Stone Tool Tradition at Musa Khel, Mianwali, Northern Punjab: A Preliminary Assessment

ARSLAN BUTT, GHANI UR RAHMAN AND ASHRAF KHAN

Abstract

The region of Kaachi-Mianwali, located in the Cis-Indus Zone of the Greater Indus Valley, holds great significance for understanding the cultural development of the Indus Civilization during the third millennium BC. However, despite its importance, archaeological inquiries in this area have been lacking. One site that has been largely unattended is Musa Khel. In May-2017, the Taxila Institute of Asian Civilizations (TIAC) conducted a preliminary survey at the site and documented the presence of a versatile material culture. This is significant as it sheds light on the cultural developments of the Indus Civilization during the third millennium BC. Specifically, this article proposes the presence of a well-established Stone Tool Tradition at Musa Khel and its cultural relation to other adjacent sites. The Stone Tool Tradition is an important aspect of the material culture of the Indus Civilization, and its presence at Musa Khel suggests that the site was an important center of production for stone tools. Furthermore, the cultural relation of Musa Khel with other adjacent sites can provide insights into the social and economic interactions between different communities during the third millennium BC.

Key words: Kaachi, Musa Khel, Indus Tradition, Salt Range, River Indus, Stone Tool Tradition, Chert Blades

Introduction

Musa Khel site is situated in Mianwali, the Cis-Indus district of northern Punjab, formerly known as *Kacchi* due to its location on the bank of River Indus[1] which is one of the largest rivers in Asia and plays a vital role in Pakistan's economy. The district has a significant geographical importance due to its location lying at the western edge of the Punjab province and is bordered by Khyber Pakhtunkhwa to the north and west, Attock district to the east, and Bhakkar district to the south. Additionally, the district lies on the edge of the Thal Desert, which covers a vast area of Northern Punjab and is an important source of groundwater for the region. The district's location has also made it an important transit point for goods traveling between Punjab and Khyber Pakhtunkhwa. Overall, the geographical location of District Mianwali has made it an important hub for trade and commerce in the region.

Additionally, this area falls in the north-western edge of the Greater Indus Valley and bounded with the regions having enriched natural resources and archaeological remains, particularly belonging to different Eras of Indus Tradition[2]. The resourceful Salt Range also surrounds this district towards north and north-east in the immediate vicinity. The important surrounded archaeological regions include Gomal and Bannu Basins on Trans-Indus

[1] District Census Report Mianwali 1961:3.

[2] The term "Indus Tradition" describes all human adaptations that led to the blending of many communities throughout the larger Indus Valley and surrounding areas (Kenoyer 2008 b:2). There are eras and phases in it. The Early Food Producing Era, which spans from 7000 to 5500 BCE, had a food-based economy but lacked ceramics. Artefact styles, like ceramics, cluster in time and space (without set limits) throughout the Regionalization Era (5500 to 2600 BCE) and are linked by regional interaction networks. Material culture of the Integration Era (2600 to 1900 BCE) has significant broad homogeneity, showing intense social interaction. General similarities between artefact styles from the Localization Era (1900 to 1300 BCE) and those from the Regionalization Era suggest that interaction networks were still present albeit in a different form. There are periods within each era, which are predominantly represented through pottery. The smallest analytical unit, a phase is restricted to a locale, a region, and a brief period. Communication channels known as interaction systems can transcend generations and cultural boundaries. Broad distributions of cultural characteristics over a short period of time reflect them (Kenoyer 1991a :34).

towards west and south-west; Sakesar Valley and Pothohar Plateau on Trans-Salt Range towards north and north-east, Sindh Sagar Doab towards south while the core of Punjab plains towards south-east (Fig.1).

