FAUNA AND SUBSISTENCE PATTERN IN THE CHALCOLITHIC CULTURE OF WESTERN INDIA, WITH SPECIAL REFERENCE TO INAMGAON

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Summary

The Chalcolithic culture of western India, particularly in the state of Maharashtra, is dated to c. 2000-700 bc. A number of Chalcolithic sites like Daimabad, Nevasa, Apegaon, Chandoli, Inamgaon, Walki, etc. have been excavated by various institutions. A majority of these sites are located in the semi-arid zone with an average annual rainfall ranging from 400 to 1000 mm. The black cotton soil of this area was perhaps an important factor for the development of the early farming communities, which subsisted on farming, stock-raising, hunting and fishing. Animal remains from a majority of the Chalcolithic sites have been studied in detail and it appears that cattle is the predominant animal in this cultural phase. Probably for an agricultural society the significance of this animal in the food economy as well as in the agricultural operations cannot be ruled out. Inamgaon, a Chalcolithic site in the Pune district has revealed Malwa, early Jorwe and late Jorwe cultural phases. The faunal material from this site is being studied by the present authors. Inamgaon has revealed some very interesting evidences regarding the subsistence pattern in the different cultural phases. As mentioned earlier cattle forms a major part in the diet of the people in the Malwa and early Jorwe phases. However, in the late Jorwe phase (1000-700 bc) a greater emphasis has been given to hunting wild animals to substantiate their food economy. This variation in the composition of animals is also reflected in the other cultural aspects such as decline in farming, the absence of storage jars, change in the shape and size of the houses, etc. This drastic change around 1000 bc at Inamgaon may have been due to envi-

Résumé

La faune et l'économie de subsistance dans le Chalcolithique de l'Inde occidentale, en particulier à Inamgaon.

La culture chalcolithique de l'Inde occidentale, en particulier dans l'état de Maharashtra, est datée d'environ 2000 à 700 bc. De nombreux sites chalcolithiques, tels que Daimabad, Nevasa, Apegaon, Chandoli, Inamgaon, Walki, etc., ont été fouillés par différentes institutions. La majorité de ces sites est située dans la zone semi-aride, avec une pluviosité annuelle moyenne de 400 à 1000 mm. Le sol noir très fertile de cette région a peut-être été un facteur important pour le développement des premières communautés agricoles. Elles ont subsisté grâce à l'agriculture, l'élevage, la chasse et la pêche. Les restes animaux de la majorité des sites chalcolithiques ont été étudiés en détail et il apparaît que le bœuf était l'animal prédominant de cette phase culturelle. Il est probable que, pour une société agricole, l'importance de cet animal dans l'économie alimentaire autant que dans les travaux agricoles ne peut être éliminée. Inamgaon, site chalcolithique du district de Pune, a livré des phases culturelles Malwa, Jorwe ancien et Jorwe récent. Le matériel faunique de ce site est étudié par les auteurs. Inamgaon a fourni des données intéressant l'économie de subsistance des différentes phases culturelles. Comme il a été dit plus haut, le bœuf joue un rôle majeur dans le régime alimentaire des habitants des phases Malwa et Jorwe ancien. Cependant, dans la phase Jorwe finale (1000-700 bc), la chasse aux animaux sauvages tient une place plus importante dans l'économie alimentaire. Cette variation dans le spectre faunique se reflète aussi dans d'autes aspects culturels, comme le déclin de l'agriculture, l'absence de

Zusammenfassung

Fauna und Subsistenz im Chalkolithikum Westindiens, mit besonderer Berücksichtigung von Inamgaon.

Das Chalkolithikum Westindiens, speziell das des Staates Maharashtra, datiert zwischen 2000 und 700 v. Chr. Eine Anzahl kupferzeitlicher Siedlungen wie Daimabad, Nevasa, Apegaon, Chandoli, Inamgaon, Walki etc. ist von verschiedenen Institutionen ausgegraben worden. Ein Großteil dieser Siedlungen befindet sich in der semi-ariden Zone mit einem durchschnittlichen Jahresniederschlag von 400-1000 mm. Die gute Erde dieser Gegend (black cotton soil) war wahrscheinlich ein wichtiger Faktor für die Entstehung früher Ackerbauernkulturen. Diese lebten vom Ackerbau, der Tierhaltung, der Jagd und dem Fischfang. Die Tierknochen eines Großteiles der chalkolithischen Siedlungen sind einer eingehenden Untersuchung unterzogen worden. Es scheint, als ob das Rind in diesem Kulturabschnitt wichtigstes Tier gewesen ist. Vermutlich ist es in einer produzierenden Wirtschaft als Ernährungsgrundlage und Arbeitstier nicht wegzudenken. Inamgaon, eine kupferzeitliche Siedlung im Distrikt von Pune, erbrachte Schichten der Malwa, frühen Jorwe und späten Jorwe Kulturphase. Die Siedlung erbrachte einige sehr interessante Ergebnisse zur Subsistenz der verschiedenen Kulturphasen. Die Rinder stellen in den Phasen Malwa und Früh-Jorwe einen bedeutenden Teil der Ernährung. In der Phase Spät-Jorwe (1000-700 v. Chr.) wurde bei der Ernährung jedoch größeres Gewicht auf die Jagd gelegt. Dieser Unterschied zeigt sich auch in anderen Aspekten der Kultur wie dem Rückgang des Ackerbaus, dem Fehlen von Vorratsgefäßen, der Änderung von Umriß und Größe der Häuser etc. Dieser drastische Wandel

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ronmental degradation caused by prolonged human interference with nature.

jarres de stockage, le changement dans la forme et la taille des maisons, etc. Ce changement brutal observé à Inamgaon aux alentours de 1000 bc peut être dû à une dégradation environnementale causée par une interférence humaine prolongée avec la nature.

um 1000 v. Chr. mag mit einer anthropogen bedingten Verschlechterung der Umweltbedingungen zusammenhängen.

