Survival Spectrum of Prehistoric Tradition in Umiam-Kapili River Valley of West Karbi Anglong, Assam

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Smita Devi Bora
Department of Anthropology, Gauhati University. E-mail : smitadevi@gauhati.ac.in

Abstract: *Reconstructing an area's unwritten history and past cultures can be deduced from the systematic study of archaeological sites and material vestiges of the past. There has been limited research work undertaken in this outlook in Karbi Anglong district of Assam because of socio-political issues and the region's remote, hilly environment. This research aims to unearth the archaeological resources from the western region of Karbi Anglong district and determine their relevance. Baolagog, Lembra and Umswai are the three villages where the fieldwork has been conducted. Field data have been gathered using archaeological explorations, and interview methods. The investigator encountered remnants of pottery and stone artifacts, especially celts. Potsherds were recovered on surface and in exposed sections which produced 195 number of ceramic sherds. Ethnoarchaeological methods including comparative analogy, petrographic examination, and X-ray diffraction (XRD) analysis were employed to evaluate ceramic sherds. Mineralogically similar composition is implied by the results of XRD analysis on samples obtained from both surface and exposed sections. Petrography has identified coarse particle mineralogy, added tempering materials and possible ceramic production processes. Typo-technological evaluation of ceramic sherds, along with existence of polished-stone artifacts (celts) and proximity of monolithic stone construction site provide a basis to investigate this situation ethnoarcheologically. Ceramic sherds and stone artifacts of the examined region; ancient monolithic alignments of stones, a historical form of subsistence; shifting agriculture; and continued utilization of clay vessels in ceremonial rituals by the local residents may be connected through time since a long antiquity. Therefore these elements have made it obvious that there is a basis to understand the area's possibility as a place of ancient habitations.*

Keywords: *Pottery, XRD, Petrography, Celt, Continuity*

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Introduction

Archaeological remains provide information of past human behaviour, furnishing important insights into past technology, subsistence patterns, clues to past ideals as well as belief systems and practices associated with it. Archaeological interpretation historically has been strongly influenced by cultural anthropology theory (Lamberg–Karlovsky 1989;Trigger 1989). Cultural anthropology, the study of modern human population helps archaeologists to understand about the mechanics of cultural system wherefore the archaeological record might reflect portions of the system. Archaeologists have to be deeply aware of phenomena in contemporary societies to make inference about the past. Northeast India is defined by highlands and mountain ranges in the north, northeast, east, and southeast, while drift less area and low-lying floodplains characterize the southwest and western regions. Northeast India is the eastern most region of India comprising eight states – Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Tripura, Nagaland and Sikkim. With its geographical location at 26.14°N and 91.77° E, the North eastern state of Assam lies in the river valleys of Barak and Brahmaputra. Edging in the southern region of Assam lays the luxuriant hill district, Karbi Anglong, formerly known as the Mikir hills within 25.84°N latitude and 93.43ºE longitude.

The Karbi Anglong district is located in Assam's south-central region and is characterised by a steep hilly topography, dense tropical forest and inhabited primarily by tribes along with few caste population. The district covers an area of 10,434 km^2 (Census Report 2011; MSME Report 2013-14) and majority of which is constituted with hills, except in few areas along the banks of the Myntriang, Karbi-Langpi, Kopili, and Amreng rivers. The hills make up the majority of the eastern portion of the undivided Karbi Anglong culminating at the plains of the Brahmaputra in the north and the plains of the Dhansiri and Jamuna valleys in the east and west, respectively (Phangcho 2001). The Karbi plateau physiographic zone is made up of two large highland blocks separated by the Kopili river valley. The Mikir hills cover the eastern highland block of the plateau, and this highland block is larger than its western counterpart. The East Karbi Anglong district is part of the Karbi plateau's eastern highland block, while the West Karbi Anglong district of Assam is part of the western highland block. The eastern highland block is 7366 km^2 in size, whereas the western highland block is 3068 km^2 (Bora 2022). The resistant Surma series sandstones that lie beneath them have contributed to the peculiar hard terrain with a few of entirely relic type hills as a result of considerable weathering and denudation. This hill zone features a range of climates in different places due to its terrain. The process of soil development in Karbi Anglong is generally gradual, as it is built on a base of Precambrian gneiss rock. The western Karbi Anglong is made up of hills that are a part of the Shillong Plateau, with elevations ranging from 150 meters to over 1219.20 meters above sea level (Sarkar et al., 2021), with the exception of a few narrow stretches of flat terrain around major rivers.

Karbi Anglong district of Assam plays a significant role in archaeological research of North East India. Number of sites along with their ancient remains have been recovered and documented by scholars like Medhi (1990 ; 2002 ; 2003), Bezbaruah (2003), Senar (2016), Das (2019), Patar and Hazarika (2023) on Karbi Anglong till date. Though rich in archaeological findings, very less work has been done in this area. This paper attempts to unearth archaeological resources and interpret them to understand their significance and comprehend their anthropo-archaeological relevance.

Study area

The study has been carried out in western part of Karbi Anglong district of Assam. The district is a part of Karbi Anglong Autonomous Council, Diphu. For the present study, three villages of Karbi Anglong district namely Baolagog, Umswai and Lembra have been considered (Fig.1) which are predominantly

inhabited by the Karbi and the Tiwa community. The Umiam-Kopili river and their tributaries form the floodplains within the research area.

