

Social and Economic Context of Early Neolithic Villages

(i) The Social and Economic Context of the Transition from Foraging to Farming: Background and previous research

Over the last century, archaeological research in the Near East has provided some of our most important advances in understanding the social and economic context of the transition from foraging to farming. Research in this area has been concerned simultaneously with both descriptive objectives and theoretical concerns related to the emergence of food production. The descriptive goals have included the traditional efforts of defining space-time frameworks for the region, periodically summarized in increasingly detailed syntheses (Bar-Yosef 1981; Mellaart 1975; Moore 1985; Rollefson et al. 1992). A second descriptive concern has concentrated on recovering representative cultural materials through different phases of the Neolithic to provide researchers with relatively course-grained reconstruction of changing social and economic systems, as expressed through shifts in material culture and subsistence practices (e.g. Banning 1998; Bar-Yosef & Meadow 1995; Goring-Morris & Belfer-Cohen 1998; Hole 1984; McCorrison & Hole 1991; Rollefson 1996, 2001). As a theoretical concern, considerable research has focused on modeling the trajectory and speed of the transition from foraging to farming in the Neolithic of the Near East and understanding how this might offer insights into social and economic developments after this period of time. In exploring the broader interrelated research goals of description, documentation, and modeling of the transition from foraging to farming, researchers working in the Near East have focused considerable attention on the Pre-Pottery Neolithic A period (PPNA), the time in which we see the first sedentary agricultural communities being founded within the Jordan Valley—communities which form the foundation for the socially and economically more complex towns of the Pre-Pottery Neolithic B period (PPNB) (Fig. 1) (see Bar-Yosef 1991; Bar-Yosef & Belfer-Cohen 1989, 1991; Bar-Yosef & Meadow 1995; Byrd 1994; Flannery 1973; Goring-Morris & Belfer-Cohen 1998; Hayden 1995; Price & Gebauer 1995; Smith 1998 and references therein).

As articulated in a range of synthesis and specialist studies (e.g. Bar-Yosef 1991; Bar-Yosef & Meadow 1995; Goring-Morris & Belfer-Cohen 1998) the critical transition from foraging and farming occurred over a thousand years in the PPNA period (c. 11,500 to c. 10,500 BP). It was characterized by the emergence of plant domestication, increases in the number of people living in communities, an intensification in material evidence of ritual/religious activities within these communities, and our first archaeological evidence for regional and inter-regional systems of shared material and cultural practices. This transition appears to have started in the Late Natufian period (c. 13,700 to c. 11,700 BP) in the Jordan Valley, with Late Natufian communities ranging in size from small ephemeral hunting and gathering stations to somewhat more sedentary camps relying upon the intensive harvesting of wild cereals (Belfer-Cohen 1991; Byrd 1989; Edwards 1989; Henry 1989). These practices began to change at the end of the Late Natufian period, at least partially related to the end of the Younger Dryas period of aridity (c. 12,500/11,700 BP), in which we witness the appearance of the first early agricultural communities. PPNA communities ranged in size from small encampments (up to 100-150 m²), to medium-sized hamlets (ca. 2,000-3,000 m²), to large (up to 2.5 or 3.0 hectare) villages (Bar-Yosef & Meadow 1995; Kuijt 1994a, 2000a) (Fig. 1). In the medium and larger-sized communities, these settlements were characterized by year-round occupation with well-built oval or circular stone residential structures, and the rare large non-domestic building, like the tower of Jericho. PPNA communities survived and thrived with a combination of hunting of wild animals, most notably migratory waterfowl, and with subsistence systems focusing on a mixture of domesticated cereals, legumes, and wild seeds and fruits. While it is not clear if the shift from systematic gathering to cultivation occurred simultaneously in different geographical locations and vegetative zones in the Near East, or at one center as proposed by Zohary (1989), there is general agreement that by the end of the PPNA (10,500 BP), hamlets and villages existed across much of the Near East and established the foundation of a social and economic system that remained in existence through the later Pre-Pottery Neolithic B (PPNB) periods.

(ii) Life in Early Neolithic Villages: Issues and Questions

While researchers generally agree that the transition from foraging to farming was initiated at some point before the start of the PPNA (11,700 BP) and was largely completed by the end of the MPPNB (9,500 BP), they differ in their interpretations of the nature of the social processes behind the transition and the degree of variation in social and economic practices within different early farming communities (see Bar-Yosef & Meadow 1995, Goring-Morris & Belfer-Cohen 1998). As articulated by Bar-Yosef and Meadow (1995: 68-71), and drawing broadly upon the works of other researchers (e.g. Bar-Yosef 1991; Bar-Yosef & Belfer-Cohen 1989, 1991; Bar-Yosef & Kislev 1989; Byrd 1992; Goring-Morris & Belfer-Cohen 1998; Hershlovitz & Gopher 1990; Hillman & Davis 1990; Hole 1984; Kuijt 2000b; McCorriston & Hole 1991; Perrot 1983; Price & Gebauer 1995), archaeologists have a reasonable understanding of the timing and location of the transition from foraging to farming, yet lack detailed knowledge of life within these transitional agricultural villages. Such a foundation is critical for understanding the social and economic foundation upon which later Pre-Pottery Neolithic B period adaptations developed.

