ECONOMY AND SETTLEMENT IN THE NEAR EAST:
Analyses of Ancient Sites and Materials

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Fig. 1:
Map of Near East showing sites mentioned in text.
ARCHAEOBOTANICAL PERSPECTIVES ON THE
RURAL-URBAN CONNECTION

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The previous paper discussed major landscape changes brought on by population growth and
technical development in parts of the ancient Near East. Contemporaneous increases in economic and
social differentiation are signalled archaeologically by changes in the settlement system, namely, the
development of distinct urban and rural sectors. Archaeobotanical studies can yield important insights
into the relationship between town and countryside.

In the ancient Near East, craft and administrative activities are generally presumed to have been based in
cities. Farmers, too, could have lived in urban settings while working the surrounding fields. In many regions,
increasingly complex settlement patterns show that the rural agricultural sector developed along with urbanization.
After all, someone had to provide surplus food for urban nonproducers. As population densities increased,
surplus production became even more important as a buffer against poor harvests. Archaeologically, the
interdependence of the rural and urban components of the social system is reflected in settlement hierarchies and in
the differential distribution of features and artifacts on different types of sites.

Much archaeobotanical research in the Near East focuses on the origins of food production, but scholars are
increasingly directing their attention to the environmental conditions and agricultural practices of the early civilizations.
The importance of archaeobotanical studies is evident when one considers that it was the rural agricultural
economy that sustained the urban civilizations of the ancient Near East. Most work on the early civilizations
concentrates on urban sites. The reconstruction of regional environment and land use in complex societies based on
excavations at a single site is inherently subject to distortion for at least two reasons, however. First, no single site
can be considered typical in a complex settlement system, and second, any subsistence practices which took advantage
of very localized resources and habitats will be hard to verify. In the absence of excavations in the rural component
of complex settlement systems, one should at least be aware of how urban remains reflect regional phenomena.

Archaeology of the Kur river basin

Late third/early second millennium developments in the Kur river basin of southern Iran exemplify the processes
of urban growth and rural development. This area was the heartland of the Achaemenid empire, but people have lived
there since Paleolithic times. Archaeological data come from various surveys of the valley and from the excavation
by The University Museum of the University of Pennsylvania at Malyan, the largest site in the valley (summarized by
Sumner 1986, 1988, 1989). Ethnographic and census data collected in modern times provide a basis for interpreting
the material evidence for ancient land use patterns (Census 1970; Kortum 1976; Miller 1982).

Malyan achieved urban status in the second half of the fourth millennium B.C., locally known as the Banesh
period. After a probable discontinuity in settlement, the city was reestablished by 2200 B.C. (Kaffari period; Sumner
1988). The site has been identified as Anshan, a capital of the Elamite polity (Stolper 1984), and was contemporary
with the Akkadian and later civilizations of Mesopotamia. Malyan-based studies of the pastoral and agricultural sectors
of the ancient economy have been completed. Zeder (1984, 1985) has discussed the distribution of pastoral products in
the urban economy, and archaeobotanical work has provided information about the agricultural economy and the envi-
environmental setting (Miller 1982, 1984, 1985). Ideally we
would test these reconstructions against new data from
other sites in the valley, but political events since the late
1970s have prevented us from excavating rural settlements
contemporary with Malyan.

A glance at the map (Fig. 1) shows that population in
the valley was unevenly distributed. (The following dis-
cussion is based on Sumner [1989]). At the beginning of
the second millennium, Malyan had clearly become the
major settlement of the Kur river basin. Evidence of craft
and administrative specialization and long-range trade
further indicates its urban status. Although supported by a
multi-tiered settlement hierarchy of towns and villages
throughout the valley, Malyan was not centrally located
with regard to the rural population. At 130 ha, it housed
nearly half the settled population of the valley. These data
suggest that the Kur river basin settlements were not
economically and politically independent of one another.