Key Words

Maharashtra, Chalcolithic, Animals, Subsistence, Environment.

Mots clés

Maharashtra, Chalcolithique, Animaux, Subsistance, Environnement.

Schlüsselworte

Maharashtra, Chalkolithikum, Tiere, Subsistenz, Umwelt.

Introduction

The Deccan trap of the Cretaceous-Eocene age extends almost from the southern flanks of the Narmada valley to the banks of river Krishna. The dominant soil type of this area is the black cotton soil and the colour is due to the presence of clay humus, colloidal complex which is formed by bio-inorganic processes. This is often referred as self ploughing soil. Western India is a subtropical monsoonic region and the rainfall occurs mostly during the southwest monsoon. Coastal Maharashtra, western Ghats and south Gujarat receive more than 2000 mm rainfall and are covered with thick deciduous and semi-evergreen forests, while the plateau of Maharashtra, north Gujarat, Saurashtra and Kutch receive rainfall less than 1000 mm and are covered by thin deciduous and thorny scrub forest (Rajaguru, 1973).

The Chalcolithic culture in western India flourished in the Tapi, Godavari and in the Krishna valleys. Very fertile black cotton soil occurs in this region, which may have attracted the early farmers to settle down in this tract. The areas receiving low rains are at present covered with xerophytic vegetation like bor (*Zizyphus jujube*), babhul (*Acacia arabica* wild), chinch (*Tamarindus indica*), etc. The concentration of Chalcolithic sites are found mainly in western Maharashtra. The beginning of settled life in Maharashtra can chronologically be placed into four cultural phases: the Savalda (2200-1800 bc), late Harappan (1800-1600 bc), Malwa (1600-1400 bc) and Jorwe (1400-700 bc), all based on diagnostic terracotta wares.

A large number of Chalcolithic sites are reported from Maharashtra, such as Prakash, Bahal, Kaothe and Tekwada (Tapi valley), Nasik, Jorwe, Daimabad, Nevasa and Apegaon (Godavari valley) and Chandoli, Walki, Inamgaon and Songaon (Bhima valley) (fig. 1). The Chalcolithic culture in this region is characterised by the presence of stone blades, wheel-made pottery, copper-bronze tools and huts with wooden posts (Thomas, 1984). These early farming communities subsisted on farming, animal husbandry, hunting and fishing.

Detailed faunal reports are available only for Inamgaon, Walki and Kaothe out of the 14 Chalcolithic sites in western Maharashtra (tab. 1). The faunal reports from sites like Apegaon, Nevasa, Damdama and Nasik are merely brief accounts of species. From the other sites, the excavation reports mention nothing about the faunal remains except for stray references of animal motives on terracotta wares, which are of little help for finer archaeozoological interpretations.

Subsistence

The remains of flora and fauna at archaeological site help in reconstructing the past subsistence systems. In addition to the biological and environmental factors, the subsistence system is often linked with cultural and technological aspects of the prehistoric cultures. In this paper, we are more concerned with the role of domestic and wild animals in the food economy of the ancient farmers. The zoological remains in the form of bones, shells, etc. from archaeological sites reveal information about the animals exploited for subsistence. These remains are different from the natural burials. The animal bones which depict cut marks, charring, fragmentation due to marrow extraction, etc. are clearly different in appearance from those found in the natural burials and thus could be attributed to the subsistence activities. Fortunately, such remains have been unearthed from a vast majority of protohistoric sites.

The domestic animals associated with the early farming communities demonstrate the very sedentary nature of the agriculturalists settlements. A high percentage (more than 70%) of cattle bones in almost all the sites reveals the significance of this animal in the food economy. The manifold uses of cattle can be the reason for their abundance in a majority of protohistoric sites in India. For instance, in addition to the meat requirement of the inhabitants, cattle have also contributed to the agricultural activities as indicated by the representation of both young and old animals at many of the sites. Also the secondary products like milk,

