CHAPTER-IV

Domestic Animals in Harappan Levels: Archaeozoological Evidences

Many Harappan sites have been excavated in India and Indian subcontinent and the reports of some of these have been published. In some reports archaeozoological evidences have been analysed. The faunal materials collected from some of the earlier excavations have not been deliberated scientifically resulting in the permanent loss of the scientific potential of the biological material. However, the last three decades have witnessed a change in the traditional approach of the archaeologists eventually emerging into multi-disciplinary research in the field of archaeology. Now the faunal assemblages of the Harappan period are being scientifically analysed. The excavations have revealed a wide spectrum of animal species associated with the Harappan Culture.

About 70 to 80 percent of the faunal assemblage of the Harappan sites belong to domestic animals. A significant amount of animal proteins was obtained from domestic animals such as cattle, buffalo, sheep, goats and pig. Invariably cattle bones have been identified from all the excavated Harappan sites and this animal protein is the most important input (Table 4.3). The second group of important animals was the sheep and goats which have been identified from all the Harappan sites (Table 4.3). From the faunal assemblage it is difficult to distinguish between the bones of sheep and goats because of their

close morphological similarities[1] A detail description of these all domesticated animal is given below:-

Dog (*Canis familiaris*):

The association between human hunter and dog would have begun at least 12,000 years ago from the cultural period of the Mesolithic era[2]. During this period human society, world-wide, had a subsistence that was still based on broad spectrum of hunting and the gathering of wild cereals. Settled communities and incipient agriculture were in the beginning, however, in western Asia, clay-lined storage pits have been excavated from Natufian sites in Israel[3].

Domesticated dogs have been found at many Harappan sites (Table 4.3). In early phase a few remains have been recovered but in Mature Harappan phase dog remains have been found at almost all sites. A number of dog figurines have also been identified from several Harappan sites (Chapter III, Pl.3.33 to 3.35) indicating the existence of several different breeds, including a squat animal resembling a bulldog and a rangy beast like an Afghan hound. Another type had pointed ears, while a fourth had an upright tail. Collars are shown around the neck of some of the figurines, reinforcing their domestic status[4]. According to B. Prashad there were probably two distinct types of dogs domesticated by the Indus people: (1) a type akin to the Pariah and (2) a more highly bred dog allied to the modern mastiff. The only remains of dog from Harappa are of the grey hound type- with an elongated snout[5], mastiff from many sites including

[1]Boessneck, J., (1969), Osteological differences between Sheep (*Ovis aries linne*) and Goat (*Capra hircus linne*), D. R. Brothwell and E. Higgs, (eds.), *Science in Archaeology*, pp. 331-58.
[2]Clutton-Brock, J., (1981), *Domesticated Animals from Early Times*, p. 34.
[3]Cluctton-Brock, J., (1984), *Dog*, Ian L. Mason (ed.), *Evolution of domesticated animals*, p. 204.
[4]McINTOSH, J. R., (2008), *The Ancient Indus Valley: New Perspectives*, pp. 129-30.
[5]Prashad, B., (1936), Animal Remain from Harappa, *MOASI*, No. 51, p. 8 & 25-26.

Mohenjodaro[6], and the modern Paraih dog from Alamgirpur[7], Lothal[8] and Rojdi[9].

A few dog bones were found in the collection without any human activity on them. These bones got mixed with the kitchen refuse probably because of the scavenging and predatory activities prevalent at Kuntasi[10]. A brick from Chanhudaro provides interesting evidence regarding a dog chasing a cat. It bears impressions of the paws of the two animals. The deep impression left on the brick when it was still wet suggests pressure resulting from speed; while the overlap of the cat's paw by that of the dog would indicate that the latter was chasing the former[11]. Interesting is a terracotta figurine of a dog from Harappa, depicting the pet wearing a collar around the neck (Pl.3.33).

There is another interesting dog motif on Rehman Dehri pottery[12]. A beautiful dog motif has been drawn on pot sherd. The dog's mouth is open, and teeth are clearly visible, eyes and ears are carefully drawn (Fig. 3.29 & 3.30).

The dog became an integral part of the human economic and social system. The dog may have helped in keeping watch over the fields and even at home, and also in the hunting pursuits of Harappan man. Mackay suggests that some of the collars are large enough to be used as protection against attacks by panthers, as practiced in the India even this day[13].

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[6]Sewell, R. B. S. and B. S. Guha, (1931), Zoological Remains, Sir J. Marshall (ed.), *Mohenjodaro and the Indus Civilization*, Vol. 3, pp. 650-52.
[7]Nath, B. and M. K. Biswas, (1969), Animal Remains from Alamgirpur, *India Museum Bulletin*, 4(1), p. 44.
[8]Nath, B. and G.V.S. Rao, (1985), Animal Remains from Lothal Excavations, S.R. Rao, (ed.), Lothal: A Harappan Port Town (1955-62), *MOASI*, No. 78, Vol. 2, p. 640.
[9]Stack-Kane, V., (1989), Animal Remains from Rojdi, G.L.Possehl and M.H. Raval (eds.), *Harappan Civilization and Rojdi*, p. 183.
[10]Thomas, P.K. and others, (1996), Faunal Remains, M.K. Dhavlikar M.R. Raval, and Y.M. Chitalwala, (eds.), *Kuntasi A Harappan Emporium on the West Cost*, p. 298.
[11]Mackay, E. J. H., (1943), *Chanhudaro Excavation 1935-36*, New Haven: American Oriental Society, Americal Oriental Series, Vol. 20.
[12]Allchin, B. and F. R. Allchin, (1982), *The Rise of Civilization in India and Pakistan*. p.34.
[13]Mackay, E. J. H., (1937-38), *Further Excavation at Mohenjodaro*, Vol. 2, p. 286.

Goat (Capra hircus):

The other important domestic animals were sheep and goats which have been identified from almost all Harappan sites (Table 4.3). The domestic goat (*capra hircus*), derives its name from the wild goat or bezoar (*capra aegagrus*), but other wild species of *capra* are also called 'wild goats'. The female is the many-goat and the male is the buck or Billy, but the term 'she-goat' and 'he goat' are commoner in scientific literature.

Bökönyi suggests that the wild goat was present in those regions of southwest Asian where agriculture was developing and that the goat is an extremely hardy animal which could withstand the rigours of being 'reduced to the state of domestication[14]. The time of domestication was before 8000 B.C. and the place was probably the slopes of the Zagros Mountains on the borders of present day Iran and Iraq. The evidence of time and place is based on the identification of bones from archaeological sites. Much doubt persists because it is difficult to distinguish between wild and domestic forms. It is also difficult to distinguish between bones of sheep and those of goats and so many reports from excavations speak of '*ovocaprids*'. Skull and horns of sheep and goats are comparatively easily separated but the bones of the extremities are very similar. However, there are differences which can be detected if the sample is large enough[15].

India and Pakistan have the highest goat populations in the world. While their milk is most important product, they also provide a very important source of meat and many breeds produce hair which may be either coarse hair or dry. The best known of the small short-ear goat breed have been found from Punjab, Uttar Pradesh and Haryana. The other short-eared breeds include the *Chapper*,

[14]Bökönyi, S., (1974), *History of Domestic Mammals in Central and Eastern Europe*, Budapest.
[15]Mason, I. L., (1984), Goat, Ian L. Mason, (ed.), *Op. Cit.*, pp. 85-99.

