A Preliminary Report on Prehistoric Investigation in the Middle Ong River Basin with Particular Reference to the Uttali and the Ghensali Stream, Southern Bargarh Upland, Odisha

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ABSTRACT

The paper presents a preliminary report on the systematic surface exploration conducted in the Middle Ong basin with particular focus on the northern tributaries, viz. the Uttali, Ghensali and Mongragod stream in the southern Bargarh Upland of Western Odisha. The investigations have resulted in the discovery of 43 new prehistoric sites in the area with predominance of microlithic components. These sites are observed in different geomorphological contexts, such as, in the cliff surface of riverbanks, hillslope, foothills and rocky outcrops. Abundant availability of raw materials, mainly chert of different colors and vein quartz in the area seem to have attracted the prehistoric communities for intensive settlements in the area. while sporadic acheulian artifacts have been found scattered here and there, most of the documented sites are dominated by microlithic components, some of which have also been associated with used/unused red ochre minerals, suggesting advanced cognitive abilities and symbolic behavior of the microlith using communities in the area of investigation.

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INTRODUCTION

Recent Archaeological explorations conducted in the Middle Ong valley, a significant tributary of the Mahanadi in the Southern Bargarh upland region, have revealed a variety of open air sites in the pedeplains and foothills of the Jhanj-Malaikhaman Hill range. spreading over an area of about 5837 square kilometres the District Bargarh, lies between latitude 20° 43' and 21° 41' North and longitude 82° 39' and 83° 58' East situated in the western part of Odisha. The district bounded on the north by Raigarh district of Chhattisgarh, on the east by Sambalpur district, on the south Balangir and Subarnapur districts, and the west by Nuapada district of Odisha. The district is mainly drained by two major river systems, namely the Jira in the northern part of the district and the river Ong on the southern part. Both the rivers are originated from the plateau of Chhhatisgarh and Eastern ghat mountain range of Odisha. The river Jira mainly divides the Bargarh Upland in to two parts, Northern and southern (Singh 1993: 770–774). The northern part of the Bargarh Upland has yielded a large number of Prehistoric settlements belonging to the Acheulian, Middle Palaeolithic and Microlithic settlements. With a view to understanding the extension of prehistoric settlements in the southern part of the Bargarh upland the present investigation was carried out. The Middle Ong river basin with particular reference to the Uttali, the Ghensali and Mongragod stream were explored as they form the part of southern Bargarh upland and central drainage system of the middle Ong river basin. On the pedeplain surface of the Jira valley, a large number of sites from Lower Palaeolithic to Microlith phases using various types of raw materials has been reported (Seth: 1995) (Mishra 1997–98) (Behera et al. 2015), (Thakur & Behera 2015), (Behera & Thakur 2018, 2019), (Behera et al. 2020). Our systematic archaeological investigation conducted in the southern part of the Bargarh upland have led to the discovery of 43 prehistoric settlements, from the Acheulian stage through the middle Palaeolithic and dense clusters of microlith bearing settlements has been reported in the area.

ENVIRONMENTAL SETTING OF THE STUDY AREA

The Ong river is a major tributary of the Mahanadi river system, drains initially NE-SW course parallel to the craton-mobile belt margin, after it takes a sharp turn towards south-eastern side and joins the Devmohini, Kolrinala, Mongragod stream, Ghensali, and Uttali stream in the middle part of the basin(Mohanty and Sahoo 2000). The Ong river maintains its east-west course till its confluence with the Mahanadi near Binka (***Figure 1***). The overall drainage pattern of the basin varies from sub-dendritic to dendritic within the cratonic areas to sub-parallel and sub-trellis within the Easternghat terrain. The drainage density is higher in the western part compared to the central and eastern parts of the area (Mohanty and Sahoo 2000). The twins' streams, Utali, and Ghensali are two major northern tributaries of the river Ong, which drains a major part of the Padampur subdivision of Bargarh district (***Figure 2***). These rivers originate in hilly tract on the west and northwest from the Jhanj-Malaikhaman range and followed the meander on the plain country following the general topographic slope. They have an approximate easterly course in the northern part of the area changing to south-easterly and finally drain towards south in the downstream region and several tributaries feed these rivers (Banarjee1964–65).

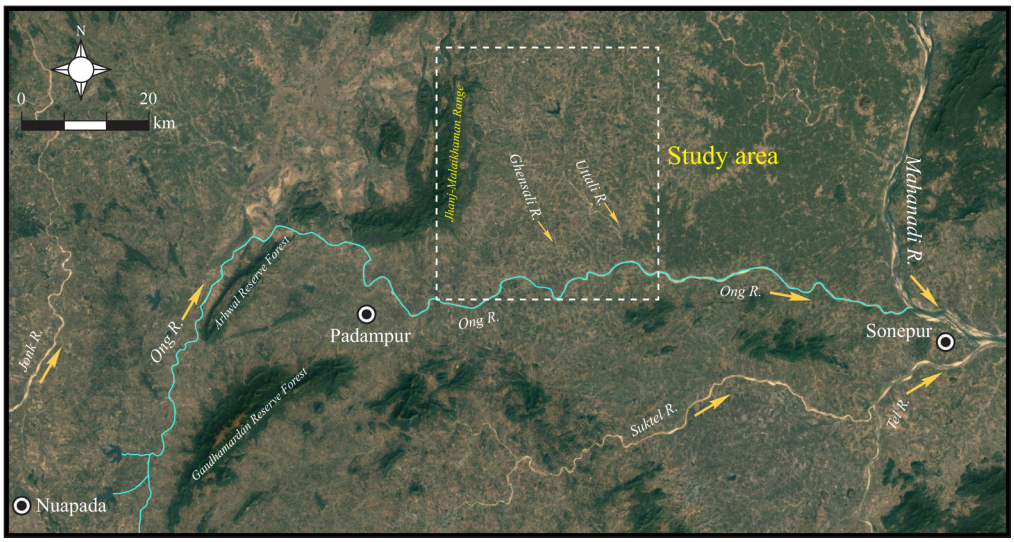

Figure 1 General view of the Southern Bargarh upland focusing Uttali and Ghensali stream in Middle Ong Basin.

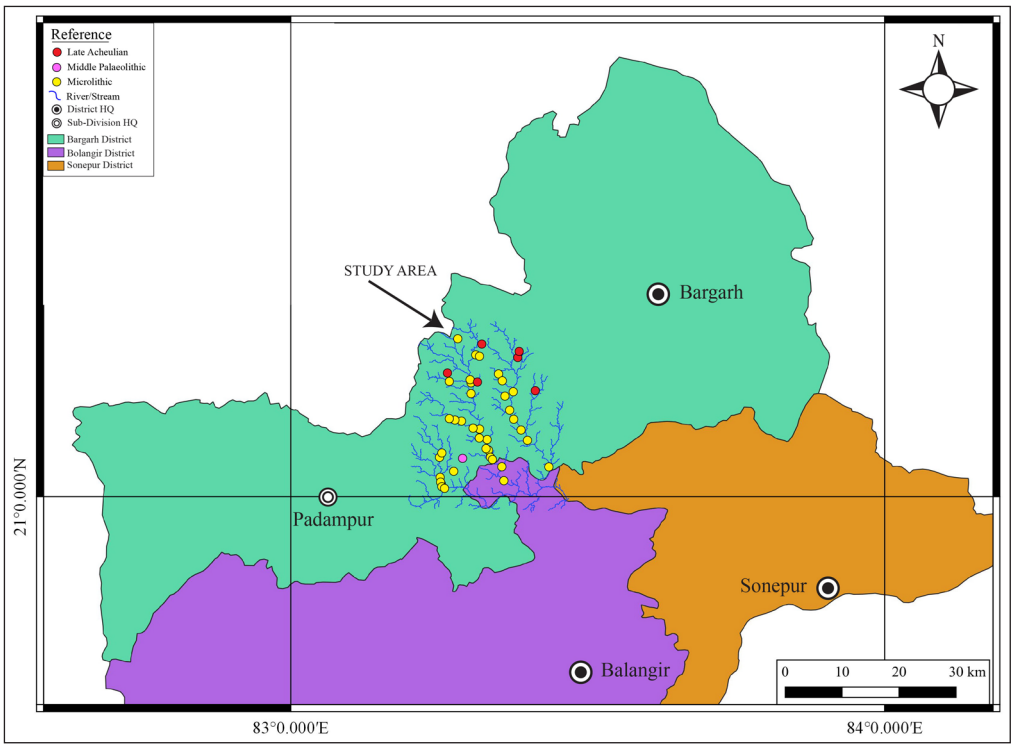

Figure 2 Drainage pattern of Uttali & Ghensali stream.

Both the rivers flowing at a distance of 10–15 km from each and joins to the river Ong, on its left bank. The Utali river flows on a granitic terrain, with wide and shallow throughout its course. The river hardly penetrates up to 3–4 meters depth, and at places the river section is lesser than a meter height. During the monsoon, the river carries heavy sediment load including clast of different size from its source region, and flooding on both banks. The river's length is nearly 50 km long, and at places, the width varies between 300 and 400m at its maximum. At places, the bedrocks are exposed in the river by fluvial erosion (***Figure 3***) and these rivers have a different depth and erosional surface because of their place of origin and load of water carrying downwards.