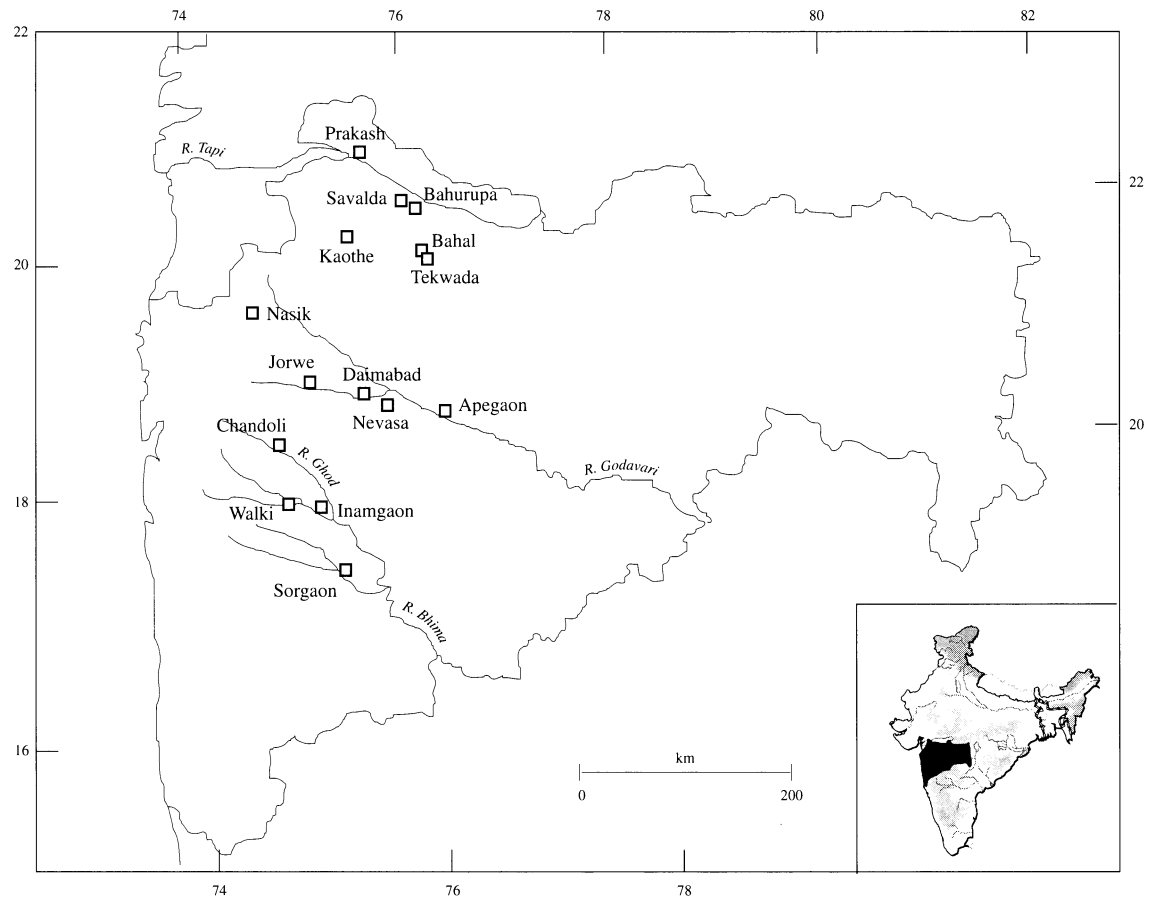

Fig. 1: Map showing important Chalcolithic sites of Maharashtra (after Dhavalikar *et al.*, 1990).

hide, dung, etc. may have been significant in the economy, although direct evidences for their utilization are lacking from archaeological sites. However, cow dung was used for plastering the floors and walls of the early settlements. Even today cattle dung is the source of domestic cooking fuel to the Indian villagers (Thomas, 1989). The evidence of the toy cart drawn by a pair of bullocks at Mohenjodaro (Mackay, 1973), a mini bronze chariot with bulls found at Daimabad (Sali, 1986) and the engraving of a cart drawn by bullocks on a storage jar at Inamgaon (Sankalia, 1974; Dhavalikar, 1977) clearly point to the use of this animal for draught purposes from early times.

In the food economy, the second most important domestic animals were sheep and goat and their bones were identified from all the sites (tab. 1), which accounted for about 15-20% in the faunal collection. It appears that sheep and goat were primarily kept for their meat since evidence is wanting for secondary usages. It is also interesting to note that out of the group of caprines, a majority of bones belonged to the goat (Thomas, 1984). Probably cattle and sheep/goat pastoralism may have been one of the main occupations of these early farmers, as agricultural activities relied mostly on unpredictable southwest monsoon rains. Even at present the farmers, who are dependent on the monsoon, graze their live stock in the forest and return to their villages before the monsoon sets in (Bose, 1975).

Buffalo was another domestic animal of importance and has been reported from a large number of sites. Buffalo bones were scanty compared to the bones of other domestic animals. Probably one of the reasons would be the lack of adaptation of the species to the harsh environmental conditions compared to cattle. However, at Kaothe (Thomas and

Table 1: Distribution of animals in the Chalcolithic culture of Maharashtra. A: Nasik (George, 1955); B: Nevasa (Clason, 1979); C: Apegaon (Badam, 1979); D: Daimabad (Badam, 1986); E: Inamgaon (Thomas, 1988); F: Kaothe (Thomas and Joglekar, 1990); G: Walki (Joglekar, 1991); + : Presence; -: Absence; ? : Species doubtful.

