

Chapter 5

RESULTS/DISCUSSIONS

Lithic assemblages belonging to five sites situated in Gujarat have been selected for a detailed analysis in this study. In this final part of the thesis main results of the analysis conducted on lithic assemblages of these five sites will be compared to know about the tool preference- typological choices, technological choices, reflection of the nature of site in its lithic assemblage (economical choices) and continuation/discontinuation of traditions.

The five sites which have been selected for this research comprise of a long time span and cultural differences. The dates from these sites, more or less, follow a chronological order. Thus the data collected from these sites will help us to distinguishing between hunter-gatherer communities (Mesolithic period at Loteshwar and Pithad) and agro-pastoral settlements (the Anarta Chalcolithic period at Loteshwar). The study has also helped in comparing the technological innovations during the Early Harappan and Pre-Prabhas (Datrana) period with that of the Urban Harappan sites involved in craft production (Bagasra) as well as inter-regional trade and exchange (Shikarpur). This is followed by a comparative study of the lithic assemblage from the Sorath Harappan context (Pithad/Jaidak) with the Harappan and other Chalcolithic period assemblages.

Table 5.1 gives a quick look at the total lithic assemblage belonging to these five sites. Detailed reviews of the lithic assemblages have already been conducted site by site (Chapter 3). Lithic assemblage belonging to the site of Bagasra (Gola Dhoru) was analyzed by the researcher for her master's dissertation. Lithic assemblage data from Bagasra has been incorporated here to better understand the lithic assemblages belonging to different types of Chalcolithic (Harappan) settlements situated in Gujarat. This section deals with the major comparable aspects of the lithic assemblages which can help us to achieve afore mentioned objectives.

Mackay in 1938 had said that, 'no arrowheads nor weapons of flint have as yet been found, and though this has been termed a Chalcolithic owing to the presence of these long

flint flakes, copper and bronze already practically entirely ousted stone'. This statement appears to be an exaggeration where the author has considered stone tools to be weapons. Mesolithic/Chalcolithic lithic tools, however, were utilized for an array of different functions and most probably formed part of day-to-day life of people.

Lithic assemblage	Loteswar		Pithad/Jaidak no timbo		Datrana	Bagasra	Shikarpur	Total
	Mesolithic	Chalcolithic	Mesolithic	Chalcolithic	Chalcolithic			
Various blades	403	973	410	63	10325	869	736	13723
Geometric tools	62	138	6	15	63	127	3	413
Non-geometric tools	14	42	204	86	180	137	30	638
Lithic debitage	920	2592	3833	1379	77235	4850	4460	95099
Total	1399	3745	4453	1543	87803	5983	5229	109873

Table 5.1: Representation of lithic assemblage at selected sites

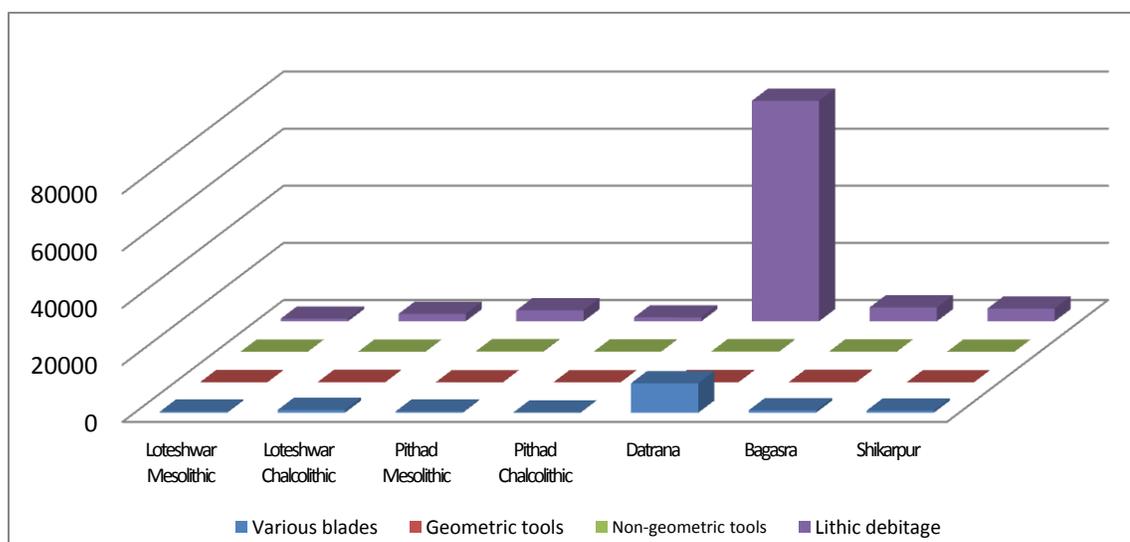


Figure 5.1: Graphic representation of lithic assemblages belonging to the five selected sites

The discussion section will begin with Mesolithic period dated to 7000 BCE at Loteshwar which is one of the earliest sites for Mesolithic cultural development in western India (Patel 2008). The Mesolithic period is followed by the Chalcolithic period at the site which has been dated between 3790calBC-2500BCE (Ajithprasad and Sonwane 2011). This clearly shows a very long continuation of habitation at one place. As can be expected such a long continuation also shows cultural development/changes. Thus a Mesolithic way of life comprising microlithic tools, palette stone and bones of wild animals, specially black bucks (Patel 2009) suggesting a hunting and gathering economy changed over time to a Chalcolithic way of life where in addition to above mentioned artefacts, pottery known as Anarta, semiprecious stone (including lapis lazuli) and steatite beads, shell bangles, copper bangle, spindle whorl as well as clay lumps with reed impressions suggesting wattle and daub structures or pottery kiln (Ajithprasad et al 2009) were found. The animals which were exploited during this period include, other than the wild ones, domesticated animals and it was found that domestication of cattle was in vogue at the site from the beginning of fourth millennium BC (Patel 2009). All these artefacts suggest beginning of settled way of life and a changing economy at the site.

