
Investigating Faunal Evidence from Vadnagar: Some Preliminary Observations

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Abstract: *The excavations at Vadnagar have uncovered a substantial quantity of faunal remains from various cultural contexts, which were analysed at the Archaeozoology Laboratory of Deccan College, Pune. While the final report on this study is still forthcoming, preliminary findings offer valuable insights into the animal-based subsistence strategies of the site's past inhabitants across different cultural periods. This paper presents an overview of these key observations, highlighting the evolving relationship between the community and their use of animal resources, thereby contributing to a deeper understanding of the subsistence strategies at Vadnagar.*

Keywords: Faunal Remains, Archaeozoology, Human-Animal Interactions, Cultural Periods, Domestication, Hunting Practices, Secondary Products

Introduction

The site of Vadnagar is situated in the Mehsana district of Gujarat. Throughout its long history, Vadnagar has been known by various names, reflecting its rich cultural and historical legacy. These names include Anartapura, Anandapur, Chamatkarpur, Skandpur, and Nagaraka, indicating its significance and evolving identity over time. Recent excavations at the site have revealed evidence of seven distinct cultural periods, each representing a unique phase in the long history of Vadnagar. These periods are chronologically classified as follows: Period I, known as the Pre-rampart period, marks the earliest phase of occupation at the site; Period II, the Rampart period, reflects the construction and use of defensive structures (rampart); Period III, the Kshatrapa period, corresponds to the time when the region was under the rule of the Western Kshatrapas; Period IV, the Post-Kshatrapa period, represents the era following the decline of Kshatrapa influence, contemporary to Maitraka of Vallabhi and later on Chavda; Period V, the Solanki period, aligns with the rule of the Solanki dynasty, which brought

significant cultural and architectural advancements to the region; Period VI, the Sultanate-Mughal period, captures the time when the site was under the control of the Sultanate and Mughal Empire; and finally, Period VII, the Gaekwad period, marks the phase associated with the rule of the Gaekwads in the recent past. These excavations have provided a comprehensive stratigraphic record, offering valuable insights into the continuous and evolving occupation of Vadnagar over several centuries.



Figure 1: Cattle femur: Unfused proximal end

The excavations also yielded a substantial quantity of faunal remains, recovered from all the cultural contexts represented at the site. These remains were meticulously collected during the course of excavation and subsequently transported to the Archaeozoology Laboratory at Deccan College, Pune, for a comprehensive scientific analysis. The study of these faunal remains has now been completed, and the preparation of a detailed report is currently in its final stages. While the final publication of this extensive report may take some time, the preliminary findings offer significant insights into the animal-based subsistence strategies employed across the various cultural periods identified at the site.

These findings contribute valuable information regarding the economic practices, dietary preferences, and overall subsistence patterns of the site's past inhabitants.



Figure 2: Cattle femur: Distal portion



Figure 3: A pair of cattle calcaneum bones



Figure 4: Centrotarsals of cattle



Figure 5: Distal portions of humerus of sheep/goat

The present paper seeks to provide a preliminary overview of these important observations. By focusing on some of the key aspects, this paper aims to shed light on the evolving relationship between the site's inhabitants and their use of animal resources across different cultural periods. In doing so, it contributes to a broader understanding of the role that faunal exploitation played in the subsistence strategies of the communities that once thrived at Vadnagar. Notably, the observations of the earlier periods presented in this paper align with findings published in a previous study that focused on the faunal remains from the formative stage of the settlement at Vadnagar (Goyal et al. 2017). This consistency in the data shows the continuity and significance of animal resource utilisation in the early phases of Vadnagar's development, offering a comparative framework for understanding the broader trajectory of subsistence practices at the site.

Evolution of Animal-Based Subsistence Strategies Across Cultural Periods at Vadnagar

The following sections provide a detailed analysis of the faunal assemblages from Vadnagar across different cultural periods. Each period reflects distinct patterns in

animal management, subsistence strategies, and the role of domestic and wild species in the community's economy, offering insights into the evolving relationship between the inhabitants and their environment.