Damani and *Kajli* of Pakistan[16]. Some evidence for the domestication of goat comes from Snake and Horse caves in northern Afghanistan[17]. Domesticated goats are also found at Mehrgarh and Kile Ghul Mohammad in Quetta region.

Bones of domestic goats and of wild forms have been found at almost all the Harappan sites (Table 4.3). Further, this animal is represented on seal/sealing, in a few figurines and in very interesting painted motifs on Harappan pottery. But it is very often problematic to distinguish whether the animal in question is the wild goat or the domestic one. Prashad describes 43 bone fragments and 11 teeth of goat from Harappa[18].

At Shikarpur and Kuntasi, compared to sheep, more goat remains were found. Probably, it is befitting to state that sheep is a grazer, and goat a browser, and the latter is more adapted to different environment conditions[19]. A goat or goat-like creature occurs on several Harappan seals or sealings (Pl.3.58 & 3.59). A goat on Harappan seal is reported from Mohenjodaro[20], Lothal[21], and two from Kalibangan[22]. Mahadevan has been listed 37 seals with a goat or goat-antelope motif[23]. A beautiful bronze goat in seating posture is reported from Mohenjodaro and other figurines are also found at this site[24]. A terracotta goat figurine was found from Harappa[25] .Generally, the bones of goats accounted

[16]Mason, Ian, L., (1984), *Op. Cit.*, p. 95.
[17]Dupree, L., (1972), *Prehistoric Research in Afghanistan (1959-66)*, Philadelphia: Transaction of the American Philosophical Society, 62(4), pp. 3-84) and Shaffer, J. G., (1978) *Prehistoric Baluchistan: With excavation report on Said Qala Tepe*, pp. 73-81.
[18]Prashad, B., (1936), *Op. Cit.*, p. 9 & 48-49.
[19]Thomas, P. K., (2002), Investigation into the archaeofauna of Harappan site in Western India, S. Settar and R. Korisettar (eds), *Protohistory: Archaeology of the Harappan Civilization*pp. 409-20.
[20]Mackay, E. J. H., (1937-38), *Op. Cit.*, Pl. XCIX, No. 670.
[21]Rao, S.R., (1985), *Op. Cit.*, Pl. CLIX, A. 3.
[22]Joshi, J. P. and A. Parpola, (1987), *Corpus of Indus Seal and Inscription*, Vol. I, K-34 and K-37.
[23]Mahadevan, I., (1977), The Indus Script: Text, Concordance and Tables, *MOASI*, No. 77, p. 793.
[24]Mackay, E. J. H., (1937-38), *Op. Cit.*, p. 292 and Pl. LXXIV, LXXX and LXXXVIII.
[25]Vats, M. S., (1940), *Excavation at Harappa*, Vol. II, pp. 330-31.
[26]Ryder, M. L., (1984), Sheep, Ian L. Mason (ed.), *Op. Cit.*, pp. 63-85.

from Harappan sites are about 7-15 percent in the total faunal assemblage. Goat/sheep was the most important food item in the Harappan economy. It is likely that sheep and goats were generally preferred as food rather than for their secondary products e.g. milk and wool, etc.

Sheep (*Ovis aries*):

Sheep were domesticated entirely within the prehistoric period by primitive peoples living at the end of the Mesolithic period. They were almost certainly settled plant cultivators, and not primarily hunters. The sheep gets attracted to man by his crops. The first animals to be domesticated after the dog were the goat and the sheep. Whether the goat or the sheep was domesticated first is not yet clear, because of the fragmentary nature of the skeletal remains, and the difficulty of distinguishing sheep and goat bones. But the goat would have been initially more useful in helping to clear forest, after which sheep would have been economically superior.

The first evidence for the domestication of sheep comes from sheep remains dated C. 9000 B.C. at Chemi Shanidar in Iraq. Other dates of early domestication are Jarmo, also in Iraq, dated C. 7000 B.C. and Tepe Sarab in Iran, dated C. 8000 B.C[26]. Prashad identified 71 bones fragment and 17 teeth of sheep from Harappa[27]. A few examples of sheep are noticed in Harappan art. Various examples of the animal are reported by Mackay[28]. There are five representations of sheep or goat motifs on Harappan pottery but it is very difficult to identify in goat or ibex. Sheep figurines are not found on Harappan seals and sealings.

[27]Prashad, B., (1936), *Op. Cit.*, pp. 9 & 50-53.
[28]Mackay, E. J. H., (1937-38), *Op. Cit.*, Pl. LXXX and LXXXVIII.

Sheep have been purposely bred to produce wool and early form of the animal would have been hairy, like their wild counterparts. They were source of meat and possibly produced milk, with which the potato could be tamed. Hearty animals, they adapted well to migration and travel, were tolerant of drought and poor pasture and fitted well into the kind of pastoral nomadism that the people of the Indus Age practiced[29]. It is usually assumed that sheep were also probably kept for their wool.

Cattle (*Bos Indicus*):

The Zebu (*Bos indicus*) was the most important domestic animal of the Harappan people. Early domesticated cattle are classed into two major types, namely humpless and humped. The humpless cattle, again, are separated into long horned and short horned types. All these types of domesticated cattle have been reported from probably all Harappan sites (Table 4.3). Cattle bones account for more than 40 to 60 percent of the total collection of faunal remains from almost all Harappan sites[30]. Cattle seem to have been the most important domestic animal in the Harappan civilization. Skeletal remains and depiction in art form of cattle have been found almost from all Harappan sites. Externally, it is characterized by a prominent hump on the shoulder, a long face, usually steeply upright horns, drooping ears, small brow ridges, which give it a peculiar expression, a dewlap and slender legs. Its colour varies but is commonly of the grey type varying to white or black[31].

[29]Possehl, G. L., (1999), *Indus Age: The Beginning*, p. 181.
[30]Thomas, P. K. and P. P. Joglekar ,(1990), Faunal Remain, M. K. Dhavalikar, V. Shinde and S. Atre, (eds.), *Excavation at Kaothe*, pp. 233-64.
[31]Thomas, P. K., (1971), Domestication of Animal in Ancient India, *Dissertation* (Unpublished), to M.S. University, Baroda, pp. 24-26.

The earliest evidence for a humped breed comes from the faunal remains at Mehrgarh I, along with a figurine from Mehrgarh II[32]. There is some ambiguity about the presence of a second kind of cattle in the Greater Indus Region during the era. It is the humpless one (*Bos taurus*), which was the predominant breed in the west. There are many humpless "taurive" cattle figurines from several Harappan sites (Pl. 3.22 to 3.27) in terracotta, steatite and there are many examples of pottery motifs. The famous Harappan stamp seals have the so-called "unicorn" - an animal that appears to be the representation of a humpless bull (Pl.3.51). There are a total of 1218 bull seals from Mature Harappan, not counting the so-called "short-horned bull". Of these, 54 are clear Zebu seals, the remaining 1164 are the so-called "unicorn"[33]. The presence of so much imagery of humpless cattle in the Mature Harappan phase, in the absence of confirming osteological evidence, is one of the unresolved issues for archaeozoologists in the study of the Harappan civilization.

