

Mobility and Subsistence Strategies: A Case Study of Inamgaon, A Chalcolithic Site in Western India



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ARCHAEOLOGY TODAY deals with being critical of our assumptions; being reflexive, relational, and contextual. The conclusions are always flexible and open to change as new relations emerge. It is impossible to approach the data without prejudice and without some general theory, but the aim is to evaluate such generality in relation to the contextual data. Our own understanding about human behavior acts as a generalization with which to understand the past. Nevertheless, we can agree that the past is *objectively* organized in contexts that are different from our own. The internal archaeological evidence then forces us to consider whether the past subject we are dealing with is familiar to us or makes us rethink deep-seated presuppositions about the nature of human behavior. The objective component of archaeological data means that the archaeologist can be confronted with a past that is different from the present. It is this *guarded objectivity* of the material “other” that provides the basis of critique. It is thus a hermeneutical procedure that involves a dialectical interplay between our own understandings and the forms of life we are seeking to understand. It is an ongoing dialogue between the past and the present in which the outcome resides wholly in neither side but is a product of both (Hodder 1991; Hodder et al. 1995; Wylie 1989).

It is with these ideas in mind that this article is aimed to analyze critically certain categories archaeologists use to understand human behavior in a dialectical effort to understand the past. Two of the most common categories involve mobility and subsistence strategies. Mobility-subsistence change and its archaeological indicators have been dealt with extensively in the archaeological literature. Binford’s (1983) seminal work sought to develop conceptual tools to understand the differences between mobility and subsistence patterns and their roles in creating diverse forms of archaeological remains. Other works have also tried to understand movement and its material consequences (e.g., Cribb 1991) through a detailed study of a particular group.

Researchers working on the Chalcolithic site of Inamgaon in western India have postulated that there was a change in mobility and subsistence associated

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with the later levels of this site due to environmental degradation. However, these scholars often used present-day categories to describe past human behavior without critically analyzing to what extent these categories are identifiable in material culture of the past. Moreover the evidence was limited to the level of one site only, that of Inamgaon.

One way to link categories is through “critical” analogies derived from ethnographic situations or anthropological accounts, often called “middle-range research.” This approach argues that mobility and subsistence change has to be understood through archaeological patterning across a landscape as well as on a single site. Further, this approach argues that to understand these aspects the researcher has to move beyond the confines of a single-site approach and comprehend the archaeological record in a holistic way, both at the level of the region and at the site.

The aim of this article is therefore to present a critical analysis of mobility and subsistence change at the site of Inamgaon within a regional framework using actualistic research and anthropological literature as heuristic devices with which to give meaning to patterning in the archaeological record. The procedure used is dialogical, in which there is continuous interplay between our own notions and the objective past archaeological record in order to come to terms with the complexity of human behavior in the past and present.

THE SITE OF INAMGAON

The site of Inamgaon, a village in Shirur taluk, Poona District, Maharashtra State (western India), is located 89 km east of the city of Pune (Fig. 1). The ancient mound, 3 km from the modern village, is situated on the right bank of the river Ghod. The main objective in undertaking large-scale excavations at Inamgaon was to obtain detailed knowledge of material culture of the Chalcolithic farmers. Accordingly, excavations were carried out for twelve seasons (1969–1982) by Deccan College, under the supervision of H. D. Sankalia, M. K. Dhavalikar, and Z. D. Ansari.

The site, measuring 550 × 430 m, consists of five mounds, 10 percent of which was excavated, concentrating primarily on the mound INM-I. The Chalcolithic Culture is divided into three phases—Malwa, Early Jorwe, and Late Jorwe—based primarily on pottery types. The dates for the three phases are c. 1600–1400, 1400–1000, and 1000–700 B.C., respectively (uncalibrated dates). The deposit is 4.18 m deep on the INM-I mound, which was subjected to extensive excavations.

For the first time in Indian archaeology, animal, botanical, and human remains, as well as sediments, were extensively studied for information on the subsistence, habitation pattern, diet, and diseases of the inhabitants. The features of the site were comprised mainly of structures, most likely mud huts, numbering approximately 134, that have survived only in the form of floors, which were destroyed by later pits. The houses were both rectangular and circular, with the latter dominating in the later levels. Some of these have been interpreted as houses of chiefs and craftsmen. A kiln, an embankment, and an irrigation channel were also identified by the excavators. The cultural material recovered includes pottery, copper, terracotta, stone objects, chalcedony, other lithics, beads, and bone objects. About 266 burials were also unearthed.

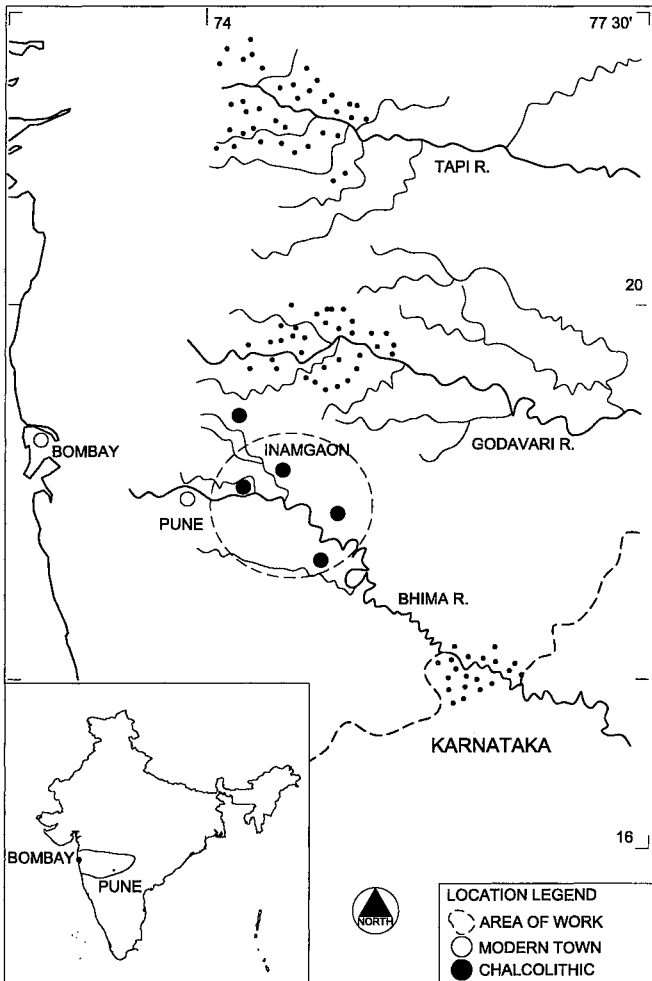


Fig. 1. The Chalcolithic sites in the study area in Maharashtra State and in Karnataka State, western Deccan, India.

The wealth of evidence gathered from systematic, prolonged, horizontal excavations, aided by scientific analysis, was used to reconstruct past lifeways at Inamgaon. The subsistence base was presumed to be subsistence agriculture, stock-raising, and a combination of hunting and fishing. It was suggested that sedentary agriculture was the main occupation of the Chalcolithic farmers until about the close of the second millennium B.C. (during the Late Jorwe period) when, because of increasing aridity, the subsistence changed to seminomadic sheep and goat pastoralism. Recent faunal studies have shown, however, that in the later levels a shift in hunting strategies occurred, as indicated by an increase in the number of deer bones (Pawankar 1996).

Environmental change was inferred on the basis of the presence of a contemporaneous sterile layer at Nevasa and Prakashe, both located in Maharashtra. This layer was formed because of severe aridity (Mujumdar and Rajaguru 1965), and this conclusion has been reached elsewhere, for example, in Rajasthan in western

India (Krishnamurthy et al. 1981). The hypothesis regarding the causal role of increasing dessication was corroborated through evidence from the site of Inamgaon, that is, there were an increase in the number of sheep and goat bones in the later levels, as opposed to cattle in the earlier levels; a decrease in the amount of plant remains; round flimsy structures were present; and consumption of animals increased, as revealed by strontium studies.

Based on the evidence from the site's public architecture (such as the granary, embankment, and irrigation channel), differences in burial customs, and the presence of larger structures, it was postulated that a chiefdom level of organization was found at Inamgaon. The Chalcolithic people exchanged materials with their contemporaries, as is evident from the presence of nonlocal items. According to earlier researchers, this exchange was disrupted because of aridity, and the inhabitants were driven out by the Megalithic people c. 700 B.C. (Dhavalikar 1984, 1988, 1994; Dhavalikar et al. 1988).

Rethinking Inamgaon

Unfavorable environmental change has been one of the most popular prime movers in archaeological explanation. The occurrence of environmental change during the Chalcolithic of western India is beyond the scope of this work; criticism has already been levied against the empirical evidence cited in favor of this change (Paddayya 1994). What is stressed here is whether there was any visible change in human behavior during this period.

Earlier researchers have postulated a change in the site of Inamgaon, from sedentary agriculture to seminomadic pastoralism and hunting, on the basis of recent reanalysis of faunal materials (Pawankar 1996). The problem is how to relate these lifestyle categories to the archaeological record. Archaeologically, how do we distinguish between sedentary settlements, or sedentary peoples, and nomadic ones? How do we classify an agricultural settlement as opposed to a pastoral one? Do organic remains unequivocally denote subsistence strategies? As has been mentioned earlier, middle-range research can help us to move between our present-day notions of human behavior and the "static" material culture of the past. These are not absolute generalizations, as alleged by many post processualists; instead, they are heuristic devices with which to comprehend the past.

Moreover, these scholars based their arguments on the evidence from one site, the site of Inamgaon. The work described here goes beyond this one-site approach to try to comprehend the archaeological patterning across a region. Thus the investigation will deal with archaeological patterning at the inter- and intra-site levels, with a middle-range perspective.

Scholars often see mobility and subsistence strategies as coterminous categories of investigation. But as we know, mobility and subsistence strategies are distinct and analytically different categories; for example, we know that agriculturists are not necessarily sedentary nor are pastoralists always nomadic and mobile. Archaeologically, therefore, these concepts cannot be understood through similar analytical procedures. Hence, in this article I deal with the problem of identifying and explaining mobility and subsistence change separately, using different modes of investigation for each.