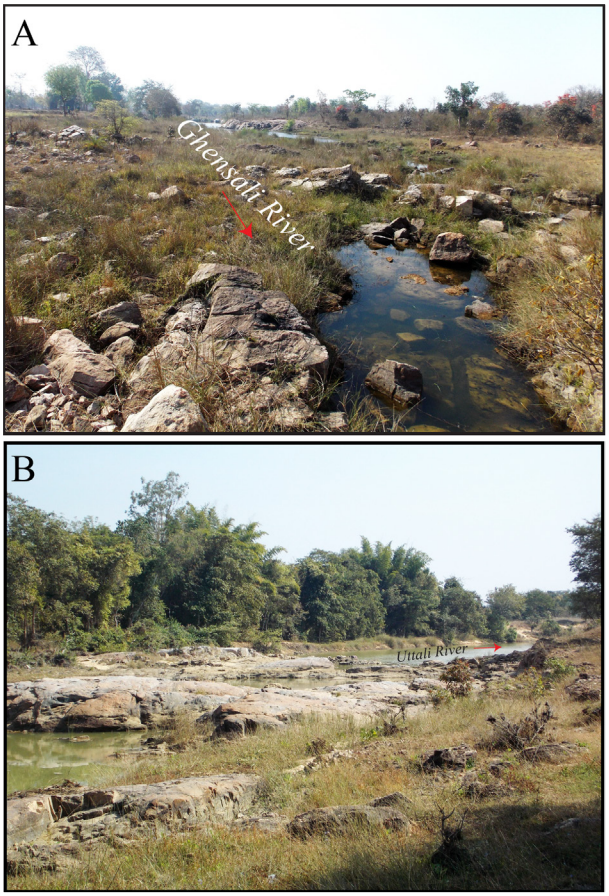

Figure 3 Exposed rocky river bed of Uttali and Ghensali stream.

The area can be divided into four physiographic units (i) The high hill ranges occupied by Chhattisgarh sedimentary in North and northwest, (ii) The dissected hill ranges of the Eastern Ghats in the south, creating plateau at Gandhamardan hills, (iii) A flat to slightly undulating soil covered terrain, by the Bastar Cratonic Gneisses (BCG) in the central part and (iv) Low lying narrow tract of circular mounds occupied by Gondwana sediments, at the south of the Ong river course. The entire region represents a flat, moderately undulating plain country with an average elevation of 198m A.M.S.L. The general slope of this area is towards SSE. The monotony of the plain country is often interrupted by the presence of several conical hillocks and low linear reefs. Rocky outcrops, in the form of residual cap deposit, occur in abundance over widely scattered areas (***Figure 4***). A substantial portion of the land in the district is kharif farmland, indicating that it is mostly utilised for agriculture. In kharif, cropland area is 348,747 hectares, whereas in rabi, cropland area is 122,949 hectares. With 70.4 percent of the total geographical area, agricultural land is the most common land use pattern, followed by forest land 12.48 percent and pastures 3.4 percent. (DLICB 2016) (***Figure 5***). The area falls under the tropical Savanna climate with seasonal variations of temperature. The maximum temperature in summer goes up-to 45°C. Furthermore, during the winter months, it ranges between 10°–12°C. The rainy season begins with the onset of monsoon during June and persists till October. The annual average rainfall ranges between 1300–1400 mm, most of which precipitates during the rainy season (Senapati and Mahanty 1971).

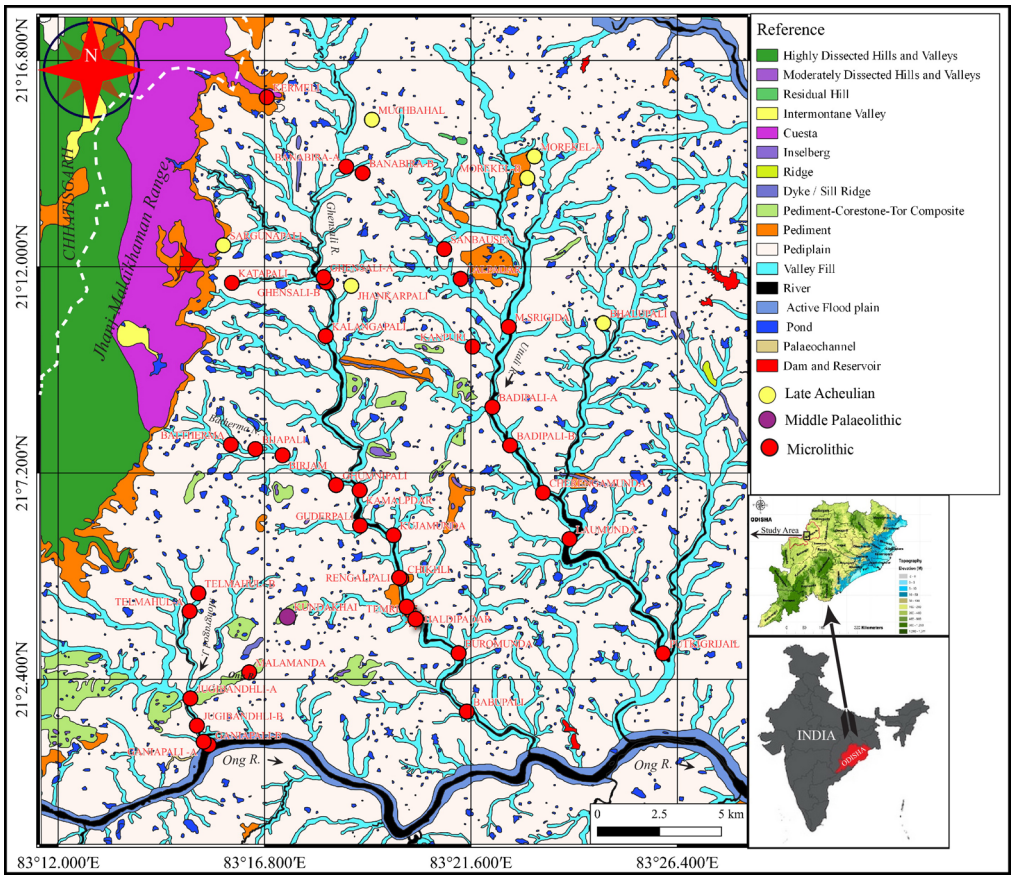

Figure 4 Geomorphology of the study area.

GEOLOGY OF THE STUDY AREA

Geologically, the area represents a complex terrain resulted in several tectonic processes which developed into different geological blocks together. The rock types of these areas belong to the Archaeans and are divisible into three groups 1. Sedimentary- Metamorphites represented by quartz, mica schist and phyllite, 2. Metamorphics are represented by hornblende schist, amphibolite and epidiorite and, 3. Granitoids includes biotite, grano-diorite and migmite gneiss (Banarjee 1964–65) (***Table 1***).

The first two groups of rocks occur as inclusions with the third group of rocks. The dolerite dykes' traverse through the granitic terrain. Veins of quartz, pegmatite, and epidote traverse through the granitoid rocks (***Figure 6***). The perennial Ong river along with its major and minor tributaries,

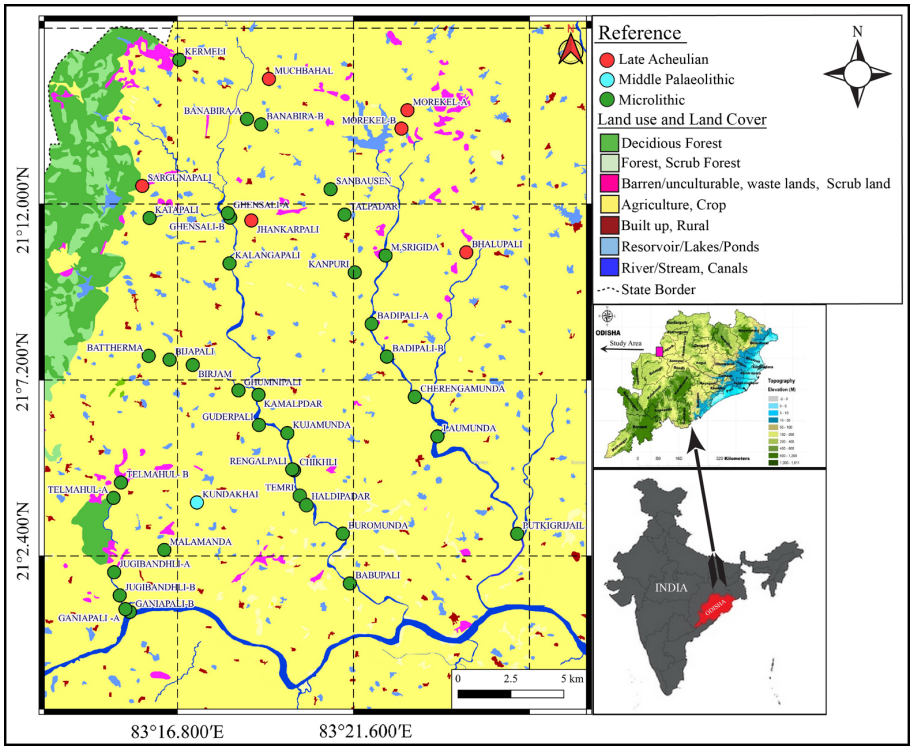

Figure 5 Land use and land cover map of the study area.