The huge numbers of terracotta cattle figurines recovered from several Harappan sites are some very good examples in steatite. A few examples in copper bronze come from Kalibangan (Pl. 3.48). There are many bull figurines made as puppets, with a separate, movable head hinged at the shoulders. Puppets of other animal also exist as do examples on wheels. This kind of toy is a distinct innovation of the Mature Harappan and seems to have been a Harappan delight, designed to entertain children and their adult playmates[34]. The Kulli phase bull figurines are almost always painted and those from the other domains are almost always plain. Cattle motifs are also the most prevalent aspect of

[32]Meadow, R.H., (1984), Note on the faunal remains from Mehrgarh with a focus on cattle (*Bos*), *South Asian Archaeology 1981*, pp. 34-40.
[33]Mackay, E. J. H., (1943), *Op. Cit.*, Pl. LVIII, Nos. 11, 12, 15, 17 and 19.
[34]Possehl, G. L., (1999), *Op. Cit.*, p. 176.

Harappan art. There are many cattle motifs noticed in Early to Late Harappan pottery with short-horned, long-horned, humped and humpless cattle.

The cattle pastoralism was one of the main economic pursuits of the Harappan[35]. Rissman also identified Post-urban small seasonal cattle pastoral camps at sites such as Oriyo and Mesadi[36]. Cattle undoubtedly were used for their dairy products but the water buffalo may have provided such products too. It may be assumed to have supplied milk, from which a host of other food-items such as curds, clarified butter, butter milk, etc. (all of which are mentioned in subsequent literature) may have been prepared[37]. Cattle were also a source of meat since many bones are charred and have butcher marks on them.

The socio-economic importance of this animal can be further deduced from clay figurines of humped cattle and their depiction on seals/sealings of Harappan periods. It can be inferred that bullocks were used for traction, to pull carts and the ploughs, all of which are documented by terracotta models, including the bulls themselves. Carts are further documented by rats in Ancient Street at Harappa[38]. It is very interesting that there is direct evidence of the traffic wearing away the walls of buildings at Mohenjodaro. "Corners of some of the smaller by-ways show evidence of having been rubbed by pack-animals or by the clothing of passers-by, and in some cases the angles of a building were purposefully rounded-off so that pack-loads should not get dislodged, a device which has also been observed in ancient 'Ur'[39] Cows were probably kept for

[35]Possehl, G. L., (1979), Pastoral Nomadism in the Indus Civilization: An Hypothesis, M. Teddei (ed.), *South Asian Archaeology 1977*, pp. 537-551.
[36]Mehta, R. N., (1984), Valabhi: A Station of Harappan Cattle Breeders, B. B. Lal and S. P. Gupta, (eds.), *Frontiers of the Indus Civilization*, pp. 227-30.
[37]Lal, B. B., (1997), *The Earliest Civilization of South Asia (Rise, Maturity and Decline*), p. 161.
[38]Wheeler, R. E. M., (1947), Harappa 1946: The Defenses and Cemetery, R-37, *Ancient India*, No.3, Pl. XXXV and Kenoyer, J. M., (1991), Urban process in the Indus Tradition: A preliminary model from Harappa, R. H. Meadow (ed.), *Harappa Excavations 1986-90: A multidisciplinary appraoch to third millennium urbanization*p. 49.
[39]Mackay, E. J. H., (1948), *Early Indus Civilization*, second edition, p. 20 and also Mackay, (1937-38) *Op. Cit.*, pp. 88 & 101.

their milk and bulls for hard working like drawing ploughs and carts, threshing and for loading, while a few bulls would be maintained for breeding, one or two bulls being enough to service all the cows of a village[40]. Cattle dung was probably used for fuel and mixed with mud as a daub applied to wattle walls. All these sources leave no scope of doubt that these cattle were the main animals of the Harappan people.

Pig (*Sus domesticus):*

The earliest remains of domesticated pig have been reported from southeast Anatolia and China dated to C. 8000 B.C[41]. In northern Mesopotamia the domesticated pig is represented on painted pottery from Lagash and in clay figurines from Arpachiyah[42]. The presence of the domesticated pig at Jarmo in northern Iraq is attested by numerous teeth and bones from ceramic level of the Late 6th millennium B.C[43]. The wild pig (*Sus scrofa*) is found from Balakot.

Domestic pigs are identified (4-10%) at Harappan sites mostly from the Mature Harappan and Post-urban periods (except for Vagad, Valabhi and Malvan in Gujarat). There are very little figurines of pig during the Mature Harappan phase. A single figurine is reported from Mohenjodaro[44]. Three examples of pig motifs reported from Rehman Dehri pottery are very interesting. First example is a single pig motif on sherd, the legs and other part of bodies are very carefully drawn (Fig. 3.18) and another example is a two pig

[40]McINTOSH, J. R., (2008), *Op. Cit.*, p. 123.
[41]Reed, C. A., (1969), The pattern of animal domestication in the Prehistoric Near East, P.J. Ucko and G.W. Dimbleby, (eds.), *The Domestication and Exploitation of Plants and Animals*, pp. 361-80.
[42]Zeuner, F. E., (1963), *A History of Domesticated animals*, Hutchinson : London, pp. 34-42.
[43]Epstien, H., (1984), Pig, Ian L. Mason (ed.), *Op. Cit.*, pp. 145-162.
[44]Marshall, Sir John, (1931), *Op. Cit.*, Pl. XCVI, No. 22.

motifs drawn on pot sherd in a row[45]. (Fig.3.21). Pig was also a source of meat since many bones are charred and have butcher marks on them.

Water Buffalo (*Bablus bublis*):

Buffaloes form two groups: the Asian (*Genus Bubalus*) and the African (*Genus Syncerus*). Along with cattle (*Bos*) and bison (*Bison*) they belong to the tribe Bovini of the family Bovidae. Mating between cattle, the Asian buffalo and the African buffalo are invariably sterile. *Bubalus bubalis*, the Asian water buffalo, achieved domestication at least 4000 years ago. All domestic buffaloes in the world today have descended from the Asian and not the African form[46]. MacGregor classified water buffaloes into two groups: Swamp buffaloes of South East Asia and the River buffaloes of the Indian subcontinent. The Swamp buffalo closely resembles the wild *arni* of India (*Bubalus arnee*) in general continence and habbit[47].

It is usually assumed that water buffaloes were first domesticated as work animals in the Harappan civilization of Harappa and Mohenjodaro some time prior to 2500 B.C. or Mesopotamia during the Akkadian dynasty. As Zeuner indicates, archaeological evidence for their history as domesticated beats is curiously scanty and is mainly restricted to seal and bone findings[48]. It is often a challenge, given the fragmentary faunal collections, to try and separate certain bones and differentiate cattle from buffalo, given the morphological similarities among their bones and teeth[49]. Wild water buffalo are reported from the

[45]Allchin, B. and F. R. Allchin, (1982), *Op. Cit.* p.46.
[46]Cockrill, W. R., (1984), Water buffalo, I.L. Mason, (ed.), *Op.Cit.*, pp. 52-62.
[47]MacGregor, R., (1941), The domestic buffalo, *Veterinary Record*, 53 (31), pp. 443-50.
[48]Zeuner, F.E., (1963), *Op. Cit.* pp.34-42.
[49]Thomas, P. K., (1977), Archaeological Aspects of the Prehistoric Cultures of Western India, *Ph. D. Dissertation*, University of Poona.

aceramic period at Mehrgarh (Period I)[50]. The domesticated water buffalo was probably present by Mature Harappan times.