MOBILITY STRATEGIES

The Regional Background

Earlier researchers working with the site of Inamgaon sought to understand mobility change from the perspective of a single site. But mobility change would also invariably be reflected in a settlement pattern change; in fact this is the most important and decisive indicator visible to the archaeologist studying shifts in movement strategies and their implications for human behavior (Rafferty 1985). Thus, mobility strategies need to be considered at the scale of the settlement system across a region as well as at the individual site.

The region has been defined by certain geographical parameters. It falls in the middle Bhima Valley, an area characterized by horizontal basaltic formations; therefore, the phenomenon of lateral erosion of rivers is common, with meanders and banks of deposition developing along their course (Fig. 2). The low-lying tracts are characterized by black soil sediments and brown coarse soils, while shallow gray and sometimes reddish soils are present in the elevated regions. The entire area is semiarid and annual rainfall is variable and scarce. It is only because of irrigation that agriculture has become important here. The most important factor here is the variability and seasonality of rainfall. Rainfall is at a maximum in September, and the total annual rainfall is less than 500 mm (Deshpande 1948, 1971).

An area forming a triangle with the known and excavated Chalcolithic sites (Inamgaon, Walki, and Songaon; see Fig. 3), was systematically surveyed through intensive field walking (in transects) and extensive intervillage survey (village-to-village and interviewing local inhabitants) for three seasons between 1991 and 1994 (Fig. 3). Efforts were made to understand not only the sites themselves but also the less obtrusive archaeological features, or materials, that fell outside the context of a regular site, often called "off-sites" or "non-sites." The area, covering 4880 km², was sampled according to the various zones around the major sites and the region in between these sites, taking into account environmental differences, namely the alluvial riverine belt with black soil sediment, the coarse brown soil sediment zone, and the stony pastureland with shallow soil and chalcedony outcrops. Because modern activities may have obliterated remains of past human activities, information from surveys coupled with interviews from older inhabitants of the villages were used to supplement the survey results.

Archaeological survey in this region identified a certain pattern of settlement. Apart from the three known and excavated Chalcolithic sites, a fourth site was identified, situated on the banks of the Bhima (Fig. 3). This site, Khed, was roughly 200 × 105 m, with a cultural deposit of about 2 to 3 m yielding pottery similar to that found at the site of Inamgaon. Around the four known sites, some artifact scatters consisting of pottery and microliths were found. Nevertheless, there was a notable lack of Chalcolithic material in the region in between the clustered settlements. The survey also identified some open-air microlithic scatters without pottery in the barren areas and around the known sites. These scatters are located in elevated stony areas with thin soil cover near ephemeral *nullahs* (small streams) and chalcedony nodules.

Microlithic scatters are found in many Chalcolithic sites in different regions in the country; thus the presence of these assemblages in this region could well

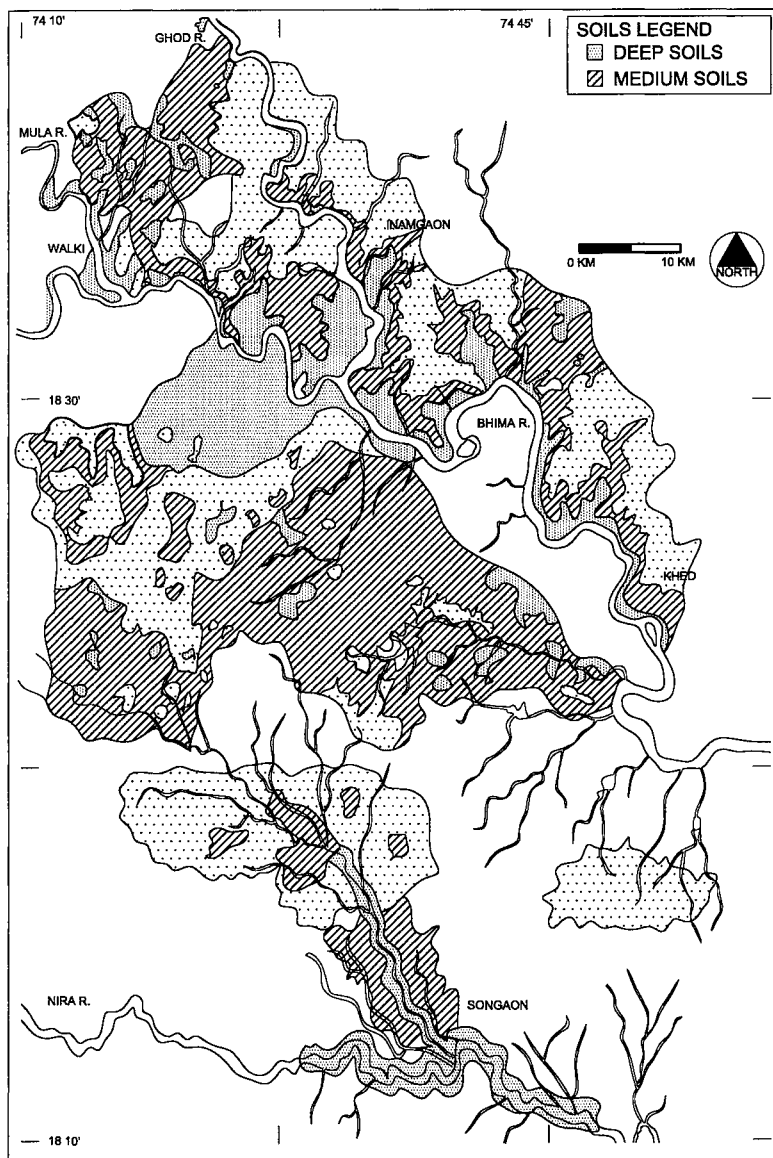


Fig. 2. Soil map of the Ghod, Bhima, and Mula rivers.

represent the remains of contemporary groups. Therefore, the chronology and nature of these scatters have become important in understanding Chalcolithic settlement patterns in this region.

Because of a close similarity in technology and raw material (chalcedony) in this area between pre-Chalcolithic and Chalcolithic lithic industries, a sample of the open-air scatters was collected and compared with a sample from the excavated site of Inamgaon. We found some differences between the two groups in

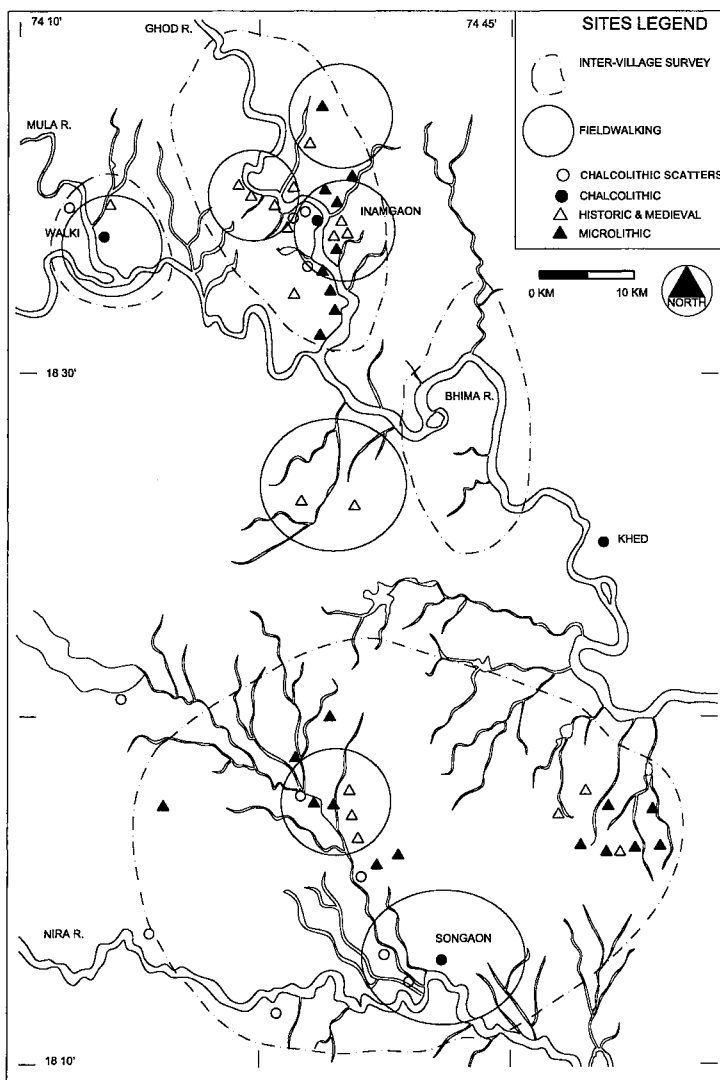


Fig. 3. Map of Chalcolithic sites in the vicinity of Inamgaon.

the size and the nature of blanks. Inamgaon had very large cores, and the blanks were dominated by blades. Among the open-air scatters, there were very small cores and a minimum of blades among the blanks; instead, flakes or both flakes and blades dominated. Despite these differences, points of similarities occurred between samples from both the units. To understand this better, the analysis was limited to the study of cores. The study revealed that these could be divided into three types.

One type of core was very crude, the blanks of which were flakes (35 percent) or flakes and blades (45 percent), with fewer blades (19 percent), and with most irregular scars. These cores were found only in the open-air sites, but not in the stratified levels at Inamgaon. Their average size was also smaller, 2.39 cm. The

majority were exhausted cores (64.3 percent), and two-thirds (66.6 percent) of the raw material was of poor quality.

A second type of core had flutes and very regular scars. Some of the shapes were cylindrical or pyramidal. They were mostly blade cores (84.4 percent). This type resembles the classic Neolithic and Chalcolithic technology. The cores were recovered from the stratified levels at Inamgaon, but were not found on any of the open-air sites. Here also, the majority (71.8 percent) were exhausted cores.