Central to the successful evaluation and future refinement of our understanding of early village life is the ability of researchers to: (a) develop a refined understanding of the transition from foraging to farming through time; (b) assess the extent to which the transition occurred as a local event in a specific area, or as a broader regional shift in social and economic systems; and, (c) investigate the extent to which observed archaeological patterning and material variation is linked to variation in the size and organization of PPNA communities, such as sedentary villages compared to seasonal camps (see Bar-Yosef 1991; Bar-Yosef & Gopher 1997; Finlayson & Mithen 1998; Garfinkel 1989; Gopher 1995, 1996; Kenyon 1981; Kuijt 1994b; Kuijt *et al.* 1991; Lechavallier & Ronen 1985; Noy 1989; Noy *et al.* 1980, Mithen *et al.* 2000 and Sayej 2001 for detailed treatments of individual PPNA sites). Developing anthropological models requires, therefore, archaeological data sets from large villages and small settlements and from settlements located in multiple vegetative and ecological zones in the southern Levant.

Previous attempts to understand the social and economic context of transition from foraging to farming, as well as further modeling of this transition, is constrained by four problems. First, and most importantly, with the exception of the incomplete excavations at Netiv Hagdud, researchers have almost no understanding of the spatial organization of human behavior within Early Neolithic Villages. With the exception of the excavation of Netiv Hagdud, no archaeological field research has produced large continuous horizontal exposures of architecture, features, or the spatial distribution of cultural materials within a PPNA site. Even in the case of Netiv Hagdud excavation results are somewhat problematic in that preservation conditions were such that material suitable for radiocarbon dates was only recovered from the Deep Sounding, not from the horizontal excavation. Thus, other than through stratigraphic analysis it is not possible to reconstruct the temporal and spatial interrelationships of individual features and structures, nor how these might inform researchers on the social and economic organization within PPNA settlements.

Second, our current archaeological knowledge of early villages of this period is largely geographically limited to the Mediterranean Woodland zone due to the historical context of research, and at the same time is thematically constrained due to a lack of comparative research on large village settlements outside of this geographical area. The majority of recent archaeological research on the PPNA period has focused on smaller settlements, most of which are located within the Mediterranean Woodland zone. These smaller PPNA settlements and multiple occupations include Sabra I, Iraq ed-Dubb, Zahrat adh-Dhra' 2, Jebel Queisa, Gesher, Hatoula, 'Ain Darat, Wadi Faynan 16, and Salibiya IX. An important complementary understanding of social and economic life in the PPNA is starting to emerge from the archaeological excavation of several village sites, including those of Jericho, Netiv Hagdud, Gilgal I, and Nahal Oren. All of these, however, are situated within the Mediterranean Woodland ecological zone in the southern Levant. Moreover, the only excavated large PPNA villages, including Jericho, Netiv Hagdud, and Gilgal I, are tightly clustered together in the restricted geographical area of the northern Jordan Valley. It

remains unclear, therefore, if these PPNA communities were characteristic of all other regions of the southern Levant, or represent a regional adaptation located North of the Dead Sea (Fig. 1).

Third, in excavating PPNA sites over the last 30 years, archaeologists have employed a wide range of field methods with limited, if any, use of a comparable systematic excavation methodology. This has resulted in significant differences in recovery and sampling of material culture from the large village sites of Jericho, Netiv Hagdud, and Gilgal I. In each of these projects researchers had different goals, excavation methods, and standards for recovery of artifacts. For example, only the excavations at Netiv Hagdud focused on broad horizontal excavation of surface areas with high-resolution recording methods, such as the use of 2 mm mesh for screening sediments. In contrast Kenyon's excavations at Jericho focused on deep soundings and employed no mesh screening. The excavations of the village of Gilgal I represent an ad-hoc mixture of these and other methods, and tragically, with the recent death of the director before the release of even preliminary publications, almost no chance for the excavator to directly comment on the comparability of these data to Jericho and Netiv Hagdud. While representing the state of the art at the time of excavation, variation in field methodology at these sites makes it very difficult to develop a comparative understanding of the PPNA occupation of these villages, let alone to reflect how these collective results inform researchers as to the social and economic context of life in Early Neolithic Villages.