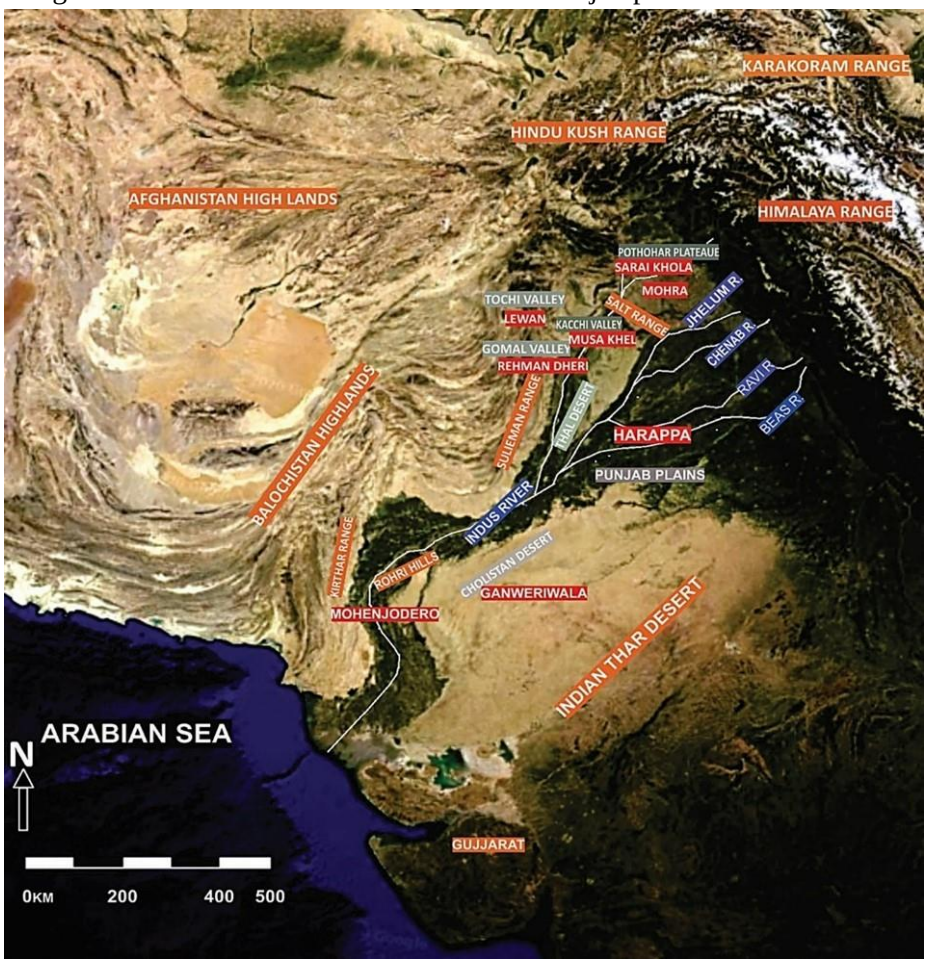

Fig. 1: Map shows Greater Indus Valley and Prominent Sites of Indus Tradition (Butt 2020).

Previous archaeological endeavors at Musa Khel were mainly confined to its discovery and surface observations (Dani 1971; Salim 1988). Moreover, Musa Khel site and the surrounding geological deposits have been studied partly to trace the provenience of minerals and rocks found at different levels of Harappa (Law 2005; Law 2008). The later study has highlighted the socio-economic significance of Musa Khel and the Salt Range in the Greater Indus Valley during the Indus Tradition.

The potential of Musa Khel was yet to be exploited. Therefore, a team from Taxila Institute of Asian Civilizations, Quaid-i-Azam University surveyed the site in May-2017. The site was found to be suffering badly from human vandalism (Fig.2-3) and abundant antiquities were found scattered with the disturbed context. As a result, a variety of material culture was recovered and studied in detail as a part doctoral dissertation (Butt 2022). Among the stone crafts, stone tools occupy the prominent position and present paper is aimed at providing a preliminary study of the examination of stone tool Industry at Musa Khel. The main purpose of the present study is to highlight the types of microliths, their production and cultural context. To propose the presence of well-established stone tool tradition at Musa Khel, diagnostic and versatile specimens besides debitage have been selected for present study from the collection, which have been conducted at different identified physical areas of Musa Khel, especially from the exposed portions. These microliths have been classified according to their morphology and subsequent functional treatment in the case of blades. Moreover,

an evaluation regarding their disturbed context is proposed based on their sporadic distribution at the site and comparison with contemporaneous sites of adjacent areas.

Fig. 2: A general view Musa Khel main mound from west side (After Butt 2022).

Fig. 3: Signs of human vandalism at northern half of Musa Khel main mound (Butt 2022).