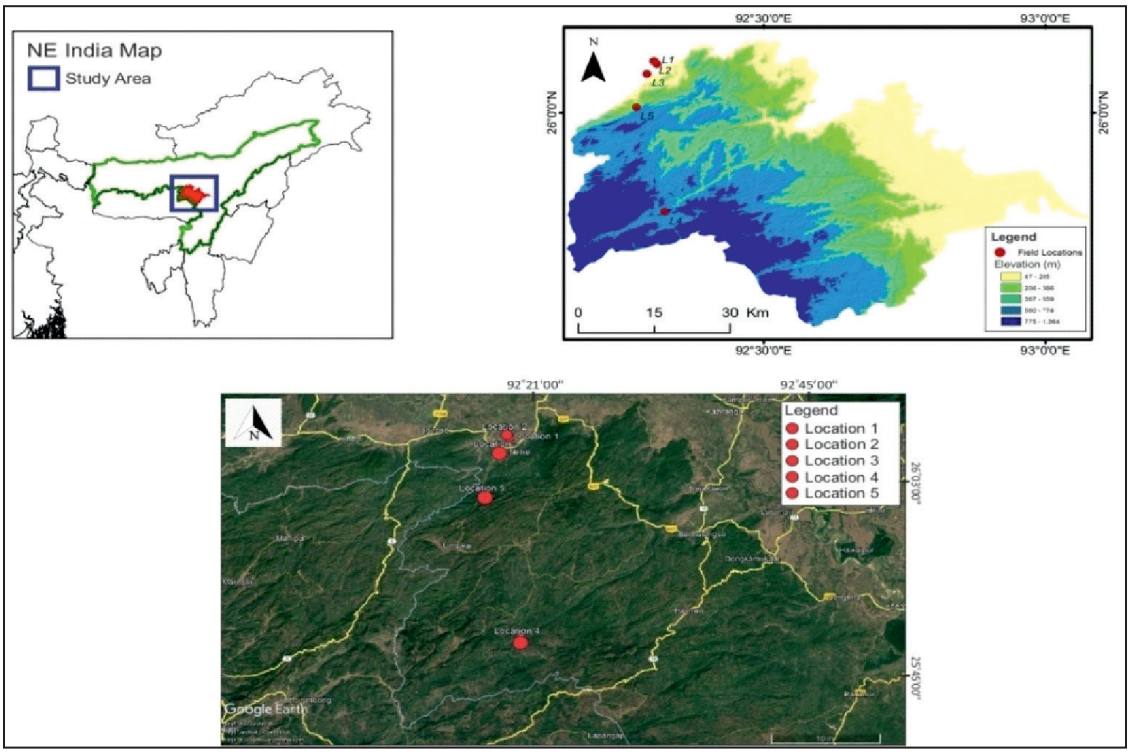

Fig. 1: Locational Map of Study Area

Methods of data collection

Standard archaeological methods of exploration were applied to collect data along with both structured and unstructured interviews. Exploration was conducted within the agricultural fields, mounds, exposed hill sections, rubber garden, monolithic ceremonial ground. Small streams and perennial rivulets in nearby areas were thoroughly explored with extensive surveys. One monolithic site inside the village was previously reported (Bora 2023) and the site was futher explored. Interviews were conducted with village headman, priests, knowledgeable elderly people of the village to collect data on continued age-old traditions and rituals. To conduct exploration, enthnographic fieldwork and to collect relevant information, consent was obtained from the village headman and the village organization committee. An ethno-archaeological approach based on analogy was employed to interpret reconstructed version of pottery. Moreover, Global Positioning System GPS was used to scientifically record the location of each site scientifically. Photographs have been taken both in field situations as well as within laboratory set up. Geomorphological and topographical features were observed and systematically recorded. Peg marking was done on the surface and exposed sections were systematically identified to record the frequency of archaeological materials culture. The materials were collected following due archaeological procedures and analysed further in the laboratory of Gauhati University. A few petrographic slides of recovered potsherds were prepared in the laboratory of the department of Geological Sciences, Gauhati University, in order to find the coarser minerals. Further, X-Ray Diffraction analysis for clay portion was carried at the Department of Instrumentation and USIC laboratory of Gauhati University to find out the mineralogical composition of finer fractions of the potsherds. Clay portion was separated from disintegrated potsherds by utilizing the pipette method of sedimentation and Stoke's law of Settling Velocity.

Findings

Baolagog is a small village situated 65 kms away from Guwahti city towards southeast direction and 14 km away from National highway 27 near Nellei town. The area is adjacent to the Assam-Meghalaya border. Climate of the area is moderate and humid. A number of streams and rivulets that originate in the Khasi hills flow through this region among which mention may be made of Kapili, Barpan, Umiam etc. the topography of the village is marked by mountain ridges on southern and eastern direction which forms a 'V' shaped valley. The valley is formed in an undulating manner where settlements of people have been prominently noticed. Towards the foot hills, patches of agricultural lands have been noticed where paddy along with tubers are cultivated in a simple manner known as creek cultivation. The region is largely covered by tropical semi evergreen woodland with patches of moist deciduous forests. The colour of the soil ranges from dark brown to reddish brown and texture is medium to fine. Towards the foothills, a rubber plantation garden was reported, where a few potsherds were observed on the surface in the south-western direction. The entire area bearing potsherds and stone artifacts is divided into two parts and marked as locality I and locality II for the present study. Between the two localities, there is a community ground where few monolithic arrangements have been observed. The villagers regarded this area as ceremonial ground with a living tradition of stone erection on the death of their clan members.

Baolagog Rubber Garden :Locality I (Coordinates 26°5′64′′N, 92°18′38′′E, Elevation153 m)

Fig. 2: Potsherds scattered on surface near rubber garden

The rubber garden is situated towards south-west direction about 800m away from village entrance where potsherds were found scattered on the surface (Fig. 2). This garden gradually merges with the agricultural field towards the foothills where potsherds were agin reported. A few potsherds have also been reported from the exposed section in the foothill area, where agricultural activities were probably done earlier by the villagers. This locality is extended about 7 m in length and 3.5 m in breadth. The ceramic sherds were systematically collected. Prior to collection, the frequency of occurrence was checked with the help of peg marks. From the surface total 105 number of potsherds (Table 1) were

recovered out of which there are 70 rims and 35 without rims. The density of potsherds is 4.28 units per square metre.