Sites	A	B	C	D	E	F	G
Domestic Mammals							
Bos indicus	+	+	+	+	+	+	+
Bubalus bubalis	+	+	+	+	+	+	+
Bos/Bubalus	–	+	–	–	–	–	+
Bos sp.	–	+	–	–	–	+	–
Capra hircus	–	+	+	+	+	–	+
Ovis aries	+	–	+	+	+	+	+
Sus domesticus	+	+	–	+	+	+	+
Sus sp.	–	–	–	–	–	–	–
Equus caballus	–	+	–	+	+	–	+
Equus asinus	–	+	–	+	+	–	+
Equus sp.	–	+	–	–	–	–	–
Canis familiaris	+?	+	–	+	+	+	+
Felis catus	–	+	–	+	–	–	+
Wild Mammals							
Presbytis entellus	–	–	–	–	–	+	–
Seminopithecus sp.	+	–	–	–	–	–	–
Bubalus arnee	–	–	–	–	–	–	+
Bos taurus	–	–	–	–	–	–	+
Elephas maximus	–	+	–	+	+	–	–
Rhinoceros sp.	–	+	–	–	–	–	–
Boselaphus tragocamelus	+	+	+?	+	–	+	+
Antilope cervicapra	–	+	+?	+	+	+	+
Gazella bennetti	–	–	–	–	–	–	+
Tetracerus quadricornis	+	+	–	+	+	+	+
Cervus unicolor	+	+	–	+	+	+	+
Cervus duvauceli	–	–	–	+	–	–	–
Cervus sp.	–	+	+	–	–	–	–
Cervus/Axis	–	+	–	–	–	–	–
Axis axis	+	–	+	+	+	+	+
Axis porcinus	–	–	–	–	–	+	+
Muntiacus muntjak	–	–	–	–	–	+	+
Sus scrofa	–	–	–	–	–	+	+
Panthera pardus	–	–	–	–	–	–	+
Panthera tigris	–	–	–	–	–	–	+
Felis chaus	–	–	–	–	–	–	+
Canis lupus	–	–	–	–	–	–	+
Canis aureus	–	–	–	–	–	–	+
Vulpes bengalensis	–	–	–	–	–	+	–
Vulpes sp.	–	+	–	–	–	–	–
Melursus ursinus	–	–	–	–	–	+	–
Viverricula indica	–	–	–	–	–	+	–
Hystrix indica	–	+	–	–	–	+	–
Herpestes edwardsi	–	–	+	–	+	–	–
Lepus nigricollis	–	+	–	–	+	+	+
Rattus rattus	+	+	–	+	+	+	–
Bandicota indica	–	+	–	–	–	–	–
Ratufa indica	–	–	–	–	–	–	+

Sites	A	B	C	D	E	F	G
Birds							
Gallus domesticus	–	+	–	–	–	+	+
Gallus gallus	–	–	–	–	–	–	–
Gallus sp.	–	–	–	+	+	–	–
Anser indicus	–	–	–	–	+	+	–
Pavo cristatus	–	–	–	–	–	+	–
Ardea sp.	–	–	–	–	–	+	–
Ardeotis nigriceps	–	–	–	–	+	–	–
Reptiles							
Trionyx gangeticus	+	+?	+	+	+	+	+
Batagur baska	–	–	–	–	–	–	+
Chitra indica	–	+?	–	–	+	–	+
Kachuga sp.	–	–	–	–	–	–	+
Lissemys punctata	–	+?	–	–	–	+	–
Crocodylus palustris	–	–	–	–	+	–	–
Gavialis gangeticus	–	–	–	–	–	–	+
Varanus sp.	–	–	–	–	+	–	–
Varanus monitor	–	–	–	–	–	–	+
Mollusca							
Lamellidens sp.	+	–	–	–	+	+	+
Corbicula sp.	–	–	–	–	–	+	+
Ariophanta sp.	–	–	–	–	–	–	+
Digoniostoma pulchella	–	–	–	–	+	–	+
Pila globosa	–	–	–	–	+	–	+
Melania striatella tuberculata	–	–	–	–	+	+	–
Sabulina octona	–	–	–	–	+	–	–
Cryptozona belangeri	–	–	–	–	+	–	–
Melania striatella scaba	–	–	–	–	–	+	–
Glessula sp.	–	–	–	–	–	+	–
Parreysia sp.	+	–	–	–	–	+	–
Viviparus bengalensis	+	–	–	–	–	–	–
Xesta semirugata	+	–	–	–	–	–	–
Cyrena impressa	+	–	–	–	–	–	–
Paphia gallus	–	–	–	–	–	–	–
Marciarecens sp.	–	–	–	–	–	–	–
Turbo coronatus	–	–	–	–	–	–	–
Ornamentaria annulus	+	–	–	–	–	–	–
Nerita chameleon	+	–	–	–	–	–	–
Dostia crepidularia	+	–	–	–	–	–	–
Melanoides pyramis	+	–	–	–	–	–	–
Indonaia caerulea	+	–	–	–	–	–	–
Conus sp.	+	–	–	–	–	–	–
Oliva sp.	+	–	–	–	–	–	–
Telescopium telescopium	+	–	–	–	–	–	–
Cantharus undosus	+	–	–	–	–	–	–
Gratiadusta pallida	+	–	–	–	–	–	–
Turbinella pyrum	+	–	–	–	+	+	+
Cypraea arabica	–	–	–	–	+	+	–
Meretrix sp.	–	–	–	–	–	–	–
Murex sp.	+	–	–	–	–	–	–

Joglekar, 1990), the bones of this animal have been found in sizable quantity. One has to reckon here with the location of this site, which is closer to south Gujarat region where the rainfall is higher compared to western Maharashtra, which is suitable for buffalo.

Domestic pigs have been reported from a number of sites and were utilized for meat by the early farmers of Maharashtra. However, compared to the Harappan sites of Gujarat and the Chalcolithic and Iron Age culture of central India, they are represented by only a few bones in western Maharashtra sites. Wild pigs were also identified at sites like Inamgaon, Walki and Kaothe. In a majority of cases it was found that piglets were killed, which was evident from the type of dentition present at these sites.

Dog was known as a companion of man from very early times and has been reported from a number of archaeological sites. As they were not part of the diet of the people, their bones are scanty in the collections and may have got mixed up with kitchen refuse because of the scavenging and predator activities at most of the sites. However, there is a solitary evidence for the consumption of dog meat in the late Jorwe period at Inamgaon, where dog bones were found with cut marks and charring (Thomas, 1984, 1988, 1989). Ethnographic parallel is also available from a tribe "Katodi" from the same region, who kills domestic dogs for food purposes in time of scarcity (Thomas, 1988).

