

Food Storage, Sustainability and Land Use at Iktānū in the Late Third Millennium

Population density models for the large late third millennium site of Tall Iktānū in the south Jordan Valley are based on the various formulae proposed by anthropologists and archaeologists working in a number of regions of the ancient Near and Middle East (especially Prag 2001: 181). There is particular relevance in the formulae based on sites and populations located within the region, where environmental regimes and even social adaptations may be presumed to be broadly similar. For the late third millennium onwards, they may be more relevant than formulae based on dissimilar environmental patterns in different parts of the globe. Many attempts have been made to estimate the size and nature of the contemporary arable and pastoral regimes, which underpinned particular ancient societies, and to reconstruct the socio-economic production at the appropriate levels. The estimates are usually based on many uncertainties in the available data. At Iktānū the size of the village, the density of occupation, the methods and potential volume of grain storage, the arable areas in relation to alluvial soils, crops and rainfall may offer a more secure basis for estimating the contemporary economic subsistence patterns. The processing and accumulation of data from the archaeological investigation of the site is slowly progressing towards this end.

In summary, the area of land occupied by the late third millennium settlement in Phase 2 at Iktānū was made up of a core area of houses on the south tall (especially Areas A, B and H; ca. 14 ha; see e.g. Prag 2000: 92); sherds but no excavated evidence for houses on the north tall (Site D, ca. 4 ha.); artifacts from Area E on the low ground north of the south tall (ca. 4 ha.); a buried site in Area G of uncertain extent north-east of the north tall; an extension of houses and sherds south of the south tall; and another sherd scatter further south again, discovered during a recent survey in 2001. The estimated area of the third millennium site is thus between 14 and 22 ha./140 and 220 dunums (or possibly more) and the population estimates have varied between 1400 and 4400. If the density

of households in Area A is applied to the rest of the site, then a higher rather than an lower number should be anticipated. Wilkinson (1994: 495) in his model for dry farming states in north Syria, proposed a population density of 100 persons per ha., which would indicate (if the conditions were similar), a population between 1400 and 2200. The intention is to review these estimates against other evidence from the site and vicinity, and eventually to modify these statistics by comparison with conclusions based on other data sets. This process is by no means complete, and the following is a statement of avenues explored and progress rather than results.

Field Systems

The local alluvial soils are clearly defined; Iktānū overlooks and lies at the eastern extremity of an alluvial fan, which slopes gently westwards and is fed by the perennial Wādī Ḥisbān. With an annual 164mm, the rainfall is today below the accepted levels for stable dry farming, but in the late third millennium the river bed may have been higher, and the ground surface of the fan lower (Prag 2001: 183, Fig. 3). The effect on a stable agricultural process of ground water seepage from the high plateau to the east also requires consideration. The streams readily permit canalization and gravity irrigation of the fields; and the available ground water augments the low-level annual rainfall.

The area of irrigable alluvial field systems available in the area in the late third millennium is based on a number of uncertainties, but working on a distance of 2.75km between Iktānū, and ar-Rāma to the west, we have a cautious measurement of distance from the site over which control and daily access to fields was possible. Using the Jordan 1:25,000 map as base, when the area of the irrigated field systems known in AD 1953 is calculated (Prag 2001: 182, Fig. 1), it provides a figure of 3.384km² / 338.4ha / 3384 dunums. This very productive land would certainly support a substantial population, but it is clear from the evidence that the ancient population of Iktānū

was supported by a mixed economy of agriculture, horticulture and pastoralism. However, there is very varied land, mostly not alluvial deposits, within a radius of ca. 2.75km from Iktānū, a territory of 23.74625km² / 2374.625 ha. / 23746.25 dunums.

The additional land is of much lower potential, though it also includes the steep narrow central valley of the Wādī Ḥisbān (Prag 1991b: 55, Fig. 5). Some of this land is used today, and was used in the nineteenth century, for catch crops of dry-farmed barley in suitable small pockets. All of the land is however important winter and spring grazing today and was also in the nineteenth century, for sheep, goats and cattle (Seetzen 1854-5: II, 330; Burckhardt 1822: 369; Conder 1883: 306-7; Oppenheim 1943: II, 212). Hole (1978: 141-149) and Barth (1961) state that a pastoralist family needs at least 200 sheep and goats to maintain a modest livelihood today. This is also the optimum number that can be managed by an ordinary family without employing a hired herd. There is no doubt even when considering the land rights of adjacent contemporary ancient communities (at, for example, Tall al-Ḥammām) that the environment of Tall Iktānū in the late third millennium could support populations on the scale proposed.

Modern Production

Traditionally this is a cereal producing area, as can be seen in TABLE 1.

Wilkinson (1994: 497 citing Zohary 1969: 56) indicates production levels at 500-1500Kg per ha. for Palestinian barley and hard wheat. The change to more modern horticultural processes and to introduced fruit and vegetable crops in the regions is reflected in the statistics for 1990, but in that year also the production of wheat and barley is almost reversed, with total production for the ash-Shūna al-Janūbiyya area in 1990 being 19.8 tons of wheat and 144 tons of barley. Outside the irrigated fields there is still (2001) considerable production in good years of dry farmed

crops of barley, produced mainly for animal fodder, but totally dependent on a very variable annual rainfall.