The third type of core was also fluted, but either the edge or the number of scars was not regular. They were made on both blades and flakes. Here the majority of the cores had amorphous shapes and size was similar to the second group of cores found in the open-air sites. They were found in both open-air contexts and in the stratified levels at Inamgaon and form an important part of the analysis.

If we compare the last group of cores from both the open-air and stratified levels, we see a similarity in technique and form. They do not differ in many respects, for example, in the nature of raw material, type of platform, exhaustion, shape, size, regularity of scars, and the nature of blanks. Hence we can argue that the Chalcolithic technology was not aimed at producing only ribbonlike blades but also at producing cruder cores that are similar to the ones found at open-air sites. There have been instances of hunting-type microliths being found with later cultures (Jacobsen 1970), which have been interpreted as indicating connections between hunter-gatherers and farmers or as a functional variant of the farmers' activities themselves. At a surface site near Karachi, on the Indus Plain, there were cores and tools characteristic of both the Harappan civilization and the Late Stone Age (Allchin 1966).

At Inamgaon, the similarities between some of the cores from open-air sites and those found in the stratified contexts permit us to infer that these two groups of assemblages were relatively contemporaneous. The dissimilar cores could indicate the presence of functional variants or use of the place by different groups of people separated in time.

Archaeological survey in this region thus revealed that there were four major sites—Inamgaon, Walki, Khed, and Songaon—situated on the banks of the rivers Ghod, Bhima, and Karha on black soil sediment or alluvium. Around Inamgaon, there were two smaller sites, one located on the alluvium and one in a thin soil zone, and still another one scatter located on the banks of the river Ghod. Songaon surveys of the 1950s revealed six scatters, three along the Karha on black soil sediment and three along the Nira in a similar setting. No other Chalcolithic sites or scatters with pottery were found in this region; however, microlithic scatters were located in areas with thin soil cover or in pasture land, or both. They may have been contemporaneous with the Chalcolithic (Fig. 3). The settlement pattern is thus characterized by an open system with a few large settlements and barren or low-density areas in between the settlements. This is in stark contrast to areas like the Tapi Valley or Godavari Valley where settlements are more clustered and form a closed system (Fig. 1; Shinde 1984, 1989).

Settlements and Mobility Strategies — Based on the description above, there is no evidence of any settlement change during the Chalcolithic, as postulated by earlier researchers. Further, it is difficult to identify traces of sedentism or seminomadism

from these archaeological patterns. Taking into account ethnographic models (Panja 1996; Wandsnider 1992), the archaeological patterns do not conform with what has been labeled as a sedentary pattern. Archaeologically, this region is characterized by huge gaps between the settlements, which is distinctly unlike Chalcolithic sites in other regions, such as the Tapi Valley (Shinde 1984) or the Bijapur area in Karnataka where there are numerous settlements along the river Bhima (Sundara 1968; Fig. 1). The sites are not always large and are not surrounded by smaller settlements. Despite considerable distance between these sites, there is a remarkable similarity of material culture. Lacking modern facilities, this interaction could have been due to movements of people between the settlements. Therefore it seems difficult to subscribe to the idea that these patterns represented purely sedentary settlements.

Early researchers had postulated that there was a shift to seminomadism in the later levels (called Late Jorwe) at Inamgaon. In most instances in which a change in movement or of subsistence strategies occurred, there is evidence of settlement pattern change. Among numerous examples, we take the case of the Early Bronze Age in the southern Levant. At the end of the Early Bronze Age II, there was a change from a complex society to one that is more consistent with pastoral nomads and small-scale farmers. The earlier urban settlements were abandoned and smaller settlements emerged, concentrated around springs (Rosen 1995). In the case of the Bhima Valley, there is no evidence of settlement change. The assemblage labeled as Late Jorwe is found at three of the sites—Inamgaon, Songaon, and Khed—but there is no evidence of any settlement pattern change at the regional level in this area. In the Bijapur district in Karnataka along the Bhima, a number of Late Jorwe sites have been discovered (Sundara 1968; Fig. 1).

Based on ethnographic analogies, the settlement pattern seems to indicate a semisedentary way of life in which a section of the population was migrating for short distances and occupying one of these four places regularly. This can explain the sites and the scatters around them. The gaps in the region between these clusters could be explained by the fact that the occupants were not occupying the same places while migrating, hence no substantial archaeological record was created here. The microlithic scatters could be the vestiges of some of the mobile people who formed a section of the population at the sites, or even independent nomadic groups. If we look at the nature of these open-air sites, we find that the assemblage shows mostly debitage and only small amounts of used flakes or blades and few finished tools. Taking into account the location of the microlithic sites, the nature of the assemblage, and the pattern of Chalcolithic sites in this region, some of these lithics could well be the remains of expedient knapping behavior of mobile groups.

Thus the settlement pattern in this region suggests that mobility during the Chalcolithic was in the form of short-term semisedentism throughout the entire period. Other nomadic groups were probably occupying the area between the sites and interacting with the semisedentary groups.

This might explain the great similarity among the material cultures of the four major sites of Inamgaon, Khed, Walki, and Songaon, even though they were separated by relatively large distances. It is with this background that we now assess the on-site evidence relevant to the interpretation of mobility strategies.

On-Site Evidence from the Site of Inamgaon

According to earlier researchers, a change from sedentary agriculture to semi-nomadic pastoralism occurred in the later phases at the site of Inamgaon. Nevertheless, taking into consideration the nature of the landscape and employing locational analysis of the sites, instead of a change from one distinct strategy to another it seems that diverse strategies were being followed in this region. Scholars concentrating on the site of Inamgaon concluded that this change was reflected primarily in the change in the shape of houses, from rectangular to round, and the change from a predominance of grains and cattle bones in the earlier levels to a lack of botanical remains and sheep and goat bones in the later layers of the site.

When these data were reanalyzed, we discovered that house shape had been considered in isolation, apart from their domestic contents, as well as other aspects, in keeping with the overall approach of the earlier workers who sought to study material culture in isolation. House shape cannot be taken as an indication of mobility without placing it in context. Change from a communal to a family-based society, in addition to environmental concerns and symbolic values, can also condition house shape. Therefore, in a holistic perspective, house shape can be understood only in relation to other aspects of material culture.

House shape does change from primarily rectangular to circular in the later levels at Inamgaon. In this analysis a random sample of the excavated houses was drawn, consisting of 86 (64 percent) houses of a total of 133, and processes of disturbance caused by natural agencies was taken into account. The results revealed that, in the Early Jorwe, rectangular houses had facilities whereas circular houses had none. In the Late Jorwe, circular houses had hearths and courtyards, but rectangular houses had few facilities (Fig. 4). Clearly, the function of the circular houses in the later phases was different from the early phases. Moreover, if we look at the artifacts inside the structures, in the Early Jorwe phase, circular structures had less variety of artifacts than rectangular structures, but in the Late Jorwe phase there seems to be no difference between rectangular and circular structures (Fig. 5). This suggests that houses of similar shape were probably used for different purposes; hence it is difficult to assume that change in the shape of houses necessarily indicates a shift in mobility strategies.

A change in organic remains, from cattle to sheep and goat, combined with a decrease in botanical materials, a change in house forms, from well-built structures to flimsy ones, and a lack of settlement planning in the later levels were also cited by early researchers as marking a shift from sedentism to seminomadism. But we cannot use these criteria in isolation to postulate mobility change. We must acknowledge that change in subsistence does not necessarily imply a change in mobility—some agriculturists are mobile and some pastoralists are sedentary (Graham 1989). Moreover, the context of the organic remains has to be taken into account. A change in organic remains on a site can also be due to functional shift in site structure that is not necessarily due to only cultural or subsistence change (Davidson 1983). Similarly, flimsy structures and a lack of settlement planning are not necessarily evidence of mobility. In many settled communities, flimsy huts are built, and they may lack planning, but mobile groups can have

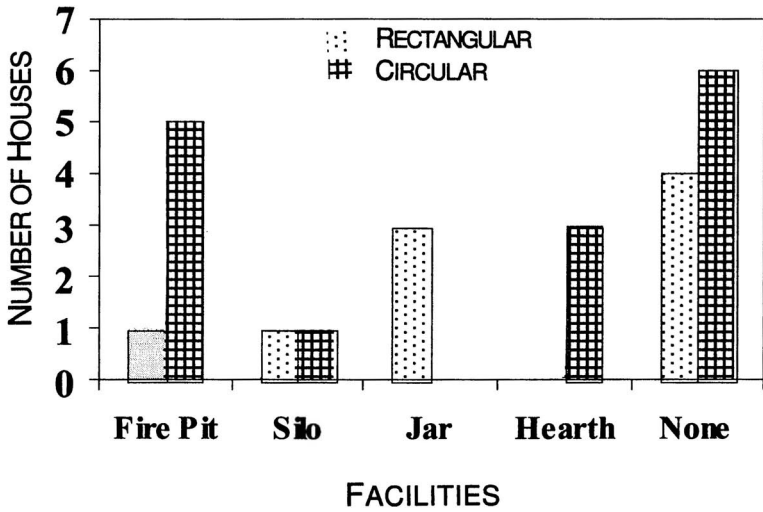
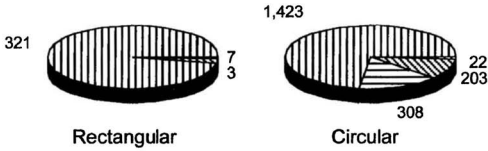


Fig. 4. Distribution of features (facilities) between rectangular- and circular-shaped houses at Inamgaon.

JORWE



LATE JORWE

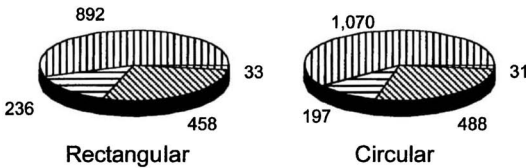
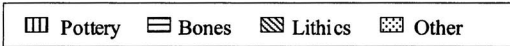


Fig. 5. Distribution of artifacts and house forms over time at Inamgaon.



permanent structures (Rafferty 1985). Therefore we cannot use these criteria in isolation to postulate mobility change.