Agricultural mound: Locality II (Coordinates 26°5′88′′N, 92°18′19′′E, Elevation 154m)

Fig. 3: Locality II

A mound adjacent to the rubber plantation was also recorded, yielding a few potsherds along with two celts from surface collection. This area is marked as the locality II (Fig. 3), covering an area of 20.7 m in length and 10 m in breadth and characterized by sparse vegetation with tubers and local herbs. A total of 20 potsherds (Table 1) were recorded, of which 10 are rim sherds and 10 are body sherds. The artefact density is 0.09 per square metre, and the assemblage is sparsely distributed.

Baolagog Ceremonial Ground: Locality III(Coordinates: 26°4′54′′N, 92°17′36′′E, Elevation 154 m)

Fig. 4: Ceremonial Ground

The Tiwa and Karbi make up most of the village's population. An alignment of megaliths in the village's northern direction near rubber garden was reported (Bora 2023). Rubber plantations fill the area to the north, Baolagog settlement to the south, agricultural fields to the east, and a few hills to the west. A Tiwa villager's death is invariably commemorated with the erection of a stone, a complex religious ceremony, followed by a community or clan feast. A total of 71 megaliths in various states of preservation, fully standing, partially fallen, and completely fallen have been identified at this living community site (Fig. 4). The monoliths are oriented along a south-north axis.

Exposed Potsherd Bearing Section

One exposed section was reported towards the western periphery of the rubber garden between locality I and II (Fig. 5).This section was exposed due to the extension of rubber plantation and agricultural activity. The vertical extension of the section is 7.06 m and horizontally extended upto 56.75 m.

Fig. 5: The Exposed Sectionpaired with close view of potsherds after marking

Systematic documentation followed by peg marking was done to understand the frequency of ceramic sherds. From this section, a total of 70 potsherds were recovered (Table 2), of which 33 are rim sherds and 37 are body sherds. The average size of potsherds recorded is 6.5×4.7×1.2cm. The density of potsherds in this section per square meter is about 6 per unit. From Baolagog village total 195 numbers of potsherds (Fig. 6 and 7) have been recovered from surface and exposed section (Table 1).

Fig. 6: Potsherds with impressed design

Table 1: Combined Inventory of Pottery from Baolagog

Surface collection				*Exposed section*		*Total collection*		*Mode of Production*			
Locality I		*Locality II*						*Hand made*	*Wheel made*		
No.	%	No.	%	No	%	No.	%	No.	%	No.	%
105	53.84	20	10.25	70	35.89	195	100	73	37.43	122	62.56

Fig. 7: Few potsherds with rim

Table 2: Inventory from the Exposed section

Ceramic recovered with different parts			*Mode of Production*			
			Handmade		*Wheel-made*	
	No.	*Per cent (%)*	*No*	*Per cent (%)*	*No.*	*Per cent (%)*
Potsherds with rim	23	32.85	10	33.33	13	32.50
Potsherds without rim	47	67.14	20	66.66	27	67.50
Total	70	100%	30	100%	40	100%

XRD Analysis of Potsherds recovered from surface and exposed section

Clay portion was separated from disintegrated potsherds recovered from surface as well as exposed sections from the Baolagog site. The clay separation was done by utilizing the pipette method of sedimentation and Stoke's law of Settling Velocity (Krumbein and Pettijohn 1938). The separated clay portion was mounted on glass slide for XRD analysis. X ray diffraction analysis of clay portion of the potsherds samples was undertaken in the UISC in a pan analytical Empyrean X Ray diffractometer with a Cu anode and K – alpha radiation of 1.5406A° wavelength. The XRD analysis was carried on to 10 samples (5 from surface and 5 from exposed section) from total collection as it completely gets destroyed and the representative diffractograms were attached here.

The X ray diffraction patterns of the samples from Baolagog surface site (BLG S) indicates the presence of Quartzite, Elite, Chaolite, Montmorillonite and Chloride. Prominent peaks of quartzite are located at $2\theta = 20.77°, 35.59°, 39.50°$. peaks of Elite are located at $2\theta = 8.86°$ and $26.68°$. Possibilities of occurrence of Kaolinite is indicated by a peak at $2\theta = 24.96°$. The possibilities of occurrence of Chloride are indicated by the presence of peak at $2\theta = 5.56°, 19.24°$ and $25.59°$ (Fig 8). The peak at $2\theta = 5.56°$ might indicate the presence of Montmorillonite in the analysed sample (Lindholm 1987).

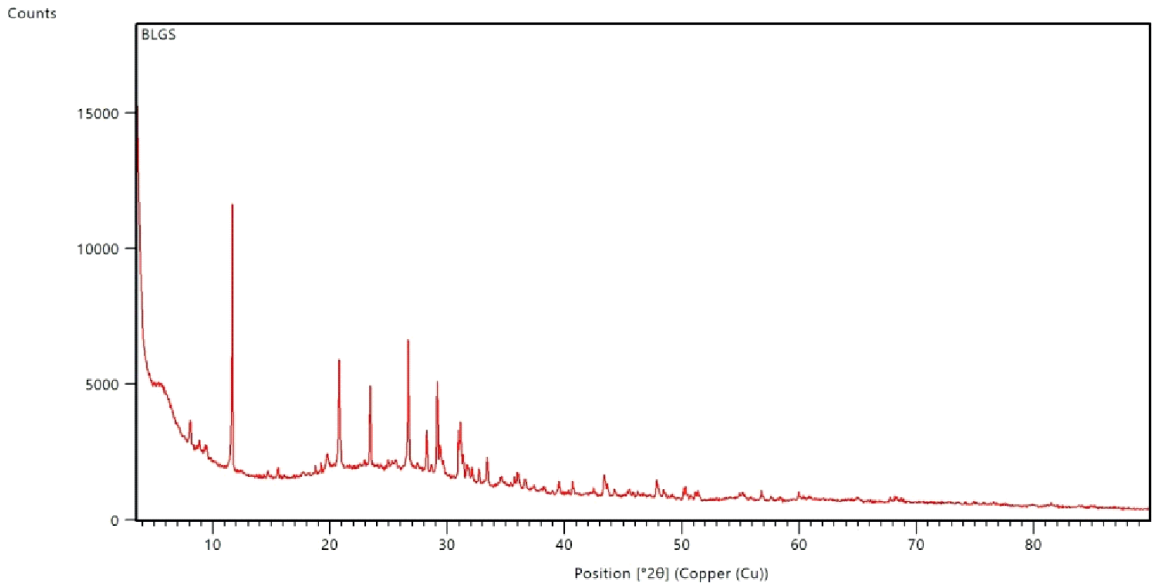

Fig. 8: Representative XRD of Baolagog surface site (BLG S)