Figure 6: Radius of a dog



Figure 7: Maxillary teeth of horse

Period I (The Pre-rampart Period)

This pre-rampart period marks the earliest phase of occupation at the site, offering a vital reference point for comparing data from later periods. During this initial phase, the main domestic animals were cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*) and goat (*Capra hircus*). A look into the age estimations of these animals reveal that sheep and goats were primarily raised for meat, while some cattle and buffalo were allowed to live to an advanced age, likely to exploit secondary products such as milk, hides, or labour. This indicates that, from the outset of occupation at Vadnagar, secondary products from cattle and buffalo played a role in the subsistence economy. However, the overall age distribution of cattle, buffalo, and sheep/goat suggests that meat production was the main focus in animal husbandry, with secondary products playing a less significant role in the subsistence economy during this phase. The presence of nearly all skeletal elements of these animals strongly suggests that some residents were raising these animals within the site itself. This comprehensive representation of skeletal remains indicates that livestock management and animal husbandry were integral to the community's daily life.

In addition to domestic animals, the assemblage from this period also includes remains of antelopes, deer, turtles/tortoises, and birds. However, the relatively limited presence of the skeletal elements of these species suggests that these animals did not play a significant role in the animal-based subsistence activities of the community. These wild

species were likely supplemental resources rather than central to the diet or economic practices of the site's inhabitants.



Figure 8: Distal portion of a radius of a horse



Figure 9: Astragalus of a camel



Figure 10: Skeletal elements of birds

Period II (The Rampart Period)

Period II marks a substantial shift in the site's animal-based subsistence practices. Domestic animals utilised during this phase included cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*), and dog (*Canis familiaris*), indicating continuity with the earlier period but with significant changes in management and exploitation. The presence of a large number of adult cattle and buffalo during this time period suggests an increase in the exploitation of secondary products such as milk, labour and possibly hides. Several skeletal elements of both cattle and buffalo display stress marks indicative of their involvement in traction-related activities. This increase in the usage of secondary items reflects a more diverse and intense subsistence economy, as the community adapted to the increased demands of a potentially expanding population or more complicated social structure. The presence of some adult sheep and goats suggests that these animals might have also been used for secondary products. However, the scale of this practice appears to be more limited compared to cattle and buffalo, perhaps reflecting different roles or importance assigned to these smaller animals within the economy. The archaeological evidence, in the form of almost complete representations of skeletal elements of these domestic animals, indicates that certain occupants were involved in livestock breeding and management at the site (Figures 1-5). No evidence of human activity in the form of butchering or charring marks have been noted on dog bones (Figure 6).

As in the previous period, remains of wild animals were also present during this time. However, their contribution to the community's subsistence efforts remained minimal, as observed in Period I. The low number of bones from wild species such as antelopes, deer, turtles/tortoises, and birds suggest that these animals were likely supplemental to the diet rather than central to it, possibly hunted opportunistically.

Period III (The Kshatrapa Period)

During the third period of occupation, Kshatrapa period, at the site, all domestic animals present in the previous two periods continued to be utilised. Notably, this period also marks the introduction of three new species into the assemblage, including the domestic pig (*Sus domesticus*), horse (*Equus caballus*), and camel (*Camelus* sp.) (Figures 7-9). The role of cattle, buffalo, sheep, and goat remained consistent with their roles in the earlier periods, focusing on both primary and secondary products. While nearly all skeletal elements were represented for cattle, buffalo, sheep, and goats, this was not the case for the other domestic animals.

