Runoff farming begins to be developed along with use of the plow. |
| Four thousand years ago (Middle & Late Bronze) | Rooftop harvesting of water into cistern experimented with. |
| Three thousand years ago (Iron Age) | Hillside terracing experimented with. |
| Two thousand years ago (Classical Era) | First large water reservoirs constructed. |
| | Hillside terracing comes into general and widespread use. |
| | Rooftop collection of water into cisterns becomes the norm. |
| One thousand years ago (Islamic Era) | Widespread construction of huge water reservoirs and cisterns. |
| | Further refinement of runoff farming technology. |
| | Aqueducts constructed for long-distance transport of water. |
| The present century (Modern Era) | Introduction of wide variety of new crops suitable to production. |
| | under runoff and dryland farming conditions. |
| | Ancient systems of water harvesting abandoned in favor of mining. |
| | of underground aquifers and reservoirs by means of deep-drilling. |

Figure 30. Chronological Water Harvesting Framework
there can be little doubt, in light of much recent research on the beginnings of agricul-
ture in this region⁴, that forests covered most of the hills and valleys around Umayri
and Hisban, and also likely much of the fertile plain surrounding Madaba and Jalul.

The best indication of this situation at this point is the fact that so little in the
way of evidence of Neolithic cultures have been found in our project area, despite very
intensive surveys within the three primary study areas. This fact lends support to the
hypothesis that while early experiments with agriculture were begun in the mountain-
ous hills of the Lower Jordan River Basin, the take-off of agriculture occurred in the
Jordan Valley during the Neolithic with the invention of runoff techniques for use in
watering cultivated crops.

It is not until the Early Bronze Age that people begin to push back up into the
mountainous regions, where fertile valleys and plains could be exploited after some ini-
tial clearing and preparation. The process of removal of forests from this time onward
is described in the following working hypothesis (see also Figure 31):

The story begins with mention of the

Figure 31. Cycle of Degeneration & Regeneration

burgeoning evidence for the beginnings of
agriculture in the Near East having occurred
in the Mediterranean forests of the Southern
Levant. The discovery of forest-dwelling
Epipalaeolithic cultures associated with this
achievement in the Hisban Region is consist-
tent with other findings that point to the exis-
tence of a Mediterranean Woodland Forest
here during Early Holocene and Neolithic
times.

The first major deforestation event in this region appears to have occurred dur-
ing the Early Bronze Age. Additional forests were cut down during the Iron Age, and by

24
Roman-Byzantine times what remained of the virgin forest was nearly completely removed. Contrary to what is often asserted, sustained regeneration of forests appears to have gotten underway during Early Islamic times. This process of recovery of the ancient forest continued until the middle of the nineteenth century when isolated stands of forests could still be seen. This regenerated forest was then cut down again as a consequence of resettlement of the region and the building of the Hejaz Railroad.

**Research on Ancient World System Connections** Along with the above research on multi-millennial adaptive processes, our project has also devoted much energy to investigating the extent to which oscillations in local food system cycles over time were produced by ancient world system influences, in particular, trade and commerce (Amin 1991; Frank 1993; Sinopoli 1994). In this regard, it is important to remind of the geographical location of the project area—along one of the ancient world’s most important crossroads of communication and commerce. As is well known, Transjordan, along with CisJordan, has for millennia served as a corridor for movement of donkey trains, camel caravans and armies traveling between the great civilizations of ancient Egypt and North Africa to the south, those of Arabia, Mesopotamia, and East Asia to the east, and those of Assyria, Anatolia and Europe to the north.

The extent to which Central Transjordan has been dominated by outsiders is well reflected in the categories with which historians and archaeologists designate successive historical eras in the region: Hellenistic, Roman, Byzantine, Seljuk, Crusader, Ayyubid, Mamluk, Ottoman, and so on.

The empirical loci for studying such ancient world system connections is primarily the multi-period tell sites, for they produce in far greater abundance than do the sur-
veys a plethora of objects attesting the changing networks of trade and the influence in the region of various foreign powers. Excavations of a number of hinterland sites have also proven to be helpful, in this regard, but the predominant source of information are the three major tells.

As most of our excavations to date have centered on Tall Hisban and Tall al-Umayri, these two sites have provided the most extensive evidence of ancient world system connections. Whereas Tall Hisban is where most of our data pertaining to the Classical and Islamic eras have come from, Tall al-Umayri has been a virtual gold mine when it comes to the Iron Age. It also has produced significant finds from the Early, Middle and Late Bronze Age. An overview of the most important world system connections uncovered at each site is seen in Figure 33 (see following page).