One would think that this change in the economy which resulted in so many material changes should be reflected in the lithic assemblage also. However what we find appears to be totally the opposite. There is hardly any change in the lithic assemblage associated with both the cultural periods. Of course, the numbers of artefacts found during Chalcolithic period are significantly higher than the number of artefacts which are found from the Mesolithic period. Following are the minor differences which were observed between the periods: Blade-flakes were abundant during Mesolithic period. Retouching (irregular retouches/notches, does not imply backing) of simple blades was carried out more during Mesolithic period. The Mesolithic period geometric assemblage showed more lunates. Chalcolithic period, on the other hand, has shown a preponderance of simple blades. It was further observed that majority of the blades were utilized during Chalcolithic period. The Chalcolithic period showed an increase of triangles and trapezes amongst the geometric tool category. Chalcolithic period also showed an increase of non-

geometric tools, especially of scrapers. The predominance of blade flakes and retouched blades during Mesolithic period and the increase in geometric and non-geometric tools during the Chalcolithic period are interesting. Both the periods have a preponderance of blade cores but was seen that at the Mesolithic level flake cores have a higher presence. The technique of blade removal during both the Mesolithic and Chalcolithic periods was the Quartering technique which is reflected in the blade cores found from the site (Allchin 1966, Ajithprasad 1992). The most striking feature is the absence of any metrological and morphological difference between cores belonging to two different cultural periods from where they are found. There appears to be only one type of technology involved in the production of microliths throughout almost four thousand years. This observation leads to the conclusion that there is a continuity of tool making tradition between the Mesolithic and Chalcolithic levels at Loteswar. If this conclusion is true it raises many questions. Why were there more retouched blades during Mesolithic period? Why were blades of Chalcolithic period thinner and narrower than the blades of Mesolithic period? It is apparent that the people were no strangers to secondary retouching then why do we see a minority of these artefacts during chalcolithic period? Can this be related to a changing economy from hunting and gathering to agriculture? Or does it have something to do with knapper's skill or the demand for more standardized products? Generally geometric tools are associated with Mesolithic period and hunting-gathering economy thus their increase during the Chalcolithic period is surprising. Most of the blades were used during Chalcolithic period. Here it should be kept in mind that Chalcolithic artefacts also include artefacts from pits and pits are expected to have objects which are discarded after use. But by separating the materials from pits and layers 1 & 2 it was found that most of the tools (78.06%) during Chalcolithic period come from layer 2. All the three pits together make only about 18% of the assemblage during Chalcolithic period. Thus this high level of utilization of blades during Chalcolithic period needs further study.

As can be seen from table (5.1), the amount of lithic debitage found from Loteswar is much less than from other sites, specially the Chalcolithic/Urban Harappan sites. Was this low percentage of lithic debitage due to technological choices (quartering versus

crested ridge technique) or other reasons? Since a raw material source near the site has not been identified till now, it is possible that the raw material was precious and people wanted to make full use of whatever was available to them.

The other Mesolithic period lithic assemblage analyzed in this research comes from the site of Pithad. This period has not been dated firmly but tentatively it belongs to earlier than the third millennium BC. The lithic assemblage from this site varies a lot from the lithic assemblage belonging to the Mesolithic period at Loteshwar. Unlike the Mesolithic period at Loteshwar Mesolithic period at Pithad has more non-geometric tools, especially varieties of scrapers. Very few geometric tools were found from the excavations. The number of blades found is much less than that of Mesolithic period of Loteshwar (table 5.1). This discrepancy in numbers becomes more prominent due to the fact that three trenches were excavated at Pithad against a single trench excavation at Loteshwar. Simple blades dominate the blade assemblage of the Mesolithic period at Pithad and almost 40% of the blades were found to have been blanks. The site has yielded a lot more lithic debitage too. This is puzzling since the method employed for blade manufacturing at Pithad was slash-flake method of blade manufacturing technique (Ajithprasad 1992) which is quite similar to the quartering technique. Another distinct feature of Mesolithic period of Pithad is the high number of cores found from the lithic assemblage. 105 blade cores while 25 flake cores were classified from the site against 46 blade cores and 8 flake cores from the Mesolithic period of Loteshwar. Could this preponderance of blade cores be due to this distinct type of blade manufacturing technique? Experiments are required to solve this question.