1 Stone Tool Tradition at Musa Khel

The archaeological site of Musa Khel has been a treasure trove of various crafts, with chert microliths being the most prominent one among them. Microliths have been found in various parts of the site, with a significant concentration in Area-3 (Fig.4). The collection includes a variety of chert blades, cores, flakes, and nodules; a glimpse of them can be seen in Figures 5,8,10-11 respectively.

Fig. 4: Aerial map shows different areas of Musa Khel site (Butt 2022).

1.1 Chert Blades

The chert blades recovered from Musa Khel exhibit a range of shapes and sizes. Most of the blades are short (Fig.5, nos. 8-16), parallel-sided (Fig.5 nos. 15-16), and thin, although there are a few examples of longer (Fig.5, nos. 2), thicker (Fig.5, no. 3; Fig.6, no.3), and asymmetrical blades. The sides of most of the blades are concave although some have straight sides. Additionally, a few blades are found with pebble cortex on their vertical sides from butt to distal end (Fig.5, nos. 10,12), indicating the use of unmodified pebbles in their manufacture. Most of the blades at Musa Khel are broken at the butt end (Fig.5, nos.8-9), but the remaining preserved specimens show faceted and plain type butts. The butt and distal sides of the blades exhibit a variety of sections, including trapezoidal, rectangular, square, triangular, and pointed (Fig.5, nos. 1-4).

Fig. 5: Variety of blades from different areas of Musa Khel site (Butt 2022).

Manufacturing Technique

Some of the chert blades were found intact with striking platforms, indicating the use of flint knapping[3] techniques to remove the flakes from the core. Further the parallel sided blades were manufactured by "crested-ridge guiding" technique[4] followed by a variety of direct and indirect retouch treatments[5].

Most chert blades at the Musa Khel site have undergone fine retouching, with broad-fine retouching, notching, and simple retouching also present (Fig.7). Direct retouching on the dorsal surface is the most common form of retouching observed on the blades, while only one specimen was found with indirect retouching on its ventral surface. Additionally, some specimens show alternate retouching on both surfaces, while others were found without any retouching at all. Most of the blades have been retouched on both sides, while a few are only retouched on one side.

Typology

Based on retouch, the chert blade collection may be classified in to the following types (Fig.6): -

Type-I: Fine retouched.

Type-II: Broad-fine retouched.

Type-III: Notched and broad-fine retouched.

[3] Flintknapping involves the controlled removal of flakes from a prepared core.

[4] In the production of blades during the 2nd and 3rd millennium BC in South Asia, this technique involved preparing the core by creating a longitudinal crested ridge. This ridge aided in the removal of parallel-sided blades (Sankalia 1982; See also Halim 1972:4).

[5] Retouching is the process of modifying or refining the edges of a stone tool after it has been knapped.

Type-IV: Simple Blades.