The bones of water buffalo have been found at majority of Harappan sites, the only exceptions being Surkotada, Malvan and Valabhi (Table 4.3). The horns of the wild water buffalo are massive, large in males than in females. They develop a wide sweep, bending around to form a semicircle, with a small space between the pointed tips; there is a gradation of angle, from a relatively vertical set to one which sweeps back to the shoulders, almost parallel to the ground. Horn size is very much reduced in the domesticated breeds and is shaped by shaving and controlling the direction of growth, partly as a "brand" for identification of the animals". The distinctive sweep of horns has been captured effectively by ancient artists of both the Greater Indus Region and Mesopotamia[51].

Water buffalo figurines are relatively rare, but there is one magnificent example from the so-called "Daimabad Bronze", which is, unfortunately, of uncertain date[52]. Another very fine water buffalo in copper-bronze comes from Mohenjodaro[53]. There are 14 stamp seals with water buffalo on them. Some depict combat with humans, reaffirming the aggressive nature of the wild animal[54] . The water buffalo is a prolific producer of milk, with very high butter fat content. It can also be used for traction; pulling and carts.

A Kuntasi and Shikarpur in Gujarat, buffalo bones constituted only 5-10 per cent of the total identifiable specimens[55]. There is one terracotta figurine

[50] Meadow, R. H., (1984), *Op. Cit.*, p. 35.
[51]Possehl, G. L., (1999), *Op. Cit.*, Pl. 3.11 and 3.12.
[52]Dhavalikar, M. K., (1982), Daimabad bronzes, *Harappan Civilization: A Contemporary perspective*, G.L. Possehl, (ed.), pp. 361-66.
[53]Mackay E. J. H., (1937-38), *Op. Cit.*, Pl. LXXI, No. 23.
[54]Mahadevan, I., (1977), *Op. Cit.*, p. 793.
[55]Thomas, P. K. and P. P Joglekar, (1994), Holocene Faunal Studies in India, *Man and Environment*, XIX (1-2), p. 186.

from Mohenjodaro that Mackay also identifies as 'the Gaur' but Possehl disagrees and suggests that it is more likely of a water buffalo[56].

Water buffalo evolved in environments with standing and slowly running water such as ponds, swamps, large rivers with ample back water and remnant lakes. They are accustomed to wallowing in these places, cooling themselves during the heat of the day and refreshing their skin, which will crack and deteriorate unless it gets its daily renewal by soaking water; making them not good animals for pastoralists. In this way, the water buffalo is a good index of stable sedentism in well watered places. It is in such environment that the buffalo is found in good numbers and it is one of the reasons that it figures prominently in the review of the cultural geography of the Greater Indus Region[57].

Horse (*Equus caballus*):

The domestication of the horse was the most important and significant event in human history. The presence or absence of the horse in Harappan civilization has been a bone of contention for decade, especially in the context of 'the Aryan invasion theory'. Some archaeologists and historians are of the view that the arrival of horse in India is linked with the so-called 'Aryan invasion'. While a section of scholars tends to believe that the Harappans were Aryans and still others dismiss the premise on the plea that the study of the animal bones from different excavated Harappan sites has not yielded sufficient number of bones of true horse (*Equus Cabbalas Linn*). Still, bones said to be of domestic horse have been found at a number of Harappan sites like, Harappa,

[56]Mackay, E .J. H., (1937-38), *Op. Cit.*, Pl. LXXVII, No. 5) and Possehl, G. L. (1999) *Op. Cit.*, p. 184.
[57]Possehl, G. L., (1999), *Op. Cit.*, p. 179.

Mohenjodaro, Surkodata, Lothal, Kalibangan, Ropar, Malvan and Kanewal etc (Table 4.2).

In India, the earliest evidence for the domesticated horse occur in C. 4500 B.C. at Bagor[58] . Subsequently the true horse is reported from the Neolithic levels at Kodekal and Hallur and after that it is reported from proto- historic times[59]. Returning to Harappan times, Mortimer Wheeler, a colourful proponent of the Aryan invasion theory, if ever there was one, admitted long ago that "it is likely enough that camel, horse and ass were in fact a familiar feature of the Indus caravan[60].

From Mohenjodaro a large fragment of the right half of the mandible, containing the premolar and molar teeth and a second fragment containing the same teeth of the left side of horse have been reported by Sewell & Guha[61].

Table 4.1 Detail of Horse's teeth from Mohenjodaro (After depth 1 ft. 10 inches)

	Right mm.	Left mm.
Premolar 2		
Length	34.5	32.5
Breadth	18.0	20.0
Premolar 3		
Length	28.0	29.0
Breadth	21.0	21.0
Premolar 4		
Length	27.0	27.0
Breadth	21.0	21.0
Molar 1		
Length	25.0	25.0
Breadth	18.5	19.0
Molar 2		

[58]Danino, M., (2003), The *Horse and the Indus-Sarasvati Civilization*, pp. 1-12.
[59]*Ibid.*
[60]Wheeler, R. E. M., (1953), *The Indian Civilization*, Cambridge, p. 92.
[61]Sewell, R. B. S. and B. S. Guha, (1931), *Op. Cit.*, Pl. CLXII, fig. 9, pp. 649-73.

	Length	25.0	25.0
	Breadth	17.5	18.0
Molar 3			
	Length	30.5	30.5
	Breadth	16.0	15.5

At Surkotada, from all three periods, a good number of bones of horse (*Equus caballus Linn*) have been recovered. These are very distinctive bones: first, second and third phalanges and few vertebrae fragment. Described below are the bones of *Equus caballus.*

The above evidence shows that horse was known to the Harappans at Surkotada. Associated with the horse also existed *Equus asinus* and *Equus hamionus.* Even today, *Equus hamionus Khur* is found in large numbers in the little Rann of Kutch[62].

The excavations at Kuntasi have brought to light mainly two cultural periods, the Harappan and the Late Harappan. Faunal materials amounting to more than 150,000 bone fragments were reported from Mature and Late Harappan periods. Three species of *Equids, Equus caballus, Equus asinus and Equus hamionus* co-existed at Kuntasi. However, the bones of horse were very few as compared to other domestic animals[63].

1. Second premolar from upper jaw
2. Metacarpal proximal
3. Scapula

[62]Sharma, A. K., (1974), Evidence of horse from Harappan settlement at Surkotada, *Puratattva,* No. 7 (ed.), B. K. Thaper, New Delhi, pp. 75-76.
[63]Thomas, P. K. & other, (1996), *Op. Cit.*, pp. 297-321.

The few teeth of the horse reported by Ross from Rana Ghundai come from section-scraping and from a stratified dig; and Zeuner had some reservation even about their identification[64].

