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Review Article

STUDY OF PALAEOLITHIC ARCHAEOLOGY USING GIS: A CASE STUDY FROM KULIANA BLOCK OF MAYURBHANJ DISTRICT IN ODISHA

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ABSTRACT

A number sporadic works on various aspect of Mayurbhanj Paleolithic culture are made by different archeologist/ anthropologist. In this search extensive filed exploration is done by mix with GIS expert and anthropologist, resulted in the discovery of kalabadia, kuliana, kamta, and Kuchei Paleolithic sites. The study area is primary in nature and has preserved habitatical deposits. Hand-axe, choppers, Scrappers are made of Quartzite are belong to the Paleolithic period. There are two Departments Remote Sensing and GIS (Geographical Information System) and Anthropology and Tribal Study under the North Orissa University, which are close to each other and made a plan for the research work. By using GIS tool and Google Earth for the analysis of location and distribution of Paleolithic stone tools was done.The accuracy of digital map, landscape of the site, location of the site, GIS tool is useful for this research. Summary made by the authors at interesting and interpreting the data recovered from the site.

INTRODUCTION

Stone Age chronologies are built up by relating archaeological material to a number of processes which produce change over time. These include the progressive nature of change in the stone 1001technology (an elaboration of the Three Age system), the evolution of life forms, and the geological record, especially, the record of climatic change-to build up sequences of the change in human cultures. (Mishra 1994) Lower, Middle and Upper Palaeolithic terminology was adopted by Sankalia (1974) who also tried to relate the different Palaeolithic stages to Quaternary stratigraphy. (Sankalia, 1964). The study of Palaeolithic cultures in Orissa is based on an archaeological study deals with district of Mayurbhanj., Robert Bruce Foote during one of hisgeological tours struck at last the first man-made artifact in Madras and recognized, what it was. (foote 1912).At Bagor in Rajasthan, bones of domesticated sheep and goat, are dated to around the 5th century B.C. Grinding stones, practically indistinguishable from those used in modern villages, occur at most sites. Ring-stones, found at many sites, were possibly used for primitive cultivation or fishing. (Mishra V.N 1973).

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The study deals with Spatial organization, mobility subsistence and Lithic resource of pre historical Hunter-Gatherers.it is important here to state that the first Palaeolithic site excavated in India was from this region being located at Kuliana in Burhabalanga valley in Mayurbhanj district. The first Neolithic site reported in Orissa was again from this area i.e. at Baidyapur by P. Acharya in 1923-24. Kuchai was the first Neolithic site excavated in Orissa during the post-independence period by B.K.Thakur and is also located near Baripada in Mayurbhanj district (Mohanta – 2013:1). Most of the sites are located very close to the river Burhabalanga and not very far from the Similipal Tiger Reserve Forest.

Geographical Information System (GIS) application in Palaeolithic culture have rare in Orissa. GIS approach useful on the site for the analysis of Palaeolithic tool distributions, the accuracy of digital maps, the statistical test to investigate the relationship between Archaeological tools distribution and Environmental variable. Geographic information systems (GIS), database solutions and web-based technologies are used to handle and process archaeological and physiographic information. (Michael et al 2009) GIS Archaeology has been considered a perfect match. Since archaeology often involves reconstructing the life way of the Post Human society with the help of their material remains in the form of tools and weapons.

There are at least two options to investigate this relationship: an analysis based on field observations and an analysis with the use of a GIS. In the first case the analysis will be based mainly on data collected in the field, with the GIS approach the main source of information will be digitized existing maps. (Rensink, 1997). It was the coordination between the drain and the hand that early man could produce a regular pattern in the flaking of the tools as distinct from those produced by the forces of nature which entitled man to be recognized as. "The only tool-maker" and separate him from the Non-Human primates particularly the great Apes. This tool making capacity is otherwise known as "Culture" which gives the status of "Human" to the biological animal of man provides him a unique place in the animal kingdom in view of his capacity not only to create culture but to remain as also to transmit the same from generation to generation. The results of archaeological study are rich in spatial information. GIS involves the study of spatial dimension of Human behaviour over time. The most aspect of GIS is pure map making and its capacity to overlay and analyse different type of abstract new information. The use of GIS in archaeology has changed not only the way archaeologist acquires and visualise data, but also the way in which archaeologist think about space itself. GIS has therefore become more of science then an objective tool.

Research area

The research area is situated in Kuliana and Bangriposi block of Mayurbhanj district, which is 12 kms distance away from the head quarter Baripada. This area is located near the Burhabalanga valley and closed to the Similipal Tiger Reserve Forest of the district. We take only the four villages i.e. Kuliana, Kanta, Kalabadia and Kuchai for our research area of 4471.123 Hector. Previous research work done by archaeologists like K.C.Tripathy, K.K.Basa, Dr. B Mohanta etc in this area, which encouraged us to do further study with GIS technology. The soil type of the study area may be broadly classified into Red soil and Laterite soil. Laterite soil is found in the hill and plateau region. Two types of laterites namely; Laterite morrum and laterite rocks have so far been identified in these areas. Most of the Paleolithic tools are found from Kalabadia are from the laterite rock beds. The clay- loam type is found near riverbank of Burhabalanga in the study area.

Kuliana

According to the villagers this site is located by some other archeologist/ researchers. The villagers encourage us to visit that site. Kuliana is situated 12 KM north of the Baripada town and 2 Km east from the river Burhabalanga. The collected artifacts are Hand-axe, Scraper. The Celts are found near the river in a rock hill. The latitude of the area is 86^0 39' 5.37" E, longitude is 22^0 04' 6.58" N.