From an analysis of structures, artifacts, and organic remains, we find that the houses in the Malwa levels contain more facilities, implying that they were probably used for domestic purposes. The ones in the Early Jorwe period are larger and contain fewer facilities; they could have been used as nondomestic units. The structures in the Late Jorwe levels are smaller and contain few facilities. Were

TABLE 1. STANDARDIZED NUMBER OF ARTIFACTS

LEVEL	POTTERY	LITHICS	OTHER
Malwa	3245	17764	1103
Jorwe	3979	25732	1073
Late Jorwe	4050	47454	2132

these functioning as houses as in the earlier levels? Could they be temporary camps or shelters?

Examining the patterning of organic remains, we see differences throughout the levels of the site. Winter crops dominate in the earlier levels, but both winter and summer crops are present in the middle levels. This may mean that the site was being occupied differently in these two periods. In the Late Jorwe levels we find fluctuating cropping patterns. These patterns could occur if groups from different geographical zones were occupying the site (Kajale 1988). Was the site being used by diverse groups of people following different strategies in the late levels? When we look at other forms of evidence, we see that artifact density and numbers also increase in the later levels (Table 1). Large quantities of artifacts can be generated by seasonal occupations of the site if many people are involved (MacNeish 1973, quoted in Rafferty 1985). Could this change in the later phase mean use of the site for different purposes—in this case short-term camps of mobile groups or mobile sections of more sedentary populations?

The history of the site seems to be a complex one. The site could have been used in different ways for domestic, nondomestic, or for short-term purposes. Therefore, change in structure shape and form, as well as a shift in the nature of organic remains, do not signify only a change in movement strategies. It could well signify a shift in the function of this particular area of the site. To understand this change we have to employ some other form of analysis. One way of perceiving mobility change from a site is through a study of site structure, or what is commonly known as intra-site spatial analysis, and it is to this that we now turn.

Intra-Site Spatial Analysis — Intra-site spatial analysis encompasses a wide area of research, but put simplistically its goal is to recognize the patterning of artifacts and ecofacts within a site to understand how space was being used in the past. In the initial stages, a site map was scrutinized to ascertain the presence of an overall structure or pattern. In the second stage a more conscious effort was made to interpret intra-site patterning based on propositions drawn from modern ethnographic analogues and tested in the archaeological record (Hill 1970). These efforts were aimed at identifying activity areas and tool kits using statistical techniques to identify specific tools for certain activities and to recognize spatially differentiated activity areas through the analysis of material recovered from living floors. Problems arose in that tools are not functionally specific nor are activity areas spatially dispersed. Ethnographic work further confirmed this assumption about the multifunctional nature of tools and activity areas. This concept underwent further criticism by Schiffer (1987) who argued that the formation processes of the archaeological record must be taken into account in order to understand its context before proceeding to identify areas of activity. This concept was further

expanded by Binford (1987), who argued that mere enumeration and mathematical expositions of formation processes failed to take into account the differential manner in which recognizable behaviors are integrated relative to other archaeological indicators of past behavior. This methodological approach, often called middle-range research, aims to explain why in different systems material culture is created differently (Binford 1987). This understanding is then used to identify different subsistence-settlement systems in the past.

Following this methodology, efforts were made to understand movement and subsistence change through an analysis of spatial debris across a site (Graham 1989; Hitchcock 1987; Kent 1992); however, this approach has been criticized because examples from ethnographic situations are episodic and are not able to capture the long-term scale of the archaeological record (Stafford 1985; Wandsnider 1989). Post-processual work on spatial studies has questioned the functional explanation of space use, including the study of formation processes and activity areas. According to proponents of this school of thought, archaeological deposits are generated in accordance with cultural rules rather than universal natural laws; they are arbitrary and conventional and constantly open to manipulation and re-interpretation (Hodder 1990; Thomas 1991).

Site structure is important in deducing mobility strategies from the archaeological record. The analysis here follows a middle-range approach, using spatial patterns in order to identify diverse mobility strategies. Nevertheless, a research emphasis on a particular aspect of site structure studies, be it an activity area study or a maintenance behavior study, depends on the nature and context of the archaeological record. Earlier researchers assumed that the artifacts found on living surfaces directly represent their original context of use; subsequent research has shown that artifacts are not always left where they were originally used but instead may undergo certain modifications both in natural and cultural formation processes. The archaeological record rarely preserves episodic events and is not conducive to fine-grained behavioral interpretation; it is instead a palimpsest involving the differential use of artifacts, structures, and places. Thus archaeological records differ in terms of their inherent integrity; some may contain more research potential for activity areas while others may throw light on other questions (Petraglia 1987; Wandsnider 1987). Therefore, the context of the record has to be understood in order to postulate how much postoccupational natural factors (fluvial and weathering processes, bioturbation, corrosion, etc.) distort the archaeological patterning and whether these artifacts reflect in situ use rather than secondary processes.

Formation Processes — The work was based on a sample of 10 percent of the excavated data of the site of Inamgaon, a sample comprising pottery, lithics, bones, and other artifacts (18,000 items). Information was supplemented by the published excavation reports, unpublished field notebooks, maps, and sections drawings. Information about natural formation processes was gathered from examination of the artifacts and from field notebooks, excavation reports, maps, and sections of the site. This information created an overall view of the nature of the archaeological record that included individual cases in which artifacts or structures were considered.

The analysis was at two levels—the first was devoted to understanding the

nature of structures and their associated artifacts and the second took the artifacts as the unit of study. The first level of analysis sought to understand how disturbance processes affecting the houses may also have affected artifacts contained within them. For both disturbed and undisturbed houses the average number of artifacts is similar: 4467 and 3969, respectively. Moreover, the processes that affected the houses, such as burning (e.g., houses 134, 105, 129) or rodent activity (house 71) did not seem to affect artifacts. Thus it appears that artifacts were deposited after the house was abandoned. The artifacts were examined for disturbance processes, such as bioturbation, weathering, fluvial action, thermal fractures, and pitting, and information about the depositional context was gathered from notebooks, maps, sections, and field observations. We conclude that natural processes did not affect the artifact patterning as much as human factors did. In analyzing specific spatial patterns, the noncontextual artifacts were therefore excluded from the study.

In considering human factors, the first aspect to be understood was whether the discarded artifacts reflect in situ use or secondary dumping activities. To understand the nature of the deposits, it is necessary to characterize artifacts by the type, variety, size, and completeness to distinguish between primary and secondary refuse. Smaller items and complete artifacts and those with high refitting values characterized primary deposits where artifacts were left behind in their place of use. Secondary refuse can be determined by artifact size, the diversity of objects, and their low use-value, denoted by the level of completeness and reuse potential (Douglas 1994). The second objective was to determine whether the structures had undergone reuse or reflected episodic events. Reuse is understood in two ways: one, in which disturbed floors have numerous artifacts that are unaffected by disturbance processes, and two, in which houses with facilities such as fire pits, hearths, and silos have a variety of artifacts, implying that houses once used for habitation purposes were later reused as dumping areas.

To realize these objectives, artifacts from the structures were analyzed on the basis of their size, type, completeness, and state of preservation in order to assess the nature of deposit. Artifact analysis revealed that most of the houses were used as secondary refuse areas. Further, the structures do not reflect episodic events, but are instead a cultural palimpsest formed of various activities (Table 2). Analyses of the artifact scatters across the site, both within and outside of structures, also seemed to indicate a mixture, which in archaeological parlance can be described as secondary refuse.

From this analysis we see that artifacts discarded on the site of Inamgaon were a result of secondary refuse dumping, though there were some areas of activity. Thus, refuse patterning can be used as a criterion to distinguish between groups

TABLE 2. HOUSES AND THEIR CONTENTS

CULTURAL PERIOD	REUSED AS DUMP	DUMP, NO REUSE	ACTIVITY AREA	DISTURBED, NO ARTIFACTS
Malwa	10	0	2	5
Jorwe	15	7	1	6
Late Jorwe	16	13	5	6

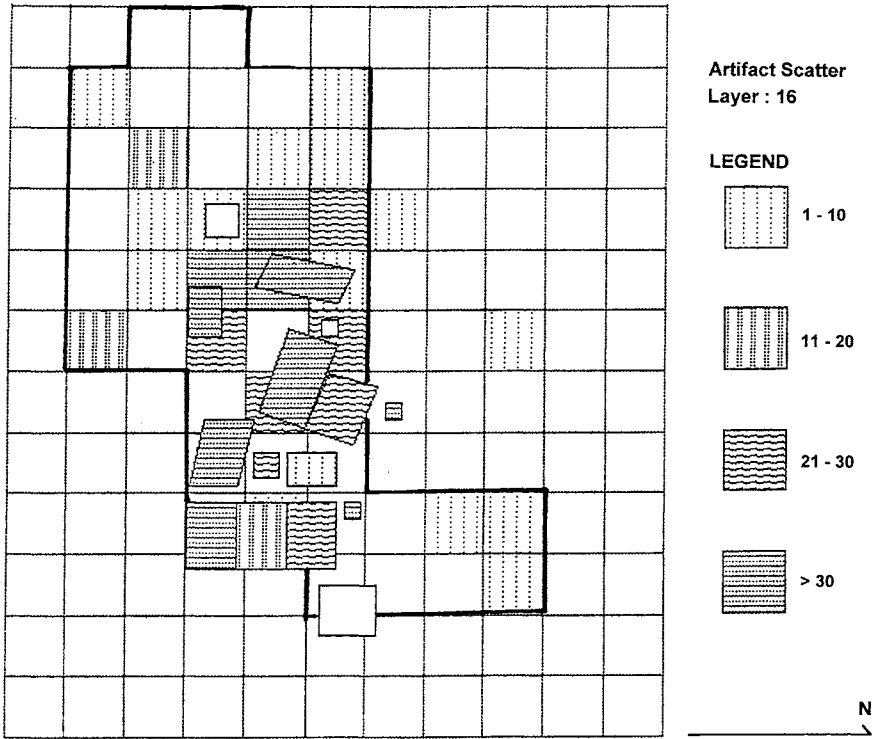


Fig. 6. Artifact patterning at Inamgaon during the Malwa phase.

with different mobility strategies. Because the analyses revealed that most of the artifactual material was in the form of secondary refuse, maintenance behavior is taken as a focal point of inquiry in this regard. Ethnographic models of refuse patterning and maintenance behavior among different groups (Panja 1996; Wandsnider 1992) were used to identify different movement strategies from spatial patterning at Inamgaon.