The identification of a terracotta figurine from Mohenjodaro[65], as that of the horse is not without doubt (Pl.3.32). At the same time, it needs to be added that the Harappan levels at Nausharo have yielded doubtless terracotta figurines of horse[66]. Also, the middle Harappan levels at Lothal have yielded a couple of terracotta figurines which have been identified as those of the horse (fig.3.74 & 3.75).

Stein reported from Periano Ghundai in Zhob valley, a fragment of horse figurine of which the lower body or rear portion have not been preserved. The curvature of its neck and the roughly made fall looks like that of a horse[67]. Rangpur of period III also yielded terracotta horse figurine[68]. Anyway, one would like to have much more evidence, to be able to say that the horse did play a significant role in the Harappan economy. But it is certain that horse was known to the Harappans. P.K. Thomas, P.P Joglekar[69] reported horse bones from the nearby Harappan site of Shikarpur in the mature Harappan period.

[64]Ross, E. J., (1946), A chalcolithic site in northern Baluchistan: Rana Ghundai, *Journal of Near Eastern Studies*, 5(4), pp.291-315.
[65]Mackay, E. J. H. (1938), *Op .Cit.*, Pl. LXXXVII-III.
[66]Jarrige, J. F., (1990), Excavation at Nausharo (1987-88), *Pakistan Archaeology*, No. 25, pp. 193-240.

[67]Stein, S. A, (1929), An Archaeological Tour in Waziristan and Northern Baluchistan, *MOASI*, No. 37, Pl.VII, Calcutta.
[68]Rao, S. R., (1963), Excavation at Rangpur and other explorations in Gujarat, *Ancient India*, No. 18-19, New Delhi, p. 137, fig.50.
[69]Thomas, P. K. and P. P. Joglekar, (1994), *Op. Cit.*, pp. 179-203.

Table 4.2 Horse bones (*Equus Caballus*) identified from various Harappan sites

Sl. No.	Site Name	References
1	Dholavira	Roy, 1993 and Patel,1997
2	Lothal	Nath and Rao 1985
3	Surkotada	A.K. Sharma, 1974, 1990
4	Kuntasi	P.K. Thomas & Joglekar, 1994
5	Malvan	Alur,1990
6	Sikarpur	Thomas & Joglekar, 1994
7	Harappa	Prashad 1936; Meadow 1991
8	Mohenjodaro	Swell & Guha 1931
9	Kalibangan	Nath & Biswas, 1969

References of Table:

Roy, A., (1993), A Preliminary Study of Found Remains of Dholavira, 1990-92, PGDA, *Dissertation* (unpublished) Institute of Archaeology, Delhi.

Patel, A., (1997), The pastoral economy of Dholavira: A First Look at Animals and Urban Life in Third Millennium Kutch, *South Asian Archaeology*, 1995, F. R. Allchin and B. Allchin (eds.), New Delhi: oxford – IBH, pp. 101-13.

Nath, B. and G.V.S. Rao, (1985), Animal Remains from Lothal Excavations, *Lothal: A Harappan port town 1955-62*, S.R. Rao (ed.), Vol. II New Delhi, pp. 636-50.

Sharma, A. K., (1974), Evidence of Horse from the Harappan Settlement at Surkotada, *Puratatva*, No. 7, Culcutta, pp. 75-76.

Sharma, A. K., (1990), Animal Bone Remains in *Excavation at Surkotada 1971-72 and Exploration in Kutch*, J. P. Joshi (ed.), New Delhi, pp. 372-83.

Thomas, P. K. and P. P. Joglekar, (1994), Holocene Faunal Studies in India, in *Man and Environment*, XIX, Pune, pp. 179-203.

Alur, K. R., (1990), Studies in Indian Archaeology and Paleontology, Dharwar; *Srihari Prakashana Studies*, No. 13, pp. 315-16.

Prashad, B., (1936), Animal remains from Harappa, *MOASI*, 51: New Delhi, pp. 1-60.

Meadow, R. H., (1991), Faunal Remains and Urbanism at Harappa, in *Harappan Excavations 1966-90*, R. H. Meadow (ed.), Madison, Wisconsin, pp. 89-106.

Sewell, R. B. S. and B. S. Guha, (1931), Zoological Remains, *Mohenjodaro and Indus Civilization*, Vol. 2, J. Marshall (ed.), London pp. 649-73.

Nath, B. and M.K. Biswas, (1969), Animal remains from Alamgirpur, *Indian Museum Bulletin*, 4(1), pp. 43-52.

Pl.4.1 Terracotta painted spoked wheel from Bhirrana (after Rao, 2008)

The use of horse can also be inferred by the presence of spoked wheel, terracotta model of which along with that of chariot, usually drawn by horses are found from a number of archaeological excavation. The spoked wheel is seen as a crucial element in the speed game, compared to the slow bullock-driven solid wheeled Harappan cart – until it turned out that Harappan did have spoked wheels, as can be seen in a few terracotta wheels from Banawali, Rakhigarhi and Bhirrana (Pl.4.1) The spokes are clearly visible in relief or painted form[70].

One need hardly be reminded of the animal driven Harappan wheeled cart or *rathas*, of which a very good bronze model has come from Mohenjodaro. Perhaps, the more beautiful and nearly complete example of a large bronze model of a bull-driven chariot has come from Daimabad in Maharashtra; the date of which may fall in the Late Harappan phase, anywhere between 1900 B.C. and 1700 B.C. Thus, there are archaeological evidences of both

[70]Lal, B. B., (2002), *The Saraswati flows on: the continuity of Indian Culture*, New Delhi, p.74.

domesticated horse and the wheeled cart. It is, therefore not improbable that the Harappan did, in fact, used horse-driven chariots[71].

The most important opinion is of Prof. Sandor Bökönyi, Director of the Archaeological Institute of Budapest, Hungary, who is the most leading scholar in the field of ancient horses in Asia and Europe. He came to Delhi in December 1991, studied the animal bones collected by J.P. Joshi at Surkotada and gave a report to the Director General, ASI in 1993.

The views of Sandor Bökönyi:

1. "I can state the following: The occurrence of true horse (*Equus Caballus L.)* was evidenced by enamel pattern of the upper and lower cheek and teeth and by the size and form of incisors and phalanges (toe bones).

2. Since no wild horse lived in India in post Pleistocene time, the domestic nature of the Surkotada horses is undoubtful. This is also supported by an inter-maxilla fragment whose incisor tooth shows clear signs of crib biting, a bad habit only existing among domestic horses which are not extensively used for war.

3. These horses were obviously imported from horse domestication centres recently discovered in Soviet Central Asia whose distance was essentially shorter from India than those in Ukraine.

4. Since horse bones represent adult individuals, one can rightly suppose that the main exploitation of these horses was for work (thus they were used for riding and as pact or draught animals); nevertheless also their meat was eaten.

[71]Gupta, S. P., Paleo - Anthropology and Archaeology of the Vedic Aryans, *The Aryan Problem*, S.B. Deo & S. Kamath (eds.) Pune, pp. 153-165.