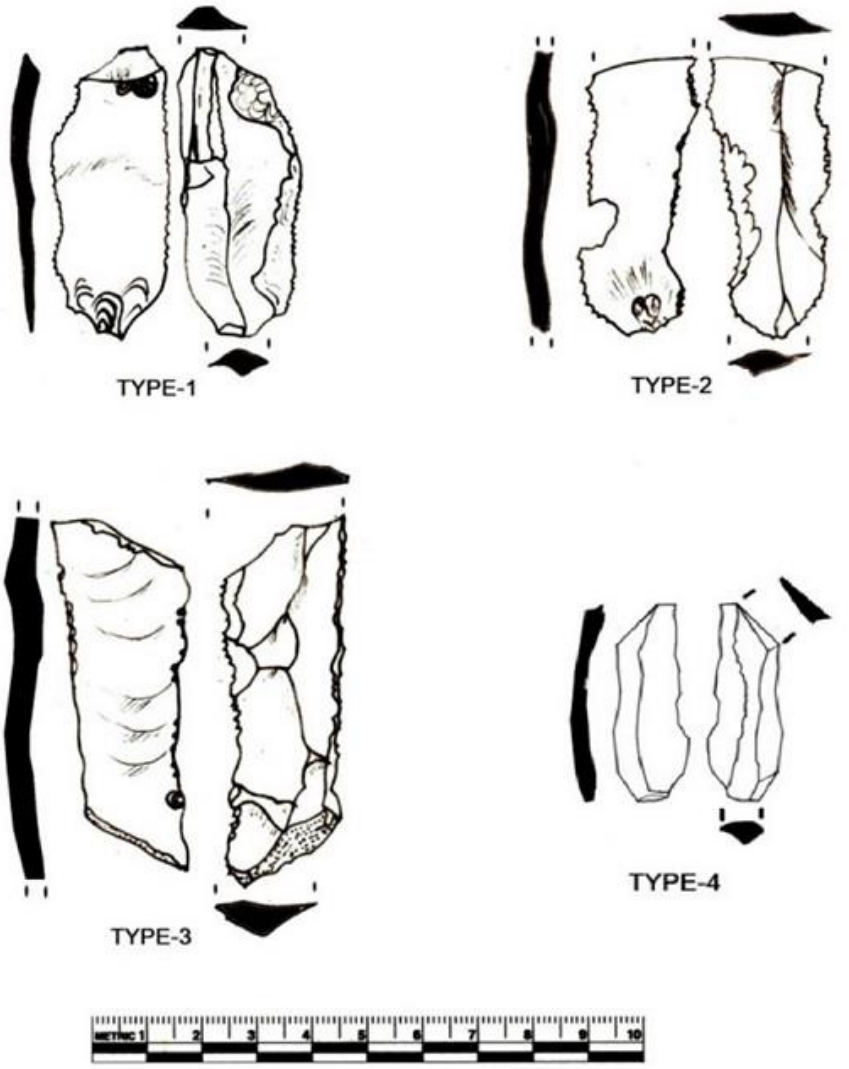

Fig. 6: Types of blades on the bases of retouch treatment (Butt 2022).

Table 1. Size & Measurements of Blade Types

Sr.#	Type	Length Range	Width Range	Thickness Range
1	Fine Retouched	13.18 mm to 52.40 mm	7.31mm to 22.15 mm	2.09.
2	Broad-Fine Retouched	25.03 mm to 65.99 mm	11.21 mm-23.50 mm	3.68mm-6.47mm.
3	Notched	49.99 mm	22.3mm	5.57 mm
4	Simple	24.80 mm to 32.89 mm	8.92 mm to 11.98 mm	2.61 mm to 4.10.

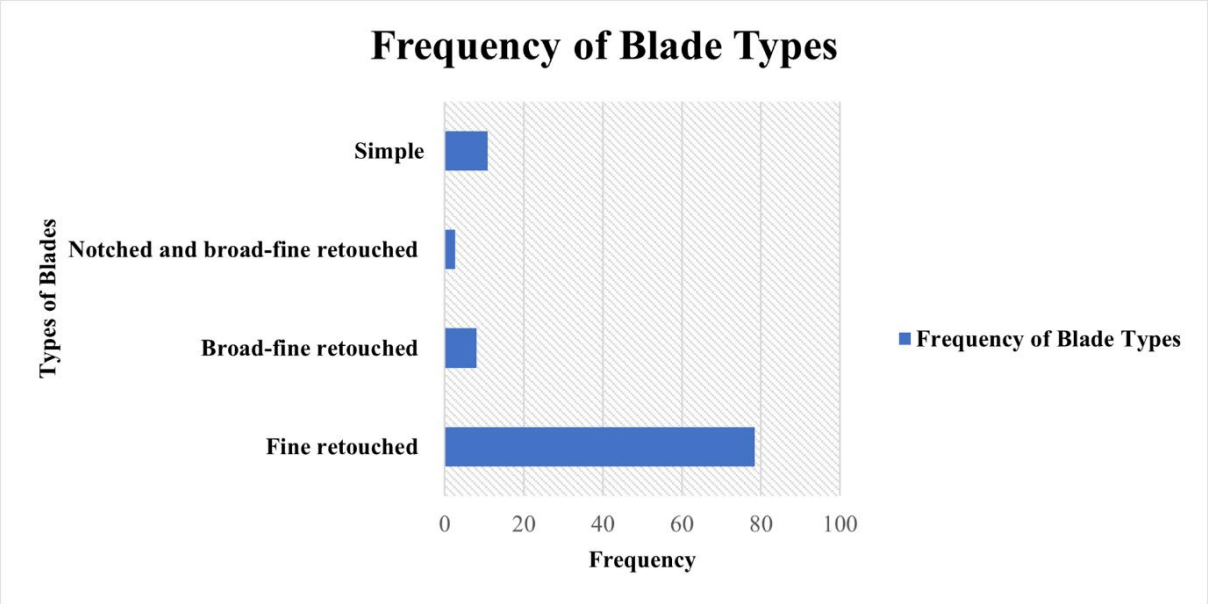

Fig. 7: Graph showing the frequency chert blade type based on retouch application.