**Research on Indigenous Hardiness Structures** Given the many changes in natural habitat, economic opportunities and political domination which have occurred in this region over the past five millennia, an interesting question arises as to the extent to which the present-day cultural values and practices of the population of Jordan represent “survival strategies” which have enabled the local indigenous population to adapt to uncertainty and change. Recent ethnoarchaeological research concerned with this question has led to the distillation of a number of what we have begun to refer to as “indigenous hardiness structures” — cultural values and practices which have enabled the local population to become enured to fatigue and hardship resulting from centuries of uncertainty and change. The following represent eight such structures:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tribalism</td>
</tr>
<tr>
<td>2.</td>
<td>Multi-resource Household Economies</td>
</tr>
<tr>
<td>3.</td>
<td>Fluid Homeland Territories</td>
</tr>
<tr>
<td>4.</td>
<td>Residential Flexibility</td>
</tr>
<tr>
<td>5.</td>
<td>Small-scale Water Sourcing</td>
</tr>
<tr>
<td>6.</td>
<td>Hardy Diet</td>
</tr>
<tr>
<td>7.</td>
<td>Hospitality</td>
</tr>
<tr>
<td>8.</td>
<td>Honor</td>
</tr>
</tbody>
</table>

*Figure 34. Summary of Eight Hardiness Structures*
### Figure 33: Overview of Ancient World System Connections Reflected at Madaba Plains Project Sites

<table>
<thead>
<tr>
<th>Period</th>
<th>Hisban</th>
<th>Umayri</th>
<th>Jalul</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB</td>
<td>Basalt objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB II</td>
<td>T. Yahudiyeh ware</td>
<td>Obsidian fragments</td>
<td></td>
</tr>
<tr>
<td>LB</td>
<td>Thutmose III seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ir I</td>
<td>Obsidian object</td>
<td>Basalt objects</td>
<td>Basalt objects</td>
</tr>
<tr>
<td></td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ir II/Per</td>
<td>Attic Ware</td>
<td>Attic Ware</td>
<td>East Greek Ware</td>
</tr>
<tr>
<td></td>
<td>Cypro-Phoenician ware</td>
<td></td>
<td>Alabaster Object</td>
</tr>
<tr>
<td></td>
<td>Alabaster Object</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ivory Objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ostracon--Arab traders</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hel</td>
<td>Rhodian wine jars</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rom</td>
<td>Terra Sigillata ware</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marble Objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byz</td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Is</td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid Is</td>
<td>Imported Fish remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late Is</td>
<td>Coins?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Imported Fish Remains at Tall Hisban

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Iron I</th>
<th>Iron II</th>
<th>Hel</th>
<th>Early Rom</th>
<th>Late Rom</th>
<th>Early Byz</th>
<th>Early Islamic</th>
<th>Middle Islamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey Mullet</td>
<td>Med Sea</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea Bass</td>
<td>Med Sea</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meager</td>
<td>Med Sea</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea Breams</td>
<td>Med Sea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuna/Mackerel*</td>
<td>Red Sea</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parrot Fish+</td>
<td>Red Sea</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Salted
+ Smoked
Tribalism. First, and most important by far, have been their kin-based social networks as members of large extended families and tribes. These kin-based networks have provided shepherds and farmers alike with a highly flexible mechanism for welding people together for their common good, whether on the open range as groups of nomads or on cultivated lands as members of villages and towns. It has provided a means by which small groups of kin have been able to adjust successfully not only to a fragile natural environment, but also to shifting political landscapes and very uncertain economic conditions.

Multi-resource household economies. Another secret of their survival has been their mixing of production of cereals and tree fruits with raising of sheep, goats, donkeys and camels. This ancient agricultural regime, which goes back at least five thousands years, has helped them to easily shift back and forth between agricultural and pastoral pursuit. They have thus been able to adjust their lifestyles to maximize chances of survival in the face of constanlty shifting economic and political conditions.

Fluid homeland territories. In order to pursue such a variety of economic options, both settled and nomadic tribes have tended to maintain fluid homeland territories. Although a somewhat fixed center of gravity may have prevailed at any given point in history, the outer boundaries of homeland territories have been allowed to continually change in order to accomodate new social, economic or environmental realities.

Residential flexibility. Over the centuries people have used stone houses, residential caves, and tents to live in. As the population has sedentarized or nomadized, the amount of time they spend living in one or another of these residences in any particular year would vary.

Small-scale water sourcing. Because of the risks involved in constructing and maintaining the sorts of elaborate water works developed, for example, by the ancient Romans, the indigenous population has for the most part relied on small-scale water
sourcing arrangements--access to natural springs and streams and re-use of ancient cisterns.

**Hardy Diet.** Another strategy used by past inhabitants of Jordan to protect against over-reliance on foreign markets has been the hardy diet or “home-grown” food.