Kuchei

Kuchei is situated 8 Km north of the Baripada town and 5 Km east to the river Burhabalanga. Though Kuchei is a Neolithic site, The Paleolithic tools like Hand-axe, Chopper, and Scraper are available near the river bed. The latitude of the site is 86^0 42' 02.97" E, longitude of the site is 21^0 59' 18.20" N and altitude of the site is 40 mts from the mean sea level

Kamta

Kamta is situated about 15 Km North of the Baripada town near the NH-5, and 1Km east of the Burhabalanga River, its altitude is 40 Mts. Its latitude is 86^0 37' 42.72" E and it longitude is 22^0 05' 14.90" N. The tools found from near the river site are Hand-axe and Scraper of Paleolithic culture.

Kalabadia

Kalabadia is situated 20kms north of the Baripada town na on the Way of NH-5, and 2 kms east of the river Burhablanga. The tools found from the sites are made of Quartz and the tools are Hand-axe, Scrappers and choppers. Its altitude is 40 mts. Its latitude is 86^0 38' 32.29" E and its longitude is 22^0 05' 21.71" N.

Objective of the study

The main aim of the present study is to report the result of field exploration in different site of Mayurbhanj district in order to study the stratigraphy and topology of the Paleolithic tools.

- The GIS and archeology research work aim at studding the distribution of Paleolithic sites of Mayurbhanj and its mapping.
- Prepare a GIS data base of stone tools of Paleolithic culture of the study area.
- More emphasis given on GIS to regional scale and archeological survey which is the systematic search for archeological site on the landscape

Methodology

To achieve the aim and objective of the study and to draw a meaning-full picture of the different aspect of the live and culture of the Paleolithic communities the following methods are follows. The method followed by the archeologist to recover the materials remains by the Paleolithic men and their analysis. It is essential to study of topo-sheet to find out the location of the Paleolithic site in the field. We refer topo-sheet no 73-J12 and 73-K09 and scale of 1:50,000 to locate district boundary, block boundary and national high way of our Paleolithic research site. By using GPS (Global Positioning System) model Garmin-72H we locate the geographical coordinate of the particular location i.e latitude, longitude and elevation of the Paleolithic site. We use ARC-GIS 10 and ERDAS 9.2 for the purpose of GIS data base and mapping of the Paleolithic site. We also refer Google Earth to identify the Paleolithic site of our study area. To measure our finding tools we use sliding caliper.

Field exploration and analysis

Archaeology is based on the study of the human activities in the past through the analysis of the material culture which includes artifacts like the hand axe, cleaver, chopper, scrapper, which are found from the Paleolithic sites during field exploration. Archaeology studies 99% of the total human history from the development of the stone tools. Now a days archaeologist have begun to use GIS to aid in mapping site. Though the research team is working in the North Orissa University, with using GIS technology it was easy to do research on archaeological site together.

Field exploration, excavation and documentation are important work in the archaeology for preservation GIS makes this research and field work efficient and precise. GIS increase the ability of show the broad geomorphology of the site mapping of each site. GIS is a computer base system which allows the collection, storage and manipulation of environmental geographic and geologic data together with archeological information in a single data base.

This could be also used region-scale archeological survey which is the systematic search for Paleolithic site on the land scape. There are 16 Hand axe found from the study area. These collections are found from the river site of Burhabalanga, from a morum pit of the Kuliana and Kalabadia. These hand axe are basically made on sizable prepared blanks. Most of the tools collected from this sites are made of quartzite possess an oval, biconvex, sub triangular.