5. Besides horse bones, the overwhelming majority of quid remains are teeth and bones of the khur, the Indian wild half-ass (*Equus hemionus khur*) that once lived in great numbers, and is still existing sporadically in Kutch"[72] .

Richard Meadow and Ajita Patel, in a rejoinder to S. Bökönyi, did challenge his report to the ASI[73] (Meadow & A. Patel, 1997). Bökönyi however, stuck to his views (although he passed away before he could give his final response), and Meadow and Patel concluded their long plea with a rather weak statement that "… in the end that [Bökönyi's identification of horse remains at Surkotada] may be a matter of emphases and opinion"[74].

The old argument that so-called horse remains invariably belong to species of wild ass such as the onager (*Equus hemionus onager*), the khur (*Equus hemionus khur*), or the plain ass (*Equus asinus)* is highly debatable, firstly because it has little or no evidence, secondly because many of the experts simultaneously report remains of the wild ass from the very same site, which implies some ability to distinguish between those species[75].

Another frequent objection is that date of the horse remains are not firmly established and might be much more recent. This overlooks the case of Mahagara (near Allahabad), where horse bones were not only identified by G.R. Sharma, but absolute carbon-14 tests six samples have given dates ranging from 2265 BCE to 1480 BCE[76]. While one would wish to have such radiocarbon dates with respect to more sites, it seems impossible to question all stratigraphic evidences, the more so as that would automatically call into question the dates of most other remains artifacts from those sites.

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[72]Lal, B. B., (1997), *Op. Cit.,* P. 162 (S.Bokonji, submitted on 13 December, 1993, in his report to DG, ASI, quoted by B. B. Lal).
[73]Meadow, R. and A. Patel, (1997), A comment on 'Horse Remains from Surkotada' by S. Bokonji, in *South Asian Studies*, Vol.13, New Delhi, Oxford & IBH, pp. 308-315.
[74]*Ibid.*
[75]Thomas, P. K. and Jaglekar, (1997), Subsistence base on animals in Harappan Culture of Gujarat, in *Anthropological*, No. 25-26, pp. 769.
[76]Sharma, G. R., (1980), *Beginning of Agriculture Allahabad*, pp. 220-221.

S.P. Gupta offers a sensible reply to the further objection that horse remains, if at all they are accepted, rarely account for more than 2% of the total animal remains at any site. Pointing out that the same holds true of the camel and elephant (animals undeniably present in Harappan sites), he explains that low proportion is "simply because these animals are not likely to have been as regularly eaten as cattle, sheep and goats as well as fish whose bones are abundantly found at all Indus-Sarasvati settlements. With regard to non-depiction of the horse on Indus seal and others, S.P. Gupta points out that the camel, wolf, cat, deer, *nilgai*, fowl, jackal are rarely or never found in [Harappan] art but their presence has been attested by bones[77]. K.D. Sethna pertinently asks, "As there are no depictions of the cow, in contrast to the pictures of the bull, which are abundant, should we conclude that Harappa Mohenjodaro had only bulls." Sethna goes further, he makes the opposite point that the mythical unicorn is found on numerous seals, and asks," was the unicorn a common animal of the proto-historic Indus Valley[78]. Clearly, animal representations, or their absence, have cultural reasons: the Indus seals were not intended to be zoological handbook. Until we have a full picture of Harappan culture, including a decipherment of its script, we can only conjecture about its iconography.

The preponderor of Aryan theory link the use of horse with the Aryans whose culture was basically horse centric because the early Vedic Aryans were nomadic pastoral people and use to move from one place to another and in this use of horse due to its speed was crucial. But the Harappan society was settled agricultural one in which use of ox or bull was more useful and hence they preferred bull due to horse.

[77] Gupta, S. P., (*1996), The Indus – Sarasvati Civilization – Origins, Problem and Issues*, Delhi, p.162.
[78] Sethna, K. D., (1992), *The problem of Aryan Origins*, N. Delhi, p. 179.

Ass (*Equus asinus*):

The ass (*Equus asinus*) is an herbivorous animal of the order Perissodactyla, family *Equidae*. The genus *Equus* comprises the horse, ass, onager and kiang and zebra. A number of scholars agree that the early domestication of ass took place in the northeast Africa, but there are many Egyptian records of domesticated asses dating from the beginning of the 4th millennium B.C[79].

The domestic ass is reported from the Mature and Late Harappan phases of a number of Harappan sites (Table 4.3). Thomas explains that the close osteological similarities between the equid like *Equus caballus* (horse), *Equus asinus* (ass) and *Equus hemionus* (Onager or Khur), and the hybrid animals (Mule or Hinny) make the precise species identification rather difficult from fragmentary and scarse remains of these animals from archaeological sites. The domestic ass, the remains of which have been found at Harappa, as per Prashad, suggestes that in view of its close relationship with the African species, it is safe to be considered as having been imported to the Indus Valley from Africa[80]. The Bones of *Equus hemionus* have been found at Rojdi[81] and Surkotada[82] (A domestic ass has been identified in a preliminary report for Kalibangan[83]. B.S. Guha and B.K. Chatterjee identified the ass (*Equus asinus*) and horse (*Equus caballus*) at Rana Ghundai, Northern Baluchistan[84]. In a slightly later context,

[79] Epstein, H., (1984) Ass, Mule and Onager, Ian L.Mason(e.d.), *Op .Cit.*, pp.177-184.
[80]Prashad, B., (1936), *Op. Cit.*, pp. 8 & 28-30.
[81]Stack-Kane, V., (1989), *Op. Cit.*, p. 183.
[82]Sharma, A. K., (1990), Animal bone remains, J. P. Joshi, Excavation at Surkotada 1971-72 and Exploration in Kuchchh, *MOASI*, No. 87, p. 375.
[83]*IAR* (1964-65), p. 38.
[84]Guha, B. S. and B. K. Chatterjee, (1946), A chalolithic site in northern Baluchistan: Report on Skeletal Remains, *Journal of Near Eastern Studies* 5(4): p. 316.

the horse and ass have been identified at Pirak, a site of the second millennium B.C., very close to Mehrgarh and Nausharo[85].

Bones of the wild ass with cut marks and evidence of charring have been found from Kuntasi as well as from Shikarpur suggesting that these animals were hunted for food[86]. Horse figurines are found from Mohenjodaro, Lothal and Rangpur but ass figurines are not found at any Harappan sites.

Camel *(Camelus dromedarius)*:

In the old world there are two types of camel, one-humped and two-humped. Linnaeus placed these in separate species, *Camelus dromedarius* and *Camelus bactrianus*, or dromedary camel and Bactrian camel. Single humped is found mainly from Arabia, on the west to India. The other species, two-humped is native of Afghanistan, Magnolia and extends even to China. Single humped camel's bones have been identified at Harappa, Mohenjodaro Surkotada, Kanewal and Kalibangan.

The three bone fragments (radius ulna, left-scapula, Ist phalanx) have been identified at Harappa by Prashad[87] Two bones have been identified from Mohenjodaro by Swell and Guha[88]. Surkodada[89] Khanewal[90] Kalibangan[91], and possibly Rojdi[92] all these sites have also been identified as abode camel species.