RECENT TO SUB-RECENT	SOIL AND ALLUVIUM, LATERITE
----------Unconformity----------	
	Quartz vein
	Dolerite
----------Intrusive contact----------	
Archaean	Biotite granodiorite
	Granite gneisses
	Hornblende schist, amphibolites and epidiorite
	Quartz, mica schist and phyllite

Table 1 Litho Stratigraphy of the Study Area (After, Banarjee 1964–65).

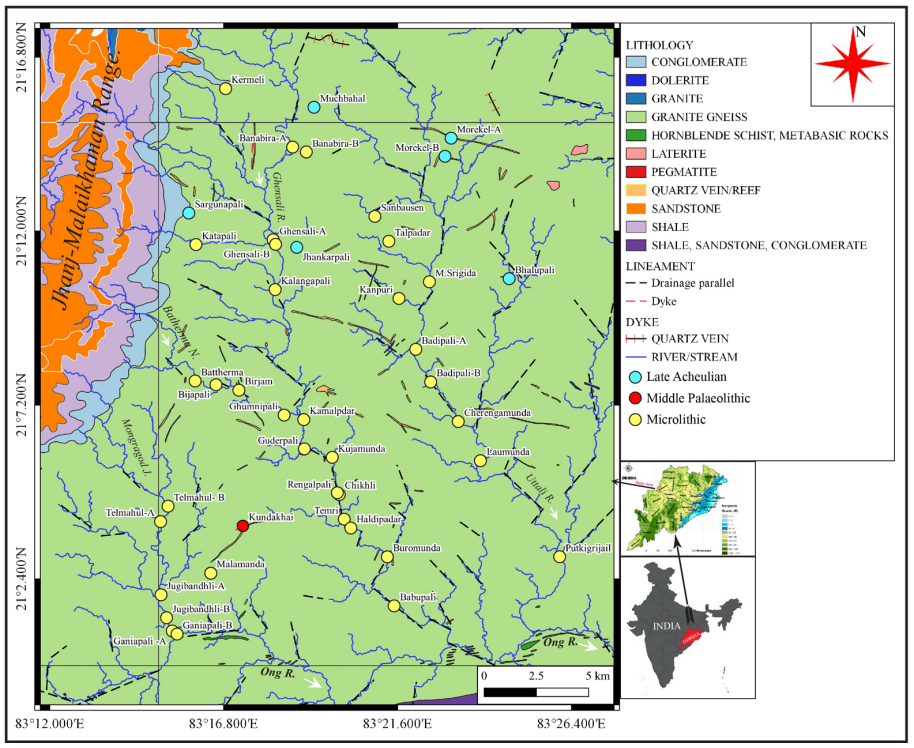

Figure 6 Lithological map of the study area.

control the drainage pattern of the entire area. The entrenched meanders of the drainage lines, rocky riverbed, and steep river bank indicate the river's rejuvenation character. In short, the region has undergone polycyclic erosion (Banerjee 1964–65) (***Figure 7***). The upper source region of river is rocky, and the middle and lower part is sandy. The Uttali and the Ghensali rivers having a north-south course are seasonal and carry substantial water only during the rainy season. Gradually the river gets shallow and more expansive towards down streams.

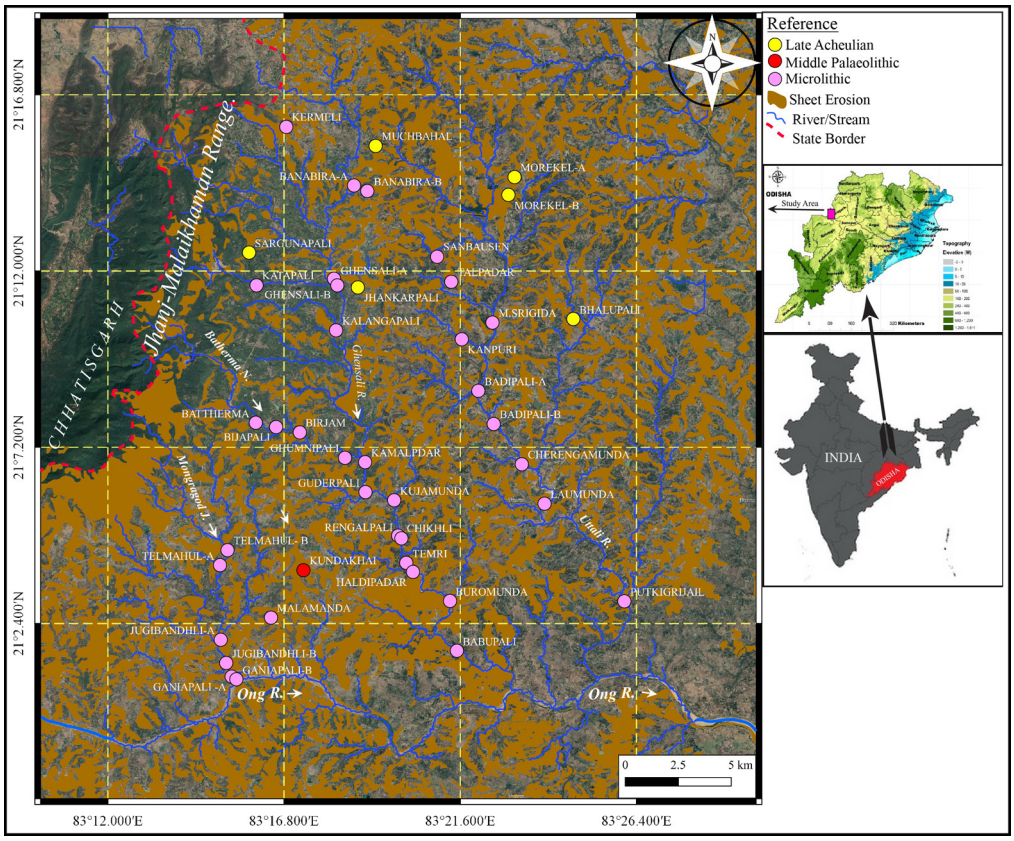

Figure 7 Erosional map of the study area.

PREVIOUS WORK

Prehistoric archaeological research in the Bargarh district of Odisha, and Particularly in the southwestern part covering the Padampur subdivision, has been sporadic in the past. The Northern Bargarh upland comprises mostly the drainage systems of numerous rivers which include, Jira, Girisul, Danta, Jhaun, and Kuliari etc. Extensive exploration conducted in this area has resulted in numerous open-air sites of different cultural phases. For the first time,Tripathy (1972) reported Microlith in the lower Jira river at Sarsara, on the right bank of the Jira river in the Bargarh district of Odisha, where he found flake tool, flake-blade tools etc SK. Mishra (1982–83). S. Mishra (1998) conducted exploration on the upper part of the Jira river and located 10 Microlithic sites and in the lower Jira river by K. Seth (1995). Afterward, P.K. Behera and N. Thakur carried out extensive field exploration and took few trial trenches to know the stratigraphic position of the cultural materials at Barpadar (Behera et al. 2015), Lohara reserve forest (Thakur and Behera 2015),Torajungha middle palaeolithic site in Danta river (Behera and Thakur 2018, 2019; Behera et al. 2020). Jira and Ranj stream by S. Deep in 2016, where he located 44 microlithic sites in various geomorphological settings (Deep 2016). However, the southwestern part of the Bargarh district, which comes under the Padampur Subdivision, was untouched and remained terra incognita.

The author took up the area for a comprehensive field investigation with a focus on the Middle Ong valley and identified total numbers of 43 new sites belongs to different cultural phases (***Figure 8***). Earlier in the upper reaches of the Ong river Tripathy reported two microlithic sites at Deuli and Nagenmal and collected 65 flakes and 52 blades, microlithic tools like scrapper, point, blade from the Upper loose gravel and brown silt (Tripathy 1972). In the year 1996, as a part of M. Phil programme, S. Panda conducted exploration in the Ong Valley and reported sketchily 17 microlithic sites un-associated with chopper chopping tools. The assemblage

contains retouched and unretouched core, flake, blade, bladelet, chips, chunks, and ring stone. The artifacts were prepared on cryptocrystalline materials such as chert, chalcedony, Quartz (Milky and Crystal), opal, agate, and khondolite for ring stone (Panda 1996), (Padhan 2016).