1.2 Chert Cores

A small number of cores were also collected from Musa Khel, mainly recovered from the northwestern area of the main mound (Fig.8). This area already has provided a maximum number of blades followed by south-eastern slope, agricultural field, northern and southwestern area of main mound.

Typology

Three types of cores have been identified in the current sample of core collection such as parallel sided blade core (Fig.8, nos.1-8), trimming blade core (Fig.8, no.9) and flake core (Fig.8, no.10). Most of the cores are comprised of small blade cores (Fig.9) found with intact pebble cortex on butt ends (Fig.8, nos. 3,7-8), few also have on their distal end as well (Fig.8, no.2). Likewise, chert blades, dark gray is the dominant chert variety with brown color hue, and very few specimens having tan-gray chert.

Type-I: Blade Cores

Blade cores have symmetrical shapes, regular negative scars of thin blades, comprised of small nodules. These blade cores have been found with preserved butt end as well as distal end (Fig.8, nos.1-8).

Type-II: Trimming Blade Cores (Fig.8, no.9)

One of core shows vertical scars, slightly irregular in form and found intact with pebble cortex at both ends, designated as trimming blade core.

Type-III: Flake Cores/Asymmetrical Cores

Flake cores are characterized by asymmetrical shape, nodules type, bigger in size, with irregular scars and roughened edges (Fig.8, no.10).

Fig. 8: Variety of cores collected from the Musa Khel site (Butt 2022).

Table 2. Size & Measurements of Core Types

Sr.#	Type	Length Range	Width Range
1	Flake Cores	32.88-45.90 mm	29.40-33.55mm
2	Blade Cores	15.76-30.11 mm	15.76-30.11mm
3	Trimming Blade Cores	33.76 mm	1.80 mm

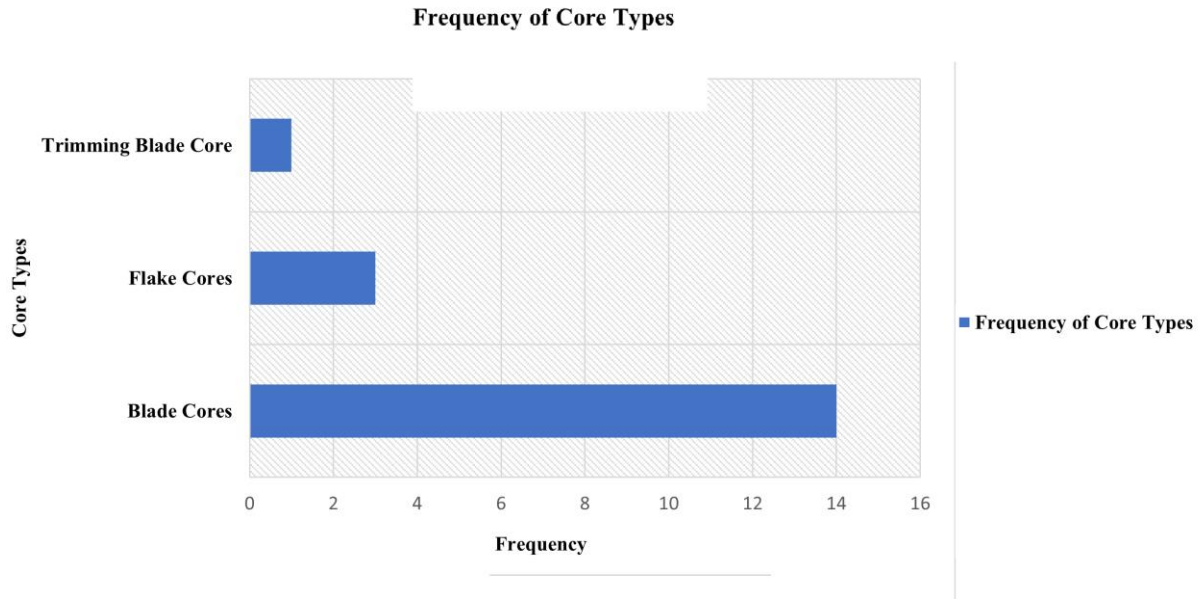

Fig. 9:Graph showing the frequency core types.