The introduction of horses and camels likely revolutionized transportation during this period. Horses, with their extraordinary speed and stamina, were perfect for transporting people and things across large distances. Their capacity to go swiftly and cover large regions would have made them invaluable for overland transportation. While horses were unquestionably significant, camels may have had an even greater impact because of their outstanding capacity to transport huge loads and tolerance to arid surroundings. Camels can sustain their carrying capacity over long distances in arid

circumstances while relying on meagre supplies like brush and thorn trees (Bulliet 1990). These qualities made camels invaluable for long-distance trade and communication throughout the region. Given these developments, the economic significance of secondary products from domestic animals may have become increasingly important during this period, reflecting a more complex and interconnected subsistence and economic strategy.

In addition to the domestic animals previously mentioned, the faunal assemblage from this period includes a substantial number of skeletal elements of wild mammals. The highest diversity of wild species is seen in this period, indicating a broad spectrum of hunting practices. The most commonly hunted wild mammals include the nilgai (*Boselaphus tragocamelus*), sambar (*Cervus unicolor*), spotted deer (*Axis axis*), blackbuck (*Antilope cervicapra*), chinkara (*Gazella bennetti*), four-horned antelope (*Tetracerus quadricornis*), wild boar (*Sus scrofa*), Indian hare (*Lepus negricollis*), and porcupine (*Hystrix indica*). This diversity reflects a varied hunting strategy that targeted both large and small game. Additionally, the diet of the inhabitants extended beyond mammals to include a range of avian species (Figure 10), reptiles, fishes, and molluscs. The exploitation of these diverse resources suggests a well-rounded subsistence strategy that incorporated various dietary components, showcasing the adaptability and resourcefulness of the community during this period.

Another notable finding from this period is the recovery of several modified astragalus bones from medium-sized mammals. These modifications suggest that the bones were used in some form of gaming activity, indicating a cultural or recreational dimension to their use.

Period IV (The Post Kshatrapa Period)

During this period, the faunal assemblage revealed the evidence of following domestic mammals: cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus domesticus*), horse (*Equus caballus*), camel (*Camelus* sp.), dog (*Canis familiaris*), and cat (*Felis catus*). Age profiles of domestic animals from this period are comparable to those found earlier, indicating that the practices surrounding their management and use for secondary products have not substantially changed. Horses and camels likely continued to serve similar functions as observed during the Kshatrapa period, suggesting continuity in their roles related to transport and possibly trade. Overall, the methods of domestic animal husbandry at the site appear to have remained largely consistent with those practiced in the Kshatrapa period. Despite shifts in social organization, the supply and management of domestic animals seem to have been stable, reflecting an enduring continuity in their economic and practical roles within the community.

This period also revealed evidence of a diverse array of wild mammals, including blackbuck (*Antilope cervicapra*), chinkara (*Gazella bennetti*), Indian hare (*Lepus negricollis*), porcupine (*Hystrix indica*), and various other rodent species. In addition, remains of birds

and reptiles were identified. Although these wild animals contributed to the fauna of the site, their role in the subsistence activities was marginal. The primary focus of the community's subsistence strategies remained on domestic animals and other key resources, with wild species serving a supplementary role rather than being central to the diet or economy.

Period V (The Solanki Period)

The subsequent period, Solanki period, continued to reflect a similar reliance on domestic animals, including cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus domesticus*), horse (*Equus caballus*), and dog (*Canis familiaris*). However, there was a noticeable shift in the economic significance of these animals. Sheep, in particular, became more prominent compared to goats, likely due to the exploitation of their wool, which contributed to their higher abundance in the faunal assemblage.

The period also saw the continued presence of a diverse range of wild species. Among the most frequently hunted wild animals were nilgai (*Boselaphus tragocamelus*), blackbuck (*Antelope cervicapra*), chinkara (*Gazella bennetti*), four-horned antelope (*Tetracerus quadricornis*), sambar (*Cervus unicolor*), spotted deer (*Axis axis*), barking deer (*Muntiacus muntjak*), wild boar (*Sus scrofa*), Indian hare (*Lepus negricollis*), and porcupine (*Hystrix indica*). These species reflect a broad hunting strategy targeting various types of game. Additionally, the community exploited a variety of other resources, including birds, reptiles, fish, and molluscs, for their dietary needs. However, despite this diversity in wild animal resources, the role of wild species in subsistence activities remained marginal, consistent with earlier periods. The primary focus of subsistence continued to be on domestic animals and their secondary products, highlighting the community's sustained emphasis on these key resources while utilizing wild species to supplement their diet.