At Daimabad, Inamgaon and Walki, a few bones of horse have been found. At Inamgaon and Walki, the context of this finds is towards the end of the Chalcolithic phase which indicates later introduction of this animal. The finds were dentition and bones of lower limb extremities which are alike at these sites. Similar was the mode of occurrence even in the succeeding Iron Age cultural phase where horses were sacrificed during a death ceremony and matching parts were kept along with the human dead body (Thomas, 1992). The use of horse as a regular part of diet is doubtful as the number of bones identified from sites are very few. However, a couple of bones from Inamgaon show cut marks and charring, suggesting consumption of meat. From the habitation deposit at Bhagimohari (an Iron Age site in the Vidarbha region of Maharashtra), horse bones have been identified along with kitchen refuse. Thus probably after the sacrifice and offering to the dead person, the rest of the body of the animal may have been consumed in a death ceremony (Thomas, 1993). It is also interesting to note that horse ornaments, horse bits and other objects associated with horse riding have been reported from a number of Iron Age - Megalithic sites from the Vidarbha region (Deo, 1985). Since horse was not a locally available animal in abundance, the early farmers could not afford killing horse for their sustenance. Ass has also been reported from Diamabad, Inamgaon and Walki. Nevertheless, this animal was the beast of burden in the Chalcolithic culture of Maharashtra.

Among other domestic animals, cat was identified at Diamabad and Walki by a few bones. Cat may have been associated with this cultural phase as a pet animal.

Domestic fowl has been reported from Kaothe, Daimabad, Inamgaon and Walki.

From the foregoing analysis of the domestic animals associated with the Chalcolithic cultural phase of Maharashtra, it appears that a planned economic strategy was adopted by the inhabitants. In addition to the domestic fauna, people have also relied on wild animals for sustenance. The ratio of domestic to wild animals was approximately 4:1. A large number of wild animals were found at Walki and in the late Jorwe Phase at Inamgaon. Blackbuck (*Antilope cervicapra*), nilgai (*Boselaphus tragocamelus*), fourhorned antelope (*Tetracerus quadricornis*), chital (*Axis axis*), sambar (*Cervus unicolor*), barking deer (*Muntiacus muntjak*), etc. were found in a majority of the Chalcolithic sites. These animals are typically found in scrub forests and plains covered with grass. Today, many of these animals are not found in the same areas, suggesting changes of the environment.

Inamgaon

As a case study it would be better to search the details of one Chalcolithic site, which has been extensively excavated and which faunal remains have been studied in detail. Inamgaon (Pune district, Maharashtra) is one of the largest Chalcolithic settlements in this region. It was excavated by Late Prof. H. D. Sankalia, Prof. M. K. Dhavalikar and Z. D. Ansari, of the Deccan College Postgraduate and Research Institute for 12 field seasons from 1968 to 1984. Inamgaon is situated on the right bank of the river Ghod, a tributary of Bhima, and is located 3 km away form the present village of Inamgaon. The total inhabited area roughly measures 550 x 430 m. The cultural deposit is 4.18 m thick, consisting of 16 layers. Layers 1-5 belong to late Jorwe phase (1000-700 bc), 6-11 to early Jorwe (1400-1000 bc) and 12-16 to Malwa phase (1400-1600 bc).

A part of the faunal remains from one of the earlier field seasons was studied by Clason (1979) and later by Badam (1977). Thomas (1988) has done an exhaustive work on the faunal remains from this site. The first author has studied the entire material as a part of her doctoral research for details of various aspects of man-animal relationships.

One issue to be emphasised here is that the NISP and the MNI calculations based on the faunal collection from

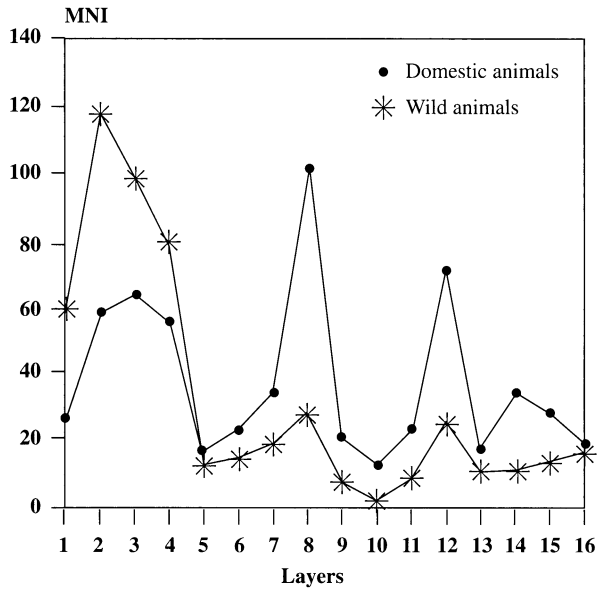

Fig. 2: MNI of domestic and wild animals at Inamgaon.