1.3 Chert Flakes & Nodules

A suitable quantity of chert flakes was collected from different areas of Musa Khel; most of them recovered from the northwestern area of main mound followed by top of the main mound, northern and south-western slope areas (Fig.4). Most of the flakes are primary in nature i.e., found intact with pebble cortex on butt end to vertical side (Fig.10, nos.1-6). A few specimens are comprised of secondary flakes i.e., without intact pebble cortex (Fig.10, nos. 7-8). Very few flakes have been found treated with retouch application (Fig.10, no.4). Most of flakes are asymmetrical in shape (Fig.10, no.7-8); few are straight sided (Fig.10, nos.3-4).

A small number of chert nodules were also collected from different areas including the top, northern slope, and north-western section of the main mound. These nodules have intact pebble cortex but are found in fragmented and chipped form (Fig.11).

Fig. 10: A variety of chert flakes recovered from the surface of Musa Khel site (After Butt 2022).

Fig. 11: Fragments of small and black and dark grey chert nodules from Musa Khel site (Butt 2022).

2 Variety of Raw Material

The stone used for producing microliths is limited to chert and has been found in variety. Dark gray is the dominant chert variety with brown color hue, and very few specimens have tan-gray color. The blades have been found in various shades of black, white, light pink, light to dark gray, and light to dark brown, with the dark grey variety being the most used (Fig.5). While the use of the white and pinkish-white chert varieties is relatively rare in blades and negligible in other microliths. Most of the nodules comprised of gray chert variety, with only a few being of the tan-brown variety (Fig.11). Chert flakes were also found to be limited to dark gray chert variety while tan-gray variety is rare in chert flakes (Fig.10).

3 Production & Provenience

The presence of chert flakes, cores and nodules in variety described above at the site (Figures. 6-8) shows that chert stone in the form nodules was brought to the Musa Khel and manufactured locally at the site (Law & Bakri 2003; Law 2005; Butt 2022). Most of the chert flakes are asymmetrical, dark grey colored and primary in nature, found intact with pebble cortex without retouch treatment shows that they have been flaked off at the site. Moreover, the presence of cores with regular negative scars of thin blades suggests that the blades were manufactured locally. The fragmentation and chipping of the nodules also strengthens that they were being worked on to create tools or other objects.

The Salt Range, lying at the north and northeast of Musa Khel (Fig.1), in its immediate vicinity, has a variety of chert stone i.e., black (dark grey), chocolate brown, light grey, purple-hued chert (Law & Bakri 2001:34). Instrumental Neutron Activation Analysis of black-brown chert stone varieties of Salt Range and the one recovered from Musa Khel have confirmed its provenience (Law 2008:712-716).

4 Cultural Context

Similar microliths have been found at nearest sites, including Sarai Khola Period I (Halim 1972: Fig. 1, nos.1-5,p.5), Period II as shown in Fig.12 (Halim 1972: Fig. 1, nos.5-14, p.5) and Mohra (Butt 2017: Fig.8, no. 30, p.32) in the Trans Salt Range zone; Gumla Period II (Dani 1971: Fig. 10, p.96), Period III (Dani 1971: Pl.53) and Period IV (Dani 1971:Pl.53, no.13; Pl.54-55) and Rehman Dheri Period I-III(Samad & Jan 2016:86) in the Gomal Valley. The Lak Largai (Khan et al 1991: Fig. 22, no.8-9; Fig. 23, no.13-14,16-20, pp.30-31) and Tarakai Ghundai sites in the Bannu Basin (Khan et al 1991: Fig. 26, no.13-16, p.34) also show evidence of Musa Khel-type microliths. Evidence of Musa Khel-type microliths also reported from Nari site which is located to the east of Musa Khel and across the Salt Range (Dar 2003: Fig. 18, no. 2-7, pp.25-26).