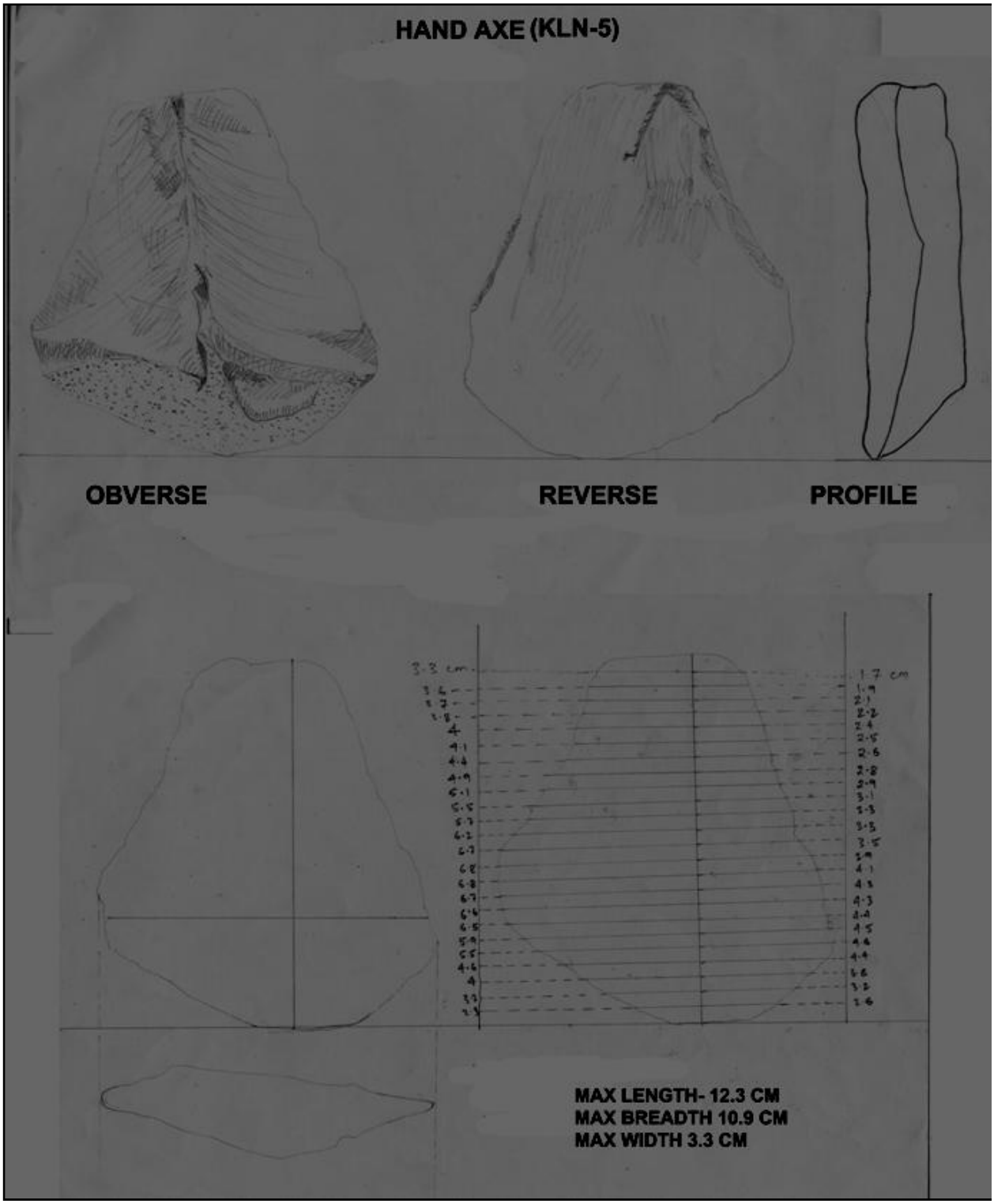

Figure 1. KLN-5: Hand axe found from village Kuliana in Kuliana block, Mayurbhanj, Odisha

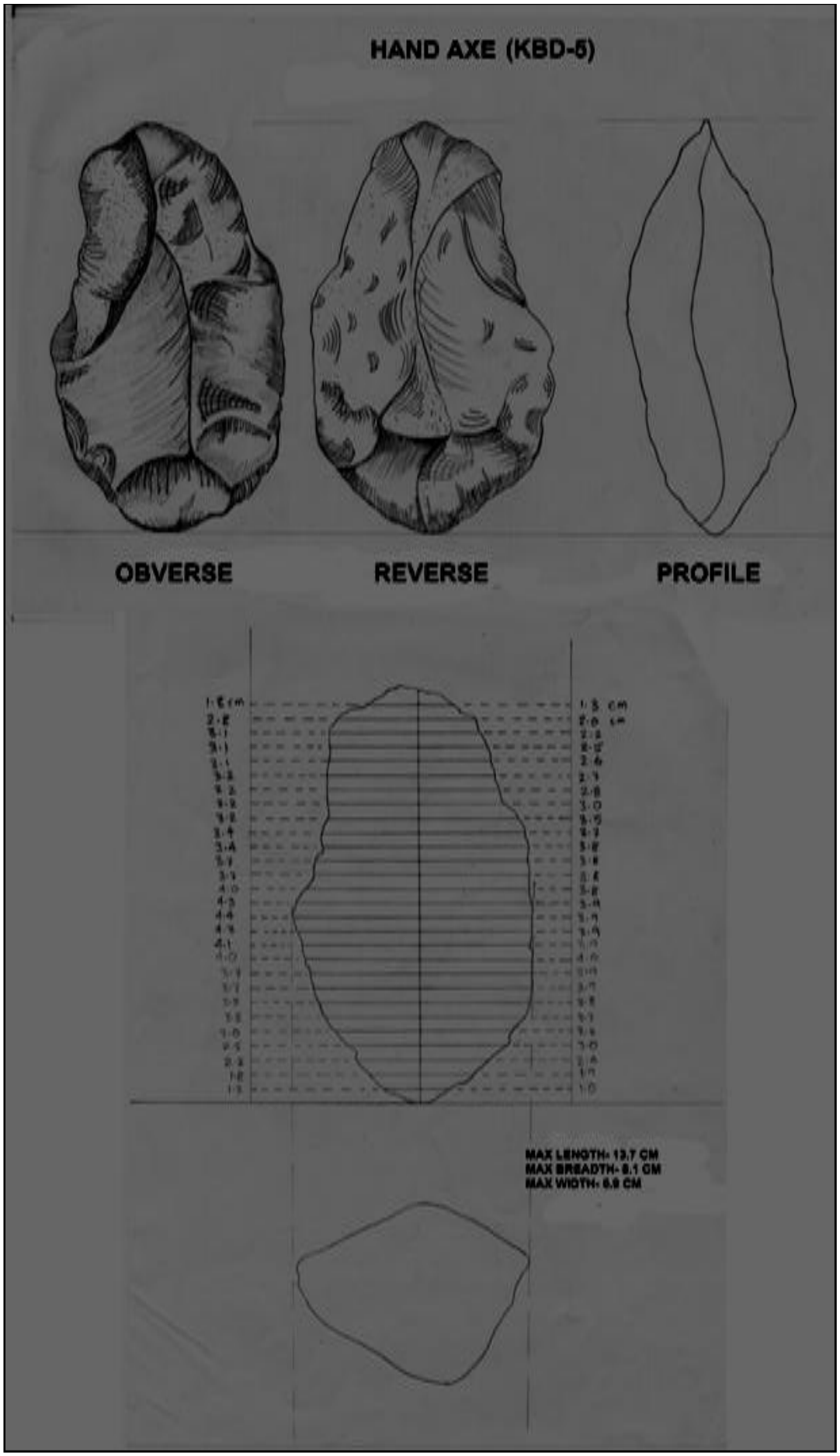

Figure 2. KBD-5: Hand axe found from village Kalabadia in Bangriposi block, Mayurbhanj, Odisha