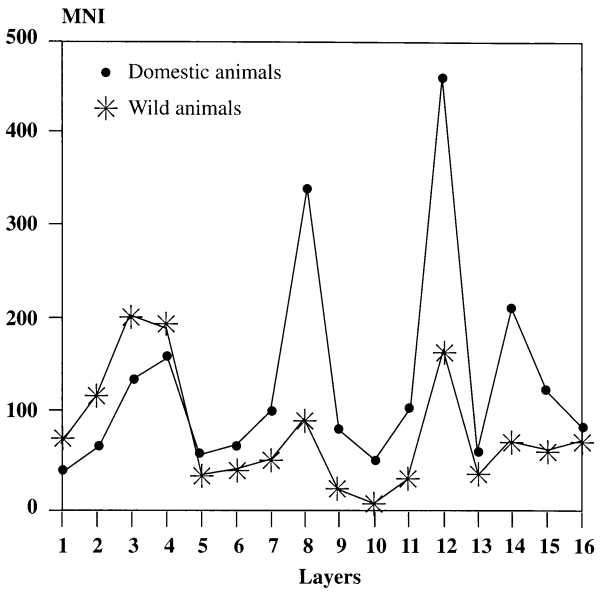

Fig. 3: Projected MNI of domestic and wild animals at Inamgaon.

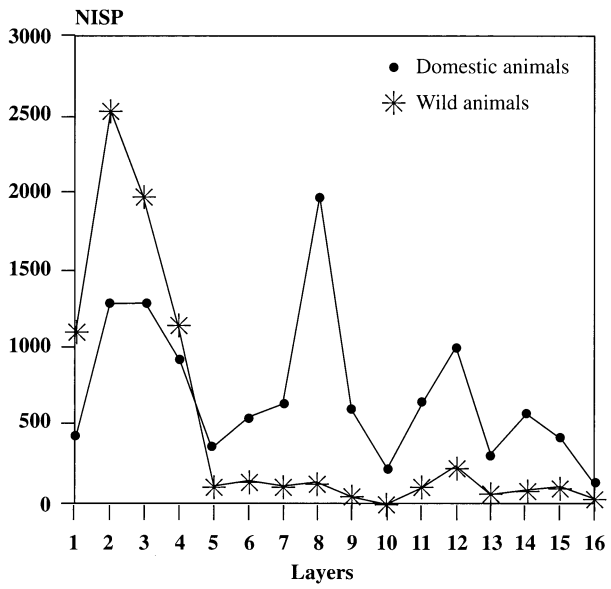

Fig. 4: NISP of domestic and wild animals at Inamgaon.

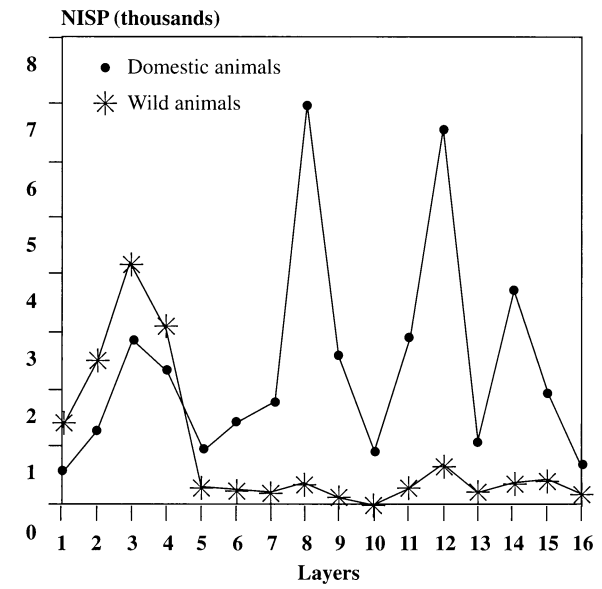

Fig. 5: Projected NISP of domestic and wild animals at Inamgaon.

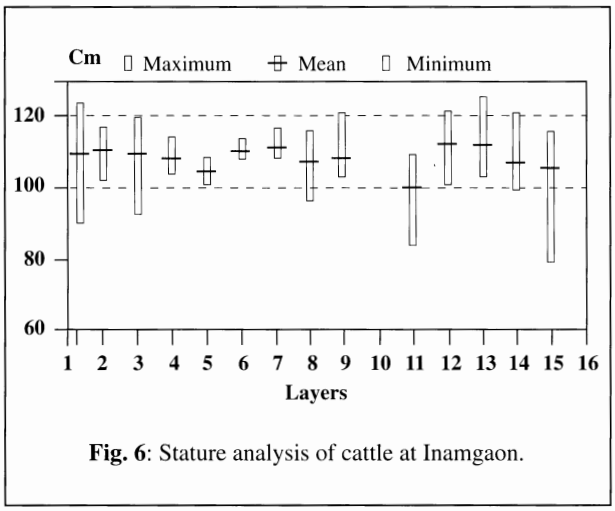

Fig. 6: Stature analysis of cattle at Inamgaon.

multi-cultural, stratified sites and their further interpretation for species abundance, food economy, etc. can be ambiguous at times when the area excavated in different parts may not be the same. It depends on the interest of cultural phase/s or layer/s for the excavator. This can lead to further serious anomalies in the faunal report. For instance, the excavations at Inamgaon concentrated more on the late Jorwe phase since this phase of the Chalcolithic culture was not represented in many sites. The volume of excavated soil from the late Jorwe phase is 28.195 m^3, early Jorwe phase 1811 m^3 and Malwa phase 977.625 m^3. Thus naturally, the cultural materials were more from the late Jorwe phase. An attempt has been made here to standardize the results of the faunal studies at one level with the assumption that the distribution of archaeofauna in the site is uniform for the excavated and unexcavated areas, which may not be always true. However, this criterion may be useful for comparing the three cultural phases at Inamgaon. Of the 16 layers at Inamgaon, the area and the volume of the deposit in layer 2 was the maximum. Assuming that all the layers were excavated in the same pattern as in layer 2, a different picture emerges as shown in figures 2-5. Hence, the over representation of faunal remains of the late Jorwe phase and the under representation of the same in the Malwa phase could be nullified by standardizing the faunal results.