Fourth, and not unrelated, researchers have yet to reach a consensus over the meaning behind the high degree of variability in material culture at PPNA sites, alternatively arguing that it is due to variation in time, space, and functional activities that occurred in sites. Field research has identified a high degree of variability in material culture within and between PPNA settlements in the southern Levant, but in the absence of tight control of chronology and representative materials from a range of different size settlements, it has been very difficult to understand the sources of this variability. Variability in stone tool technology between settlements, for example, is very high and includes significant differences in the percentage of diagnostic tool forms, such as lunates, projectile points and Hagdud truncations. As noted elsewhere (Garfinkel 1996; Garfinkel & Nadel 1989; Kuijt 1996a, 1997, 1998; Mithen et al. 2000; Nadel 1990, 1996), researchers have yet to determine the sources of such variation and alternatively argue that this reflects either different periods of occupation, variation in archaeological recovery methods, variation in functional activities in located in specific spatial areas of settlements, and the mixing of cultural material from different periods of time, or a combination of these possibilities. The proposed research at Dhra' will allow researchers to move beyond these limitations by providing a detailed understanding of the spatial organization of a well-dated PPNA village from an ecological area outside of the Mediterranean Woodland zone, employing high-resolution recording methods comparable to Netiv Hagdud, and at the same time, explicitly exploring sources of variation in material culture.

(iii) Archaeological field research at Dhra', Jordan

This proposed research is focused on the synchronic occupation of a single PPNA period site to reconstruct the social and economic context of village life from which dedicated food production emerged in the later PPNB period. As one of a limited number of villages known from this period, and the only known village situated south of the Mediterranean Woodland zone, archaeological research at Dhra' provides an important opportunity to refine the models for foraging to farming transition in the Near East, improve our understanding of the social context under which food production emerged in Pre-Pottery Neolithic period, and develop a detailed understanding of spatial organization of PPNA villages. Previous excavations at Dhra' demonstrate that this relatively large village (1.5 ha), approximately the same size as Netiv Hagdud and Gilgal I, was occupied in the early stages of the PPNA at around 11,500 BP (Goodale et al. in press; Kuijt 2001; Kuijt and Finlayson in press; Kuijt, & Mahasneh 1995; 1998)(Table 1). The site has outstanding preservation of multiple types of architecture, ground and chipped stone materials, and faunal and macro-botanical remains. Located 5 meters below sea level, the site is bounded by high cliffs to the east, the Wadi Dhra' to the north, and erosional cuts to the west and south (Fig. 2).

Table 1. Pre-Pottery Neolithic A Period Radiocarbon dates from Dhra', Jordan.

Location	Radiocarbon date	PDB 13C	Sample number	Meters below surface	Comments
Area I Tank Trench	9,960 ± 110	-24.7	ISGS-2898	-1.20	Wood charcoal. Sample recovered 20 cm above mudbrick and sterile colluvium deposits.
Area I Tank Trench	9,940 ± 180	-25.9	ISGS-3278	-2.60	Wood charcoal. Sample recovered 20 cm above floor of Structure II.
Area I Tank Trench	10,031 ± 69	-25.2	AA-38141 (AMS)	-2.30	Wood charcoal. Sample recovered from secondary sediments above floor of Structure II.
Area I Tank Trench	10,059 ± 73	-21.1	AA-38142 (AMS)	-1.80	Wood charcoal. Sample recovered from later secondary sediments filling Structure II.
Area 1, Feature 6 Structure 1	9,610 ± 170	-25.7	ISGS-3277	-1.25	Wood charcoal. Sample recovered from just above flagstone bench next to wall 007, Structure I.
Area 1, Feature 6 Structure 1	9,984 ± 67	-25.5	AA-38143 (AMS)	-1.31	As per above.
Area 1, Feature 6 Structure 1	10,000 ± 68	-25.8	AA-38144 (AMS)	-1.01	As per above.
Area 1, Feature 1, Structure 4	9,913±59	-27.4	ISGS-A0246 (AMS)	-1.01	Wood charcoal. Sample either pre-dates or is contemporary with construction event of mud-brick Structure 4.
Area 1, Feature 1, Structure 4	9,835±65	-25.6	ISGS-A0248 (AMS)	-0.40	Wood charcoal. Large beam recovered. Dates abandonment event of mud-brick Structure 4.

As at Jericho, Netiv Hagdud, and Tell Aswad, the settlement of Dhra' is situated in a location that has year-round access to water (the springs of 'Ain Waida' are 500 meters to the east and even today water flows 50 meters from the site) and in close proximity to several large alluvial terraces.