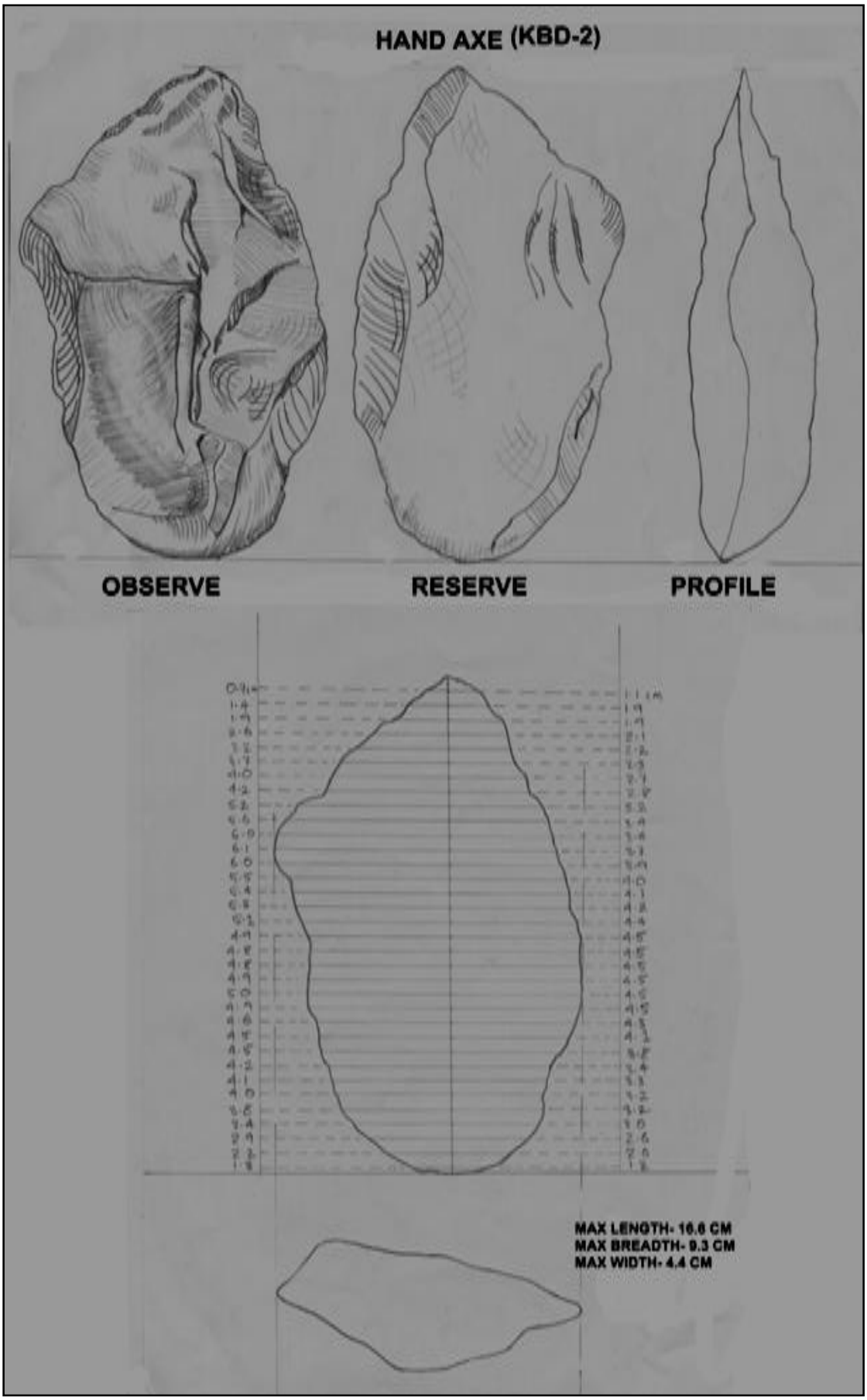

Figure 3. KBD-2: Hand axe found from village Kalabadia in Bangriposi block, Mayurbhanj, Odisha