In chronological order the Early Harappan lithic assemblage is provided by the site of Datrana. Datrana is a very interesting site in terms of its lithic assemblage. The site has yielded thousands of different variety of blades as well as geometric and non-geometric tools, along with an enormous amount of debris, earning the honour of being one of the oldest blade factory sites. The site has been dated to 3300 BCE by radiocarbon determination (Ajithprasad 2011). The site has also given evidence of employing crested guiding ridge technique for the first time in the region of Gujarat. Datrana has produced Early Harappan ceramic assemblage along with the Pre-Prabhas and a few sherds of

Anarta potteries. The other noteworthy finds include the abundance of a particular type of core, defined by Cleland (1977) as a flat blade core (found from Amri, an Early Harappan site) belonging to a distinct technological tradition, which now is known as the quartering technique; a fine copper/bronze punch point which must have been used in stone knapping; Rohri chert blades and proto blade-cores (cores where crested ridges have been prepared but were not flaked further). The presence of above mentioned ceramic assemblage as well as the other distinct artefacts suggests a cultural interaction with the Indus valley going back to the beginning of the third millennium BCE. It also points to the cultural processes responsible for the development and spread of early village farming communities in North Gujarat.

As mentioned earlier Datrana has produces thousands of finished blades. One would imagine that this should be the case at a factory site. The problem which arises here is that a very high percentages of these blades show utilization though at the same time this site does have a higher percentage of blade blanks than the other sites. It should be pointed out that prehistoric/protohistoric factory sites should not be confused with modern factories where only the processing and finished goods are seen. These sites were also habitational areas for the people. The habitational evidence are to be found in terms of thousands of animal bones, most of which show breakage most probably to get to the marrow inside as well as the grinding stones which have given evidence of grinding of grains for food (Garcia-Granero, J.J. personal communication). Even after considering above mentioned points it simply does not make sense to have 65% (6685) of blades utilized at the site. It should be kept in mind here that the numbers under consideration come from an excavation of 5x5m trench. The site itself is not very large, about 3 hectares. It is logical to ask what these utilized blades are doing at the site? Did the people have some particular use for the blades at the site itself which has produced such high number of utilized blades? It's not as if the site did not have other type of tools. The geometric-non-geometric tools recovered from the site correspond with the same category of tools from other sites. Thus the people of Datrana did have other tools to be utilized. It was further observed that the intact blades did not show a very high percentage in the used category. The broken blades were the blades which showed high percentages

of utilization, which makes complete sense. Now the question which asserts itself again is about the presence of these utilized blades. At this point it is difficult to offer a convincing explanation for the presence of these utilized blades which are found in thousands. Further studies focusing on experimental replication and use-wear techniques are required for successfully addressing this issue.

As has been mentioned earlier Dadrana is one of the earliest sites from Gujarat to provide evidence for the utilization of crested guiding ridge blade technique. Hundreds of blades as well as cores show crested ridges running along their longer axis. It is accepted that crested ridge technique was the preferred technique to manufacture blades in the 2nd and 3rd millenniums BC in South Asia (Sankalia 1982). Subbaro (1955) has noted that the most significant feature of this industry is its association with the Chalcolithic cultures beginning with the Indus Valley Civilization. This technique includes preparation of the core by making a longitudinal crested ridge. 786 or 8.8% (of the total blades) crested ridge blades have been found from layer 2 at Dadrana. 286 blade cores have also been recovered from the same layer. These cores are interesting as some of them show the presence of one or two, very rarely even three, retained crested ridges. These ridges are found to lie diagonally across the core, on the extreme right or left, both sides of the core or at the back of the core. However at the same time quartering technique which is generally seen during Mesolithic seems to have been still employed at the site. Cleland (1977) discussed about a particular type of blade core from Amri which he had defined as a flat blade core and thought that Amri participated in distinct technological tradition. He said that his impression is further reinforced by the presence of triangles at both Amri and Balakot, one of the other sites with a flat blade core. He also noted that Balakot's flat blade core is much smaller than Amri's and could only have produced micro-blades. Looking at the illustration provided by Cleland it appears that these cores were flaked only from one side, leaving the other side with cortex intact. Such cores were also encountered by Allchin (1966) during her study of lithic assemblages belonging to Central Indian "Late Stone Age" sites. She has described them as blade cores which are flaked on part of the surface and are with cortex remaining on one, two or three sides (*ibid*). Quartering technique (mainly practiced during the Mesolithic period in Gujarat)

has been found to provide such type of exhausted cores as the end product (Ajithprasad 1992). These types of cores have also been found from Datrana where they have been classified as wedge shaped cores (generally blades are removed only from one face). The presence of these cores along with the crested cores at Datrana gives evidence of two different tool traditions. As mentioned in chapter 2 Datrana has a microlithic/Mesolithic level preceding the Chalcolithic habitation. Quartering technique, as mentioned earlier, was prevalent during the microlithic/Mesolithic period in Gujarat. Thus this evidence suggests that most probably the inhabitants of Datrana adopted the new crested ridge technology by coming in touch with the Early Harappans of Sindh but at the same time continued their familiar technology as well.

One of the very interesting recoveries from Datrana was the discovery of three cores with more than one unutilized crested ridges during the surface survey. These cores show evidence of 3, and in one instance 4, crested ridges prepared on them while no further flaking was undertaken. This might be the first time that such cores have been encountered from a site; the only other known example coming from the original excavations of Mohenjodaro, now in the museum, reported by Cleland (1977). These cores indicate that each core may have utilized multiple initiation ridges. It has been hypothesized that providing multiple crested ridges on cores may have served to aide city-dwelling consumers who may have had less advanced blade production skills (Raczek 2007). Since it is easier to remove a blade from a prepared core than from an unworked nodule, preparing crested guided ridges before transport provided a service to consumers. That is cores reached cities in a “ready-made” state. This hypothesis, as yet untested, could be valid for big cities of Urban Harappan civilization where cores/blades were imported from Rohri hill quarries. However Datrana is a small rural Early Harappan site and thus this hypothesis does not seem to be applicable here. Multiple crest preparation on large parent nodules is a strategy to facilitate maximum utility of the nodule as it helps the knapper to utilize alternate ridges for successive blade removals even as one or more of the ridges become dysfunctional in the process of knapping. Experimental replications are necessary to validate this proposition.