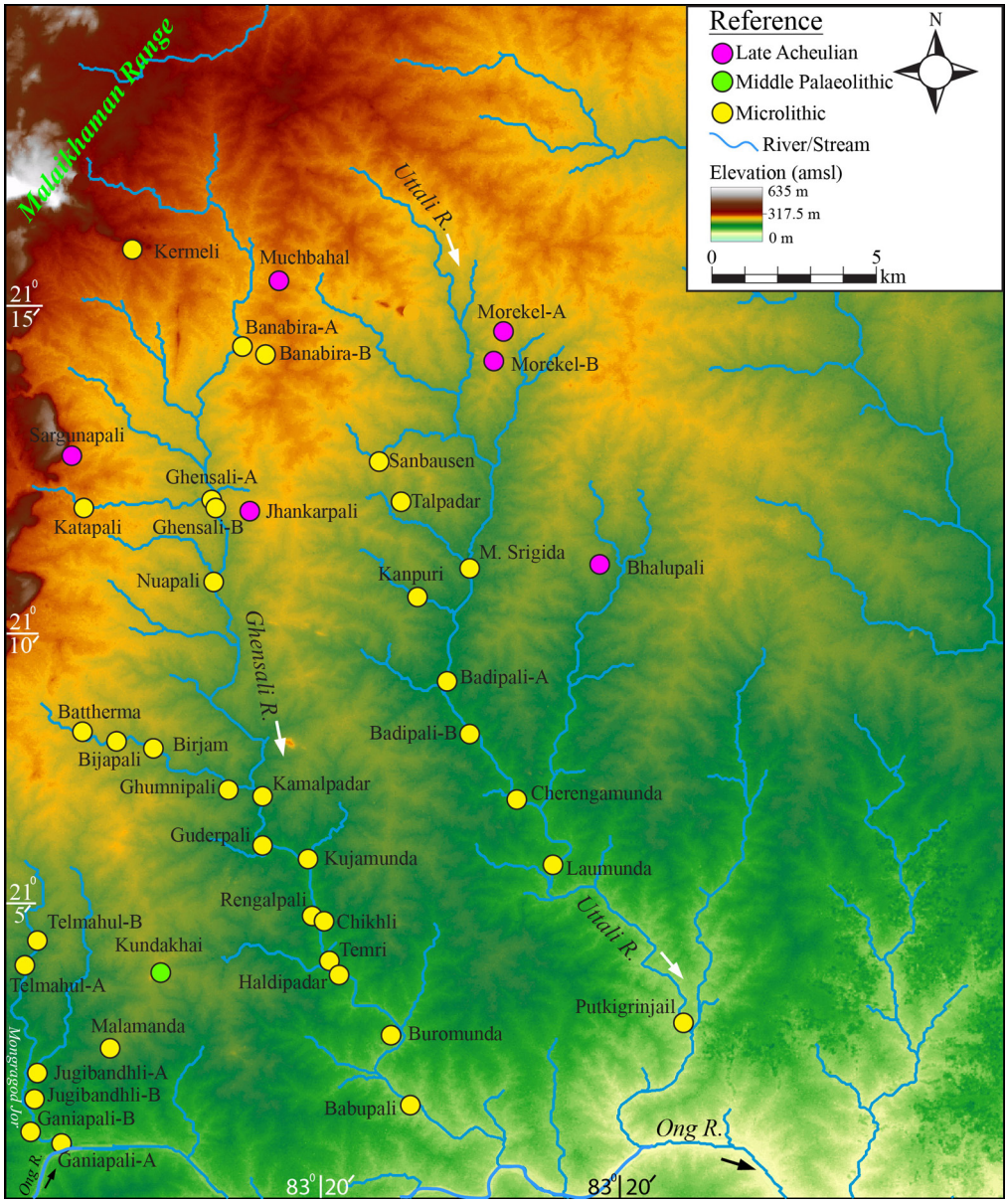

Figure 8 DEM map showing the Distribution pattern of sites in the study area.

METHODOLOGY

For the present study, an intensive exploration was carried out to locate the prehistoric settlement, their distribution pattern and to understand the stratigraphic position of the artifact in the study area. For systematic exploration, we have used the toposheet maps namely (64 O/3, 64 O/4, 64 O/7 and 64 O/8 which is of 1:50,000 scale prepared by Survey of India and District Resources Map of Bargarh. Since geographical information system (GIS) applications are ideal for managing archaeological data, and also it has dual nature, as they are scattered both in time and space, besides environmental aspects have been broadly adopted for the present study (Scianna and Villa 2011). GIS technique was used where ever necessary to locate site, and sites were studied from the point of view of geological, geomorphological, drainage systems. For this purpose, different software, like Arch GIS (ESRI), Quantum GIS, Golden Surfer, and satellite data from Bhuvan, ISRO, USGS Earth explorer, Bhukosh Geological Survey of India, Google-earth satellite images, Bing Satellite images have been widely used. Various thematic layers like Digital Elevation Model (DEM), catchment analysis, watershed, drainage, contour of the study area, slope, land use land cover, soil erosion, lithology, geomorphology maps were generated using GIS for seamless integration of different thematic layers in relation to the prehistoric site contexts. Interactive spatial analysis of the map theme was generated for a

better understanding of surface features of the land, potential outcrops such as, hill slope, river bank, river sections, erosional surface, pedimented areas, and stony outcrops in the area of the present study. For a better understanding of the site and surrounding landforms, digital terrain modelling was prepared for each site (***Figure 9***). For detailed documentation of each site, Garmin (Etrex-10) GPS was used (<3m resolution) for recording the geo-coordinates of each site. The entire study area covers 1079 sq km was surveyed on foot and motorbike was used for easy movement on narrow and unpaved roads on both stream banks and surrounding areas where ever necessary and potential river sections, exposed river bank surfaces were thoroughly checked for finding artifacts.

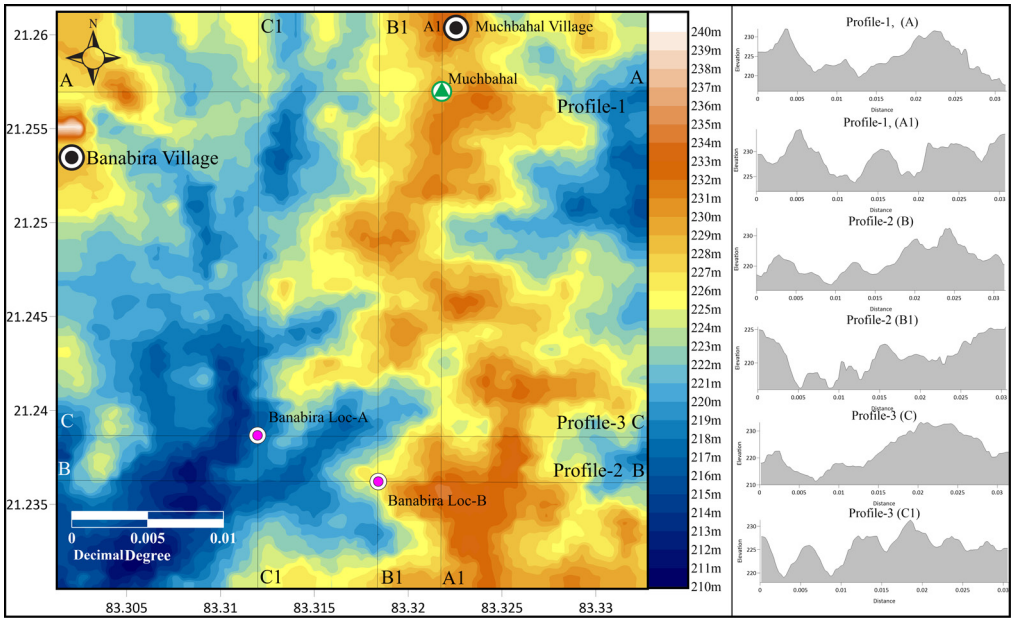

Figure 9 Digital Terrain modelling of the Banabira site.

The exposed lithics scattered in different geomorphological contexts were thoroughly studied and the artifacts were collected using simple random sampling, systematic random sampling, cluster sampling and dog leash method was followed and their extent was recorded. The artifacts were sampled systematically from the surface by taking photographs and geo-coordinates for further detailed techno-typological analysis in the laboratory.

LITHIC ASSEMBLAGE COMPOSITION

Explorations conducted in the Utali and Ghensali streams resulted discovery of six Late Acheulian sites, one Middle Palaeolithic site, and 36 Microlithic sites (***Table 2***). The data in ***Table 2*** clearly shows that majority of the sites are located in the Ghensali stream and its surrounding areas. Explorations in the Utali and Ghensali stream resulted in discovering six Late Acheulian sites with the sporadic distribution of artifacts. The artifacts consist of handaxe, cleaver, polyhedron, scrapper, flakes, cores, and discoid (***Figure 10***). The Acheulian sites in the Bargarh Upland are found in diverse geomorphological conditions such as hill slope, pedimented erosional surface, and river section. The Acheulian artifacts mostly found from the Northern Bargarh Upland are hand axe, cleaver, polyhedron, unidirectional and bidirectional cores, Kombewa flakes, and a variety of scrapper. During the course of exploration, one important Middle Palaeolithic site, named Kundakhai, located on the foothill of an inselberg in the Kundakhai village of the Bargarh district were explored. The site was recorded, and a total 862 artifacts were collected from the foothill, hillslope, and hilltop (***Figure 11***). The majority of the lithic assemblage are prepared on the locally available silicified raw materials of which the inselberg is formed (***Figure 12***) and on which the percussion marks are found on the top of the hill. The Silicified rock is predominant lithic raw material in the lithic composition which is 93.62% of the total assemblage followed by Milky quartz 3.71%, chert 2.44% and Quartzite 0.23% (***Table 3***). Some of the noted toolkits found from the sites are Levallois cores such as Recurrent Levallois core, Preferential Levallois core, and discoidal cores (***Figure 13***). Above all a large number of Levallois flakes, Non-Levallois flakes, few blades, and bladelets were found (***Figure 14***). Besides this, a single Handaxe was found prepared on chert.