Malyan’s preeminence in the settlement system in-
sured that it was a major locus of agricultural production,
consumption, and distribution in the valley. First, Malyan
is very large, and only a few small sites lie within a 10-km
radius; it is therefore likely that many agricultural workers
actually lived in the city, and farmed in the immediate
vicinity. Second, if Malyan housed about half of the
valley’s population, about half of the consumption of
agricultural products (namely, food) would have taken
place there as well. Third, some of the agricultural products
produced elsewhere in the valley would have been brought
to the city, to feed non-producers (scribes and other ad-
ministrative personnel, craft workers, and the like).

The available data are heavily biased in favor of the
urban settlement, yet Malyan was not independent of its
rural hinterland. Because Malyan was involved in a regional
system, it is possible to make some generalizations about
the environment and land use in the valley as a whole. Yet
until we have excavated evidence from other parts of the
valley, we will not be able to determine how the rural
population participated in and was integrated into the
regional economy.

Ethnobotanical considerations

Fortunately, plant remains do not simply reflect envi-
ronmental conditions. At Malyan they provide evidence
for basic resource management, such as fuel procurement
and agricultural and pastoral practices. Plant remains re-
covered from urban settings represent the final deposition
of fuel, agricultural products, and other resources that
originated in the countryside. Most plant remains are
preserved by charring, so fire, usually under human con-
trol, is the primary factor of archaeobotanical preservation.
Patterns of fuel use must be understood before one can infer
the environment, irrigation, crop choice, and pasture
practices from plant remains (Miller 1984, 1985).

Wood may be brought to a site for a variety of reasons,
but when burned (and thus archaeologically visible) it is
generally used as fuel. In non-industrialized situations,
transport cost determined by distance is typically the
overriding factor in species choice. Although archaeo-
logical charcoal cannot be used to determine the relative propor-
tions of tree types in the forest, it is usually the only direct
evidence that we have for species availability. The third
millennium saw a great increase in settled population in the
Kur basin (cf. Sumner 1989). Land use patterns had to
change in order to satisfy the increased demand for both
fuel and food.

The following interpretation of the Malyan plant re-
 mains rests on several assumptions about fuel use that are
strongly supported by ethnographic analogy (Miller 1984,
1985). First, given a choice, wood and charcoal were
preferred to dung. Second, as the more desired fuels, wood
and charcoal could be transported profitably from as far
away as the mountainsides, a distance of only about 10 km.
And finally, most of the archaeological seeds reflect ani-
mal fodder.

The view from Malyan

The charcoal analysis identified some of the environ-
mental disturbance that resulted from fuel cutting during
the third millennium. For example, trees growing within 5
or 10 km of the site were most probably utilized at the
beginning of the third millennium; by the end of the third
millennium, the more distant stands of oak were tapped
(Miller 1985, this volume). Wood is not the only fuel,
however, that provides information about the environment.

The other commonly used fuel at Malyan was dung.
When burned, dung leaves a residue of ash and identifiable
seeds. The seeds represent plants of pasture, field stubble,
and fodder, and they are incidentally useful indicators of
environment and land use. Thus, the documented increase
in the use of dung fuel relative to wood corroborates this
picture of an expanding circle of tree clearance around
Malyan (Miller 1985).

Aspects of agricultural and pastoral production may
also be addressed with the archaeobotanical data. The
presence of weed species of irrigated fields in the
archaeobotanical assemblage (e.g., Chenopodium, Avena,
Lolium, Fumaria, and Hyoscyamus [Miller 1982:161 ff.])
suggests that at least some crops were irrigated in both
Banesh and Kaftari times. The high proportions of seeds of
nearby meadow and field plants found in flotation samples
suggests that animals were pastured relatively near Malyan;
there are only a few seeds of Prosopis, a plant that grows
as much as 30 km away.