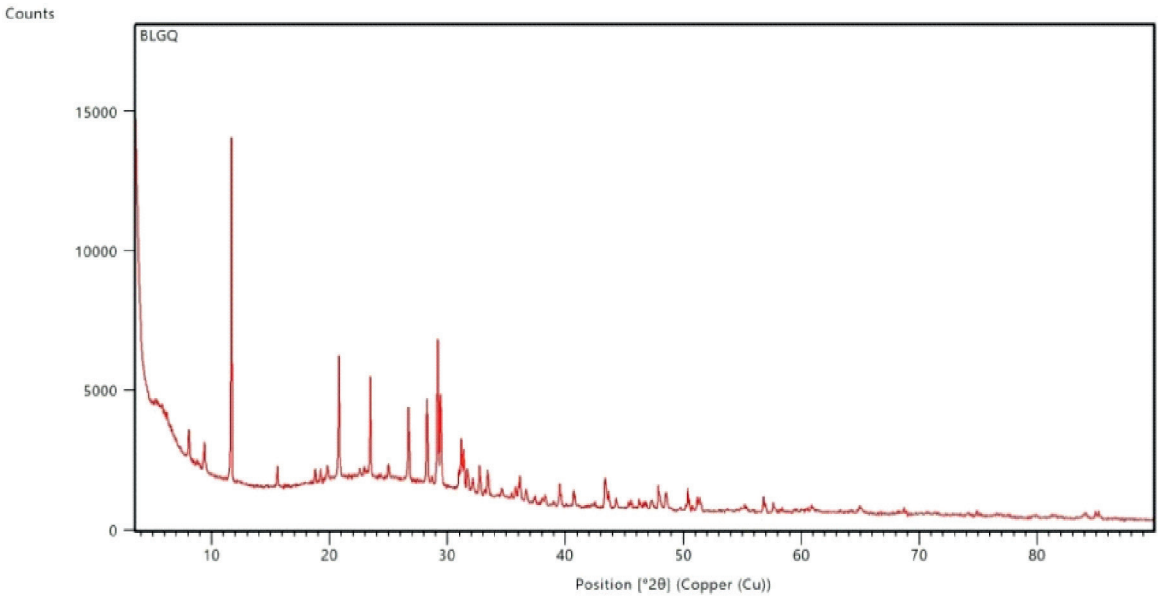

Fig. 9: Representative XRD of Baolagogtrench (BLG ES) Baolagog exposed section

The X ray diffraction patterns of the samples from Baolagog exposed section (BLG ES) indicate the presence of Quartz, Illite, Montmorillonite, Chlorite, Calcite and Heulandite. Prominent peaks of Quartz are located at 2θ = 20.78°, 36.70°, 39.52°. Peaks of Illite are located at 2θ = 8.08° and 26.69°. Possibilities of occurrence of Calcite is indicated by peaks at 2θ = 23.43° and 39.00° (Lindholm 1987). Calcite has been identified in the sample which probably indicates the use of lime stone as a cementing material in the pot making practice. The possibilities of occurrence of Chlorite are indicated by the presence of peak at 2θ = 5.99°, 11.68° and 24.97°. The peak at 2θ = 22.54° might indicate the presence of Heulandite in the analysed sample (Fig. 9). This is a mineral belonging to Zeolite group which is characterised by less amount of water content. This probably might indicate formation of minerals through water during the process of firing of the pottery.

Table 5: Comparative attributes of present (BLG) pottery with adjoining sites of Assam

Sites	*Texture*	*Technology*	*Design*	*Colour*	*Dominant Shape*	*Firing*
Baolagog (BLG) (present findings)	Coarse to Fine	Both Hand made Wheel made	Thick bands, impressed design and circles with dots	Red and Buff	bowl, globular pot, pitcher and shallow vessels like dish or platter	Medium to low
DaojaliHading (DJH) (Goswami and Sharma 1962; Sharma 1967)	Coarse	Mostly hand made	Cord, paddle, stamp impressed, cross hatching, diamond pattern	Grey	No diagnostic type	low
Sarutaru (SRT) (Rao 1973)	Coarse	Mostly hand made	Simple Cord Twisted cord Herring bone and zig zag pattern	Brown, Buff and Grey	Not specified	Medium to low
Marakdola (MRD) (Rao 1976)	Fine	Mostly wheel made	Curve paddle impressed, medium net, Parallel bands, Herring bone	Brown, Buff and Grey	Globular vessels, Spouted vessels, Goblets, Bowls, Dish, Lid	Medium to high
Ambari (AMB) (Hazarika *et.al*. 2022)	Coarse to Fine	Both Hand made Wheel made	Cord and paddle impressed, thick bands, stamped, incised, appliqué decoration	Kaoline, Red and Green Glaze	Lota, Jar,Plates, short necked Globular bowls, Pitcher	Medium to high
Bichikkri (BCK) (Senar 2016)	Coarse	handmade	Devoid of designs	Red	Bowl, cooking vessels. platters	low
KekangAdong (KKA) (Das 2019)	Fine	Both handmade and Wheel made	Cord impressed	Red and Buff	Pot, bowl, platter	Medium to low
Umchi Rani (UCR) (Bora &Bezbaruah 2022)	Fine	Mostly wheel made	Thick bands, impressed-design, cord impress	Red and Buff	Bowl, pitcher Dish	Medium to low
Ganapati (GNP) (Bezbaruah 2020)	Fine	Both wheel made and Handmade	impress design, thick bands, cord impressed, circles with dots	Mostly Buff	Bowls with short neck, spouted vessels	Medium to high

Comparative analysis of present samples with the adjoining pottery sites of Assam reveals (Table 5) that, Baolagog (BLG) sherds exhibits similarity in respect of texture, colour, with Marakdola (MRD), Ambari(AMB), Kekang-Adong (KKA), Umchi- Rani (UCR) and Ganapati (GNP). Technologically present collection is akin to AMB, KKA and GNP. Stylistically the BLG potteries have affinity with all except Bichikkri (BCK). Morphologically they are more similar with MRD, AMB. In respect of firing also, BLG exhibits more similarity with MRD, AMB, and GNP Followed by KKA, UMC, Sarutaru (SRT). The BLG potsherds confirm difference in relation to texture and firing with DaojaliHading (DJH) and BCK pottery.