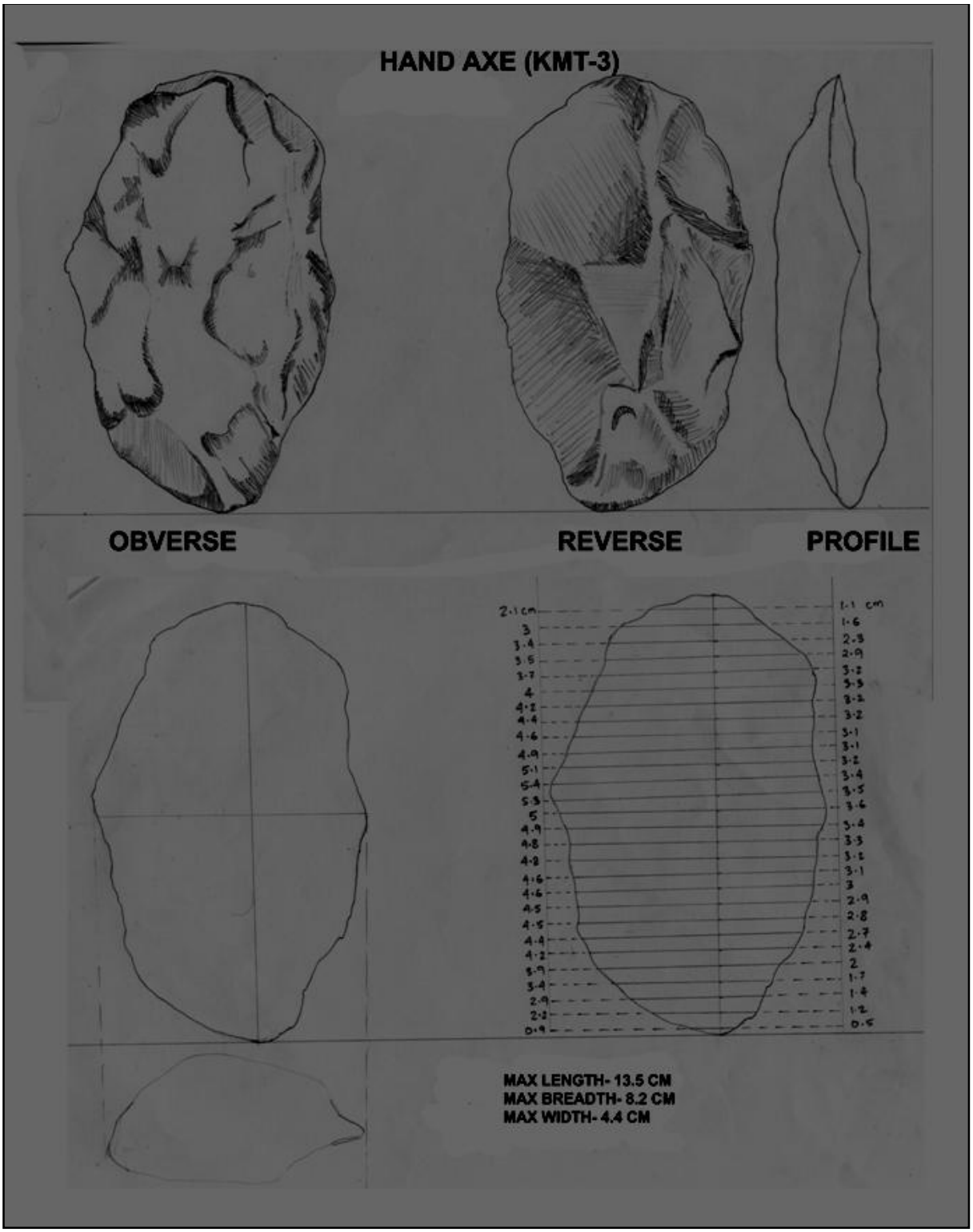

Figure 4. KMT-3: Hand axe found from village Kamta in Kuliana block, Mayurbhanj, Odisha

Some hand axe are generally characterized Bi-beveled and Uni-beveled. In the case of their butt ends some tools have core but the tip end is pointed. Hand axe have been found from the Kalabatia, Kuliana, Kamta sites of the locality, which are primarily distributed in the river valley and foot hill site. All tools are made from Quartzite. The hand axe are prepare on flat based and splot based pebbles on the basis of working edges. All these hand axe are classified as bi-facial hand axe.

The working edge of the hand axe have been faced by dislodging free flakes in direct precision method.

KLN-5

This hand axe is formed from Kuliana. It is clear from the metric analysis that lower Paleolithic folk of this region were prepared to produce this type of tool. (Length 12.3 cm x Breadth 10.9 cm x Thickness 3.3 cm).

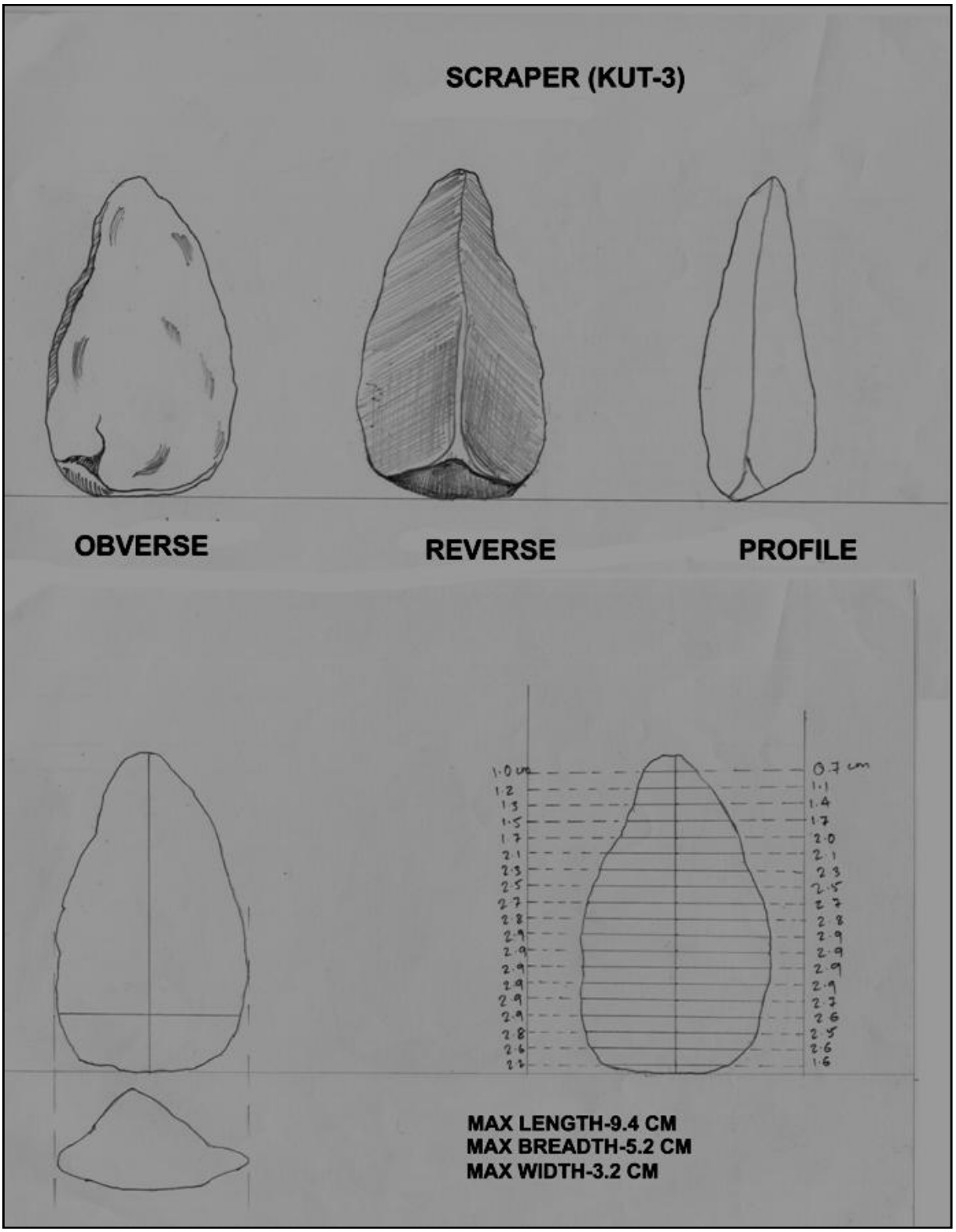

Figure 5. KUT-3: Scrapper found from village Kuchai in Kuliana block, Mayurbhanj, Odisha.