The recovery of a fine copper/bronze punch point which must have been used in the stone

knapping is significant. It has been said that generally the blades are flaked by a sharp, straight, narrow-edged tool like a chisel, which acted as an intermediary, the blows being struck with a light hammer (Sankalia 1967). Presence of this copper/bronze punch is very important in this light. The hammer seems to have been made of wood, horns or small quartzite pebble. Several quartzite pebbles are found during excavation as well as surface exploration, showing bruised, rough surfaces on one or both the longitudinal ends giving evidence that most probably these pebbles were utilized as hammers.

The crested guiding ridge technique was practiced throughout the duration of the Chalcolithic occupation of the site. The crested ridge does not occur in the purely microlithic industry which according to latest evidence, precedes the Chalcolithic in several parts of India, although fluted cores and parallel sided flakes are found in this industry (Ajithprasad 2002).

The other interesting evidence is found amongst the Rohri chert blades recovered from Datrana. Hardly any lithic debitage of this particular raw material has been found during the excavation, affirming the conclusion that they were imported and not made locally at the site. A total of 20 blades have been found from the site. Only one was found to be intact, all the others are in broken condition. The mean length of these broken blades was found to be 16.29mm, mean breadth 10.38mm and mean thickness 2.66mm. These blades are much longer, broader and thicker than the blades made out of other raw materials. As mentioned earlier the site has yielded evidence of Early Harappan potteries showing affinities with sites situated in Sindh in association with the lithic assemblages which would suggest early cultural contact between the two regions during the Early Harappan times (Ajithprasad 2011). Lithic data from the Early Harappan phase from sites of Amri, Kot Diji and Balakot was accessible for a comparative study. A metric comparison of lithic tools from these sites shows striking contrast with the tools of Datrana.

Blades from Amri, Kot Diji and Balakot are clearly much larger, broader and thicker than the blades of Datrana (figure 5.2). As noted earlier, Rohri chert blades were unquestionably imported from Sindh, it has also been observed that during the Urban Harappan period breaking Rohri chert blades into pieces for optimizing their use was

common. The same appears to be the case at Datrana where more economical use of a rare commodity in a far off place from its origin would be one of the reasons for their fragmentation.

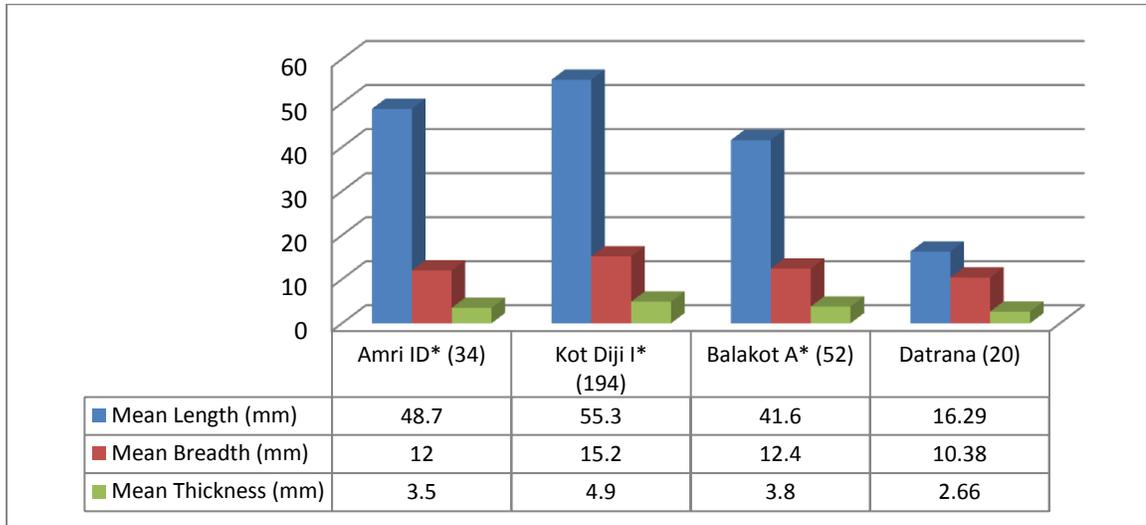


Figure 5.2: Metric comparison of Rohri chert blades from different Early Harappan sites (* data from Cleland 1977)

The Rohri chert blades found from Urban Harappan sites in this research are represented by the sites of Bagasra and Shikarpur. Bagasra has produced 164 Rohri chert blade fragments which make 18.85% of the blade assemblage found from the site. While Shikarpur has produced 655 blades which constitute 89% of the total blade assemblage found from the site. The archaeological importance of the Rohri hill and other quarries situated in Sindh, Pakistan and their association with the Indus Civilization have been pointed out by several scholars (Allchin 1979, Shaikh & Biagi 1997, Biagi 2007:3, Law 2008). Scholars have also emphatically pointed out that long distance trade and standardized products are characteristic of the economic production scheme of the Harappan civilization (Inizan & Lechevallier 1997). The wide distribution of standardized Rohri blades is often regarded as an index of the Harappan efficiency in long distance trade and craft production.