Petrographic analysis of BLG potsherds

Out of total collection, 10 samples (5 from surface and 5 from exposed section) were randomly selected for petrographic analysis. Prepared fragments of potsherds were mounted on glass slides for thin section petrographic analysis. The specimens were ground to a thickness at which the quartz fragments showed first order grey interference colour. Thin section petrographic analysis indicates a fine siliceous groundmass with numerous concentrations of reddish sub-rounded to rounded materials. These might be fragments of ferruginous materials (Fig.10). Large highly angular and fractured fragments of quartz are found randomly distributed within the fine siliceous groundmass. Large sub-rounded deep-brown

coloured deposits are also found in the groundmass. There are also occasional occurrences of coalified and silicified materials within the groundmass (Fig. 11). Traces of long slender fragments of vegetative materials are also observed within the groundmass (Fig.12). These features indicate the use of vegetative materials like wood fragments, grass, straw and so forth in the preparation of the dough for making pottery. In one sample the groundmass is reddish in colour, indicating the occurrence of high amount of ferruginous materials in it (Fig. 13). Coarser and angular fragments of broken and partially weathered quartz and feldspar grains are found irregularly distributed within the red-coloured groundmass. An interesting feature that has been observed in one sample is the parallel orientation of elongated quartz and feldspar fragments. This probably indicates the effect of tamping during the time of moulding of the pottery (Fig. 14). Opaque desiccated coaly materials are also found within the fine groundmass (Fig.15).

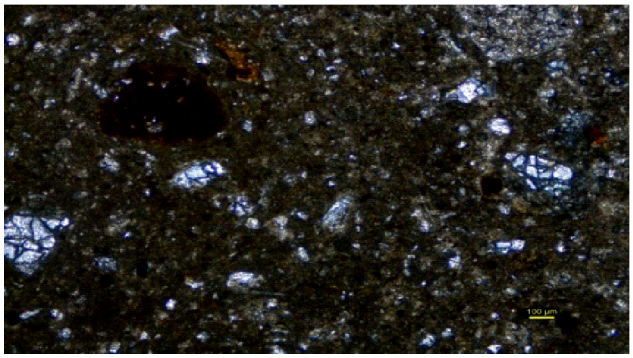

Fig. 10: Fine siliceous groundmass with distributed

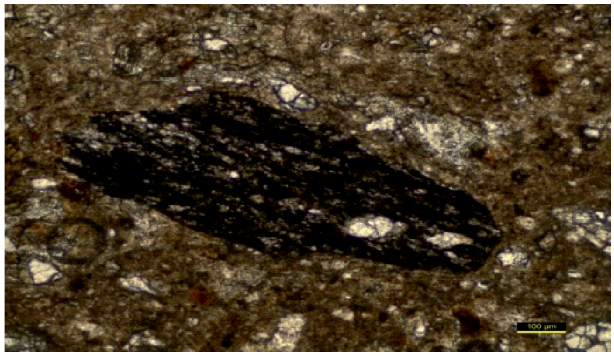

Fig. 11: Burnt woody materials highly angular and fractured quartz fragments.

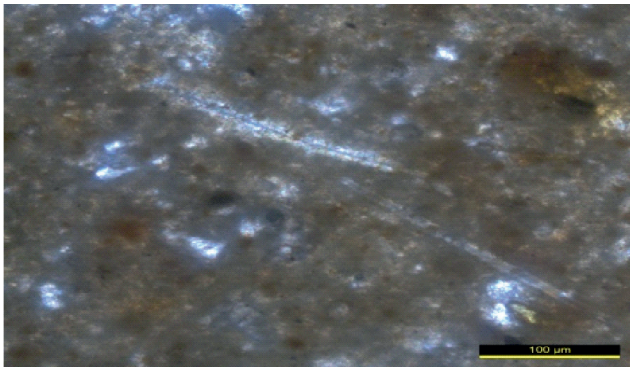

Fig. 12: Slender fragments of vegetative materials in the groundmass.

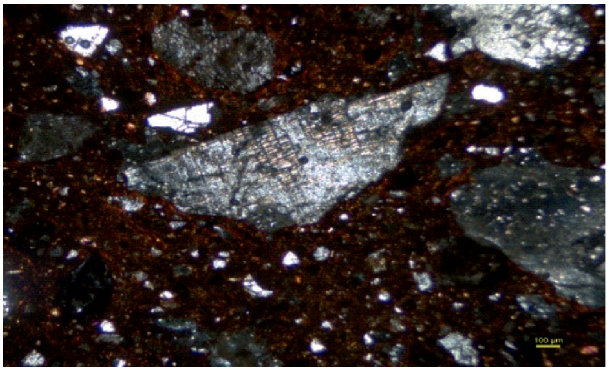

Fig. 13: Angular fragments of feldspar and quartz in a fine red- coloured groundmass.