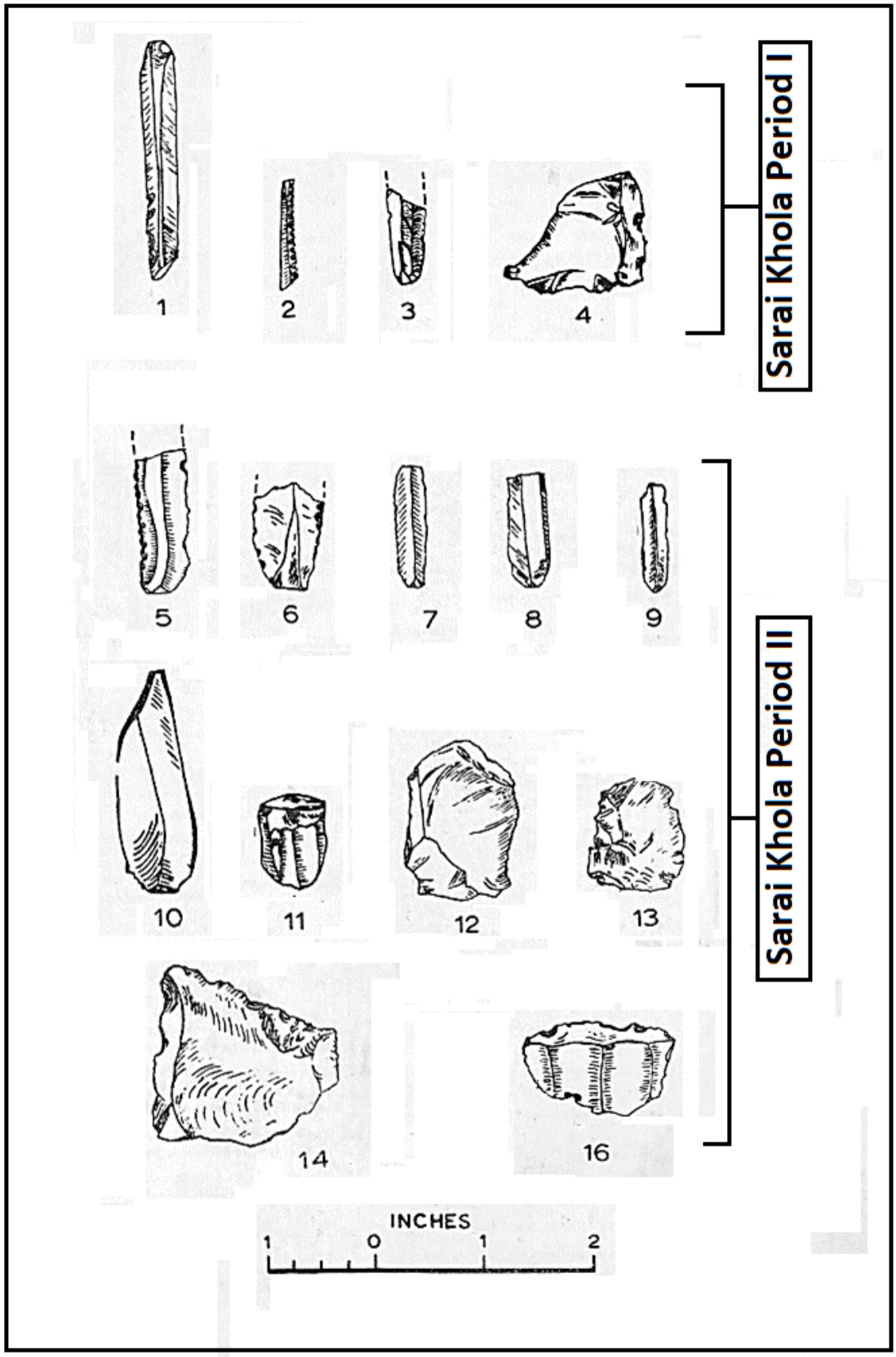

Fig. 12: Chert Microlith from Sarai Khola for comparison (After Halim 1972:5).

Conclusion

The Musa Khel archaeological finds revealed a highly developed tradition of stone tool production in the region. Chert blades, cores, flakes, and nodules were found at the site, indicating that the Musa Khel people were not only skilled but also knowledgeable about the processes used to produce stone tools. They were highly skilled, as evidenced by their command of knapping methods and the variety of chert materials they had at their disposal.