The Rohri chert blades recovered from Bagasra and Shikarpur were clearly manufactured in the quarries situated in the Sindh region. This is seen in the lack of lithic debitage of the same raw material from the sites as well as in the fact that these blades follow a

standardized pattern of measurement and were clearly broken for optimal use. Table 5.3 shows how they follow the standardized pattern and following is an analysis which will make it apparent that these blades which are found way away from their manufacturing areas were so precious to the people that they were broken into segments to optimize their use.

Inizan and Lechvallier (1997) have proposed that if there is great similarity in the average width of blades (12-14mm) at sites, such widths in parallel edged blades suggest a certain length also. By looking at the ratio of number of mesial to proximal fragments, they have reconstructed blades and have suggested reconstructions for the fractured blades. The ratios of mesial:proximal fragments are interesting. It of course varies between various sites but it can also be seen that the fragments are more in number in sites which are situated further away from the raw material quarries. The ratio was found to be 2.93:1 for Dholavira, 1.95:1 for Banawali, 2.31:1 for Bagasra, 2.08:1 for Shikarpur while 1.4:1 for Mohenjo-daro and 1.1:1 for other Indus valley sites. By following the reconstruction of blades done by Inizan and Lechvallier (1997) it was clearly seen that the lengths of blades do not vary much between sites situated in Indus valley or sites situated outside Indus Valley. The reconstructed length for blade from Banawali comes to be about 14cm [1 proximal (4.6cm), 2 mesial (3.0cm) 1 distal (4.0cm)]; for Dholavira: 13.5cm [1 proximal (3cm), 3 mesial (2.5cm) 1 distal (3cm)]; for Bagasra: 12cm [1 proximal (3.46cm), 2 mesial (2.61cm) 1 distal (3.16cm)]; for Shikarpur 12cm [1 proximal (3.35cm), 2 mesial (2.56cm) 1 distal (3.12cm)]; for Mohenjo-Daro 13cm [1 proximal (4.83cm), 1 mesial (3.64cm) 1 distal (4.59cm)] and for other Indus valley sites 13.7cm [1 proximal (4.77cm), 1 mesial (4.16cm) 1 distal (4.77cm)].

One more fact supports this breaking of blades. Very few blades have been found intact from above mentioned sites. Datrana has a single intact blade which was found to have been not utilized; Bagasra has two intact blades which appear to have been utilized while Shikarpur has 20 intact blades out of which only 6 were found to bear evidences of edge damage and thus utilization. More significantly the single long intact blade (106mm in length) was left totally blank. On the other hand all the broken blades found from Datrana and Bagasra were heavily utilized. And except 4.5% the other broken blades found from

Table 5.3: Metric comparison of Rohri chert blades (all sizes are in mm)

	Dholavira ¹					Banawali ¹					Bagasra ²					Mohenjo-Daro ³			Indus Valley ³			Shikarpur					
	N	Mean	Max	Min	Sd	N	Mean	Max	Min	Sd	N	Mean	Max	Min	Sd	N	Mean	Sd	N	Mean	Sd	N	Mean	Max	Min	Sd	
Length																											
proximal	76	28.6	91	15	12	93	42.4	89	15	17.4	32	34.6	72.7	13.4	15.1	30	48.3	15	583	47.7	17	183	33.5	79.96	4.19	15.18	
mesial	223	25.3	51	13	7.5	182	29.2	67	8	9.5	74	26.1	57.7	9.4	10.9	42	36.4	11.7	642	41.6	15.9	382	25.62	75.45	7.11	11.92	
distal	33	29.5	78	17	13.8	40	37.6	77	13	15.3	43	31.6	70.3	10.9	12.8	23	45.9	10.3	261	47.7	17.2	70	31.18	77.72	9.22	13.71	
Width																											
proximal	76	11.6	18	6	2.7	93	13.3	23	6	11	32	12.4	21.8	7.5	2.9	30	13.5	3.5	583	13.5	4.1	182	10.96	24.74	3.42	3.64	
mesial	233	12.2	21	5	2.6	182	12.9	19	3.5	2.7	74	11.9	26.8	6.4	3.2	42	13.1	3	642	13	4.1	382	11.52	30.1	3.79	3.13	
distal	33	11.7	19	7	2.4	40	11	18	3.3	3.6	43	11.6	17.1	4.5	3	23	10.3	2.1	261	13.4	5	70	10.63	17.04	4.33	2.82	
Thickness																											
proximal	76	2.7	5	1	0.8	93	3.3	7	1	3.3	32	3.3	6.7	1.9	0.87	30	3.3	1.2	583	4.1	1.3	183	2.98	19.67	0.68	1.79	
mesial	233	2.8	5	1	0.7	182	3.1	5	1	1.3	74	2.9	6.8	1.4	0.9	42	3.2	0.9	642	3.7	1.2	382	3.03	13.11	0.09	1.25	
distal	33	2.5	4	1	0.9	40	3.9	4.5	1	0.9	43	3.2	6	1.5	1	23	3.6	1.7	261	4	1.7	70	2.86	12.64	1.06	1.46	

Data for Dholavira, Banawali, Bagasra, Mohenjo-daro and Indus valley sites has been taken from following sources:

¹ Inizan, M.L and M.A.Lechevallier, 1997. Transcultural Phenomena in the Chalcolithic and Bronze Age Lithics of the Old World: Raw Material Circulation and Production of Standardized Long Blades. The Example of the Indus Civilization. In B. Allchin and F. R. Allchin, (Eds.) *South Asian Archaeology 1995* (pp77-85).