Food plants grown or collected by ancient Malyanins in
both Banesh and Kaftari times include cultigens (wheat,
barley, lentil, and grape), and nuts (pistachio and almond).
Wheat and barley are the most important crop plants
represented. A mineralized Kaftari latrine deposit yielded
twice as much wheat as barley, whereas barley predomi-
nates at better than ten to one in the charred material from both Banesh and Kafkari deposits. Presumably, wheat was more important as human food, and barley was grown primarily as fodder (that is, most of the charred seeds were incidentally incorporated in dung fuel [Miller 1984]).

There was an increase in 2-row barley at the expense of the 6-row type. The major economically important difference between the two is that 6-row barley has a higher protein content relative to starch than does the 2-row form, a trait which makes 6-row more suitable for food and fodder. In contrast, the high starch content of 2-row barley makes it well suited to malting and beer-making (Hutcheson et al. 1936). Textual evidence from Mesopotamia suggests that there was a shift from food to drink in the use of barley between the Sargonid period (mid-third millennium) and the Third Dynasty of Ur (late third to early second millennium) (Oppenheim 1950). One might suggest that a similar shift, reflected in a changing pattern of barley use, occurred in the Kur basin, but archaeological evidence of brewing, such as large ceramic vats containing masses of wheat and barley residue (cf. Geller 1989), has yet to be found at Malyan.

Alternatively, crop choice at Malyan could reflect agricultural practices in the Kur river basin. Harvests of both wheat and barley are more secure if irrigated, but barley is more drought-resistant than wheat (Nuttson 1957:7). Two-row barley tends to be more drought-resistant than the 6-row type, and in those parts of the Near East where both are grown, 6-row barley is irrigated and 2-row is not (Harlan 1968).

One might expect the grain yield of 6-row barley, with three times as many grains per spikelet, to be greater than that of 2-row barley, but this does not appear to be the case. In one experiment, yields of two varieties each of 2- and 6-row barley types were not correlated with type (Thayer and Rather 1937). In another test, the 2-row barley was found to yield slightly less in general. However, at lower rates of seeding, it outyielded both of the 6-row varieties tested (Bonnell and Woodworth 1931). Considering that in the Kur basin today, unirrigated grain fields are seeded less densely than irrigated ones, this might confer a yield advantage on 2-row barley under dry farming.

In the third millennium barley production for hay and fodder could therefore have been expanded by clearing

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Fig. 1: Map of the Kur river basin during the Kafkari period.
trees from unirrigated land around Malyan, and 2-row barley could have been grown with relatively little risk of drought. Turning irrigated lands over to wheat production would have minimized additional labor costs, while at the same time reducing the risk of crop failure and maximizing food yield. The irrigated fields would have been used to secure a plentiful and reliable wheat harvest for the human population, and barley for the animals would have been relegated to the recently cleared dry-farmed fields.

The view from the countryside

Remnants of the natural vegetation, physiography, and modern land use enable one to identify ecologically distinctive zones. Pistachio and almond dominate the southeastern end of the valley, whereas oak grows on the hillsides to the northwest. Traditionally, the north edge of the valley had extensive pasture, as did the central moist meadow area (cf. Census 1970; Miller 1982). The southeast part has a long history of river irrigation (Kortum 1976). Any economic differentiation of the communities in the valley which takes advantage of this variability will allow for more efficient use of the landscape.

Rainfall agriculture is possible in the Kur basin, but irrigation greatly enhances crop security and productivity. Based on the distribution of water sources and archaeological sites in the valley, William Sumner (1989) suggests that irrigation was an important factor in agricultural production of the late third millennium. But the archaeobotanical evidence, based on excavated materials from one site, does not support the inference of expanding irrigation. This apparent discrepancy can be resolved by considering rural-urban relations.

Irrigation near Malyan is limited only by the availability of water; it may have reached its limit in both Banesh and Kaftari times (Sumner, pers. comm. 1989). Furthermore, dry-farming would have been more suitable for distant fields, as it is less labor-intensive than irrigation agriculture. If Malyan were an independent, self-sufficient settlement, one could reasonably infer from the archaeobotanical evidence that people expanded food and fodder production by increasing the area cultivated rather than by improving yields with more labor intensive practices. First, forest clearance would have opened more land for fields. Second, the wheat-to-barley ratio is fairly constant. And third, cultivation of 6-row barley declined relative to the 2-row type.