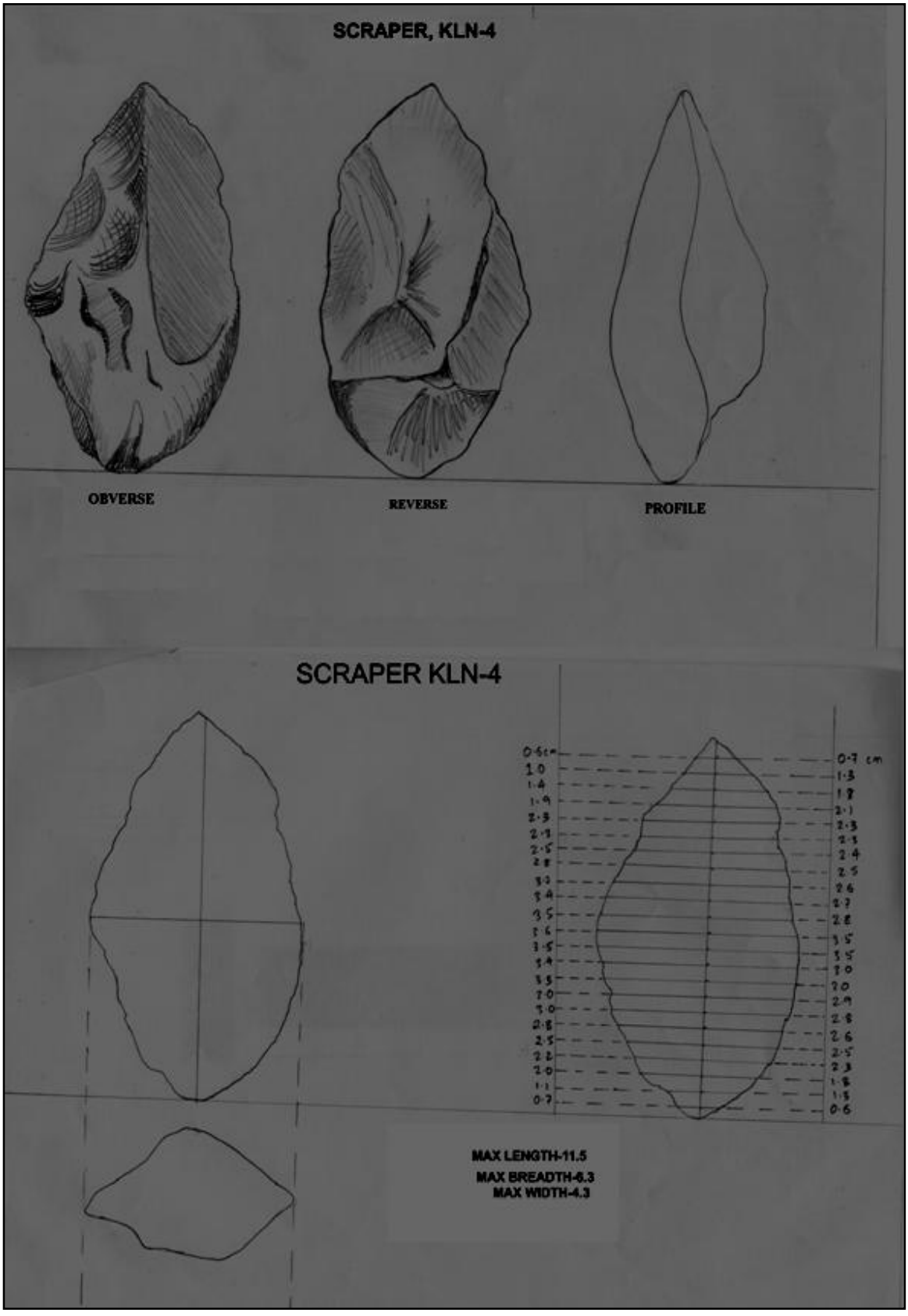

Figure 6. KLN-4: Scrapper found from village Kuliana in Kuliana block, Mayurbhanj, Odisha