Table 2 Location and other details of the explored sites.

(X) Represent the context of the site.

SL. NO.	NAME OF THE SITE	LATITUDES	LONGITUDE	ELEVATION	CULTURAL PERIOD	RIVER	CONTEXT OF THE SITE		
							FOOT HILL	ROCKY OUTCROP	RIVER BANK/ EXPOSED SURFACE
1	Kermeli	21.26569	83.28086	255	Microlithic	Ghensali	X		
2	Sargunapali	21.20832	83.26401	234	Late Acheulian	Ghensali	X		
3	Muchbahal	21.25699	83.32162	230	Late Acheulian	Ghensali			X
4	Banabira-B	21.2363	83.31804	226	Microlithic	Ghensali			X
5	Katapali	21.19374	83.26733	225	Microlithic	Ghensali			X
6	Banabira-A	21.23878	83.31165	216	Microlithic	Ghensali			X
7	Morekel-A	21.24274	83.38458	213	Late Acheulian	Uttali			X
8	Jhankarpali	21.19258	83.3136	211	Late Acheulian	Ghensali	X		
9	Morekel-B	21.2344	83.38187	209	Late Acheulian	Uttali			X
10	Battherma	21.13101	83.26693	207	Microlithic	Battherma Nala			X
11	Sanbausen	21.20682	83.34964	205	Microlithic	Uttali			X
12	Ghensali-B	21.1939	83.30396	205	Microlithic	Ghensali			X
13	Ghensali-A	21.19592	83.30292	205	Microlithic	Ghensali			X
14	Kundakhai	21.06433	83.28885	204	Middle Palaeolithic	Ghensali	X		
15	Talpadar	21.19528	83.356	202	Microlithic	Uttali		X	
16	Bijapali	21.12929	83.27646	201	Microlithic	Battherma Nala			X
17	Birjam	21.12687	83.28697	199	Microlithic	Battherma Nala		X	
18	Kalangapali	21.17309	83.30369	198	Microlithic	Ghensali			X
19	Malamanda	21.04273	83.27405	193	Microlithic	Mongragod Jhor		X	
20	Bhalupali	21.17812	83.41134	193	Late Acheulian	Uttali			X
21	Telmahul- B	21.0734	83.25432	187	Microlithic	Mongragod Jhor			X
22	Kanpuri	21.169	83.36064	187	Microlithic	Uttali		X	
23	Ghumnipali	21.11533	83.30776	186	Microlithic	Battherma Nala		X	
24	M.Srigida	21.17667	83.37465	183	Microlithic	Uttali			X
25	Telmahul-A	21.06642	83.25095	182	Microlithic	Mongragod Jhor			X
26	Kamalpdar	21.11332	83.31686	179	Microlithic	Ghensali			X
27	Guderpali	21.09959	83.31707	175	Microlithic	Ghensali			X
28	Badipali-A	21.14557	83.36832	175	Microlithic	Uttali			X
29	Kujamunda	21.09588	83.32998	174	Microlithic	Ghensali			X
30	Badipali-B	21.13069	83.37523	173	Microlithic	Uttali			X
31	Cherengamunda	21.11238	83.38795	171	Microlithic	Uttali			X
32	Chikhli	21.07897	83.33299	169	Microlithic	Ghensali			X
33	Rengalpali	21.07941	83.33221	168	Microlithic	Ghensali			X
34	Temri	21.0674	83.33557	167	Microlithic	Ghensali			X
35	Laumunda	21.09438	83.39822	167	Microlithic	Uttali			X
36	Jugibandhli-A	21.03261	83.25123	166	Microlithic	Mongragod Jhor			X
37	Ganiapali-B	21.01456	83.2584	166	Microlithic	Ong			X
38	Jugibandhli-B	21.02206	83.25377	165	Microlithic	Mongragod Jhor			X
39	Haldipadar	21.0634	83.33843	165	Microlithic	Ghensali			X
40	Ganiapali -A	21.01582	83.25637	165	Microlithic	Ong		X	
41	Buromunda	21.05015	83.3552	162	Microlithic	Ghensali			X
42	Babupali	21.02752	83.3584	156	Microlithic	Ghensali			X
43	Putkigrijail	21.05009	83.4345	154	Microlithic	Uttali			X

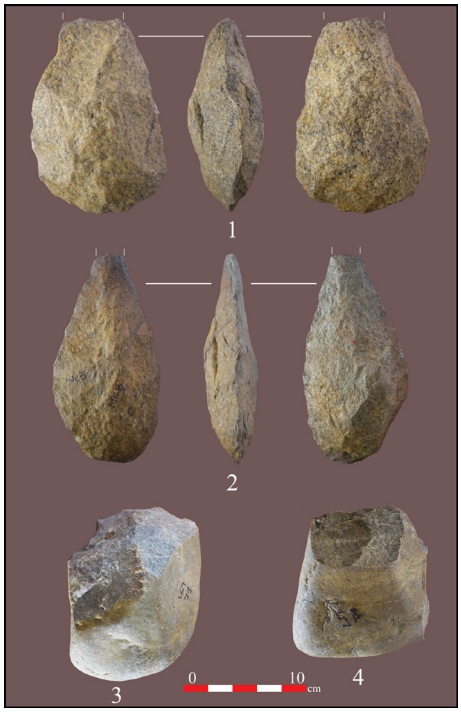

Figure 10 Hand axe (1 & 2) and Chopper (3 & 4).

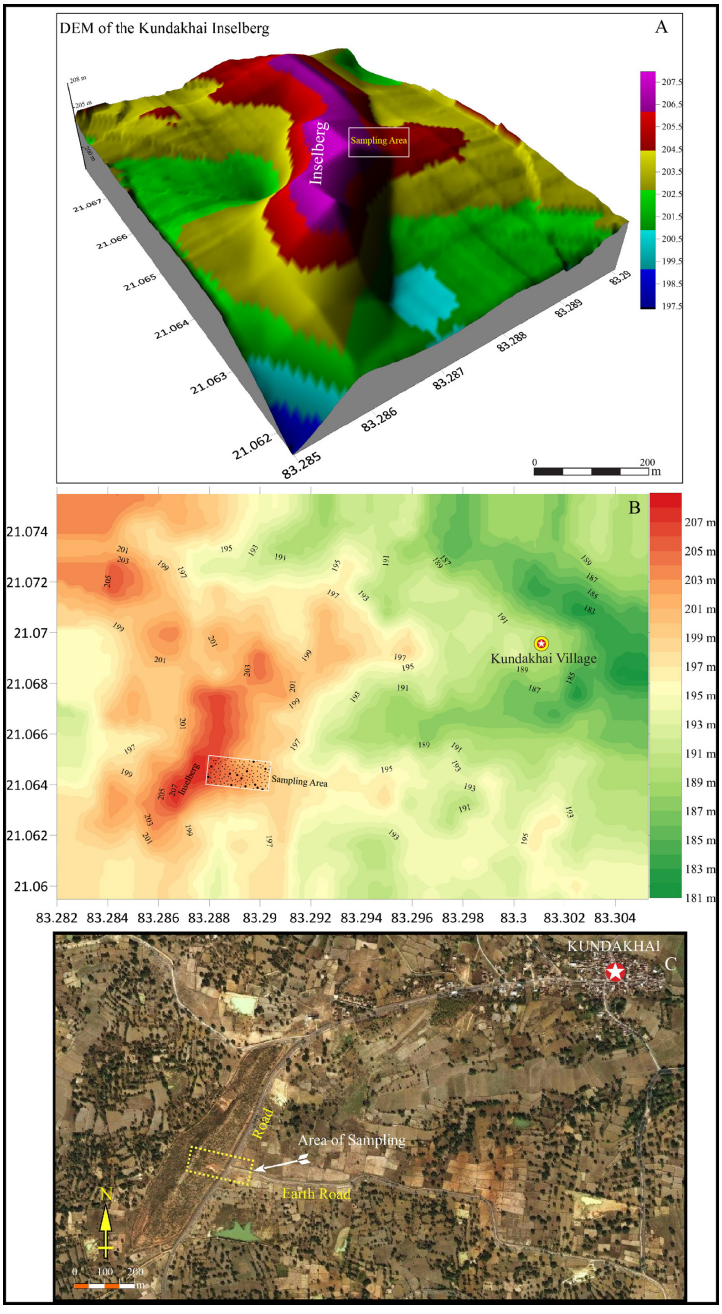

Figure 11 3D plan of the Kundakhai site & inselberg **(A)**, Contour plan of the site, inselberg and its surrounding area **(B)**, Satellite view of the inselberg and artifact sampling area **(C)**.

Figure 12 A general view on the top of the Inselberg at Kundakhai site **(A)**, Scattered Middle Palaeolithic artifacats at the foot hill of the inselberg at Kundakhai **(B)**.