² Gadekar, C.S. 2006. *A Preliminary Study of the Harappan Blade and Flake Industry of Bagasra*. Unpublished M.A. Dissertation. Department of Archaeology and Ancient History, The M.S.University of Baroda, Vadodara.

³ Kenoyer, J.M. 1984. Chipped Stone Tools from Mohenjo-daro. In *Frontiers of Indus Civilization*. Lal, B. B. and S.P. Gupta: 117-132.

Shikarpur showed heavy utilization as well. Some of the blade fragments show polish on both their edges which most probably was either due to utilization or hafting. It might also suggest that edges of these blades had been utilized alternately. If that indeed was the case, it supports the preciousness of raw material and the desire to make use of the blades as much as possible.

The discrepancy in the number of Rohri chert blades between the sites of Bagasra and Shikarpur is significant as it informs a great deal about the different natures of these contemporary sites. As has been mentioned earlier, Bagasra and Shikarpur are settlements which were geographically strategically positioned. Both are situated on opposite shores of narrow stretch of the Gulf of Kachchh and are approximately 25km apart as the crow flies. Both of them are small settlements but were involved in very different activities. Bagasra was a craft centre (Sonawane et al 2003), while it appears that Shikarpur was more involved in inter regional trade and exchange network and might even have worked as middle men. Shikarpur definitely had more access to Rohri chert blades and thus very few evidence are to be found of the manufacturing of blades out of locally available raw material which was the common trend in Bagasra. The Rohri blades are longer, broader and thicker than the blades made out of other raw materials and it is obvious that people would prefer such blades if they were easily available. A lot of other different artefacts (Chase et al 2014) found from Shikarpur, as well as the evidence of the Rohri chert blades, clearly shows that the people of Shikarpur had more contact/access to distant Indus cities. This distinction is very important since from afar it appears as if both the settlements are similar in nature. The variation most probably was due to the existence of multigenerational kin groups with varied economic interests, domestic practices and backgrounds (ibid).

The Chalcolithic period of Loteshwar has given evidence of it being a small agro-pastoral settlement which was occupied seasonally for a long period of time. During the later stages of this settlement there are even evidence of interaction with the Urban Harappan settlements in the form of a few Rohri chert blade fragments, lapis lazuli and steatite beads and shell bangle fragments with characteristic Harappan chevron motifs. It would be interesting to compare Loteshwar with important Urban Harappan settlements such as

Bagasra and Shikarpur to see the development of stone tools before and after the urbanization. By looking at the table (5.1) it can be seen that the Chalcolithic period at Loteshwar definitely had more lithic tools but less lithic debitage than Bagasra and Shikarpur. It should also be kept in mind that the lithic assemblage data from Loteshwar has been recovered from a single trench while the lithic assemblage data from Bagasra as well as Shikarpur has been recovered from more than 80 trenches. Thus the numbers show significant differences between the Urban Harappan sites compared to a small agropastoral settlement. As discussed in chapter 3 the technology followed at Loteshwar is mostly quartering technique for blade manufacturing while Shikarpur and Bagasra relied on crested ridge technique. The less amount of lithic debitage recovered from Loteshwar most probably suggests difference in the technology followed at these sites. Though it should be kept in mind that Bagasra and Shikarpur have given evidence of bead manufacturing as well. An effort was made to separate the lithic waste of blade manufacture and bead manufacture but it is a task difficult to achieve. The question which comes to mind is why were there so few tools in these Urban Harappan settlements? Were the stone tools being replaced by metal tools? Very few metal tools have been found from these sites though the re-use of copper has to be kept in mind here. The number of geometric tools is not significantly different between Bagasra and Loteshwar suggesting that these tools at least were important for the people at both the sites. Shikarpur has shown dearth of geometric and non-geometric tools but then most probably Rohri chert blades would have sufficed for any needs which arose. Since Bagasra was a craft centre it is possible that the stone tools were not essential for the people living there. However they must have been useful for some of their needs and thus their presence at the site is important.

Bagasra and Shikarpur have been excavated for a number of years and thus it would be useful to see a spatial distribution of lithic assemblage from these sites. Since the lithic assemblage from Bagasra was not re-analyzed for this study a quick look at the spatial distribution found at the site has been presented here first. As mentioned earlier Bagasra has been divided into four phases. Phase I at Bagasra shows the beginning of a small settlement without any fortification walls. Very few trenches have been excavated till this

phase. The lithic assemblage recovered from this phase is 5.63% of the total lithic assemblage. The lithic assemblage shows that the southern part of the settlement (trenches Eo3, Eo6 and Eo10) was the main centre of lithic activity during this phase. However a single trench (Ec1) in western side of the settlement (figure 5.3) has given evidence of being an important activity area from where except one tool only lithic debitage was recovered. Could it be possible that this area was a stone tool manufacturing place from where the tools were removed after they were made and thus only the lithic debitage remains?