The Malwa phase is characterised by the presence of typical Malwa pottery of central India and people using this ware were the first settlers at Inamgaon around 1600 bc and flourished for a couple of centuries. Then the introduction of a local pottery (the Jorwe ware) is noticed in the culture and the archaeologists designated this phase as early Jorwe which was the most prosperous period at Inamgaon. A degenerate late phase of Jorwe period continued at Inamgaon after 1000 bc till people deserted the site around 700 bc. In the Tapi and the Pravara - Godavari valleys, the Jorwe farmers deserted their habitation around 1000 bc however; they continued to survive in the Bhima valley where the conditions may not have been that drastic.

At Inamgaon more than 50 species of animals comprising mammals, birds, reptiles, fishes and molluscs were identified but the faunal assemblage was dominated by cattle bones in the first two cultural phases. Stature analysis of cattle revealed a gradual decrease in the size of the animal towards the transitional layers between Malwa and early Jorwe, and early Jorwe and late Jorwe and a gradual increase after the transitional layers (fig. 6). The Malwa people, originally from central India, might have brought their cattle with them to start their life in this region. As this was an agro-pastoral community the use of cattle was manifold. Inbreeding of animals within the same stock for a longer period of time results in size reduction. Probably in the beginning itself these people had contact with other cultural complexes of adjacent areas and the exchange of cattle resulting in an increase in the size during the Malwa phase. The size decrease toward the end of this phase may be due to inbreeding. This is followed by the Jorwe phase at the site and the contact with Jorwe people resulted again in an increase in the size of cattle. Increase in size also occurred in the late Jorwe period, probably because of the association with people using iron. A Burial site of the Iron Age period has been reported at Pimpalsuti, hardly 6 km to the west of Inamgaon (Ansari and Dhavalikar, 1975).

The evidence of sharing of meat between people of two different houses in the Malwa phase is unique and significant. The bones of the right half of the body of a three year old bull were found in house n° 83 and bones from the left part in house n° 79. The same degree of charring and the metrical analysis shows that these bones belong to one and the same animal. Probably at some special occasion, this animal was killed or sacrificed and the meat was shared among the people of these two different houses (Thomas, 1988). This evidence throws some light on the socio-cultural aspects of the people concerned. In the Malwa phase a comparison of faunal remains from the floors of the settlements and those coming from other parts of the site shows that many activities were confined to the settlement area.

Based on archaeological evidence it can be presumed that economically the early Jorwe phase was the most prosperous phase and an immense increase in the cattle population has been noticed along with large scale agricultural activities. However, hunting of wild animals like blackbuck, chital, sambar, four-horned antelope, etc. continued. Horse was introduced towards the end of this phase. Turtle, bird, fish and molluscs have also played an important role in the

Table 2: Layer wise distribution of bones with human activity at Inamgaon.

Layers	Charred bones	Bones with cut marks	Butchering marks	Charred bones with cut marks	Charred unidentifiable fragments
1	30	165	2	8	7
2	210	370	1	40	170
3	235	189	3	46	200
4	90	222		34	193
5	25	9		3	184
6	68	22		9	361
7	93	50		19	589
8	123	202		27	208
9	38	64		5	352
10	36	3		5	504
11	82	26	1	18	426
12	110	61		32	709
13	64	21	1	14	46
14	47	62		14	155
15	41	39		12	58
16	14	5		4	2

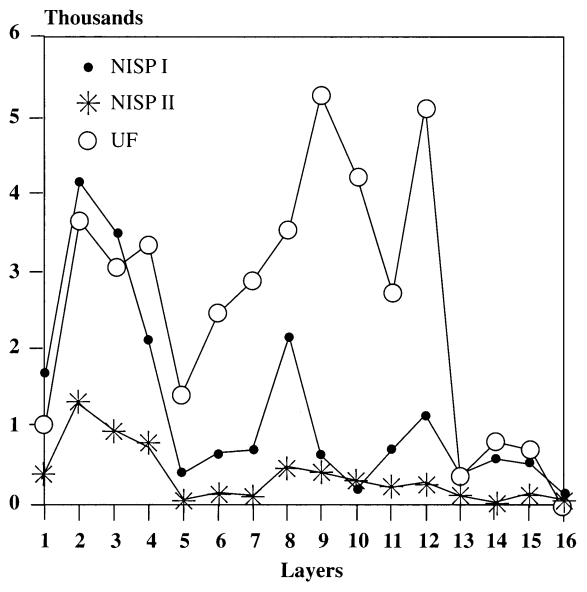

Fig. 7: Level of identification of bones at Inamgaon.

food economy. There was very scanty representations of faunal remains from the floors of the settlements, suggesting that major activities were taking place outside the living area.