RAW MATERIAL TYPE	CORE	DEBITAGE	SHAPED TOOL	HAMMER	WASTE	TOTAL	
	n	n	n	n	n	n	%
Silicified Rock	127	266	137	0	277	807	93.62
Chert	3	6	3	0	9	21	2.44
Milky Quartz	0	9	0	0	23	32	3.71
Quartzite	0	0	0	2	0	2	0.23
Total	**130**	**281**	**140**	**2**	**309**	**862**	**100**

Table 3 Use of raw material at Kundakhai Site.

Microlithic sites are found throughout the study area, and the artifacts found from most of the sites contains core, flake, blade, bladelet, points, Levallois point, retouched flake, retouched blade, retouched bladelets, burin, triangle, crescent, lunate, trapeze, scrapper, Isosceles triangle, denticulate, notch etc. From the present study area, 36 microlithic sites has been reported and a total n of 8266 artefacts were studied (***Table 4***) out of which 2063 are lithic waste product which represents 24.96% of the total assemblage. A total n of 6203 lithic artifacts were studied

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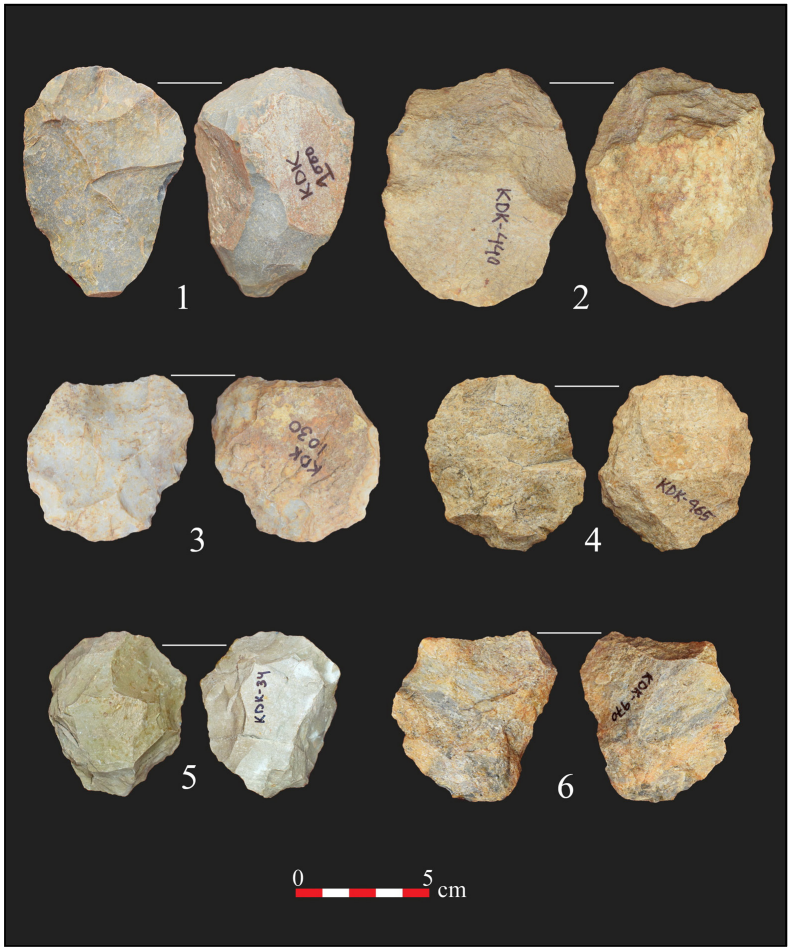

Figure 13 Recurrent Levallois core (1–2), Preferential Levallois core (3–4) and Discoidal core (5–6) from Kundakhai site.

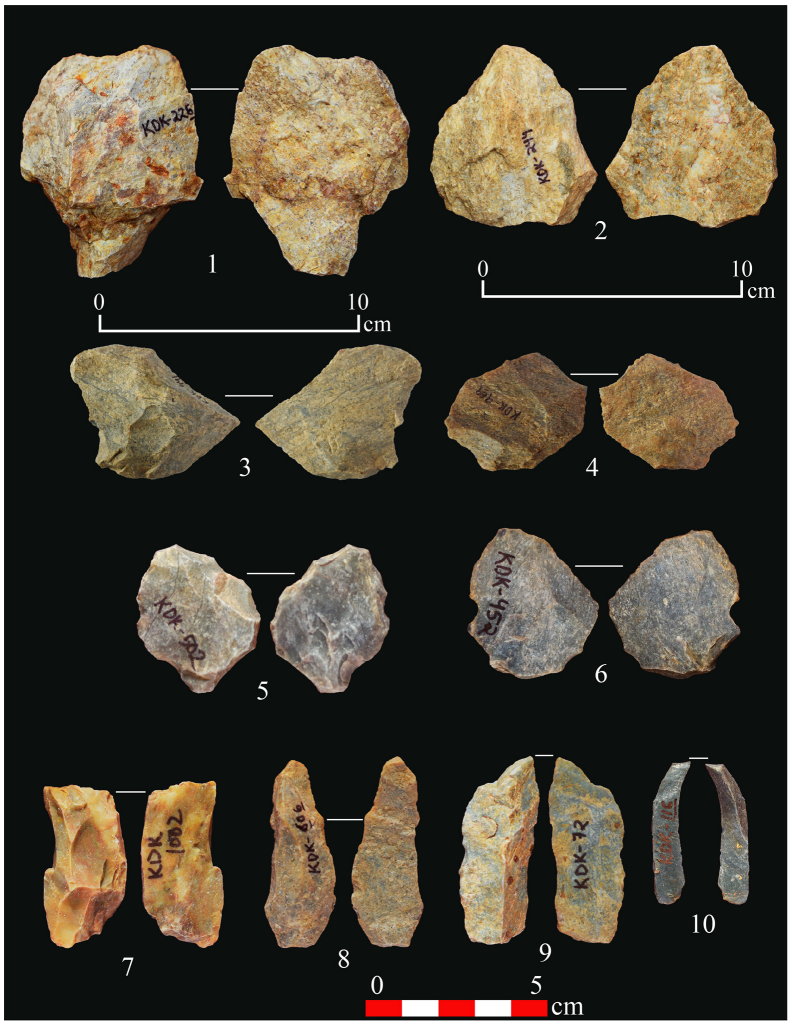

Figure 14 Pseudo Levallois tanged point (1), Levallois point (2 & 6), Levallois flake (3–4), Side scrapper (5), Blade (7–9), Offset dihedral burin (7), partially retouched Lateral (9), Bladelet (10) from Kundakhai site.

out of which contains 1159 n of core which occupies (14.02%) of the total lithic assemblage, flake contains 3621 n and it occupies (43.81%) of the total lithic assemblage, besides this 736 n of blades which occupies the (8.90%) of the total lithic assemblage and 680 n of bladelet were collected which represents (8.23%) of the total lithic assemblage, 3 hammer made of quartzite pebble were found and it represent 0.04% of the total lithic assemblages along with this 4 red ochre nodules were found from three open air sites which represents 0.05% of the total lithic assemblage. Out of this total assemblage composition the retouched percentage for core is 0.57%, flake 67.55%, blade 17.46% and bladelet is 14.42%. The assemblage clearly dominated by the flakes followed by core than blade and bladelet.

ARTEFACT CATEGORY	TOTAL n	%	UNRETOUCHED n	%	RETOUCHED n	%	PERCENTAGE UTILIZED
Core	1159	14.02	1153	22.42	6	0.569	0.52
Flake	3621	43.81	2909	56.56	712	67.55	19.66
Blade	736	8.90	552	10.73	184	17.46	25.00
Bladelet	680	8.23	529	10.29	152	14.42	22.35
Hammer	3	0.04	–	–	–	–	–
Red Ochre	4	0.05	–	–	–	–	–
Total	6203	75.04	5143	100.00	1054	100.000	67.53
Waste	2063	24.96					
Grand Total	8266	100.00					

Table 4 Assemblage composition of Microlithic sites in the middle Ong basin.

Core constitutes total 14.02% of the Assemblage and the cores from the assemblage are unidirectional and bidirectional flaked, fluted core, chips chunks are found from these sites (***Figure 15***). Microlithic components are found along with chopper from some of the sites (***Figure 10*** $_{(3–4)}$). Chert and quartz are extensively utilized in the river for manufacturing microlithic artifacts. However, in the Ghesali river, chert is extensively utilized for the manufacturing of microliths (***Figure 16***). In both the river, local materials chert and quartz are utilized for manufacturing artifacts, and rarely quartzite has been used for making the large flake-based tools. From the Microlithic site of the Ghumnipali located on the right bank of the Battherma stream, 20 cup marks were found scattered on the granite boulders outcrop (***Figure 17***). The average diameter is 8–10 cm, and the depth of the cup mark is between 10–14 cm.