Phase II at Bagasra is marked by building of a huge fortification in the northern part of the settlement (figure 5.3). Within the fortification area were situated the craft activity areas. This phase is the most prosperous phase at the site which is also reflected in the lithic assemblage associated with this phase. 57.96% of the total lithic assemblage belongs to this phase. Lithic tool manufacturing areas situated outside the fortification wall will be discussed at first since continuity from the earlier phase can be seen in these areas. The southern area which showed lithic activity during phase I now falls way outside the fortification wall. A few more trenches were excavated in this area and it appears that the lithic activities from phase I were carried forward to phase II. On the other hand the western area does show continuity of lithic activity but it appears that it was no longer an important lithic activity area. A few new lithic activity areas emerge during this phase. Trench Eh3, situated in the southern side, close to the fortification wall has yielded evidence of bead manufacturing and its surrounding trenches (Eh4, Ei1, Ei5) too show lithic concentrations but it appears that these were primarily evidence of bead making and not tool making. However a few exhausted cores found from these trenches indicate some amount of tool manufacturing as well. Another new activity area was found near the eastern side in trench Ep6/Ep7. From here evidence of tool production in the form of exhausted cores, flakes, chips and a few finished tools were recovered. Since this trench gives evidence of a very small amount production it has been hypothesized that most probably a small scale knapper was working from here or somebody was making tools for self-sufficiency.

Coming to the area situated inside the fortification. Trench Do7 is situated in the north-



Figure 5.3: Distribution of excavated trenches at Bagasra (courtesy: The Department of Archaeology and Ancient History, The M.S. University of Baroda, Vadodara)

eastern corner of the wall and given evidence of small scale tool production. More tools and less lithic debitage were recovered from this trench. 17 trenches situated near the western fortification wall have been taken together since a shell bangle manufacturing workshop was unearthed from here. Again more tools and less amount of lithic debitage were recovered from this area. So many tools suggest their usefulness in shell cutting activity for bangle manufacturing process. Kenoyer (1984) has suggested that blades might have been effective for incising shells before actually cutting them after some experimental studies. Was the same being followed in Bagasra? Experiments should be conducted to verify this for shell bangle manufacturing at Bagasra.

Almost all lithic tool activity areas have shown evidence of more tools and less lithic debitage (except the southern area outside the fortification), irrespective of their place inside or outside the fortification. Was this due to the skill that these people had acquired for knapping or some other reason?

Phase III is marked by economic setback of the settlement which is reflected in lithic activities. The numbers involved are less (28.41%) than the previous phase. Blades take a back seat during this phase and non-geometric tools are found to be more in number. The southern area (figure 5.3) continues to be important activity area for tool manufacture. First let's have a look at the trenches which are situated outside the fortification wall. Trench Eo13 is no longer the centre of activity while trench Eo2 becomes more popular during this phase. The area in the western side of the settlement had totally abandoned lithic tool manufacturing during this phase. Trench Eh3 situated near the southern fortification wall showed continuation of a very small scale lithic activity during this phase. The trenches in the south-eastern corner show a new activity area adjacent to the old one. Another new activity area was seen in the trench Ep8 (figure 5.3).

Inside the fortification trench Do7 continued to be an important work place during Phase III. New activities areas adjacent to this trench were discovered. These trenches give evidence of more tools, specially non-geometric tools than lithic debitage. Trenches situated near south-eastern corner show negligible lithic activity during this phase. Even the area from where shell bangle workshop was discovered during phase II no longer

shows major concentration of lithic activity during phase III. Small clusters of minor lithic activities were seen in trenches Eb13, Eb14, Eb15, Eg1, Eg2, Eg3 and Eb14/Eg2 (figure 5.3). Another cluster is formed by trenches Ea11, Ea12, Ea16 and Ea8/Eb5 (figure 5.3) in the western side of this area, a little away from the shell bangle workshop.

Phase IV is the terminal phase at the site. It is confined to the southern area of the site, outside the fortification. Only a few of the trenches which were excavated contain Phase IV as compared to Phase II and III. Lithic assemblage from this phase constitutes 8% of the total lithic assemblage recovered from the site. Trenches Eo2, Eo6 and Eo10 (figure 5.3) were the main centre of lithic activity during this phase. Trench Er13 shows some amount of lithic debitage and the adjacent trench Ew1 shows presence of tools. Trenches Ei11 and Ei15 also show less amount of lithic debitage compared to the tools. While trenches Eh5/Eh6 and Es3/Es4 show presence of lithic debitage but negligible presence of tools (figure 5.3).

An eastward shift in the lithic activity areas can be seen from the distribution of lithic assemblage recovered from the excavated trenches. It also appears that this small settlement had various lithic tool manufacturing areas but the southern side of the settlement was one place where evidence of tool manufacturing was found right from the first phase. It is also clear that though a few Rohri chert blades were imported at Bagasra majority of their stone tools were manufactured at the site itself. The distribution of lithic assemblage was found to be as following: 52.55% blades, 54.79% geometric and non-geometric tool and 34.67% lithic debitage was found from trenches located inside the fortification wall. 40.86% blades, 42.15% geometric and non-geometric tools and 56.89% lithic debitage were found from trenches located outside the fortification wall while 6.6% blades, 3.07% geometric and non-geometric tools and 8.44% lithic debitage were found from trenches located on the wall.

Shikarpur presents a very different picture than Bagasra. The people here were able to afford imported tools such as Rohri chert blades and thus evidence for the local manufacturing of lithic tools are very few. Most of the lithic debitage recovered from the site appears to be debris of the bead manufacturing activity and not blade manufacturing

activity. Looking at the distribution of the lithic assemblage it becomes very clear that most of the activity was occurring inside the fortification. 87.35% tools and 79.98% lithic debitage are recovered from trenches which are located inside the fortification. 9.05% tools and 15.72% lithic debitage was found from trenches located outside the fortification. 3.6% tools and 4.3% lithic debitage was found from trenches located on the fortification wall itself.