Spatial Patterning at Inamgaon — The artifact patterning during the Malwa phase (Figs. 6 and 7¹) was characterized by refuse dumps concentrated in a certain area in and around the structures. During the Jorwe period patterns are similar, though some show a preponderance of a certain type of artifacts, thus implying a certain activity occurring (Figs. 8 and 9). The Late Jorwe phase shows scattered refuse areas, with a part of the space well maintained and with fewer artifacts (Figs. 10 and 11).

Mobility Change at Inamgaon

In the Malwa period, refuse areas were marked out, indicating somewhat long periods of stay. Most of the structures had facilities and seemed to be reused as refuse areas, implying that different or similar groups of people were using the houses as domestic units, abandoning them, and reusing them in diverse ways, including as dumping spots. The botanical remains provide evidence of winter crops, pointing to some form of seasonality in occupation of the site. This shows

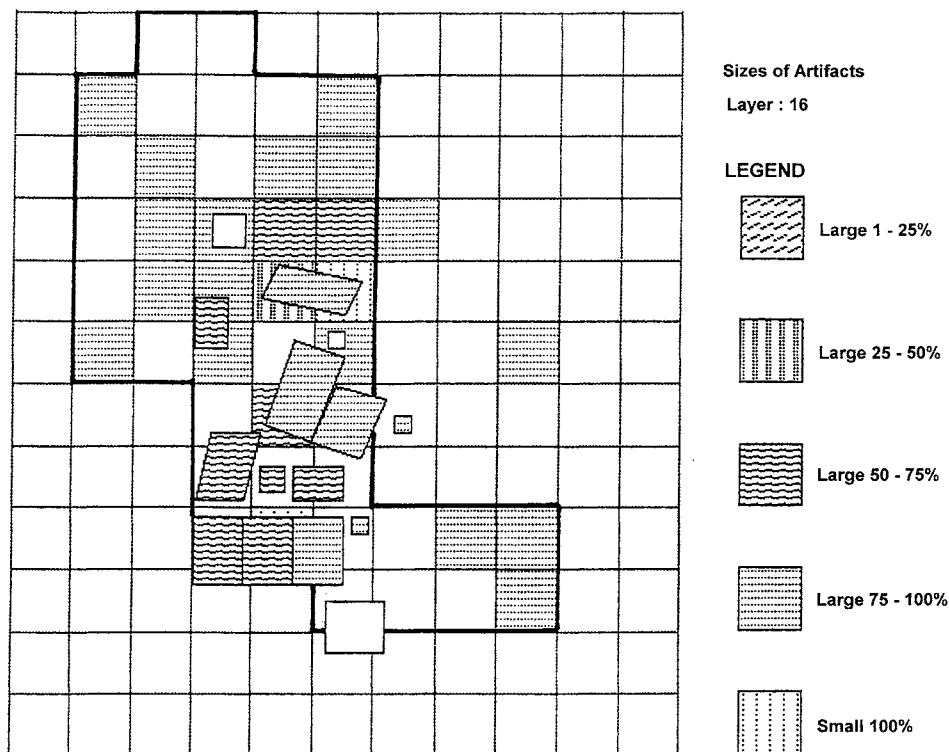


Fig. 7. Artifact patterning at Inamgaon during the Jorwe phase.

that some form of short-term semisedentary movements took place during the early period that the site was occupied.

During the Early Jorwe period, dumps were also concentrated in and around structures and certain areas show some specific activity. Houses had few facilities, were large, and were also reused as refuse areas. During this period, houses were used for nonhousehold activity. On the basis of the concentrated dumps, the presence of few activity areas, and the presence of both summer and winter crops, we can surmise that people during this time were both sedentary and semisedentary.

During the Late Jorwe period, the dumps were scattered and concentrated around structures. A part of the area was well maintained, with small artifacts. The houses did not have facilities. The presence of botanical remains decreases during this period, but on the other hand the remains of summer and winter crops predominate through the layers. Evidence of wild animals increases in this period (Pawankar 1996). Given that the dumps are scattered, people seem to have been staying for shorter periods of time. Some parts of the site were used for short-term purposes, because there are few artifacts. The presence of diverse pottery and evidence of fluctuating cropping patterns point to the fact that diverse groups of people were occupying the site. Thus it seems that a section of the population was semisedentary or seminomadic and was staying for short periods of time while nomadic groups were using other parts of the site for short-term purposes.

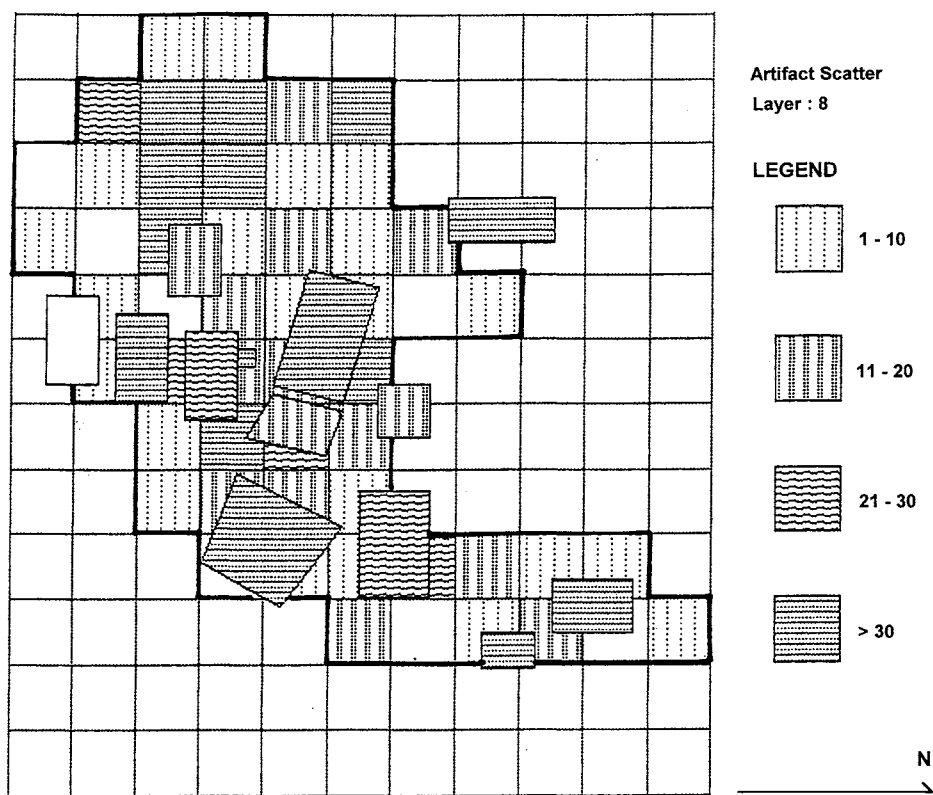


Fig. 8. Size of artifacts at Inamgaon during the Malwa phase.

Earlier researchers postulated that a change occurred from a sedentary lifestyle to one dominated by seminomadic pastoralism. However, the preceding analysis shows that the site was inhabited by diverse groups of people following different mobility strategies—semisedentary, sedentary, and nomadic. The excavations at Inamgaon covered only 10 percent of the entire site, so it is possible that the excavated part represented only a portion of the entire area occupied. Thus, material change could well represent a differential use of the site rather than a change in subsistence and mobility. The change in the later levels was functional rather than cultural. Functional change refers to lateral shifts in the location of various activities, giving the appearance of temporal change at a given location even though there is no overall change in subsistence strategy. Studies on foragers and agriculturalists have shown that, as the residential focus of a settlement system moves laterally across the landscape, various places previously used from the former residential locus may change roles in a very systematic way (Binford 1983; Schlanger 1992). Research carried out on the Palaeolithic cave sites in the Levant region of eastern Spain shows that the change evident in faunal remains does not signify a shift in subsistence strategies due to environmental degradation, but instead a change in the functions of the sites in relation to the exploitation of a given set of resources (Davidson 1983).

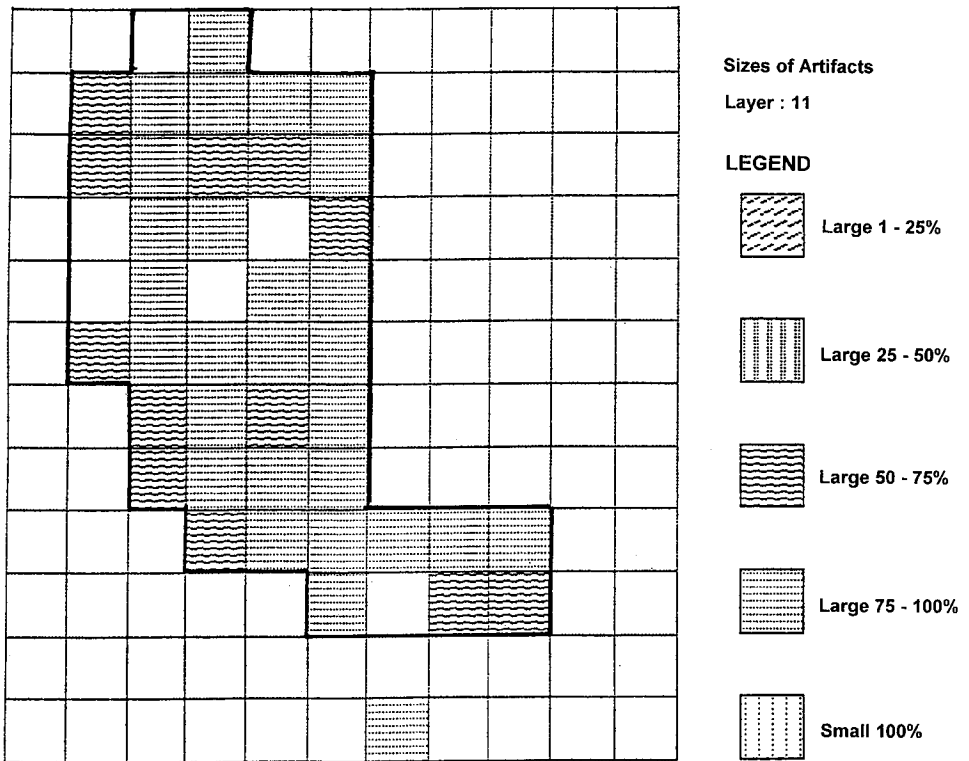


Fig. 9. Size of artifacts at Inamgaon during the Jorwe phase.