RAW MATERIAL USE

Stone tools are a key element of most prehistoric archaeological assemblages, and they have long been studied as sources of information on many aspects of prehistoric life (Wilson 2007, Andrefsky Jr. 1994). The sourcing of lithic raw material and understanding whether or how different materials were curated and recycled bear important implications for understanding site catchments, site exploitation territories, and hominin land use patterns (Vita Finzi and Higgs 1970, Binford 1979, Bailey and Davidson 1983, Feblot-Augustins 1993, Fernandes et al. 2008). During the exploration, the raw material sources near the foothill, outcrop, and river basin were closely observed and recorded. Vein Quartz is abundantly available in nodule form and chunks within the weathered granite bedrock in the Uttali river, and small to medium-sized nodules, and pebbles are found near river channel, in the form of section, transported, or surface-exposed deposits. However, the Ghensali river basin is found with large chert beds, and the angular and subangular clasts are found in the river channel (***Figure 18***). Chert and quartz are extensively utilized in the Ghensali, Uttali, and Mongragod stream, which are a part of the Middle Ong basin. From the Ghensali river, a total 3380 artifacts were collected, out of which Chert (60.65%) is the predominant raw material for lithic manufacturing, Quartz (20.50%) followed by Silicified rock (16.09%) from the total assemblage of the Ghensali stream. In the Uttali stream, a total 911 artifacts were collected, out of which Quartz (69.37%) is the predominant raw material for lithic manufacturing, followed by chert (26.78%) of the total assemblage collected from Uttali stream. A total no of 1912 artifacts were collected from the Mongragod stream, where Chert (59.68%) is the predominant raw material for lithic manufacturing, followed by Quartz (36.09%) of the total assemblage recovered from the Mongragod Jhor (***Table 5***).

Figure 15 Opposed platform opposite face blade-bladelet core (1), Flake Core (2), Flake blade core (3), Unidirectional Core (4–5), Bidirectional Core (6), Flake (7), Levallois point (8 & 12), Blade (9–11), Lunate (13–15), Bladelet (16–18), Baked bladelet (19–20).

Figure 16 Microliths from the site of Bijapali **(A & B)**, Telmahul **(C)** and Ghensali **(D)**.

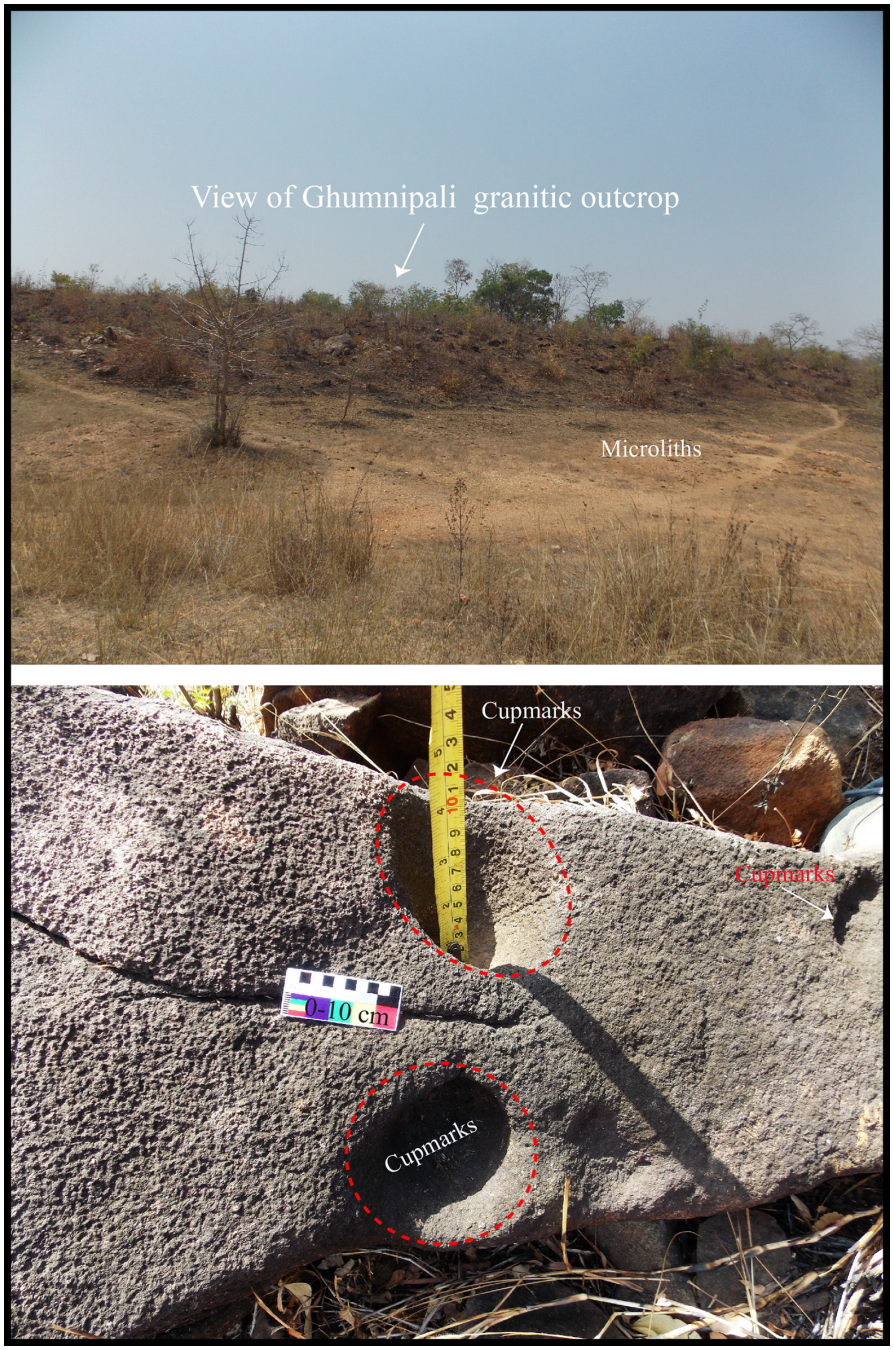

Figure 17 General view of the Ghumnipali site and Cupules on the granite out crop at the site of Ghumnipali.

Figure 18 A General view of the angular and sub-angular chert clast from the Ghensali river bed.

RAW MATERIAL TYPE	GHENSALI STREAM		UTTALI STREAM		MONGRAGOD STREAM		TOTAL	
	n	%	n	%	n	%	n	%
Chert	2050	60.65	244	26.78	1141	59.68	3435	55.38
Quartzite	48	1.42	11	1.21	26	1.36	85	1.37
Quartz	693	20.50	632	69.37	690	36.09	2015	32.48
Crystal	7	0.21	2	0.22	3	0.16	12	0.19
Silicified	544	16.09	8	0.88	24	1.26	576	9.29
Sandstone	14	0.41	1	0.11	9	0.47	24	0.39
Jasper	12	0.36	5	0.55	5	0.26	22	0.35
Chalcedony	7	0.21	8	0.88	14	0.73	29	0.47
BHRJ	1	0.02959	–	–	–	–	1	0.02
Red Ochre	4	0.11834	–	–	–	–	4	0.06
Total	**3380**	**100.00**	**911**	**100.00**	**1912**	**100.00**	**6203**	**100.00**

Table 5 Distribution pattern of raw material from different stream of Middle Ong basin.

In Prehistoric material records, the usage of red ochre is often well-considered as a major depiction of contemporary human behaviour, symbolism, cognitive and linguistic capabilities (Behera and Thakur 2018). The use of red ochre was found from the African Middle Stone age context, and over the past decades, several functional hypotheses have been proposed for the use of ochre. It has been shown to have antiseptic properties and constrain collagenase's bacterial production (Rifkin 2011: 131–158, Rifkin 2012). The use of red ochre is mostly found in the cave or rock shelter context, the use of red ochre in the open-air site was reported at Torajunga (Behera and Thakur 2018, Behera et al. 2020) in the late Middle Palaeolithic context from Bargarh Upland, Odisha. In the Middle Ong basin, the three open-air sites, i.e., Bijapali, Jugibandhli, and Telmahul from where rubbed red ochre or hydrated iron oxide, has been found from the Microlithic context from the surface exploration (***Figure 20***). The nearest source of red ochre lies more than a hundred twenty kilometres further north of these sites in the Permian-Triassic Kamthi Formation in Sundargarh district of Odisha. The present evidence suggests that the late Pleistocene microlith using communities of this area have imported red ochre from a distant source.

The artifacts collected from the sites of the study area were divided into three Geomorphological units, i.e., 1. Foot hill 2. River bank and 3. Rocky out-crop. A total number of 6196 artifacts were studies where there is predominance distribution of artifacts in the riverbank context (69.42%), rocky outcrop context (21.01%) and followed by foothill context (9.57%) (***Table 6***). Due to extensive agriculture in the foothill of Jhanj-Malaikhaman hill range prehistoric sites are found in very less number as compare to the riverbank and rocky outcrop context in the study area.