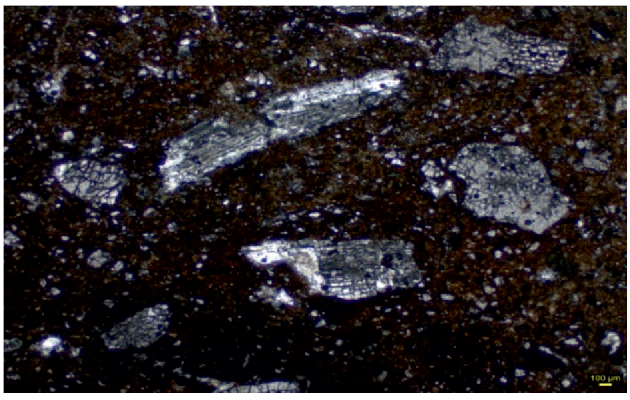

Fig. 14: Parallel alignment of elongated quartz and feldspar grain

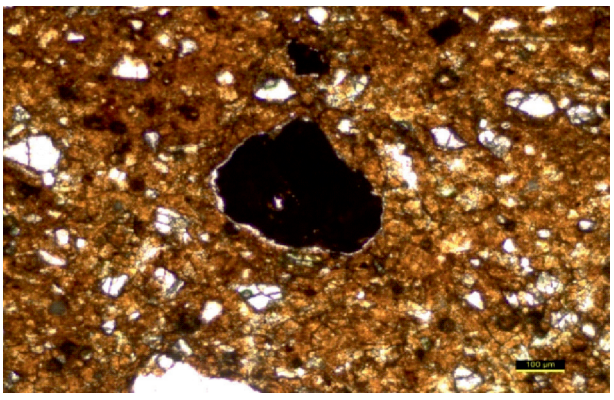

Fig. 15: Sub-rounded opaque desiccated coaly materials in the groundmass

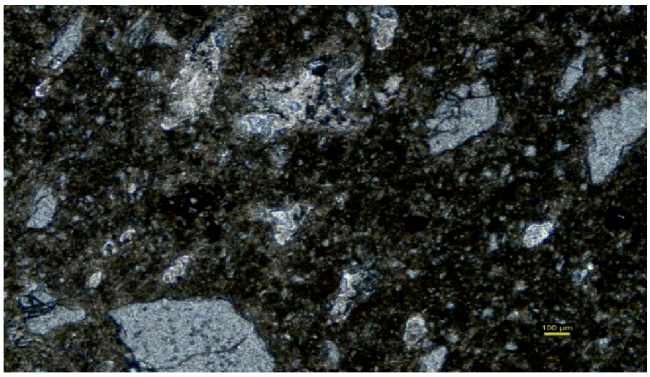

Fig. 16: Parallel alignment of large elongated grains of feldspar and quartz in the groundmass

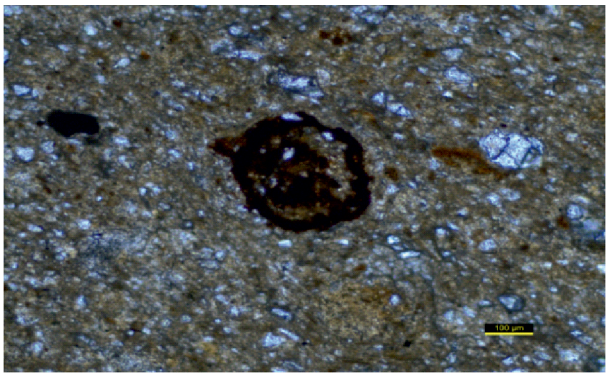

Fig. 17: Light coloured groundmass of sand

Three petrographic samples contain less ferruginous groundmass with the larger angular fragments of quartz and feldspars showing a distinct parallel orientation (Fig. 16). This might be the result of more intense tamping of the dough during pottery moulding. Another sample is composed of a groundmass comprising of a mixture of pale brown muddy material and sand. The sand particles show first order grey interference colour, with the coarser sand fragments showing a rough parallel alignment amongst them (Fig. 17). Brown coloured burnt traces of vegetative materials are also found within the groundmass.

Table 3: Explored Sites with their attributes

Sl. No	*Site*	*Co ordinates*	*Elevation*	*Total area (square meter)*	*Area Explored (square meter)*
1.	Rubber Garden (Locality I)	26°5′64′′N 92°18′38′′E	153 m	3020	1050
2	Agricultural mound (Locality II)	26°5′88′′N 92°18′19′′E	154 m	207	207
3	Ceremonial Ground (Locality III)	26°4′54′′N 92°17′36′′E	154 m	800	800
4	Umswaijhum field	25º47’34" N 92º19’29" E	543 m	1600	1000
5	LembraJhum field	26°00′44′′N 92°15′84′′E	416 m	1000	1000

Umswai Jhum Field Exploration

Umswai village is in the Donka Tehsil of Karbi Anglong district in Assam, India. It is situated 80 km away from sub-district headquarter Donka and 250 km away from district headquarter Diphu. A prepared jhum field is observed near the road that connects Umswai with eastern part of Meghalaya. The GPS reading of the Jhum field is 25º47’34" N 92º19’29" E and at an elevation of about 543 m. After conducting extensive exploration, a total of 13 numbers of celts (Fig. 18) were recovered on the surface. The Jhum field was burned at the time of field work so that the ashes could seep into the ground as the monsoon approached.

Lembra Village Jhum Field Exploration

Lembra village is located in Donka subdivision of Karbi Anglong district in Assam, India. It is situated 25km away from sub-district headquarter Donka (tehsildar office) and 160 km away from district

headquarter Diphu. The total geographical area of village is 20 hectares. The study area is a Jhum field which is located on a hill slope near the road which runs between Baolagog village and Umswai village. The Jhum field is abandoned with banana, pineapple, different verities of taro and herbs like chilly, turmeric, ginger plantation. During the time of data collection, each cultivated items were harvested and the entire field was prepared for the next horticulture activity. The GPS reading of the Jhum field is 26°00′44′′N and 92°15′84′′E with an elevation of 416 m. The villagers burnt the entire Jhum field as the ashes were laying over the surface soil. These ashes will act as a fertilizer for the next Jhum cultivation. Few stone artifacts have been recovered from the Jhum field as surface collection which were further analyzed in the laboratory of the Department of Anthropology, Gauhati University.