Previous field excavations by Bennett (1979), Kuijt and Mahasneh (1994), and most recently Kuijt and Finlayson (2001), have documented the existence of an extensive PPNA occupation with excellent plant and animal preservation conditions, and well-preserved stone and mud-brick architecture. Radiocarbon samples from floor deposits of PPNA residential structures in Trench One, as well as Structure 1 in Area 1 indicates that the occupation of Dhra' was roughly contemporary with the large PPNA villages of Jericho and Gilgal I, and preceded the major occupation of Netiv Hagdud by approximately 200 to 400 years (Kuijt 2001). These soundings also recovered considerable amounts of chipped and ground-stone material and well-preserved macro-botanical and faunal remains from multiple living floors inside structures that were re-occupied several times. Structure 1 appears to have been a minimum of 3 m in diameter with well-constructed stone walls preserved to a height of 85 cm. Wall construction employed cobblestones 20 - 30 cm in size, and intact and dissolved mudbrick was found on top of the stone walls. At the base of the structure excavators exposed a possible bench, constructed of large flat stones. A series of three

radiocarbon dates clustering around 11,500 BP from wood charcoal recovered from the base of Structure 1 date this structure to the early stage of the PPNA. Similarly, soundings in Trench One revealed a series of semi-subterranean structures, covered by 50 to 70 cm of Pottery Neolithic deposits. Due to the limited exposure of these remains, these deposits were originally misidentified as dating to the Early Bronze Age.

Research by Kuijt and Finlayson (in press) over six weeks in 2001 developed an improved understanding of the size and occupational history of the site of Dhra' (Fig. 2). Excavations in 2001 focused on expanding the excavations around the PPNA stone structure in Area 1, and putting new soundings in three other areas. In Area 2, a 1 x 3 meter sounding, PPNA deposits were uncovered down to 1.3 meters below surface. This sounding uncovered part of a well-preserved, large mud-plaster bin feature. Sterile deposits were not reached, and no Bronze Age or Pottery Neolithic materials were uncovered above the PPNA deposits. In Area 3, four 1 x 1 meter units were excavated. Three of these were excavated down to a depth of .60 meters. The fourth one was excavated down to a depth of 200 cm with sterile deposits below. Only PPNA cultural material was recovered from these units. Area 4 excavations focused on a 1 x 2 meter unit placed on the south side of military trench. This sounding revealed a .30-.40 cm layer of PPNA deposits capped by .40 meters of sterile colluvium redeposited from up-slope.

The majority of field research in 2001 concentrated on reconstructing the spatial organization of the PPNA occupation around the well-preserved stone structure previously identified in Area 1. Employing geophysical remote sensing methods, Dr. M. Schurr conducted a high-resolution survey of the majority of the site. This identified a series of magnetic anomalies, one of which was selected for excavation. This involved opening a 5 x 5 meter excavation unit to the west of the stone structure, a 5 x 5 meter unit north of this unit to cover the magnetic anomaly, and a small 2 x 2 meter excavation extension to trace the outlines of two stone features. Detailed analysis of the features and materials recovered from these excavations are currently being undertaken. Preliminary excavation results include the identification of at least two, and possibly as many as three, large structures in addition to several other smaller features. It also resulted in the recovery of over 230,000 chipped stone items, materials, numerous pestles and limestone slab cup-holes, and a clay figurine remarkably similar to one recovered from Netiv Hagdud (Fig. 3b)

Excavations in the northern 5 x 5 meter unit positioned above the magnetic anomaly uncovered Structure 4, a well-preserved mud-brick building that was burned in place. The walls of this structure are preserved to a height of .60 meter (Fig. 3a). Due to time constraints, excavations focused on only the western half of the structure. Excavation in this half of the structure revealed the presence of five up-right stones, placed in lines, with notches chipped into the top of the stones, and positioned to support wooden beams stretching across the structure. Two of the .35-.50 meter high stones used as up-rights were reused grinding stones, while the others may have been specially constructed for this purpose. Large pieces of burned wood recovered *in situ*, as well as lumps of burned mud with wood and vegetal impressions, suggest that this structure had a raised floor of wood, covered with mud (Fig. 3b). Field observations indicate that the sediments recovered from inside of the structure were linked to the collapse of the original floor, the roof and walls of the structure. It is also interesting to note that the floor appears to have been slanted at an eight degree angle, with the northeastern end of the floor being c. 30 cm above that of the southwestern end. Two radiocarbon samples date the initial construction / the last occupation phase before construction at 9,913±59 bp (ISGS-A0246), and the abandonment of the mud-brick structure to 9,835±65 bp (ISGS-A0248). Thus, the building appears to have been constructed at some point around 11,300-11,200 BP and abandoned between 11,260-11,175 BP, with the building being used for no more than a hundred years. All cultural materials recovered from inside and above this structure are diagnostic of the PPNA period. This assemblage includes el-Khiam projectile points, borers, and ground stone pestles. Also recovered from inside this structure was part of a carved limestone vessel. In a general sense, this building is similar to previously identified mud structures identified from the PPNA occupations of Netiv Hagdud (locus 26) and at Jericho. This is, however, the first identified example from

the southern Levantine PPNA of the use of upright stones in mud or stone structures designed to hold wooden beams for a floor level. The function of this building remains unclear, but field observations and the contrast between this building and others previously identified as PPNA residential structures, suggests that this structure may have been for food storage. Certainly the concern for drainage, the absence of internal features, the remarkably low density of cultural materials, and the presence of unusually high number of pestles, fit with expectations for activities related to food storage and production.