The point stressed here is that the archaeological record at Inamgaon is a palimpsest composed of diverse activities and different types of use and record-creating processes. What we have here is a kind of horizontal stratigraphy in which several processes have produced their own particular patterns of material remains yielding a complex palimpsest (Rothschild et al. 1993). Thus, based on the regional patterns and an on-site analysis, we surmise that there were diverse mobility strategies during this period and that the change in material culture in the Late Jorwe period could well be attributable to differential use of the site by these diverse groups.

SUBSISTENCE CHANGE AT INAMGAON

The Regional Background

Archaeologists working on the site of Inamgaon also postulated a change in subsistence strategies, from agriculture to pastoralism, due to a shift toward a more arid climate. This conclusion was based on a change in organic remains, that is, a shift from cattle to sheep and goat remains (and also to wild animal remains, according to recent research) and a decrease in botanical remains in the later levels. As with mobility strategies, subsistence patterns cannot be reconstructed from the archaeological remains of a single site. Subsistence must be viewed in

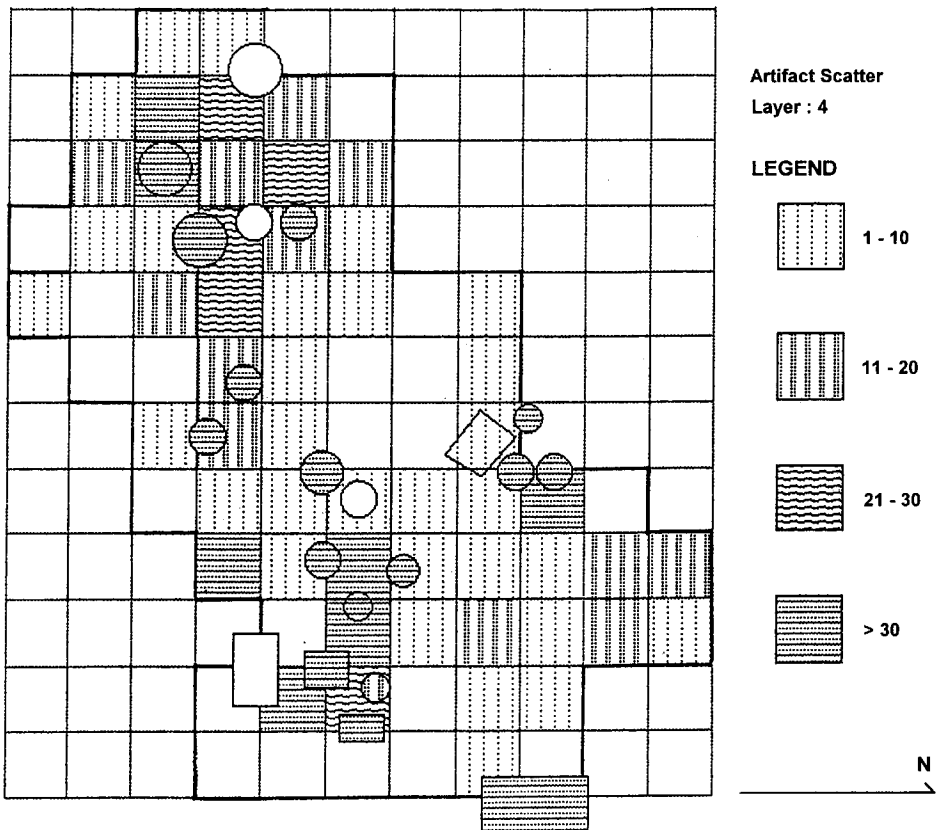


Fig. 10. Artifact patterning at Inamgaon during the Late Jorwe phase.

relation to the nature of the region as a whole, its natural resources, and its long-term history. Without regional data, a single site cannot help us to distinguish between agricultural and pastoral populations. Therefore, archaeological evidence at the level of the site must be examined in the context of the entire region, taking into account its formation history. Anthropological, ethnographic, and actualistic indicators of subsistence strategies—such as material objects signifying diverse subsistence practices or animal kill-off patterns or cropping patterns—can be used as heuristic devices to identify archaeological patterns on the site itself.

It is with these points in mind that we critically examine the diverse evidence cited by earlier researchers in support of the conclusion that subsistence changed in the later levels at the site of Inamgaon. The purpose here is to contextualize the evidence from the site of Inamgaon in a wider regional perspective, taking into account the nature of resources present and the historical development of the region, in addition to identifying the indicators of various subsistence groups through ethnographic and anthropological literature.

Geomorphological studies in this region have shown that the climate in this area was not much different during the Holocene, and so the Chalcolithic people faced a similar sort of landscape and environment as in the Holocene (Rajaguru

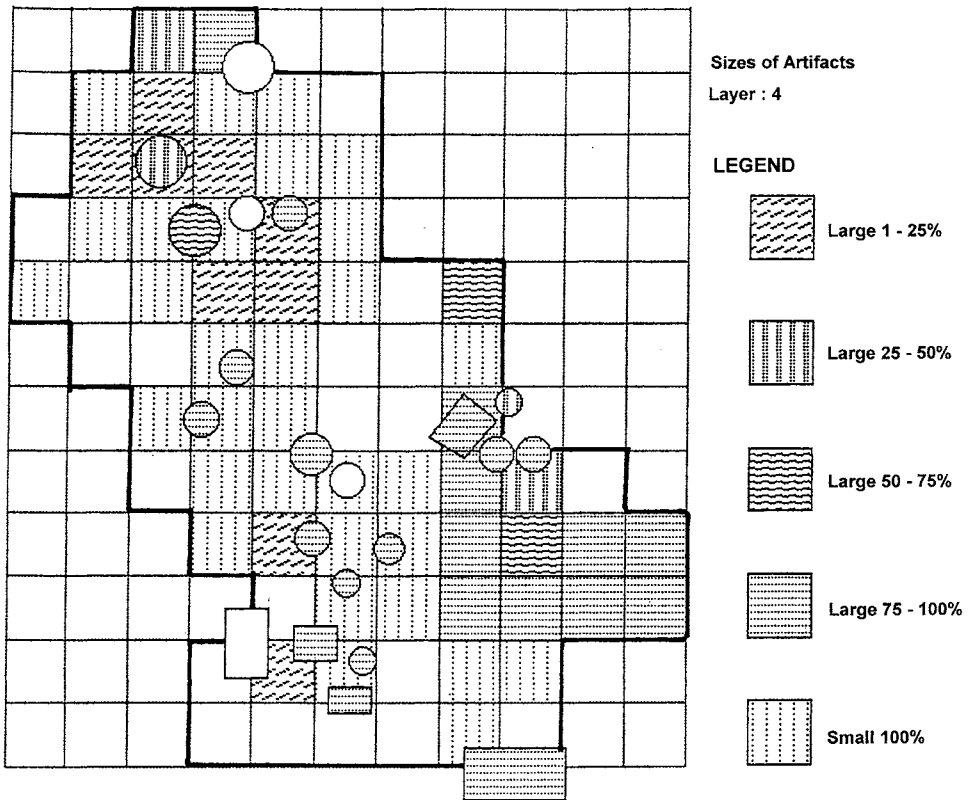


Fig. 11. Size of artifacts at Inamgaon during the Late Jorwe phase.

1988). The higher proportion of organic matter and a better development of soil profile than what is observed in the modern black soil of the region, however, suggests that the forest cover, though of thorn and scrub, was probably denser than today (Kajale 1977; Rajaguru 1988). Work carried out on palaeosoils, or buried soils, at Chandoli, Songaon, and Inamgaon showed that ancient soils possessed better arable potential than modern soils (Pappu 1988). Nevertheless, the landscape was not much different from today during the Chalcolithic; the Ghod River flowed more or less at the same bed level, but the alluvial terrace was covered by fairly mature black soil. Therefore, a contemporary understanding of the region from geographical, anthropological, and historical literature functions as a strong interpretive framework with which to understand past subsistence and settlement systems, and it is to this that we now turn.

This semiarid tract is a precarious famine- and drought-prone zone characterized by seasonality and variability of rainfall, where average agricultural yields are low and the risk of crop failure is high. High rates of evaporation and the characteristics of tropical rainfall pose particular problems. Here, rainfall is limited and variability is high. Average values may be of no use because the rainfall varies from zero to that which may be comparable to or even exceed the average (National Commission of Agriculture 1976). Rainfall data show such marked

variations from year to year at different rain stations and differences so great in the average fall at stations at no distance apart that it is difficult to divide the distribution according to its rainfall. Thus, in this region rainfall is limited and variability and evaporation rates are relatively high. The agriculture of this region is mostly dependent on rainfall, and it faces the twin problems of low production and instability. Cropping without irrigation is highly speculative. In these tracts where rainfall is inadequate and extremely uncertain, there are often the dangers of complete failure of crops and periodic scarcities and famines (Jagalpure and Kale 1938; Mann and Kanitkar 1921). Traditionally, inhabitants of these regions relied on herding domestic animals to supplement their food supply, the ultimate degree of this dependence being pure pastoralism. In this area, however, where there are no leaf-yielding forests, grass is scarce and most of the straw-producing crops are millets, whose stalks are valuable fodder. There is a great scarcity of stable litter, and grass and grazing invariably undergo a setback and ultimately fail when the rains are late. Studies on botanical composition of vegetation show that the majority of grasslands are found in medium to low rainfall areas where the problem of production is acute. Modern-day studies on botanical composition of vegetation in this region show that hay constitutes only 5 percent of the biological needs, and most of the forage requirements are given in the form of cultivated fodders and various crop residues, which meet 60 percent of the minimum biological needs (Oke 1968).