Fig. 18: Recovered celts from Jhum field of Umswai

Fig. 19: Stone artifacts recovered from Jhum fields of Lembra village

Total 11 numbers of celts (Fig.19) were recovered from this Jhum field. During time of fieldwork, the area was prepared for Jhum. Therefore, intensive exploration could not be conducted because it might have interrupted the Jhum field preparation process. Therefore, artifacts recovery was limited to 11 numbers only.

Table 4: Dimensional and Typological analysis of Stone artifacts

Parameters	*Range / Typology*	*Numbers*	*Percentage (%)*
Length (in cm)	1-6	8	33.33
	7-12	16	66.66
Breadth (in cm)	1-6	13	54.16
	7-12	11	45.83
Thickness (in cm)	Upto 1.5	14	58.33
	1.6-3	10	41.66
Weight (in gm)	1-20	2	8.3
	21-40	13	54.16
	41-60	9	37.5
Shape	Trapezoidal	14	58.33
	Oval	3	12.5
	Triangular	3	12.5
	Pentagonal	4	16.66
Typology	Adze	15	62.50
	Axe	6	25
	Shouldered Celt	3	12.5
Working edge	Straight	8	33.33
	Convex	11	45.83
	Rounded	5	20.83

Discussion

Ceramic analysis can give additional information regarding technological level, subsistence, chronology, ecological condition, trade and exchange patterns for every day as well as specific ritualistic practices, social and symbolic meaning associated in any community (Rice 1987).The total collection shows (Table 1) that the potsherds were both handmade (37.43%) and wheel made (62.56%). The exposed section also exhibits both handmade and wheel made potsherds (Table 2) and the wheel made ceramics were found deposited above handmade ones. From this it can be inferred that handmade pottery perhaps existed prior to wheel made pottery in and around the studied area. Furthermore, after analysing the rough texture and dark patches of colour on surface of the wheel made potsherds, it can be opined that these were not a finer version or the potters were not very skilled in pot making techniques. The colour of the ceramic ranges from red to buff, the fabric of entire collection can be placed from coarse to fine. The predominant reconstructed shape of the ceramic collection is bowl, globular pot, pitcher and shallow vessels like dish or platter. In the entire collection, few sherds are devoid of any design but few exhibited thick bands, impressed design, and circles with dots. The core of few pottery pieces is fully oxidised and few displaying blackish to grey colour indicate medium to low firing.

Ethnoarchaeological approach provide a framework for intensive study about cultural behaviour and can be used to generate cultural analogies or as direct historical method (David and Kramer 2001; Griffin and Solheim 1990). The reconstructed version of ceramic sherds provides an insight of morphological proximity with the present-day utensils utilized by the population in the village. Analogy can be drawn in respect of shape and size of the utensils. However, variation was observed in respect of raw materials with a few present-day utensils used by villagers. For instance, in place of ceramic vessels, they prefer metal or alloy utensils, especially in daily household activities. This

change may be because of durability and lack of traditional knowledge to prepare the clay or due to the gradual decline of potter community in the neighbouring areas. But in many instances like ritualistic ceremonies and festivals, the villagers still use the ceramic items which they procure from the neighbouring potter communities from the villages near Nellie, at a distance of about twenty kilometres. This is argued on basis of ethnographic parallel at field situation and interviews conducted with village priest who was involved in ceremonial performances with pottery as an integral element. Moreover, males and females of Baolagog village, who have been using clay pottery in various occasions, were also interviewed.

On the basis of ethnographic parallels and historical documents one can understand about probable use of the pottery which may include cooking, storing, serving food, water, rice beer, as well as ceremonial uses like 'spirit offerings' and wedding rituals etc. (Solheim 1965). With the help of ethnographic methods in Baolagog village, the researcher was able to observe the difference regarding the use of handmade and wheel made pottery. Few utensils with their shape and size are preferred more in daily activities, while few particular shapes are used only in special ceremonial occasion. The complete morphology comes out from the reconstructed potsherds from the study area providing insights that the handmade pots were preferred for daily activities and wheel made earthenware's were mostly used for ritualistic purpose.

Other traits which suggest probable function of pottery can also be discovered through experimental studies. Rice's (1987) experimental research had revealed that vessels with angles experience higher thermal shock when heated than rounder vessels, thus making them less suitable for use as cooking vessels. The present reconstructed ceramic collection also points out that the handmade pots exhibit more angularity compare to wheel made which possess more curvature. Mentioned may be made of Skibo's (1992) use-alternation study where cooking utensils can leave detectable marks on the internal surface of a vessel, allowing researcher to infer usage. This required scientific microscopic observation and sufficient amount of traces. But due to humid tropical landscape and quality of the soil, the traces on internal surface was not much noticeable for the present ceramic collection.

Handmade potsherds with impressed designs are reported from Baolagog study area. Impressed designed pottery had also been found at DaojaliHading (Sharma 1966), Sarutaru (Rao 1973), Marakdola (Rao 1976), Ambari (Sharma *et.al.* 1994),Bichikkri (Senar 2016), as well as Kekang-Adong (Das 2019) in Assam. The ceramic samples from DaojaliHadingprovides date of 2.7 ± 0.3 ka through infrared stimulated luminescence technique (Sharma and Singh 2017), whereas the date assigned for Sarutaru is 658 ± 93 years B.P., or 1292 A.D., with a half-life value of 5570 ± 30 years (Rao 1976). It is difficult to assign the absolute chronology of the potsherds from study area without scientific dating and stratigraphic context. Relative chrono-cultural proximity can be made of present findings with that of Ambari, DaojaliHading, Marakdola, Bichikkri, KekangAdong, Umichi Rani and Ganapati on the basis of texture, technology, design, colour, prominent shape and firing (Table 5). On the basis of use of whitish clay (Kaoline) as raw material, texture, technology, designs, colour, prominent shape and firing the present site Baolagog is more analogous to Ambari, Marakdola, Kekang-Adong and Ganapati site and it can be placed in the comparable time period of early Historic period. From this one can't ignore that Baolagog site may embody a cultural phase that stands out as a continuum of Neolithic tradition through prehistoric ages to the historic times.