In the Post urban period at Pirak, domestic camel bones have been found in northern Kachi plain in association with camel figurines and camel effigies

[85]Meadow, R. H., (1979), A Preliminary Note on the Faunal Remains from Pirak, J. F. Jarrige, J. F. Enault and M. Santoni, (eds.), *Fouilles de Pirak*, Vol. I, p.334.
[86]Thomas, P. K. and P. P. Joglekar, (1994), *Op. Cit.*, p. 186-187.
[87]Prashad, B., (1936), *Op. Cit.*, pp. 58-59.
[88]Sewell, R. B. S. and B. S. Guha, (1931), *Op. Cit.*, pp. 660.
[89]Sharma, A. K., (1990), *Op .Cit.*, p. 380)
[90]Shah, D. R., (1980), Animal Remains from Kanewal, R. N. Mehta, K. N. Momin and D. R. Shai (eds.), Excavation at Kanewal, *M.S. University Archaeology Series*, No. 17, p. 75.
[91] *IAR* (1964-65), p. 38.
[92]Stack-Kane, V., (1989), *Op. Cit.*, p. 183.

on pottery from period-I dated to C. 1700 B. C. From Rehman Dehri very interesting motifs on pottery have been identified consisting of a goat motif by Allchin[93]. But my identification is different because elongated neck and open mouth are very similar to a camel's neck with face. On head three zigzag lines are drawn which make doubtful the identification of this figure (Fig. 3.19).

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A copper tablet from Mohenjodaro has a composite animal, with the long drooping neck of camel, but a hump is not clearly shown and there are heads and necks on both ends[94]. A calcaneum of a camel was reported from the slop of the eastern side of the main mound at Kuntasi[95]. The camel is an extraordinarily durable and useful riding and pack animal as well as a source for traction. Its milk and flesh are both consumed. Camels are highly tolerant of arid environment, can go for long period without drinking and can eat rough plant and so the camel is nicknamed as 'the ship of desert'. It can run as fast as 15 kms per hour and can score 150 kms in a day[96]. They are important in Pakistan, especially in Sindh, Baluchistan, the northwest and Punjab. In India the camel is found throughout Kuchchh, North Gujarat, Rajasthan, Punjab and southern Haryana. There could hardly be a better fit with the geography of Mature Harappan[97]. The camel figures are not found in Harappan art but there is no doubt that the camel bones have been recovered from many Harappan sites (Table 4.3).

[93]Meadow, R. H., (1979), *Op. Cit.*, p. 334.
[94]Mackay E. J. H., (1937-38), *Op .Cit.*, pl. CII, No. 6. Sathe and Atre (Sathe V.G. and Shubhangan Atre (1989), The Problem of Camel in the Indus Civilization, Bulletin of the *Deccan College Post – Graduate and Research Institute*, Vol. 47-48, pp. 301-06.
[95]Thomas, P. K. and others, (1996), *Op. Cit.*, pp. 297-321.
[96]Lal, B. B., (2005), *The Homeland of the Aryans: Evidence of Rigvedic Flora and Fauna & Archaeology*, p. 32.
[97]Possehl, G. L., (1999), *Op. Cit.*, pp. 195-96.

Elephant *(Elephas maximus)*:

There are two species, the African elephant (*Loxodont africans*) and the Asian elephant (*Elephas maximus*), and Asian elephant too called Indian elephant. In view of the unsuitability of the elephant as a domesticated animal, one might ask why man bothered to tame and train it at all. There are two answers. Firstly, the elephant can move heavier loads, secondly, it was discovered that elephants could be formidable in battle as super-heavy cavalry.

The earliest evidence of elephants in captivity comes from the Indian subcontinent; later documentation is common throughout south and Southeast Asia. The elephant remains reported from the Greater Indus region are of ceramic of Period-I at Mehrgarh[98]. During the Harappan period elephant was very much a part of the domestic animal of Harappan people. It is found in fauna and also in art form. A number of good evidences are found of ivory work on an extensive scale during the Harappan Age.

Elephant bone remains have been found at Mohenjodaro[99], Harappa[100], Lothal[101], Surkotada from Period IC[102], Chanhudaro[103] and Kalibangan[104]. One massive rib from Rajdi has been identified as possibly that of an elephant[105] (table 4.3).

There are also figurines of elephant in terracotta from several sites; one from Mohenjodaro[106], a beautiful terracotta figurine from Harappa[107] and

[98] Meadow, R. H., (1984), *Op. Cit.*, p. 35.
[99]Sewell, R. B. S. and B. S. Guha, (1931), *Op. Cit*., p. 653.
[100]Nath, B., (1959), Remains of the horse and Indian elephant from the prehistoric site at Harappa, *Proceeding of the First All-India Congress of Zoologists*, Pt. 2, Scientific Papers: 14.
[101]Nath, B., G.V.S. Rao, (1985), *Op. Cit.*, p. 641.
[102]Sharma, A. K., (1990), *Op. Cit.*, p. 380.
[103]Mackay, E. J. H., (1943), *Op. Cit.*, p. 14.
[104]IAR (1964-65), p. 38.
[105]Stack-Kane, V., (1989), *Op. Cit.*, p. 183.
[106]Mackay, E. J. H., (1937-38), *Op. Cit.*, plate LXXIX, No. 13.
[107]Vats, M. S., (1940), *Op. Cit.*, p. 330.

another from Chanhudaro[108]. Mahadevan has identified 55 stamp seals with an elephant motif[109]. A copper bronze figurine with pedestal is reported from Daimabad belong to Late Harappan period (Pl. 3.47). A truly magnificent hollow terracotta elephant was found at Nausharo III (Mature Harappan). This is a part of a three-headed composite[110].

Ivory, which probably came mainly from the elephant, was extensively used by the Harappans. At most of these sites, have also been found, objects made of ivory such as combs, mirror-handles, hair-pins, antimony rods, etc. In fact, at some of the sites, for example Lothal and Mohenjodaro, there is evidence of ivory-working[111]. The Harappan people used elephants for riding and carrying heavy loads.

Cat (*Felis domesticus*):

The exact origin of domestication of Cat (*Felis domesticus*) is unknown but there is reason to think that the process occurred during the rise and flourishing of civilization in the Fertile Crescent of the Middle East. More specifically, it would be related to the early days of agriculture which ushered in settled farming and stock keeping. This implied houses, granaries and barns. A new environment was created which was quickly exploited by the house mouse, as judged by the masses of skeleton recovered from the basement of dwellings in Middle East archaeological sites[112].

It is possible that cats were kept by the Harappans; but there are not many signs to show that the Harappans had domestic house cats. The only two sites have indicated that Harappans kept this animal. Stack-Kane have identified cat

[108]Mackay, E. J. H., (1943), *Op. Cit.*, p. 155-61.
[109]Mahadevan, I. (1997), *Op. Cit.*, p. 793.
[110]Jarrige, C., (1992), Unetere d'elephant en terre cuite de Nausharo (Pakistan), *Art Asiatique*, 47, pp132-36.
[111]Lal, B. B., (2005), *Op. Cit.*, pp. 45-46.
[112]Robinson, R. (1984), Cat, Ian L. Mason (ed.), *Op. Cit.*, p. 217-225.

bones from Rojdi[113] and another examples are from Harappa[114]. This short discussion of dog and cats of the Indus age would be incomplete without mention of the foot imprints that Mackay found on a brick from Chanhudaro[115].