The 2001 soundings have resulted in an improved understanding of the occupational history of the prehistoric occupation at Dhra', the size of the settlement, and by extension, how to approach this site as a research project. Four major insights have been gained from this field work. First, due to the limited exposure in Trench One Kuijt & Mahasneh (1995, 1998) erroneously assumed there was an Early Bronze Age occupation above the Pre-Pottery Neolithic A occupation. Subsequent radiocarbon dating (Kuijt 2001) indicates that this occupation dates to the Pottery Neolithic period. Second, it is now clear that the Pottery Neolithic occupation observed in Trench One (Kuijt & Mahasneh 1995, 1998) is spatially limited to a tightly restricted area of the settlement around Trench One. Surprisingly, the 2001 soundings in Areas 2, 3, and 4, all placed around Trench One, uncovered no cultural material of any other periods of time. Second, only in excavation Area 1 were Pottery Neolithic deposits identified, and these were limited to three small pit features. Typically these were small, approximately 1.5 by 1.5 meters in size, 30 cm deep, and characterized by collections of fire cracked-rock, large pottery fragments, and differences in soil coloration from the PPNA sediments. Thus, with the exception of the area around Trench One, it is possible to excavate the PPNA occupational material without having to invest significant energy and time in dealing with overlaying cultural layers from other periods of occupation. A clear example of this is seen in the identification of the top of Structure 4 and intact PPNA deposits 20 cm below the surface and with intact charcoal radiocarbon dated to the PPNA being recovered from 40 cm below the surface. Third, the 2001 excavations have documented that the settlement is considerably larger than originally assumed (Fig. 2) and that there are at least two meters of PPNA deposits in the major area being excavated. Finally, the 2001 excavations have unquestionably documented the existence of outstanding preservation conditions at Dhra'. The uncovering of a multi-floor mud structure preserved to a height of at least 60 cm and the remains of several other structures highlights the potential for understanding the spatial organization of this PPNA settlement, and at the same time, using radiocarbon dating to aid in the chronological placement of these remains. Thus, previous excavations in multiple areas have identified an extensive single phase PPNA occupation at Dhra', with excellent preservation of architectural, faunal, paleobotanical, and lithic remains, as well as identified that this settlement is well suited to evaluating existing models of the PPNA foraging to farming transition.

(iv) Proposed Research and Research Design

The proposed interdisciplinary research involves a three-year program of investigation of the PPNA social and economic adaptations in the Jordan Valley, with three, six-week long field seasons centering on the excavations of the large architectural village settlement of Dhra' (Table 2). During the duration of this project, housing and field laboratory facilities will be located in Kerak (30 min drive) where pressurized water and electricity are available. All necessary food, gasoline, and other supplies are also available in Kerak. The excavations will involve an international group of senior researchers, professional excavators, and undergraduate students from the United Kingdom, Germany, Jordan, Canada, and the United States. Detailed analysis of ground stone materials, architecture, and skeletal remains will be conducted at the Council for British Research in the Levant (Amman) and the University of Notre Dame (South Bend) under the direction of Drs. W. Finlayson and I. Kuijt. The analysis of the chipped stone materials will be conducted by graduate student N. Goodale, with the preliminary results of the 2001 season having been completed and submitted for publication (Goodale et al. n.d.). Analysis of macrobotanical remains will be conducted by Dr. R. Neef (Deutsches Archäologisches Institut Eurasienabteilung, Berlin). The analysis of faunal remains will be conducted by Dr. C. Becker (Institut für Prähistorische Archäologie der FU,

Berlin) and Dr. J. Peters (Institut für Paläoanatomie, Domestikationsforschung und Geschichte der Tiermedizin, Munich). T. Arpin, a senior graduate student studying with Dr. P. Goldberg (both Boston University), will be conducting geoarchaeological and micromorphological research to further our understanding of site formation and paleoenvironmental conditions.