In such a region, where the ecology will support neither agriculture or pastoralism alone, the emphasis may be on a form of subsistence that combines in some fashion crop and animal husbandry—if the society occupies a geographic area of which some is appropriate for cultivation and also if the society has access to land suitable only for grazing livestock (Massey 1987). Agropastoralism is a necessity for societies and households that face conditions where the ecology will support neither agriculture nor pastoralism alone, but where the environmental conditions for both production activities are available.

This region is one of variety and diversity, where environmental conditions for both production activities are available. The entire area can be divided, on the basis of soils, landforms, climate, and vegetation, into four microregions: the Ghod-Kukdi Valley, Bhima Basin, Nira Basin, and the Mula Valley (Fig. 3; Govt. of India 1988). The Ghod-Kukdi Valley has an uneven valley surface as a result of erosion. There are deep soils near the confluence of the Bhima and Ghod (Fig. 2), but shallow and medium soils account for most of the land. In the Bhima Basin, the area near the banks of the Bhima has deep soils and is suitable for cultivation; however, the topography changes farther away from the rivers. Where there is scrubland, there are torlike formations and very shallow soil that is unsuitable for cultivation but useful for grazing. The Nira Basin has deep, black alluvial soils near the confluence of the rivers Nira and Karha and very shallow soil in the rest of the area. The Mula Valley is covered generally by medium and deep black soils. Thus, this area has a diversity of zones. Near the rivers there are patches that are suitable for year-round agriculture, but the majority of the region has soil suitable only for occasional *kharif* crops or for grasslands. Shallow soil meant for pasture is present only in the rocky areas. Areas suitable for seasonal agriculture and pasture occupy a major part of the landscape.

Thus, this region is characterized by a lack of arable soil for year-round

agriculture, a periodic shortage of rains, crop failures, and animal losses due to drought or famine. In such a region, without irrigation agriculture is a precarious activity; similarly, pastoralism cannot be the only occupation because grasslands are limited. There are rich forests on the riverbanks, much of which has been depleted where hunting could have supplemented agriculture and pastoralism. The early gazetteers recorded the occurrence of tigers in every district except Sholapur and Osmanabad; some typical forest animals such as *chital*, *sambar*, black-buck, and barking deer were present throughout the Deccan (Govt. of Maharashtra 1974). Therefore, this region of diverse ecozones, uncertainty regarding rainfall, and periodic droughts would support what is termed as subsistence diversity and a variety of lifestyles, namely agropastoralism supplemented with hunting.

The diversity is evident in the historical documents of this region. The place names and personal names on the inscriptions of the Deccan and Gujarat from the first century B.C. to the first century A.D. portray a dry, barren land where small-scale agriculture and pastoral activities were carried out (Mulay 1972). The Marathi Mahatmyas, which deals with the set of holy places along the banks of rivers from their sources to their confluences, describes the land around the Bhima River as a forest region without prominent cities and farming villages (Feldaus 1990). It is in this tract that hero-stones commemorating the memory of warriors killed while defending cattle are found (Dandekar 1991). There are numerous legends about cowherds and other evidence of cattle herding exists within temple buildings. In medieval documents, too, we find mention of pastoral activities along with agriculture (Fukasawa 1991; Kulkarni 1967). Oral traditions and cults of pastoral communities also mention linkages with hunting-gathering peoples (Murty and Sontheimer 1980). Therefore, this zone was one that attracted a diversity of subsistence and movement strategies, an essential strategy in a risk-prone area.

If we note the settlement pattern of the Chalcolithic sites in this region in relation to exploited resources, we find that the main sites and scatters are located in arable land, with no other sites in the region having shallow soil. In this region some microlithic scatters occur. The main sites are located in arable lands near rivers. Inamgaon, the largest site, is situated in the most barren part whereas Walki, the smallest site, is situated in a very fertile zone. Moreover, these sites are separated by great distances and no settlements occur in the very arable settings in the region in between. If we compare it with the settlement model in the Tapi Basin (Shinde 1984), where numerous sites occur along the river in arable settings, the contrast is striking. In addition, at the time of the foundation of the new village in Tapi, people usually choose the rocky portion for habitation and reserved more fertile land for cultivation (Karve 1957; Valunjkar 1966) because of the scarcity of arable land. But in the Inamgaon region most of the sites are situated on the fertile land; therefore, valuable soil was wasted in this barren tract. This shows that agriculture could not have been of prime importance in the location of settlements.

Though most of the sites are located on arable land, the region in between these sites was characterized by shallow soil suitable for pasture or medium soil suitable for occasional cultivation and grasslands. No doubt there could have been pastoral groups, either forming a section of the population of these sites or forming independent groups, as suggested by the number of microlithic scatters in

barren lands suitable for pastoral activity. If we look at the distribution of the sites, we find that most of these microlithic sites are located on shallow soil with abundant chalcedony outcrops and a considerable amount of pastureland. The composition of the assemblage shows mostly debitage, little-used flakes or blades, and no finished tools, which shows that some form of expedient knapping took place. It has also been shown that microliths need not be associated solely with hunters (Allchin and Allchin 1974). Domesticated animal remains have been found with microliths in stratified contexts at Bagor; therefore, microlithic assemblages can also be associated with pastoral herders. Taking into account the location of the microlithic sites, the nature of the assemblage, and the nature of the Chalcolithic sites in this region, some of these lithics could well be the remains of expedient knapping behavior of the Chalcolithic people moving out of their villages either with their herds or for hunting. The varied nature of the assemblage could be explained by use of the same place by other groups chronologically earlier. These scatters could be the vestiges of nomadic hunters, or of herders that formed a section of the agropastoral population, or of independent groups of people.

But pastoralism could not have been the only form of subsistence in this region, because there are regions conducive for agriculture, and the variability in rainfall might have led to drought or the drying up of pastures. We cannot postulate that the Chalcolithic sites were pastoral settlements, because botanical remains are found in ample quantities on the site. Moreover, not one of the main sites is located on land suitable only for pastoralism. We also do not find any change in the settlement and subsistence pattern in the later Jorwe levels, during which period earlier researchers had postulated a change to pastoralism.

Most of the Chalcolithic sites are located in areas that have water, arable land, pastures, and forests suitable for a variety of subsistence strategies. We are therefore suggesting that the diversity of ecozones and the scarcity and variability of rainfall promoted a diverse subsistence system where agriculture and pastoralism were combined to avoid risk and uncertainty. Agropastoralism was the mainstay of the economy, combined with purely pastoral and hunting activities. Agriculture could have been possible near the rivers, pastoralism in areas with shallow soil, and hunting in the thick forests on the banks of the rivers. The Chalcolithic system should therefore be seen as an interaction among different subsistence strategies.

Given this conclusion, it seems difficult to imagine a situation where a drastic change from agriculture to pastoralism would occur, as supposed by earlier researchers. In this drought-prone famine belt, there would always have to be a diversity of subsistence strategies to cope with the risks and uncertainties. The land-use patterns and the locational analysis of the sites across the landscape have shown that diverse subsistence strategies were being followed in this region.

On-Site Evidence from Inamgaon

It is with this regional background that we reanalyze the evidence from the Chalcolithic site of Inamgaon. This site is located on an alluvial terrace about 14 m above the bed level of the Ghod River. The surrounding area is barren, except for patches of alluvium and black soil sediment near the river banks, and consists of stony uplands separated by rugged valleys. Toward the river boundaries

the land slopes into open plains. Site catchment analysis and subsistence studies carried out by earlier researchers showed that there was enough land to grow crops (Dhavalikar and Possehl 1974). Their analysis was done with *jowar* (millet), wheat, and rice, but not barley, which is found in ample quantities at Inamgaon.

It is not only the soil but also the nature of rainfall that must be considered in assessing the land-use potential in this area. The site falls in the lowest rainfall zone; well irrigation is limited because of minimum recuperation of wells, and the area is dependent on rainfall, which is erratic and insufficient.

The botanical remains at Inamgaon show that the main crops were barley, lentils, and horsegram, followed by wheat and hyacinth bean. Other crops included green gram, grass pea, black gram, gram, sesamum, and millets. The most important crop in this semiarid region today is millet; however, it is not represented in the archaeological record. The main crop, barley, is generally associated with regions of high rainfall and humid weather conditions, but most barley grown in the dry regions is produced for feed (Arnon 1972). There are, however, varieties of barley that can adapt to semiarid growing conditions, but yields are much lower. Wheat is also not drought resistant and cannot survive long periods of drought. Pulses include winter crops such as lentils, common pea, chickpea or gram, grass pea, and the summer crops horsegram and hyacinth bean. Horsegram, or *kulthi*, which is predominant in the organic assemblage recovered from the site of Inamgaon, furnishes the concentrated feed for cattle, supplementing the bulky-straw fodders (as opposed to being a staple in the human diet) (Indian Council of Agricultural Research 1970). The pulses, which are more important today as food, gram, black gram, and green gram occur in small quantities. Most of the crops at Inamgaon were winter ones. In this region the moisture absorbed by the black soil, the winter dew, and limited irrigation facilities constrain farmers to cultivate winter crops. If late rains fail and the irrigation facilities do not draw sufficient water, there is every possibility of a failure of monsoon and winter crops.