Fowl (*Gallus gallus*):

The earliest conclusive evidence of domestic fowl from Harappan culture dates from 2500 B.C. Domestic fowl or chickens are known and kept throughout the world. They are the most widely utilized of all poultry species. The modern domesticated chicken is descendent of the Indian Red Jungle Fowl.

Domestic fowl bones have been found on many Harappan sites, including two cities of Mohenjodaro[116] and Harappa[117] (the town of Rupar[118] and Kalibangan[119] in the east, and Lothal[120], Rojdi[121] and Surkotada[122] (all three in the west). Rojdi evidence come in the form of one very well preserved leg bone with a magnificent spur.

A few terracotta figurines of fowl have been found. Mackay have found terracotta figurines and suggests that a hen with the feeding container in front of it could be evidence of domestication, or at least the keeping of tamed fowl (Plate)[123]. The Indus script includes bird logographs. Mackay has claimed that one of the seal has two cocks in a fighting attitude which might indicate that this

[113]Stack-Kane, V., (1989), *Op. Cit.*, p. 183.
[114]Prashad, B., (1936), *Op. Cit.*, pp. 7-8 & 16-17.
[115]Mackay, E. J. H., (1943) *Op. Cit.*, p.222.
[116]Sewell, R. B. S. and Guha, B. S., (1931), *Op. Cit.*, p. 662.
[117]Prashad, B., (1936), *Op. Cit.*, p. 15.
[118]Nath, B., (1968), Animal Remain from Rupar and Bara site, Ambala District, East Punjab, *IMB*, 31(1-2), pp. 69-115.
[119]*IAR* (1964-65), p. 38.
[120]Nath, B. and S. Rao, (1985), *Op. Cit.*, p. 639-40.
[121]Stack-Kane, V., (1989) *Op. Cit.*, p. 183.
[122]Sharma, A. K., (1990) *Op. Cit.*, p. 380.
[123]Mackay, E. J. H., (1937-38), *Op. Cit.*, Pl. LXXX, No. 20, p. 296.

was a sport of the Indus people. It may be that he is referring to a place where bird signs are doubled[124] but a "fighting attitude" on this seal is not seen.

Fowl was another domesticated species for Harappan economy. It may be used for meat and its eggs are used as food.

In the following table a birds' eye view of the whole range of animal species found at different site in India sub continent is given in order to have a complete picture their prevalence for absence.

Table 4.3 Domestic animals found from various Harappan sites.

Sites	Domestic Animals											
	Dog	Goat	Sheep	Cattle	Pig	Buffalo	Horse	Ass	Camel	Elephant	Cat	Fowl
Mehragrah III-VII	P	P	P	P	P	D						
Pirak	P	P	P	P	P	D	P		P			
Balakot	D	P	P	P	D	P						
Kile Gul Mohammad	P	P	P	P	P							
Mohenjodaro	P		P	P	P	P			P	P		P
Harappa	P	P	P	P	P	P	P	P	D	P	P	P
Chanhudaro		P	P	P	P						P	
Jalilpur		P	P	P		P						
Kot Diji		P		P	P							
Rehman Dheri		P	P	P						P		P
Gumla				P								
Amri		P	P	P	P							
Bhagwanpura	P	P	P	P		P			P			

[124]Marshall, Sir John, (1931), *Op. Cit.*, Pl. CXI, No. 338.

Rupar	P	P	P	P	P	P			P	P		
Bara		P	P	P	P		P	P				
Kalibangan	P	P	P	P	P	P	P	P	P	P	P	P
Bhirrana	P	P	P	P	P	P	D					
Farmana		P	D	P	P			P				
Tarkhanewala-Dera		P	P	P								
Rakhigarhi		P	P	P	P	P						
Lothal	P	P	P	P	P	P	P	P		P	P	
Surkotada	P	P	P	P	P		P	P	P	P		
Rangpur	P	P	P	P	P	P		P				
Shikarpur	P	P	P	P	P	P	P					
Kuntasi	P	P	P	P	P	P	P	P	D			P
Khanpur		P	P	P	P	P						
Padri		P	P	P	P	P		P				
Kanmer	P	P	P	P	P	P	P	P		P		
Rojdi	P	P	P	P	P	P			D	D		P
Nagheswar	P	P	P	P	P	P						
OriyoTimbo		P	P	P	P	P						
Dholavira		P	P	P	D	P	D	D			P	
Malvan	P		P	P			P					
Babarkot	P	P	P	P	P	P						
Alamgirpur	P	P	P	P	P	P					P	
Hulas		P	P	P								

Note: P=Present, D=Doubtful

Table: 4.4 The percentage of domestic animal bone remains in Hrappan period

Species	Percentage
Cattle	**40-60**
Sheep	**8-16**
Goat	**7-15**
Pig	**4-10**
Buffalo	**9-17**
Dog	**0.40-0.45**
Fowl	**1-1.5**
Horse	**0.02-0.04**
Ass	**0.05-0.07**
Elephant	**0.12-0.20**
Camel	**0.03-0.04**
Cat	**0.20-0.30**

The Animal bones and other mineralized tissues are hardy and are usually found in good quantity in archaeological excavations. Some of these bones dates to tens of thousands years ago. With all the ways that animals have touched human life on earth, it is easy to say that durable remnants of ancient animals provide us with one of the best ways of looking at how humans adapted to their environment and with one another.

The archaeozoological studies have established that more than 80 per cent of the faunal assemblage of both early and late Harappan phases are comprised of bones of domesticated animals. Cattle bones were most numerous constituting more than 77 per cent of the assemblage. This evidence shows the predominance of cattle in the early Harappan phase. Further, analysis of bones and teeth shows that domesticated animals were killed at different stages. Most of the cattle and buffaloes lived up to the age of their maturity, suggesting thereby that the cattle and buffaloes were valued for their secondary products and their use for draught purposes. Sheep and goats were killed at relatively

younger age, suggesting that they were primarily reared for meat and the meat of young animals was relished more by the inhabitants of the region.

Towards the end of mature Harappan phase, there appears an increase in the exploitation of wild animals which *inter alia* suggests decline in numbers of domesticated animals. This decline, probably, was due to failure of rains that might have resulted in famine or a combination of other factors. Archaeozoological research also throws light on the relationship between humans and animals and the consequences of these interactions for both humans and their environment such as animal bone remains recovered from butchery throws light on cooking activity and food habits of the people; paintings illustrate the hunting strategies; hoof impressions offer evidence of herd migration. More recently DNA analysis of animal bone, lipid analysis of dairy or fat residues in vessels, and stable isotope studies of human and animal diet have expanded this repertoire.

Archaeozoological studies of Harappan civilization have further revealed that a significant amount of animal proteins was obtained from domestic animals such as cattle, buffalo, sheep, goats and pig. The second group of important animals was the sheep and goats which have been identified from all the Harappan sites, though it is difficult to distinguish between the bones of sheep and goats because of their close morphological similarities. As such, the present study highlights the importance of tracing ancient animal exploitation patterns from the Early to the Mature Harappan period,

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