Data Sources and Sampling

The 2002-2004 field seasons will focus on the excavation of large horizontal areas and limited geophysical testing (Table 2). The 2001 pre-excavation employment of two non-destructive geophysical survey methods under the direction of Dr. M. Schurr (University of Notre Dame) clarified our understanding of the horizontal extent of the site and led to the identification of specific loci for excavation. In the first two weeks of the 2001 season Dr. Schurr completed a high-quality map of the settlement. This will be used in 2002, to identify areas for excavation. It is planned that in 2003 Dr. Schurr will conduct additional geophysical survey research inside of the excavated areas. Employing high-resolution methods along a 25 cm grid, this will be conducted within the 5 x 5 meter excavation units to identified PPNA features and structures below those previously identified and excavated. As with in 2001, these results will aid us in selecting areas for excavation in the 2003 and 2004 field seasons.

Excavations in 2002-2004 will concentrate on producing large, continuous horizontal exposures around Area I of architecture associated with the PPNA occupation at Dhra'. It is planned that two 5 x 5 meter units will be opened up each season. Given the depth of cultural deposits around Area 1, our goal is not to excavate these units down to sterile deposits, rather to gain a broad horizontal exposure to the most recent phases of PPNA occupation. Thus, the excavation areas will be positioned in order to: (a) assess the sequence of building phases, (b) document the differences in spatial layout for the different phases of PPNA period occupation. Excavation will be controlled by 1 x 1 meter units (divided into quadrants) in 5 cm levels (or natural layers/lenses < 10 cm thick). Aside from samples for special analysis, all matrix will be dry-screened through 2mm mesh to ensure standardization in sampling with the excavated PPNA sites of Netiv Hagdud and Iraq ed-Dubb. Soil samples from selected contexts will be floted. In addition to the use of traditional recording methods for drafting detailed plans, sections, and profiles, all architecture, features, and large artifacts will be recorded with digital camera and total station, allowing computer generated plans to be developed daily. Hard copies of the plans can be taken to the field the following day for verification and used as working plans.

Research Domains

The proposed research program is designed to explore two interrelated issues: (1) the socioeconomic frameworks of life within early agricultural Neolithic villages; and (2) the spatial context and organization of human behavior within Dhra'. More specifically, this project seeks to further our understanding of the social processes under which the transition from foraging to farming first occurred in the Near East, the range of variation social and economic practices within early village communities, and the extent to these are identifiable within the archaeological record. To these ends, data will be collected in an effort to reconstruct: (a) economic and subsistence activities, (b) demography and season(s) of occupation, (c) paleoenvironment, (d) chronology and regional interaction, and (e) social organization.

(a) Economic and subsistence activities

Efforts to reconstruct subsistence activities and strategies will draw upon analysis of paleobotanical, faunal, and chipped stone materials. Information on the dietary components (such as gathered or cultivated plants) and fuel use will be obtained through systematic sampling and recovery of charred plant remains through flotation. These analyses will be undertaken by Dr. R. Neef. A range of sampling systems will be employed to ensure representative paleobotanical remains. In the case of fire hearths, or other features, all sediment from the entire context will be floted. Large bulk samples of sediments will also be collected to maximize our understanding of the presence of rare taxa and the use of dung for fuel, and to aid in the identification of special activity areas within the settlement. The analysis of faunal

remains will be conducted by Dr. C. Becker and Dr. J. Peters. Among other issues, this research will focus on reconstructing taxonomic diversity in human diet, past methods of obtaining wild game, the degree to which butchery practices occurred on and off site, and overall mortality patterns of the animals. Both the macro-botanical and faunal analysis will address how economic and subsistence activities were spatially and seasonally structured within the Neolithic community. This work will be integrated with spatial evidence for features, such as the mud-brick structure that might have been used for food storage (Fig. 3a and b), to understand the development of storage systems, and by extension, an economic shift to controlled food resources. Descriptive analysis of chipped and stone tools will be conducted by N. Goodale (under the supervision of Drs. I. Kuijt and W. Finlayson) using established descriptive and analytical methods and focusing on formal tools, debitage, and ground stone materials. Use-wear analysis will be conducted by S. Smith (Reading University, UK) as part of his Ph.D. research. Of the 230,000 chipped stone pieces recovered during the 2001 season, 55,000 have already been analyzed, with the results submitted for publication (Goodale et al. n.d.). Preliminary use-wear analysis by Goodale and Smith (n.d.) complements this typological research and will lead to a better reconstruction of the use of specific tool forms. Beyond this descriptive report, future analysis will explore hunting practices, functional activities, and changing use of raw materials with the transition from foraging to farming.

(b) Demography and season(s) of occupation

A second important aspect to this project will be the reconstruction of the density and scale of occupation of the village of Dhra', the seasonality of occupation, and the relative permanence of the occupation. In addressing issues of Neolithic demography, it is important to consider both population aggregation as well as regional population growth (Hershkovitz & Gopher 1990; Kuijt 2000a). At the settlement level, reconstruction of the size of this community will be accomplished through consideration of spatial organization, including the size and density of residential and non-residential structures, and the number and types of non-residential features, including food processing locations, fire hearths, and storage areas. Consideration of archaeological features and structures will also be used to address the relative permanence and size of the settlement of Dhra'. The size of individual features, the labor invested in their construction, the presence of non-portable artifacts such as pestles, grinding stones, and cup-holes, all furnish a general proxy measure of the relative permanence of this occupation and the degree of sedentary life.