Ancient production

Sampling the archaeobotanical evidence was the primary object of the three-season project undertaken at Tall Iktānū between 1987 and 1990. In 1966 it was assumed that with virtually no visible charcoal in occupational deposits so close to the surface, and active high-calcium ground water regimes, such evidence was unlikely to survive. The importance of retrieving this material from Bronze Age and later deposits was still not fully appreciated at that time. An intensive program of flotation was a primary feature of the later excavations, and the full analysis has been undertaken by Dr U. Thannheiser (University of Vienna). The Phase 2 deposits, normally within the top 10 to 20cm of the site, were indeed generally unproductive, producing at most three items per liter. The small sample produced wheat, barley, bean and fig. No organic materials were associated with the rich Phase 2 assemblage of broken storage jars.

The preservation in the earlier, stratigraphically lower Phase 1 deposits, which included some pits and silos, was much better, with up to 90 items per liter. The sample included a lot of barley, wheat, pea, lentil, bean, pistachio, grape, fig, olive and carob? - a profile similar to that retrieved from the Early Bronze 3 material excavated as part of the same project at Tall al-Ḥammām, and to that retrieved from the Early Bronze 1 levels at Iktānū. It is notable that the late third millennium sample had higher levels of barley than wheat, while the Early Bronze 1 sample indicated higher levels of wheat production than barley, and thus that moister, easier environmental conditions probably obtained in the later fourth millennium.

Tool Kits

The site produced a rich assemblage of querns (at least

TABLE 1. Department of Statistics of Jordan, 1975 average yields in tons per dunum of selected field and fruit crops: figures for South Ghawr, East Bank.

Crops in 1975	Irrigated yield	Unirrigated yield	Production (tons)
wheat	0.082	0.037	114.3
barley	0.071	0.031	16.2
lentils	-	0.037	6.2
beans	0.068	-	10.2
olives	insignificant	-	-
grapes	0.721	-	17.31
figs	0.032	-	0.94
dates	some	-	6.40

one per household in excavated areas, see Prag 1990: pl. 1: 1), mortars (up to two per room in some areas, see Prag 1991a: Figs 1 and 2), sickle blades (McCartney 1996), all of which could be related to the harvest and processing of cereals and other foodstuffs.

Agricultural Storage

Two silos were found and excavated in Area A; and several more were recorded and sampled in the cutting of the Dead Sea Highway (Prag 1990: 125).

Ceramics were inevitably the largest category of archaeological evidence, and because of the very large numbers of broken but more or less complete vessels recovered, their reconstruction and analysis has inevitably progressed slowly. There were only two complete, intact vessels found during the whole four seasons of excavation, a small four-spouted lamp, and a medium-sized jug. Most vessels were broken into many fragments, in one case into more than 250 fragments. The fragmentation studies indicate that the great majority of the Phase 2 vessels were smashed *in situ* following abandonment of the site, and represent good primary contexts. The first (unpublished) paper on the preliminary results was presented at a workshop in Sheffield in 1992, but there has been considerable progress since then. Virtually, all restorable pots have now been mended and their capacity measured. Whether it will be possible to produce reliable formulae for estimating the capacity of fragmentary vessels has yet to be tested. Almost all restorable vessels belong to Phase 2; while Phase 1 pottery is represented mainly (except in the kilns, see Prag 1988) by domestic debris and unrelated sherds in rubbish pits with very few joins. As noted above, no organic remains were associated with the Phase 2 pottery, so inevitably the best ceramic sequence does not directly relate to the best organic evidence.

By far the greatest numbers of vessels were storage jars mainly in the range of 20 to 60 liters but the largest jar measured held 98 liters. Many are relatively broad based and proportionately wide in relation to their height, when compared to the storage jars found in tombs on the West Bank. There are in addition many medium large jugs (a similar shape to the jars, but with a single strap handle), and many "cooking pots", which also vary considerably in size. Some cooking pots, at 50cm in di-

ameter, seem too large for any but large communal meals of stew or porridge, and might perhaps have been used for making beer.

The numbers of such vessels found in one room is significant. There is no evidence for any cultic, votive function or activity. These vessels, like the silos, appear to emphasize the need for secure storage of foodstuffs, whether grain or dried fruits and pulses; or liquid, especially water, as there was no evidence for a source on the site. This may in itself indicate the pressures on the population to secure adequate foodstuffs for subsistence. In terms of grain storage, it may also be significant that the storage jar capacity in one room adds up to virtually the same quantity as the contents of a silo, and suggests a defined regime of household storage in relation to silo capacity.

Pastoralism

The animal bones (analysis Dr Gil Clark) should not be neglected in estimating the basic economy. Cattle, sheep and goat, the latter probably dominant, must have been grazed around the site in seasonal regimes. The dry foothills to the east offer winter and spring grazing; cattle and goats survive year round in the Ghawr, and graze the stubble in the harvested barley fields in April and May. Sheep and flocks generally may well have been moved further a field for water and grazing in the summer. The regional ethnographic pattern, at least since the nineteenth century, is one of transhumance, with migration of people and animals in April /May to the plateau, and return to the Ghawr in time to sow crops for the first rains of the following winter. As suggested previously, the site at Iktānū may have been abandoned following a disastrous failure of the winter rain in one or more seasons.

Conclusion

It is hoped to reconstruct the economy of Tall Iktānū in the late third millennium, not just on the basis of the data retrieved from the archaeological evidence, but in a reconstruction that is founded also on more recent and broad based materials. These may contribute to our understanding of the processes by which a sizeable population (in prehistoric terms) could be sustained for limited periods in a relatively marginal zone.

TABLE 2. Size and capacity of silos excavated at Tall Iktānū.

Context	feature	depth in metres	base diameter (m)	Cubic capacity (m)	volume in litres
IK.752.1	bell silo	1.80	1.90	0.85	850
IK.404.40	bell silo	1.62	1.28	0.69	694

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