NOTES ON EXPOSED STRATIGRAPHY

At the site of Morekel, an exposed section was noticed with microliths and middle palaeolithic artefacts are found in the primary context (***Figure 19***). The sediment strata seen in the section are developed primarily under insitu weathering conditions, mafic- felsic mineral-rich, old rock, and the resulting residual matter is deposited in the stratified conditions. It is observed that the top layer is deeply weathered from the atmospheric agents due to its surface exposure. The second layer shows fine textured, thick, compact, undisturbed soil of nearly uniform tone, deposited by the effect of decomposition and disintegration of the lower. The third layer of medium thickness shows irregular deposition of coarse-grained sediments in insitu condition. The highly angular shape of theses sediments deposited under stress, fused with each other and shows common boundaries. This layer is rich in pebble, cobble, and coarse sand-sized sediments cemented grains, well cemented by silty, and fine-grained ferruginous clay. The bottom-most layer in the section shows irregular contact with the upper layer and is composed of coarse-sized angular to sub angular, moderate to deeply weathered, in-situ, coarse grade sediments at the top while fine-grained at the bottom. It clearly shows the deposition variation in two phases; indicate less denudational effect for the upper layer and high for the lower. The coarse-grained upper part of layer is basically composed with coarse sand and few pebble grades, and are well cemented

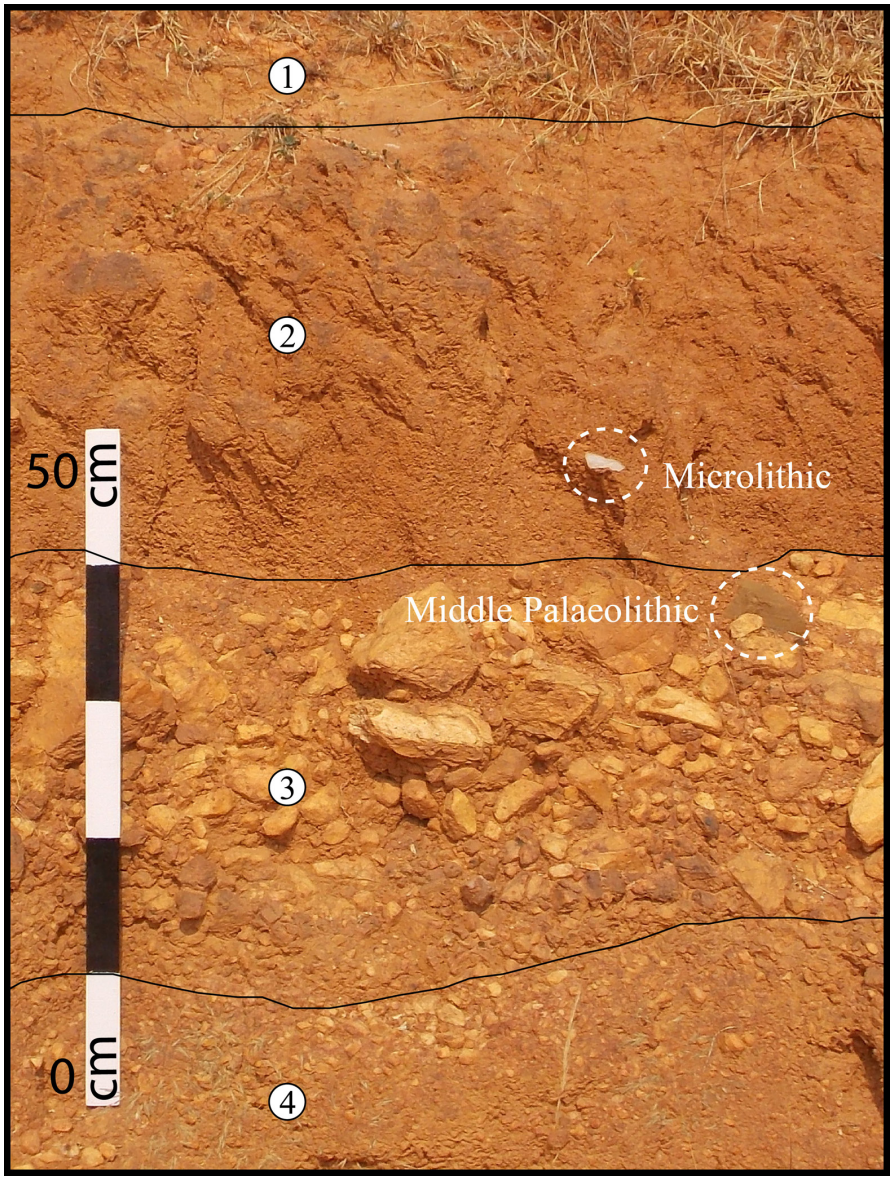

Figure 19 Exposed section at the Morekel site.

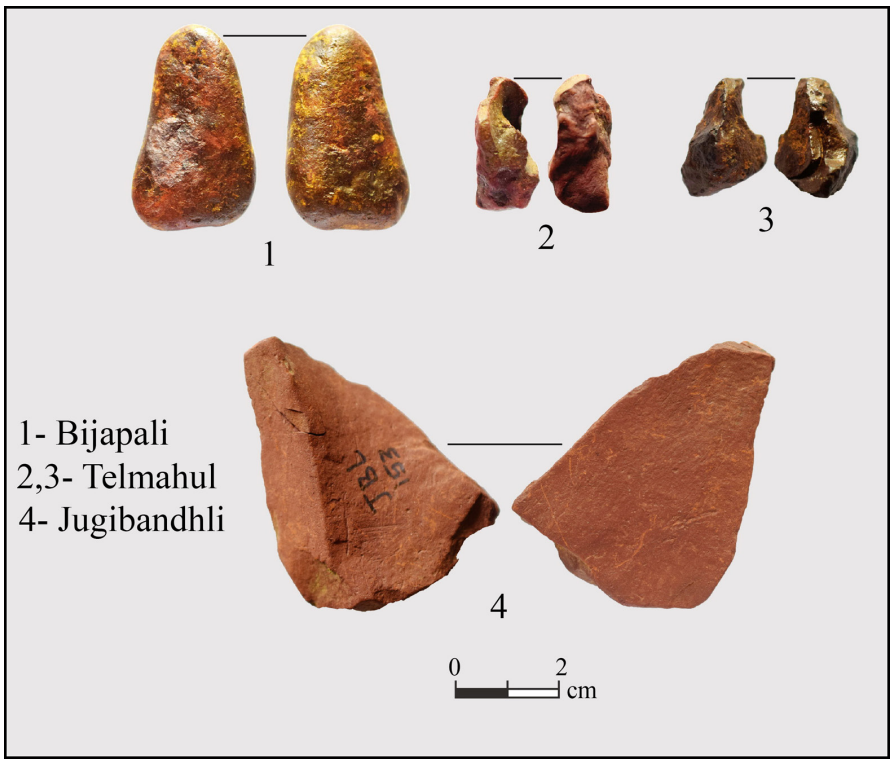

Figure 20 Used/unused red ochre from the open air Microlithic site of Bijapali, Telmahul & Jugibandhli.

CONTEXT	FOOTHILL		RIVER BANK		ROCKY OUT CROP		TOTAL	
ARTEFACT TYPE	n	%	n	%	n	%	n	%
Core	145	24.45	772	17.95	242	18.59	1159	18.71
Flake	405	68.30	2495	58.01	721	55.38	3621	58.44
Blade	39	6.58	536	12.46	161	12.37	736	11.88
Bladelet	4	0.67	498	11.58	178	13.67	680	10.97
Total	**593**	**100.00**	**4301**	**100.00**	**1302**	**100.00**	**6196**	**100.00**
%	**9.57**		**69.42**		**21.01**		**100.00**	

Table 6 Distribution of pattern of artifacts in different geomorphological units.

with fine textured silty, ferruginous clay cement. As a result of prolonged and deep in-situ weathering in the old rocks has produced a thick layer of unconsolidated saprolite material and hence a clayey overburden, deposited over the country rock.

DISCUSSION

The exploration conducted in the middle Ong valley with particular reference to the Ghensali, Uttali and Mongragod stream has brought significant evidence of stone age occupations in the Middle Ong basin. Unlike the other areas, the river and its tributaries are quite potential for prehistoric research. Close to the area is the river Jira and Ong, which has already yielded several prehistoric sites. As the river Jira is dividing the Bargarh Upland into two-part northern and southern parts, particularly in the northern part of the Bargarh Upland, it is found that the prehistoric inhabitant has widely exploited the quartzite, fine grained quartzite, dolerite for manufacturing the Lower Palaeolithic artifact as the source of raw materials Debrigarh and Lohara massif are within 5–10 km range. During the microlithic phase, the inhabitant used cryptocrystalline materials like chert, chalcedony, quartz, crystal, which are locally available. Nevertheless, in the southern Bargarh Upland, after crossing the Jira river, changes can be observed in the raw material exploitation strategy of the inhabitant. Only a few Palaeolithic sites are found and observed with sporadic use of quartzite and sandstone raw materials but dense distribution of microlithic sites are found with extensive use of variety of chert, chalcedony, jasper, silicified rock, quartz and crystal in the study area. Further, if excavation will take places at the several selected site in the Middle Ong valley it will contextualize the Late Acheulian, Middle Palaeolithic and microlithic phases of artefact and it will throw valuable light to understand the Prehistoric chronology, and contextualizing of red ochre also. The red ochre will throw valuable light on the symbolic and cognitive ability of the inhabitant of this area. As this area has a great potentiality in respect of raw material resource, perennial water availability, and suitable environment for the prehistoric inhabitant.

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COMPETING INTERESTS

The authors have no competing interests to declare.

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