Seasonality will be established through a consideration of (a) macro-botanical and (b) faunal remains. As outlined by several researchers (e.g. Horwitz et al. 1999; Tchernov 1994), there are a host of seasonally-specific fauna, especially rodents and migratory birds, that provide researchers with a good understanding of the season(s) in which PPNA settlements were occupied. Similarly, the marked seasonality of the region with a long dry-season and short winter wet-season provides a good foundation for documenting the annual life-cycles of plants, and by extension, the periods during which they were likely to be harvested, used, and deposited by people within the settlement.

(c) Paleoenvironment

Reconstruction of the paleoenvironmental context of past Neolithic communities is another important dimension to this project. The environmental reconstruction will be based upon multiple lines of evidence drawn from: (a) faunal study (Drs. Becker and Peters), (b) macrobotanical study (Dr. R. Neef), (c) geological investigations (T. Arpin), and (d) pollen analysis. Each of these lines of inquiry will also contribute to other research foci, such as the topics of seasonality and subsistence. Previous test excavations have documented outstanding preservation of bone and macrobotanical remains at Dhra'. Collectively, these data will provide a detailed environmental reconstruction for the PPNA in this area of the southern Levant, and by extension, allow researchers to develop a critical regional comparative perspective on the interface between environmental and cultural change. In modeling this interface, Bar-Yosef & Meadow (1995:69-70) have argued that the emergence of farming communities within the Jordan Valley was a socioeconomic response to the forcing effects of the Younger Dryas, a period of cold and dry

climatic conditions, where new communities were founded in areas with good, predictable water supplies. If they are correct, then this research should find multiple lines of evidence, such as the appearance of diagnostic water fowl, consistent with this model.

(d) Chronology and Regional interaction

Another facet of the research will involve efforts to develop a fine-resolution understanding of material culture, expressed through stone tools and architecture for example, at the PPNA occupation at Dhra'. This information will also be used to understand how the chronological sequence and material culture from Dhra' compare to other known PPNA settlements, and to develop a regional understanding of the timing of the forager to farmer transition. Centering upon the possible reasons for inter-site variation in lithic technology from multiple PPNA settlements, researchers continue to debate if the PPNA should be treated as one or two distinct cultural-historical manifestations (e.g., Bar-Yosef 1991; Garfinkel 1996; Goring-Morris & Belfer-Cohen 1998; Kuijt 1997; Mithen et al. 2000). As pointed out by Garfinkel (1996), some of this debated may be linked to the fact that many, if not most, PPNA lithic assemblages are mixed with earlier Natufian chipped stone tools. Given the lack of Late Natufian occupation at Dhra', the presence of intact sealed cultural deposits, as well as the fact that this settlement was occupied intensely in the early phase of the PPNA, excavations are likely to produce representative diagnostic lithic material that will aid us in resolving some of our current cultural-historical debates. Preliminary analysis of the recovered lithic materials from Dhra' illustrate a high degree of inter-assemblage variability across the site (Kuijt 2001; Goodale et al. in press). Further field research is, however, necessary to determine if this variability is linked to site level differences in the spatial location of tool production and use, discard patterns within the settlement, or regional scale differences in the types of functional and subsistence activities that occurred at Dhra'.

The degree to which community members at Dhra' interacted with local and regional communities will be evaluated through comparison of: (a) trade items (e.g., shell and bone beads), (b) use of local and non-local lithic raw materials (e.g., basalt), (c) residential and non-residential architectural practices, and (d) detailed methods of stone tool manufacture. These will provide insights into the nature of the inhabitants of Dhra' participation in broader regional systems of shared cultural practices, such as with architecture, mortuary practices, and stone tool manufacture, as well as more local systems, including the trade and exchange of shell and stone materials.

(e) Social organization.