A remarkable change in the composition of species was noticed in the late Jorwe phase. The percentage of wild animals (using both the MNI and NISP; figs. 2 and 4) was higher than the domestic animals, suggesting the significance of hunting in the subsistence system contrary to the earlier two cultural phases at Inamgaon. The one wild species thoroughly exploited in this cultural phase was the blackbuck (*Antilope cervicapra*) which substituted for cattle in the food economy. The consumption of dog meat, the maximum exploitation of the aquatic and avian resources and a large number of bone fragments with cut marks were found in this phase (tab. 2). From the foregoing evidence, it is clear that the late Jorwe people depended more on wild fauna of the region for food purposes. Bones were also subjected to further analysis such as the level of identification and the measurability index to ascertain the intensity of human activity on the fauna. To find out the level of identification, the faunal remains from Inamgaon were classified into three groups, as follows:

1. NISP first level: fragments which could be identified to the species level.

2. NISP second level: fragments which could be identified into broad groups such as large, medium and small sized mammals, birds, reptiles and fishes.

3. Unidentifiable: fragments which could not be identified to any taxonomic unit or skeletal part.

The level of identification (fig. 7) shows a high degree of fragmentation of bones in the early Jorwe phase. The fragmentation of bones depends on many factors such as the taphonomy, the pattern of butchery, carcass utilization, cooking, the secondary uses of bones, excavation and transport...

The measurability index is the percentage of total measurable bone fragments in NISP first level, which includes

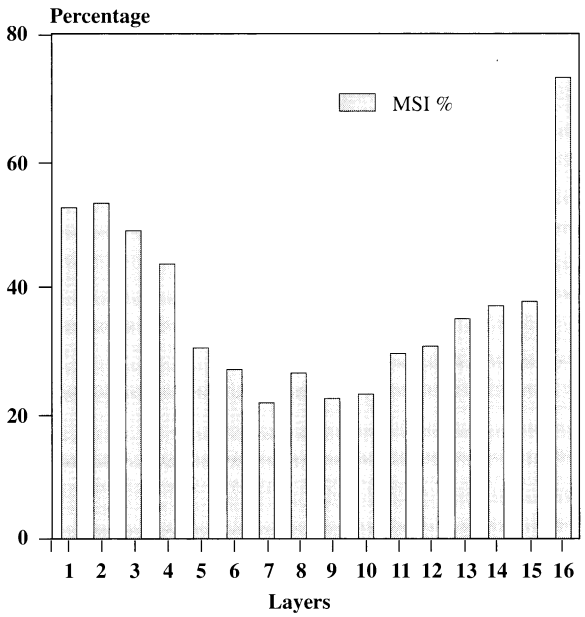

Fig. 8: Measurability index of bones at Inamgaon.

complete and partially complete bones. The index (fig. 8) calculated for the bones from Inamgaon shows that a large number of bones were measurable in the late Jorwe phase and the degree of fragmentation is higher in the early Jorwe and Malwa phases which conform the observations made from the level of identification.

The botanical evidence from the site suggests that people raised a number of crops which include monsoon (summer) crops like rice, black-gram, green-gram, hyacinth bean, horse gram and winter crops like wheat, barley, lentil, grass-pea, common-pea, etc. However, in the early Jorwe phase, vast quantities of charred grains were recovered suggesting the increased intensity of cultivation of all domestic plants. There was a gradual change in the agricultural activity in late Jorwe phase. All the earlier domesticated species continued but in highly reduced intensity (Kajale, 1988).

The trace element studies carried out on the human skeletal remains have shown some very interesting dietary habits of the Inamgaon population. The early Jorwe people consumed relatively more agricultural products than their counter parts in the late Jorwe culture. In the late Jorwe phase, the higher concentration of copper, zinc, strontium and manganese indicates clearly that the people were having a diet rich in animal food, fish, molluscs and locally gathered plant species. This study further states that the rise in the weaning age in this period may have been associated with gradual shift from agricultural sedentary life to semi-nomadic life at Inamgaon (Gogte and Kshirsagar, 1988).

More emphasis on animal species was also noticed in layers 8 and 12 of the early Jorwe and Malwa phases, respectively. Layer 12 represented a transitional stage between these two cultural phases. According to the evidence from the excavation, these layers yielded very little of the cultural and botanical material. Hence, more emphasis on animal food in these layers may have been also due to agricultural decline. If one looks at this episode, it is clear that this was happening at a regular interval after the deposition of every three layers. In the Malwa and early Jorwe phases this set back was of a temporary nature. However, when the natural degradation occurred during the final phase of the occupation, it continued for a longer period of time and the inhabitants were forced to adopt a new way of life and finally deserted the site.

Over 200 Chalcolithic sites have been reported from Maharashtra, a majority of which belonged to the early Jorwe period, followed by the Malwa and very few of the late Jorwe period. From the foregoing discussion, it is suggested that a mixed economy based on subsistence agriculture, animal husbandry and hunting-fishing was prevalent among the early farmers of Maharashtra. As a large portion of this area belonged to the semi-arid zone, dry farming may have been practiced at these places. Amidst the cereals, the most common was barley. Cattle pastoralism was one of the main occupations of the people as evidenced from all excavated sites, followed by animal husbandry of common domestic animals for food purposes. Hunting and fishing also played a very significant role in the subsistence system. However, towards the end of the early Jorwe phase, around 1000 bc, there was a decline in all the cultural activities, thereby people in the Bhima valley especially at Inamgaon in the late Jorwe phase adopted a new strategy where emphasis was given to hunting and semi-nomadic way of life, probably an adaptation to the declined environmental conditions. In a short period of time they were displaced too. At almost all the other places in Central India, Western India and the Deccan the activities of the early farming communities came to a standstill around 1000 bc and the settlements remained unoccupied for almost four or five centuries until the beginning of historical period in the 6^{th}-5^{th} centuries BC.

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