The utility of artifacts can also be accessed through the location in which they are reported. For instance, earthenware vessels are frequently recovered from burial sites in Southeast Asia, indicating that the vessels were provided as a form of funeral good or used as a burial urn. (Janse 1941, Beauclair 1962, Solheim 1965, Metcalf 1982).Keeping this in view, exploration was conducted in Baolagog

rubber garden and exposed section located towards the western periphery of the village. The entire area is abandoned with stone out crop within 5-8 km of range from the explored area. The villagers prefer to select the stone for erection ceremony after the death of any clan member, from this particular area from the ancient times During the stone selection and erection ceremony, the Tiwa and Karbi people use to perform ritualistic practices using pottery and never use those ceramic items again. So, the occurrence of ceramic sherds closer to outcrops may indicate similar connotation with that of Southeast Asian context.

In the region where yam, types of tubers, rice, bottle gourd, and broad beans were the principal cultivated plants, the cultivation was done with the use of digging sticks, with ground stone celts serving as the blades of weeding hoes (Sharma 1974). From the present study, the occurrence of few celts in the Jhum field of Umswai and Lembra village (Fig. 18 and 19) can be also be correlated with horticultural activities. Similar evidence can be observed from the Spirit cave in Northwestern Thailand (Gorman, 1971), where people consume a wide variety of plants, including bottle gourd, betel nut, almond, broad beans, chinese water chestnut, pepper, and cucumber, some of which had been domesticated as early as 10,000 B.C.

The Neolithic sites that have been discovered so far in Brahmaputra valley are mostly near high altitudes or foot hill regions where shifting cultivation is still practiced by the present inhabitants (Bora and Bezbaruah 2022). It is likely that the neolithic people preferred to settle near land that was away from the natural flood calamity of big rivers like the Brahmaputra and its tributaries where agriculture was possible. The mountainous parts of Karbi Anglong, Manipur, Arunachal Pradesh, Nagaland, Meghalaya particularly in the Garo Hills, and Khasi Hills, demonstrate a preference for such kind of places for agricultural activities (Hazarika 2006).

Following Sir John Lubbock's discovery of a blue jadeite stone Neolithic artifact in an eastern Indian context in Assam (Lubbock 1867), several articles have documented the discovery of neolithic celts by both amateur and professional archaeologists (Steel 1870). Barua (1939) had created a complete regional synthesis of the celts found in old Darrang and Cachar regions and compared with the adzes found in Burma and Chotanagpur region of India. Other researchers, such as Choudhury (1944), made methodical attempts to comprehend this region's neolithic situation by looking at the stone tools. Assam and the north-eastern states were split into six zones by Dani (1960), who conducted a thorough study of the eastern Neolithic culture. Towards the Assam –Meghalaya Border areas almost all the stone artifacts are grounded and polished, bearing late neolithic features with variation regarding their morphological features between the highlands and foothills (Duarah 2014). Celts are the most common neolithic stone tool found in Assam, particularly in the foothills. When these celts appear on the surface, they have long been retained by every ethnic group in this region. Because it is often assumed that these are thunderbolts or "God's Axe." Traditional healers from ethnic communities like the Garos, Rabhas, Karbis, and Khasi use these stone celts for therapeutic purposes. The celts recovered from the study area also have similar kind of credence among the villagers. The use of these stone artefacts is still popular among various ethnic groups of Assam, but in different contexts and related to strong beliefs and sentiments. Similar implements constructed of iron and hafted with bamboo and wooden shafts have been found mostly among the neighbouring inhabitants and are primarily employed in the Jhum field for tilling. On the basis of morphology, nature of hafting, and the mode of operation it can be inferred that, the iron hoe or axe is merely a faithful replication of stone artifacts (celts) which connect the past and present (Bora and Bezbaruah 2017, Bora 2017).

The thin section petrographic slides of Sample 1 and 8 indicate the presence of fine siliceous groundmass together with ferruginous materials (Fig.10) possibly indicating their derivation from

soil form due to weathering of biotite and hornblende rich rock. The Quartzo-feldspathic gneisses and granites of Karbi Anglong hills may be the source of derivation of these minerals. Samples 2 and 5 reveal the presence of weathered feldspar and broken fragments of quartz (Fig. 11) is also indicative of chemical and mechanical weathering of rock leading to the formation of soils rich in clay and iron content. The presence of organic materials (coalified woody materials Fig. 11, straw impression etc. Fig. 12 and Fig. 11) may indicate their inclusion into the dough during the mixing or a result of inclusion of fragments of burnt woody material into the dough during firing. In samples 2 and 6, the parallel orientation of elongated quartz (Fig. 14) and in samples 3 and 10, distinct parallel orientation of angular quartz (Fig. 13) can be seen which is indicative of the fact that there was some mechanical beating of the dough during the process of moulding the dough to a proper shape of a vessel. The confirmation of presence of quartz fragments in the dough is got through the first order interference colour exhibited by these fragments from sample 4, 7 and 9(Fig.17).

XRD analysis of samples recovered from surface and exposed section reveals almost similar mineral content in the potsherds. The minerals like quartz, illite, montmorillonite, chlorite etc. are reported in X Ray diffraction. Mention may be made of the presence of calcite in the samples recovered from the exposed section. This was probably used as a binding agent and it also provided a whitish colour to the potsherds (Fig. 6). Moreover, the presence of heulandite in the potsherds also might indicate elaborate firing process after pot making.

Northeast India's distinct climate, ethnic makeup, and geographic location have all contributed to the region's capacity to maintain a distinctive culture despite its volatility (Ashraf and Roy, 2012). The rich evergreen forest, undulating hilly terrain, river system, and rich soil of Karbi Anglong have provided a unique advantageous environment for human exploitation since prehistoric times. The entire situation can be well comprehended from the presence of both handmade and wheel made pottery, stone artifacts, monolith erection tradition and an archaic subsistence strategy i.e. shifting cultivation from the study area.

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