The final research domain focuses on reconstructing household and community social organization. While unquestionably the most complex of the research domains being addressed within this project, the combination of the excellent preservation conditions at Dhra', remote sensing and broad horizontal excavations, provides an unique opportunity to address these more complex issues. In examining questions of social organization at Dhra', this study will concentrate on these four questions: (a) how were communities spatially organized? (b) what was the nature of ritual practices? (c) where did mortuary practices occur? and (d) what evidence is there for social differentiation? Detailed analysis of the relationship between residential and non-residential spaces, burials and caches, the spatial distribution of material culture recovered from these different contexts, and the presence and absence of material objects likely to be signifiers of social differentiation will form the basis for addressing these questions. A number of researchers working at Neolithic settlements have demonstrated how select aspects of past social organization can be addressed through a consideration of the spatial layout of communities (Byrd 1994; Banning & Byrd 1987; Rollefson 2000). This includes examination of the spatial division of space within communities, including the creation of private residential areas with controlled access, compared to public areas with open access. It may also include examining the location of storage features, food processing areas, and consideration of the life-history of individual structures as they are modified with the changing and expanding family unit. As demonstrated by Byrd (1994) and Kuijt (1996b; 2000c) study of the spatial organization of behavior also informs researchers about the location and role of ritual

behavior within these communities. One aspect of this can be seen in the use of specific buildings for community purposes.

Examination of mortuary practices and evidence for social differentiation also provide important insights into social organization within PPNA communities. Although highly complex, this project will seek to understand the degree to which individuals were differentiated within PPNA communities through consideration of: (a) the nature of variation in mortuary practices, (b) variation in access to residential architecture, (c) evidence for differential access to luxury goods, such as non-local trade items, art objects, jewelry, and (d) evidence for differential access to different food items. Previous research (e.g., Goring-Morris 2000; Kuijt 1996b, 2000c; Rollefson 2000) has outlined methods under which archaeologists can gain insight into Neolithic social organization by understanding to what degree people were differentiated from each other in times of death (including the presence, absence, or variation within mortuary practices), and to what degree they were distinguished from each other during life with access to preferential residential housing. Excavations at Dhra' will enhance our understanding of the extent to which individual community members or households had differential access to material culture, like non-local trade items or food resources, ritual commemoration, and variable living conditions.

(v) Significance and Contributions:

Excavation at Dhra' offers an important opportunity to understand the transition from foraging to farming from the perspective of a critical archaeological case study. This research will produce an unique data set from the earliest stage of the PPNA with outstanding preservation conditions. Collectively the use of broad horizontal excavations and well preserved macrobotanical, faunal, and lithic remains, provide the perfect opportunity to evaluate and refine existing models of the transition from foraging to farming.

This research will contribute to our understanding of the transition from foraging to farming on three levels. First, this research will expand our understanding of the transition from foraging to farming at the local and settlement level. Preliminary test excavations at Dhra' have demonstrated the existence of a large PPNA village situated outside of Mediterranean-desert ecotone, and occupied in a single phase of the PPNA period. Preliminary research has, moreover, documented extensive and well-preserved architecture and features, and outstanding preservation conditions of materials, such as paleobotanical and faunal remains. As a case study the excavation and analysis of remains will allow us to better understand how and where different subsistence and social activities were spatially organized within this PPNA community, how this changed through time, and by extension, the nature of the transition from foraging to farming at Dhra'.

Second, proposed excavations will provide an understanding of regional and intra-regional scale adaptations in the southern Levant. These excavations, in brief, will serve as a critical data set upon which we can understand PPNA occupations within the southern Jordan Valley, and compare these results with previously excavated PPNA settlements from the northern Jordan Valley. Previous research in this area has identified several small PPNA occupation in the marginal zone south of the Dead Sea, including Ghawair I, Sabra I, 'Ain Darat, Jebel Queisa, and Wadi Faynan 16. All of these are characterized by limited architectural remains, shallow cultural deposits, and in many cases represent seasonal encampments rather than year-round occupations. Excavation of Dhra' will provide a much-needed perspective of the variety of socio-economic practices that occurred within the southern Jordan Valley, and a better understanding of variation in the southern Levant. By employing the same high-resolution recovery techniques employed at Netiv Hagdud, which is the only other PPNA site that has been excavated with broad horizontal exposures, the excavations at Dhra' over three years will provide an improved understanding of regional scale issues, including the overall timing of this transition, and the extent to which social and economic variation exists within our earliest transition from foraging to farming, and the degree to which this transition was linked to the emergence of social inequality.

Third, this research will provide researchers with an new understanding of the global scale of the social transition from foraging to farming. Excavations at Dhra' provide an unique opportunity to understand two interrelated global issues related to the transition from foraging to farming: the socioeconomic frameworks of life within early agricultural villages and the temporal context under which this transition occurred. As an evolutionary event the transition from foraging to farming is one of the most important social and economic transition in human prehistory. The development and incorporation of new, or expansion of previously existing, systems of food production forever changed social needs for scheduling of collective labor for tasks associated with food production, managing the growing number of people living in communities and households, and gave rise to a host of previously unknown social, economic, and biological changes from earlier hunter-gatherer and foraging systems. The proposed research will provide the means to refine our anthropological models for the transition from foraging to farming in general, and at the same time, develop a detailed understanding of this transition in the environmental context of the southern Levant and Near East.