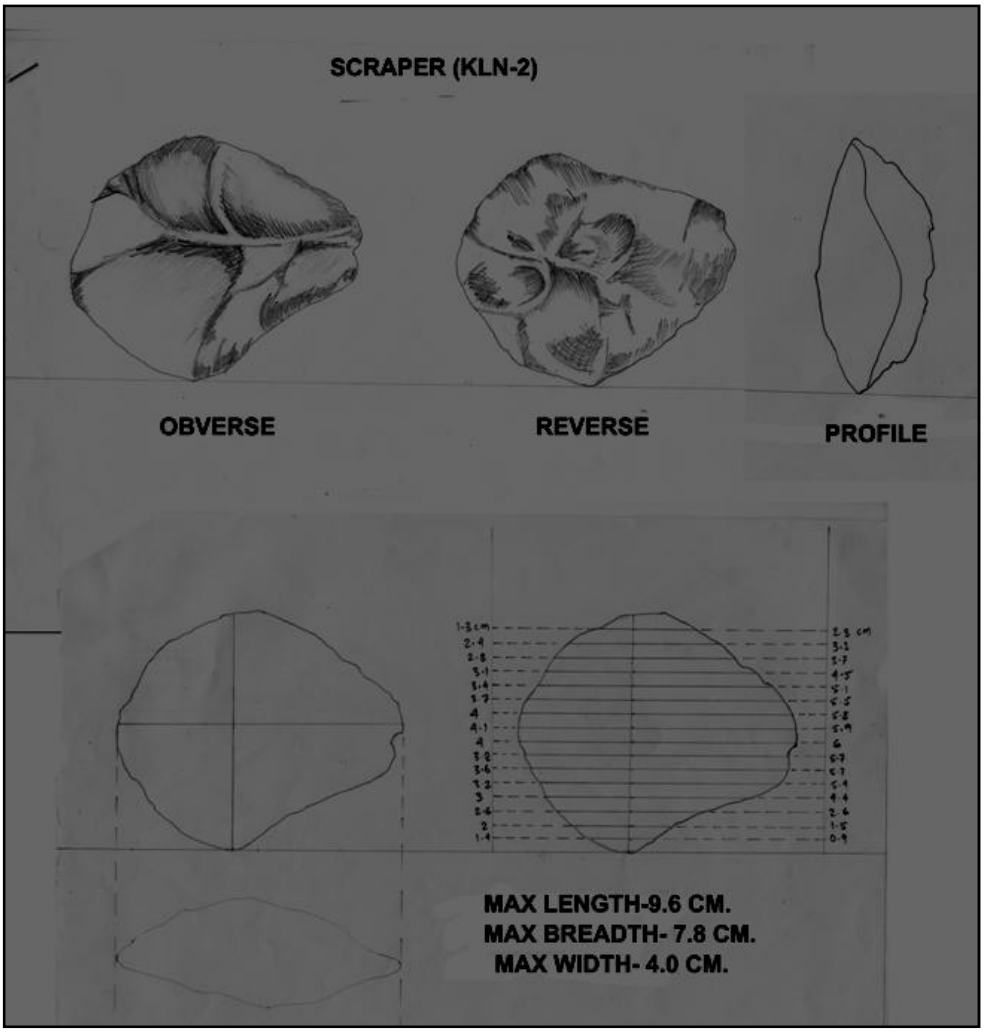

Figure 7. KLN-2: Scrapper found from village Kuliana in Kuliana block, Mayurbhanj, Odisha

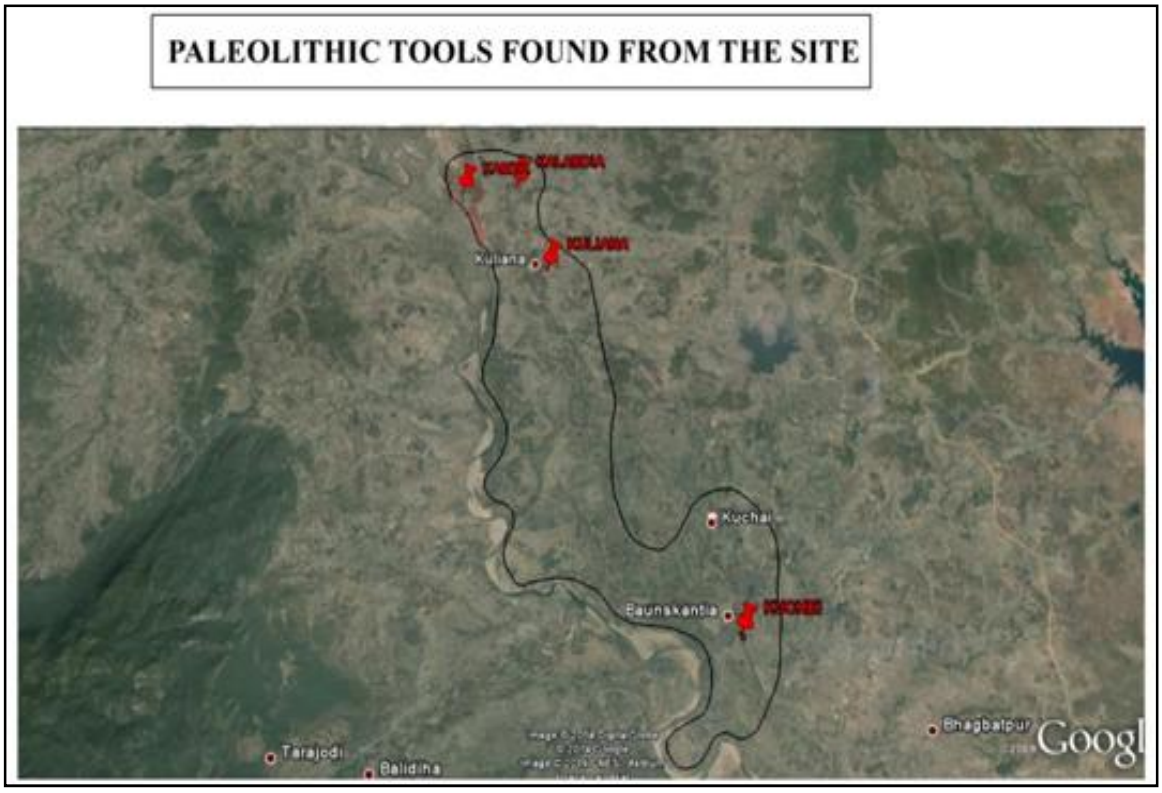

Figure 8. Study Area and location find out from Google earth

Figure 9. Location of Palaeolithic Artefacts found from the respective sites.