But Malyan was not independent, even though it dominated the valley. As suggested above, the most efficient system of agricultural production would take advantage of the variety of natural conditions in the valley. This could only occur if valley-wide systems of distribution developed. Although distribution may have been uneven, with political centers drawing in more resources from the countryside than they returned, intra-valley specialization could have increased production. Near Malyan, the only available water sources for irrigation are a few springs along the valley edge, and rainfall is higher there, so barley may have become the preferred crop. Malyan could well have obtained fodder locally, and imported irrigated wheat through trade or taxation. Since the archaeological remains reflect fodder, not food, we are seeing only one part of the agricultural system. Distinguishing local from regional production requires archaeobotanical assemblages from more than one site, however important that site may be.

Archaeobotanical test implications

One way to test the degree of economic integration in the valley is to focus on different supply systems. For a given product, if availability is the primary determinant of its distribution, one might expect a gradual falloff in quantity as one leaves the source area. If, on the other hand, distribution is influenced by a central authority or central marketing point, one might expect “central places” to have relatively large amounts of that product. I think fuel and fodder distribution was governed by availability, but food distribution is more likely to have followed a central place model (cf. Johnson 1973). The identification of distribution channels for particular items would increase our understanding of the relation between Malyan and its hinterland, and excavation in the southeastern irrigation district should clarify the degree of Malyan’s dominance.

Charcoal analysis could prove to be a useful tool here. Trees are likely to have lasted on the mountainsides longer than in the valley because the hilly land is unsuited to alternative agricultural uses and population densities were lower. One would therefore expect villages on the valley edge to have greater access to wood fuel. Similarly, villages in the central meadow areas might have particularly high percentages of meadow plants. If each family collected its own fuel, one would expect those sites on the valley edge to have a relatively high proportion of charcoal of forest woods, oak in the northwest, and pistachio and almond in the southeast. Dung use as determined by the amount of charcoal relative to weed seeds would be low compared to a populous site like Malyan. In contrast, if city dwellers had direct access to forest woods either as individuals or perhaps through some kind of specialized marketing channel (like charcoal cutters), one would expect wood use at Malyan to be comparable to or even higher than that of the valley edge.

If animal pastures and fuel sources are local, weed seed assemblages from sites in the irrigation district should yield seeds from irrigated weeds and plants of the region, like Capparis and Prosopis, neither of whose range extends to Malyan. Inter- and intra-settlement differences in pastoral production might also lead to occupational or status-based differences in fuel residues. Patterns of meat distribution at Malyan itself suggest higher status people living in Malyan were further removed from production
than some of the other residents who were pastoral specialists (Zeder 1984). These specialists would have had ready access to the daily output of locally produced dung. Unfortunately, there is insufficient evidence to determine whether people had differential access to the various fuels, wood, charcoal, and dung.

Finally, the nature of relations with groups outside the valley can be assessed through excavation in rural sites. The Kur basin lies on a major route to Mesopotamia from the Iranian plateau. If Malayan was indeed the urban center it appears to have been, one would expect exotic goods destined for or passing through the valley to be concentrated in that city; rural settlements would have less access to such items. Source analyses of minerals are widely used to trace trade networks, but even humble plant remains can provide evidence for long-range trade. Two imported date pits from late third millennium Malayan show the potential of this kind of analysis.

Conclusions

The contribution of the agricultural sector to urban development is an important aspect of the study of ancient civilization. The nature of the rural-urban connection can be illuminated by a research strategy that combines regional archaeological survey and excavation at both major centers and smaller sites. Archaeobotanical evidence is critical for identifying regional patterns of land use, and the analysis of plant remains can provide insight into the relations between rural and urban communities.

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