The centrally located trenches appear to have been centres of activity since they show presence of significant lithic assemblage, tools as well as lithic debitage. All the cores which are found amongst the assemblage are found from trenches situated inside the fortification wall. This most probably indicates that the minor amount of lithic production which was carried on at the site was done inside the fortification. This is in total contrast to Bagasra where the southern area (falling outside the fortification from Phase II, figure 5.3) appears to be the centre of lithic activity.

The chalcolithic period identified at the site of Pithad has been dated to 2200 BC. The lithic assemblage recovered from the Chalcolithic period at Pithad is very less in number compared to other Chalcolithic sites which is clearly seen from the table (5.1). It is clear that lithic implements were not favoured at Pithad during Chalcolithic period which is totally in contrast to the Mesolithic period identified at the same site. This phenomenon is not easy to understand since the Chalcolithic period at Pithad has been defined as one of the major Sorath Harappan settlements and one of the features of Sorath Harappans was their ability of double cropping (Possehl and Raval 1989). Two possibilities for this scenario comes to mind, either the stone tools were lost in fields and thus are not found at the site or that the people had access to better tools for agriculture than stone implements. Copper objects have been found from the site but nothing remotely related to an agricultural tool made out of copper has been unearthed. This dearth of stone tools is also seen at the site of Rojdi (ibid) which is generally considered the type site of this regional Chalcolithic culture.

The excavators have stated that the phase III at Bagasra was dominated by Sorath Harappan artefact assemblage (Sonawane et al 2003). As we have seen the lithic

assemblage during Phase III is much less than the lithic assemblage found from Phase II but nonetheless it is found in good quantity. If the stone implements were still useful for people during the third phase at Bagasra why were they not useful for the people of Pithad? Is this difference in stone tools due to the difference in economy at these two settlements? Phase III at Bagasra has shown a setback in the urban economy (ibid) at the site. Were the people at Bagasra simply following a stone tool tradition which has been observed at the site right from the beginning? Two contemporary settlements, situated in similar geographical settings showing difference in their lithic assemblage raise a lot of questions. However, one similarity which is seen between the phase III at Bagasra and the Chalcolithic period at Pithad is a comparative increase of non-geometric tools, especially scrapers at both the places.

Another concern about the lithic assemblage belonging to the Chalcolithic period at Pithad is that there might be a mix-up of material from the earlier period, namely the Mesolithic. During the excavation in 1992 Mesolithic and Chalcolithic periods were found to be very distinct and thus there is no dispute about the material found from them. There are a couple of facts which appear to contradict this concern about the Chalcolithic lithic assemblage recovered during excavations of 2005-06/2006-2007. First of all, majority of the Mesolithic period materials were found from the mound Jaidak 1 which is separated from the mound of Jaidak 2 (from where evidence of Chalcolithic period are found) by a deep erosional *nullah* (IAR 1991-92). The excavation report however mentions that evidence of Mesolithic habitation might have been found from southeast periphery of the site but have shown uncertainty regarding the extent of this period in the west side of the mound. They further mention that the actual Mesolithic remains excavated in 1992 (IAR 1991-92) extended over a 1 meter thick deposit and was found resting directly over disintegrated bedrock. Thus the presence of a few isolated microlithic artefacts including a few geometric forms reported from early layers in a few of the trenches during 2005-06/2006-07 excavations have suggested to the excavators that the Mesolithic people frequented the site.

The lithic assemblage however tells us a different story. It was found that Mesolithic lithic tool assemblage was dominated by various types of blades while the Chalcolithic

lithic tool assemblage, though still showed the presence of blades, was found to have been dominated by geometric and non-geometric tools. It was further found that 30.25% tools and 42.07% lithic debitage were recovered from layer 2 belonging to various trenches excavated during years 2005-06/2006-07. Very few (3.36% tools and 2.36% lithic debitage) lithic assemblage was recovered from layer 5, the deepest layer where there are possibility of a mixing up of material with an earlier cultural habitational level. Thus it appears that this concern over mixing of material between Mesolithic and Chalcolithic periods might be unfounded.

In conclusion it can be seen that the lithic assemblages associated with Mesolithic and Chalcolithic periods spanning more than five thousand years have different characteristic features which reflect the characteristics of the sites with which these have been found associated. The hunter-gatherer tool kit at Loteshwar was found to have blade and blade flakes as dominant tools while the hunter-gatherer tool kit found from the site of Pithad showed preference for different types of scrapers. The technology followed at both the sites was adapted from quartering technique. Quartering technique continued for a long period of time, even after the introduction of crested ridge technique. Crested ridge technique was introduced during the beginning of the third millennium BCE at the site of Datrana. At the same time the expansion/ beginning of contact with the Sindh region was also observed. This contact led to the development of one of the major civilizations with a vast geographical spread. The two settlements which represent this period, the Urban Harappan, show vast differences in their lithic assemblages suggesting multiple modules of adaptation and application of the lithic tools during this period. Bagasra was found to rely on lithic tools manufactured locally at the site using locally available raw materials while Shikarpur has shown major import of lithic tools. The reliance on blade tools seems to have decreased during the later period of this civilization which is seen from the lithic assemblage belonging to the site of Pithad where a significant increase was seen in different types of scrapers.