Period VI (The Sultanate-Mughal Period)

During this period, the domestic animal landscape remained relatively consistent, with cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus domesticus*), horse (*Equus caballus*) and dog (*Canis familiaris*) being prominent species. A notable trend emerged during this time, as the consumption of cattle and buffalo meat experienced a significant uptick. This could have been related to shifts in dietary preferences, economic factors or even to cultural changes. At the same time, the secondary products derived from these animals, such as milk, power, hides and dung, continued to hold substantial value, indicating their multifaceted role in the society. The patterns observed in the utilisation of other domestic animals during this period generally aligned with those documented in the preceding periods, indicating continuity in animal husbandry practices. Although wild mammalian species like the blackbuck (*Antelope cervicapra*) and spotted deer (*Axis axis*) were present in the faunal assemblage of this period, their numbers were relatively sparse. Additionally, a significant number of avian skeletal elements were recorded. However, skeletal remains of other non-

mammalian groups, including reptiles, fish, and molluscs, were entirely absent during this period.

Period VII (The Gaekwad Period)

In this last cultural period, faunal data reveal a notable decline in the quantity of animal bones recovered from the site, indicating a reduced reliance on animal resources compared to earlier periods. The assemblage predominantly comprises domestic animals such as cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus domesticus*), and dog (*Canis familiaris*), with evidence of the exploitation of secondary products from cattle and buffalo, indicating their continued economic importance. Although wild mammals remained part of the faunal record, their representation diminished markedly, suggesting a shift in subsistence strategies or environmental conditions that may have impacted hunting practices or availability of wild resources. This reduction in wild mammal remains, coupled with the sustained emphasis on domestic species, reflects a period of increased reliance on controlled and predictable sources of animal products.

Discussion and Conclusion

The archaeozoological data at Vadnagar reveals a dynamic evolution of animal-use strategies, transitioning from a more subsistence-oriented approach to a more intensive and diversified system. While the overall quantity of animal bones excavated decreases chronologically, the diversity of taxa represented increases, particularly from the Kshatrapa period onwards. This suggests a shift towards a broader spectrum of animal exploitation, including birds, reptiles, fish, and molluscs, alongside a continued reliance on major domestic animals.

Beginning from the Solanki period, there are multiple instances of drought (Pokharia et al. 2024). However, despite these conditions, a significant number of water buffalo bones have been found. Water buffaloes require substantial amounts of water to soak their skin. Buffaloes primarily engage in this behavior to thermoregulate, as their limited sweat glands make it challenging to dissipate heat through perspiration (Hafez 2000). This suggests that water was abundantly available near the site. This evidence is crucial as it indicates that the inhabitants recognized the importance of water and made adequate arrangements to ensure a continuous supply around the site. The presence of water buffalo, even during periods of drought, indicates the site's abundant water resources and the inhabitants' awareness of their importance.

The ratio of cattle to buffalo and goat to sheep fluctuated across different occupational phases, with cattle initially more prevalent and buffaloes becoming dominant in later periods. The exploitation of secondary animal products, such as dairy and traction animals, likely impacted various aspects of the local economy, including agriculture, craft production, trade, and social differentiation. Access to and control over these resources would have been crucial factors in shaping social hierarchies and economic standing within the community.

Dogs and cats were primarily kept for companionship and potential symbolic purposes, with no clear evidence of their use in food processing. These animals likely played roles in protecting domestic animals and settlements from predators and rodents, respectively.

Although wild animals were hunted, their contribution to subsistence was relatively minor. Mutton consistently dominated the meat diet, while other wild game, such as antelopes, deer, wild boar, hare, birds, and reptiles, played a supplementary role.

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