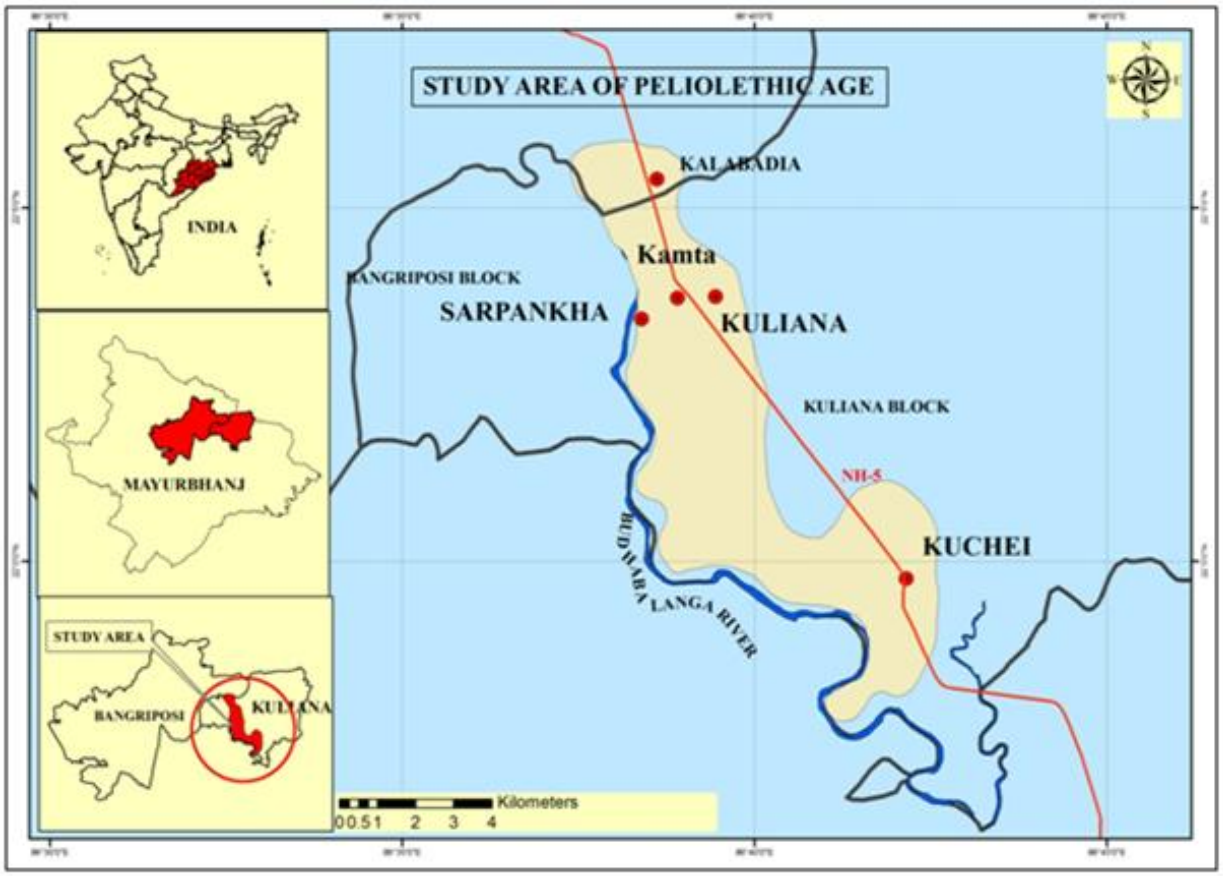

Figure 10. Location of the Palaeolithic sites by using ArcGIS

KBD-2

It is made on the flat based pebble of Quartzite. It bears a Bi-facially worked carved edge. (Length 16.6 cm x Breadth 9.3 cm x Thickness 4.4 cm).

KBD-5

This hand axe are roundish and massive of the lower Paleolithic culture. The butt end is round to grip. The working edge are formed to made in Bi-facial manner by removing the primary and secondary flake of the working edge. (Length 18.1 cm x Breadth 8.1 x width 5.9 cm).

KMT-3

This artifact is flat and one-convex cross-section, made up of Quartzite. The working edge is broadly shows flacking. (Length 13.5 cm x Breadth 8.2 cm x Width 4.4 cm).

KLN-4

This artifacts also found from Kuliana. The working end of the specimen is pointed, butt end is coretex for the grip. (Length 11.5 cm x Breadth 6.3 cm x Width 4.3 cm).

KLN-2

This artifact is made of Quartzite posses an oval or biconvex. It is fabricated by bilateral flacking. (Length 9.6 cm x Breadth 9.6 cm x Width 4.0 cm).

KTC-3

This artifact is partly chipped shape with a pointed and butt end is semi-round the working end is pointed. (Length 9.4 cm x Breadth 5.2 cm x Width 3.2 cm).

Conclusion

It is important to describe general work with Paleolithic site distributed in Mayurbhanj emphasizing research work and distribution of Paleolithic culture. Though GIS is a new trend in Orissa so we prepare a data base of Paleolithic culture in two block in Mayurbhanj district in Orissa by using GIS and Google Earth. By using GPS (Global Positioning System) we find out the Latitude and the Longitude of the site and Altitude of the site. Discussion of the Paleolithic tools, attempt for the discovery of the Paleolithic site and collection of Ethnographic Information was achieved of the present research. Use of GIS in archeology, intensive surface exploration, mapping and plotting, drawing of photographs, scientific analysis and interview with local people was achieved through this research.

The aim of the paper to find out Paleolithic site by using GIS and it also help to explore advance landscape of the site. GIS was helpful for us to approach each Paleolithic site of different area and there Geomorphological and Environmental condition of the area. Location of the site were described with Google Earth map and individual site map and tool type were described in detail, found from the sites were also described by GIS mapping. It helped to immediate access to the data collection for analysis and understands the site and its finding batter.

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