Taking into account the scarcity of water, the variability in rainfall, the nature of the crops that are hardy and capable of being used as both fodder and food, and the location of the site, it is difficult to infer that agriculture was ever an exclusive subsistence strategy at Inamgaon. Pastoralism, involving cattle or sheep and goat, could have been an alternative strategy. However, Inamgaon was not solely a pastoral settlement. Some land is available for cultivation and a permanent water pool lies near the site. As far as the carrying capacity of the land is concerned, earlier research showed that there was enough pasture for the animals at Inamgaon (Dhavalikar and Possehl 1974). The vegetation in this area is dry deciduous forest, which is the chief forest type of the semiarid tract of Deccan trap, which receives less than 150 cm rainfall per annum. Because of the seasonality of rainfall in April and May, very little pasture is available in the Deccan. This region is not cattle country; the grazing almost everywhere is poor, and so for five months each year the cattle are fed on the green grass in the fields and at other times they subsist on *bajri* straw or *jowar* straw (Govt. of India 1885).

The faunal remains indicate that the cattle killed throughout the time span of the site were mostly young. In a meat-producing economy it makes sense to slaughter near the end of an animal's immaturity (Thomas 1988). In subsistence herding, the herds support the maximum number of people who can be regularly

fed from their produce so as to ensure a regular supply of food. Therefore, live-animal products such as milk and blood are utilized most and terminal products such as meat are used only for special occasions (Dyson-Hudson and Dyson-Hudson 1969). The ages of the animals slaughtered at Inamgaon indicate that they were killed mostly for meat, and so secondary products were not nearly as important.

Recent research has shown that deer bones were present in great numbers in Late Jorwe levels; hence, hunting was an important subsistence activity at this time. Hunting is used to supplement agropastoral activities in areas that are prone to risks of subsistence failure due to variability in rainfall. But how confident can we be about an exclusive hunting strategy in the later levels of the site? In regions where there is a risk of subsistence failure, wild resources play a major role in the economic system. For example, in the Near East, hunting emerged as an important seasonal component of the Neolithic economy in order to reduce subsistence risks, especially in winter, the season of greatest uncertainty (Stein 1989). But it is difficult to subscribe to the view that hunting emerged as an exclusive subsistence strategy in the later phases. In and around the site of Inamgaon, water was always available, as was some arable land for cultivation. A combination of strategies was the best solution in this risk-prone region.

Paleopathological analysis revealed an increase in the presence of infectious and degenerative diseases in the later phases, an increase that has been cited by earlier researchers as evidence of a decline in health due to climatic reasons (Dhavalikar 1988; Lukacs et al. 1986). Very few burials were recovered from the earlier levels and, as the researchers themselves said, evidence of an increase in pathology may reflect differences in sample size and age structure rather than changes of a climatic or cultural nature. A decrease in skeletal robustness, retarded skeletal growth, reduced sexual dimorphism, very high infant mortality, and a higher rate of nonspecific dental and skeletal infections indicate the presence of stress throughout the site's occupation (Walimbe and Tavares 1992). Analysis of malnourishment levels, based on bone height, stature, proportions, Harris lines, and enamel hypoplasia, reveals evidence through all the layers of malnourishment and episodic stresses such as famines. And so stress-related disorders were always present within the Chalcolithic population and were not the result of drastic change in the level of pathology during the later levels of the site.

It is difficult to postulate, on the basis of the nature of the region and the inter- and intra-site archaeological patterns, that exclusive or dominant strategies prevailed at Inamgaon and that a drastic and late change in subsistence practices occurred because of aridity. Instead, agropastoralism, combined with hunting, played a major role in the site's history, and the change in material culture could be explained by a functional change in the use of the site, that is, the site of Inamgaon may have been used for diverse subsistence purposes by different or similar groups of people.

THE CHALCOLITHIC AT INAMGAON

The region under study saw the presence of diverse strategies in terms of both movement and subsistence. To what extent was this movement linked with sub-

Mobility/Subsistence Strategies

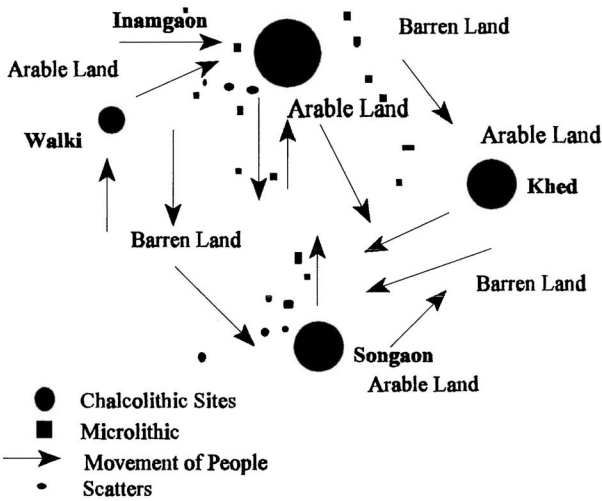


Fig. 12. Mobility and subsistence strategies in the Deccan during the Chalcolithic.

sistence or ecological factors? What can it tell us about the Chalcolithic in this region?

Mobility, we know, is caused by diverse factors—subsistence, cognitive, political, and personal. Historical factors also play a role in changing movement strategies. Looking at this region it appears that the different ecozones, and the risk-prone nature of the area, prompted humans to adopt various strategies in order to persist. Agriculture, pastoral activities, and hunting combined to enable people to survive in this inhospitable terrain. Diverse movement strategies coexisted to overcome the problems of variable and scarce rainfall and the threat of losing crops and livestock (Fig. 12). This movement of people could have been to offset difficulties such as disease and drought, to minimize the effective use of limited resources, and to avoid overgrazing. For example, in areas of central and southwest Niger the nomadic pastoralists use movement as an important strategy in livestock management systems (Legge 1989).

The seasonal regime of all the Maharashtra rivers determines the life of the people. Maximum flow is in August, when heavy floods occur, and minimum flow is in March and April. Copious water supply in one season and its complete scarcity in the other influence the rhythm of life here. Inamgaon is situated in a flood-prone zone, but it has a water pool that contains water throughout the year. Similarly, the Nuer, who stay on endless marshes and wide savannah plains, seek protection from flooding by moving to higher ground. Absence of water and pasture on this higher ground compels them to move during drought conditions. In the dry seasons they congregate near water, but they move away during the wet season. Inamgaon could have been completely occupied during the dry season, when flooding was less; during the rainy season a section of the population could have moved with their flocks to avoid excess water, disease, and overgrazing, as is the situation among many groups in Africa. Recent studies of grasses in this region of India have shown that rotational grazing facilitates the growth of grasses

(Oke 1968). The same situation obtains among the Karimojong and the Ngongoro of Africa (Arhem 1985; Dyson-Hudson and Dyson-Hudson 1969), who move their herds between large, dry-season camps and temporary, smaller, wet-season camps to optimize the use of principal resources—grass and water—and to minimize the risk of disease and the scarcity of salt and minerals.

Hunter-gatherers today are encapsulated by and interact with nonforaging peoples, and the interstices between horticultural societies are frequently filled by nomadic foragers and pastoralists. During the Chalcolithic period, these hunters or herders interacted with the mobile section of the population residing at these sites, and thereby an economic and social exchange resulted. Given that the area under study is one of unpredictable resources and low demographic pressure, there would have been less conflict over pasture and land. A symbiotic relationship developed between different subsistence groups that fostered social contact and enabled the inhabitants to overcome the risks and uncertainties inherent in this region. The sites with access to water, pasture, and arable land could have been centralized focal points where groups congregated for economic and social reasons.

The reconstruction offered here is that of a complex mosaic of multiple strategies used by different people who interacted with each other in an effort to subsist in an ecologically diverse, arid, and famine-prone belt (Fig. 12). The simplistic assumption that cultural change was caused by environmental change, as envisaged by earlier researchers, does not take into account the complex nature of the system in this region.

This article has been an attempt to set forth an understanding of the complexity of the category terms we use and the relationship between these categories and the archaeological record. Human behavior is seen as rational in the strict utilitarian sense of the term. It is, of course, an open question as to whether or to what extent nonecological variables must be figured into explanatory models of human behavior. The archaeological record either confirms or expands our view of human behavior, and it is this dialectical interplay between source-side and subject-side research that enables us to understand the complexity of the archaeological record and past human behavior embedded in it.

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NOTE

1. The maps were generated through a program written in QBasic, which linked Dbase III+ files with graphical images of trenches and structures. All the houses have been drawn as circular or rectangular even though the shape might fall in between these two broad categories. All houses are enclosed, to understand spatial patterns, even though they might not be perfect squares or circles.

For each of the cultural periods, Malwa, Jorwe, and Late Jorwe, maps of certain layers are included, because of lack of space to illustrate the points raised in the text.

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ABSTRACT

This article concerns archaeological methodology and examines the categories archaeologists use to describe mobility and subsistence strategies of the past. The Chalcolithic Culture of Inamgaon (western India) is taken as a case study, first, to assess how earlier researchers have tried to understand subsistence and mobility change from past material culture and, second, to rethink the nature of the Chalcolithic in the Bhima Valley with special reference to the site of Inamgaon. Traditionally, it has been thought that a change occurred, from sedentary agriculture to that

dominated by seminomadic sheep and goat pastoralism, in the later levels of this site because of environmental degradation and aridity. Given the nature of this drought-prone region, its land-use capability, the archaeological settlement pattern of the region, and the material remains of the site of Inamgaon, there is no evidence of a drastic change from a sedentary agriculturist to a seminomadic pastoralist lifestyle. It is suggested that semisedentary agropastoralism always existed in this area, along with small-scale mobility either by the whole population or a section of the population. Other nomadic groups with different subsistence strategies also existed in this region. The difference in material culture in the later levels of the site probably resulted from a change in the function of the site, from that of a habitation area to a short-term camping area frequented by mobile peoples, not from a cultural shift from sedentism to seminomadism. **KEYWORDS:** settlement pattern, subsistence, behavioral archaeology, India.