**Hospitality.** The emphasis on hospitality for which the Arab population of Jordan is famous has its roots in more than good manners. By means of their generosity to fellow tribesmen and strangers, people have been able to accumulate I-owe-you’s which can be banked until such a time as a pay-back favor can come in handy. Also, by means of hospitality, information which is vital to their existence as shepherds and farmers may be shared.

**Honor.** The institution of honor, whereby members of families and tribes demonstrate their solidarity with each other as a group of kin, also has a very practical function in tribal society. Its built in system of rewards and punishments serve to assure that individuals and families don’t shirk their obligations toward one another as kin. Cooperation in feuds is only one of many examples of the operation of this institution at work.

**Controlled Comparison Research** The voluntary adoption of MPP field techniques and recording procedures by other projects—a number of them MPP “spin-offs”—has created an opportunity for controlled comparison research on wider regional connectivity. An example of such a partnership is one recently established between MPP and the Palestine Institute of Archaeology (PIA) at Birzeit University in Palestine. Thanks to a generous research grant to Birzeit University from the Norwegian Government, researchers from PIA will be undertaking excavations and surveys at Tall Birzeit and vicinity using MPP excavation and survey procedures, along with MPP recording protocols.

The goal of this cooperation will be to rigorously compare—using identical stan-
standardized procedures—the results of excavations and surveys in order to compare
to changes over time in landscape history, human adaptive strategies, and to ascertain
the extent of connectivity between the highlands of Central Cis-Jordan and those of
Central Transjordan (Al Quds and Al Balqa) through the millennia. The possibilities for
establishing similar joint research agendas with other projects using MPP research
procedures are currently being explored as well.

Conclusion

In my view, the theme of this conference—Jordan through the millennia—is a
challenge to us archaeologists and historians to reach beyond our period specializa-
tions in order to try to uncover and describe truly long-term processes—those span-
ning multiple millennia. In this paper, my purpose has been to lay open for discussion
and criticism our approach to this challenge and what some of these multi-millennial
processes are that our research has brought to light. I hereby welcome your construc-
tive criticisms of these efforts.

Completed 31 May 1998
Oystein S. LaBianca
Research Professor of Archaeology,
Department of Behavioral Sciences
and Associate Director,
Institute of Archaeology
Andrews University
Institute of Archaeology
labianca@andrews.edu
Notes


2. The Madaba Plains Project began in 1968 with the Heshbon expedition, an excavation organized by Prof. Siegfried S. Horn of Andrews University and Prof. Roger S. Boraas of Upsala College. Its original aims were twofold: To excavate Tall Hisban to see if it was the Heshbon frequently mentioned in the Old Testament, and to attain for central Transjordan a solid stratigraphic and ceramic baseline. When it became apparent that there was not much found at Tall Hisban that had direct bearing on the biblical Heshbon, the second aim emerged as the primary one. The Hisban Regional Survey, begun in 1973 and concentrating on the region within ten kilometers of Tall Hisban ended up locating 148 archaeological sites—representing the entire span of history in the region.

The food system perspective came to serve as an heuristic device for fitting together the different lines of scientific information. One of the most important outcomes resulting from using this perspective was that it brought into focus the dynamic coexistence of both nomadic and sedentary modes of existence in the project area. The emphasis on the quest for food in a broader sense, not just on agriculture, opened a window on the dynamic shifts over time in the intensity with which people in this region exploited their land and animals to produce food. Out of this insight evolved research on food system intensification and abatement, and the related processes of sedentarization and nomadization.

3. Tomasali (1977) posits a model of vegetation dynamics involving the concepts of degeneration and regeneration (or progressive evolution) of vegetation. In his model (See Fig. 3), degeneration of the climax (i.e. Forest) passes through different stages of degradation until the area is characterized by devastated “bare earth” devoid of natural vegetation. Such degeneration can be caused by the agricultural or other practices of man or by natural causes. However, Tomasali also theorizes that at any stage of the degeneration, progressive evolution may begin if the factor that caused the degeneration is removed. Vegetation in a state of progressive evolution begins to regenerate again towards the climax. Progressive evolution is generally much slower than the process of degeneration, particularly if the land has undergone extreme degradation. However, if the degeneration of the vegetation has not been followed by soil erosion or a drier climate, regeneration may occur quite rapidly.

Bibliography


Baruch, U., and Bottema, S. (1991) Palynological evidence for climatic changes in the Levant ca. 17,000-9,000 B.P. In O. Bar-Yosef and J. Valla (Eds.), The Natufian Culture in the Levant (pp.11-20). Ann Arbor, MI: International Monographs in Prehistory.