Due to its durability and availability, chert stone was carefully selected as the preferred material for blade production. Musa Khel's fine-grained chert is perfect for making thin, sharp blades that are highly practical for a variety of tasks. The Musa Khel people's inventive approach to tool making can be seen in their willingness to experiment with various chert types to produce the best blades.

The site's profusion of locally mined chert flakes, cores, and nodules suggests that the Musa Khel people had a thorough understanding of their regional resources and were highly skilled in making use of them for stone tool production.

The sizes and shapes of the stone tools found at the site show that they were uniquely created to meet the cutting, slicing, and piercing needs of the Musa Khel people. As further evidence of a sophisticated understanding of stone tool production, the presence of a wide range of stone tools at the site suggests the use of manufacturing techniques beyond just microliths.

Comparative analysis shows that the Musa Khel chert microliths have been found clearly related to two distinct phases, the Early Harappan-Kot Diji phase and Harappan phase of Indus Tradition, which spanned from approximately 3200-1900 BCE. Kot Diji phase is well-represented in the Musa Khel stone tool collection. The presence of pre-Kot Diji and Late Kot Diji phase elements has also been attested based on comparative study, which needs further investigation. Microliths from this stone tool industry have been found at sites across the Greater Indus Valley, indicating that they were widely distributed.

The striking similarities between the Greater Indus Valley's other sites and the Musa Khel people's stone tool industry highlight how actively involved they were in the region's larger cultural network. The technological prowess and cultural norms exposed by the Musa Khel stone tool tradition offer priceless insights into the highly developed knowledge and abilities of Indus Valley communities, illuminating their sophisticated and avant-garde approach to stone tool production.

References

Butt, A. 2018. Mohra: A Newly Discovered Kot Diji Phase Site in Northern Punjab. Journal of Asian Civilizations 41(1):21-46.

Butt, A. 2020. Explorations at Mohra in Trans-salt Range Zone, Northern Punjab, Pakistan: The Evolution of Early Harappan Phase. -Ancient Asia 11:1-12.

Butt, A. 2022. Musa Khel and the Indus Tradition of the Northern Punjab, unpublished Ph.D. dissertation, Taxila Institute of Asian Civilizations, Quaid-i-Azam University.

Dani, A.H. 1971. Explorations in Gomal Valley. -Ancient Pakistan 6:1-177.

Dar, S.R. 2003. Nari: The First Early Indus Valley Site Discovered between the Salt Range and the River Jhelum. -Journal of Asian Civilizations 26 (2):1-65.

District Census Report Mianwali. 1961. Population Census of Pakistan, Census Organization, Pakistan.

Halim, M. A. 1972. Excavation at Sarai-Khola. -Pakistan Archaeology 8:1-112.

Kenoyer, J.M. 1991a. The Indus Valley Tradition of Pakistan and Western India. -Journal of World Prehistory 5(4):331-385.

Khan, Farid, et al. 1991. Explorations and Excavations in Bannu District, North-West Frontier Province, Pakistan, 1985-1988. -British Museum Occasional Papers 80, The British Museum, London.

Law, R.W. 2008. Inter-Regional Interaction and Urbanism in the Ancient Indus Valley: A Geologic Provenience Study of Harappa's Rock and Mineral Assemblage (A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Wisconsin-Madison).

Law, R.W. 2005. Regional Interaction in the Prehistoric Indus Valley: Initial Results of Rock and Mineral Sourcing Studies at Harappa. -South Asian Archaeology 1:179-190.

Law, R.W., S.R.H. Baqri. 2003. Black Chert Source Identified at Nammal Gorge, Salt Range. -Ancient Pakistan 14: 34-37.

Sankalia, H.D. 1982. Stone Age Tools: their techniques, names and probable functions. Building Centenary and Silver Jubilee Series:1. Deccan College Postgraduate and Research institute, Poona.

Salim, M. 1992. Archaeological Explorations in Punjab and N.W.F.P., Northern Pakistan. -Journal of Central Asia 25(1):34-73.

Samad, Abdul, Z.U. Jan. 2016. Archaeological Excavations at Rehman Dheri in the Gomal Plain 2015. -Frontier Archaeology 8:1-96.