Excavations at the Early Historic Coastal Site of Gauranga Patana, Chilka Lake, Odisha

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The site of Gauranga Patana is spread out over approximately four hectare (ha) on the western shore of the present-day Chilka Lake. Excavations of four different areas were undertaken to investigate the cultural remains and stratigraphic sequence, revealing pottery that is contemporaneous with the Early Historic settlements of Sisupalgarh and Talapada. Excavations also revealed an abundance of marine shells and diversity of other aquatic species that indicate an intensive use of local resources. The recovery of Gauranga Patana as a coastal site provides the opportunity to understand the configuration and function of "port" sites in the Early Historic period in this region of eastern India.

Researchers have long sustained an interest in the study of Early Historic port sites around peninsular India, as seen in the investigation of sites such as Barygaza (Broach) and Somnath[1] on the Gujarat coast, Arikamedu on the Tamil coast[2], and Pattanam in Kerala. [3] At the same time, researchers are increasingly recognizing that ports are not necessarily places of permanent installations and infrastructure, but can also be represented by favorable topographic areas that enable simple strategies of pulling boats near to the shore. By regarding ports as an "economic concept" [4] that can be flexible or minimalist in appearance, we can greatly expand the number of places in which ancient people would have engaged in residential and economic activities that were significant in their impact on hinterland relationships but may not have had a particularly distinctive architectural signature.

Chilka Lake in particular represents numerous opportunities for effective trade and transportation as an ecological interface between the land and the open ocean (Fig. 1 and Pl. 1). The brackish-water lake, measuring 60x20 km in size and having several openings to the Bay of Bengal, was first formed in the Holocene and is today known for its distinct ecosystem that harbors a large number of migratory birds.[5] The lake is fed by a number of streams that result in a gradient of brackishness with a lower proportion of salinity as one move inward from the Bay of Bengal, and there are wells that even today provide fresh water within less than 100 m of the present-day Chilka shoreline on the western side of the lake.[6] The lake itself, which is dotted by numerous low-lying sandbars as well as rock islands, has a number of consumable food resources in the form of fish and prawns, as well as birds and birds' eggs. There is evidence for some inland trade of these resources for

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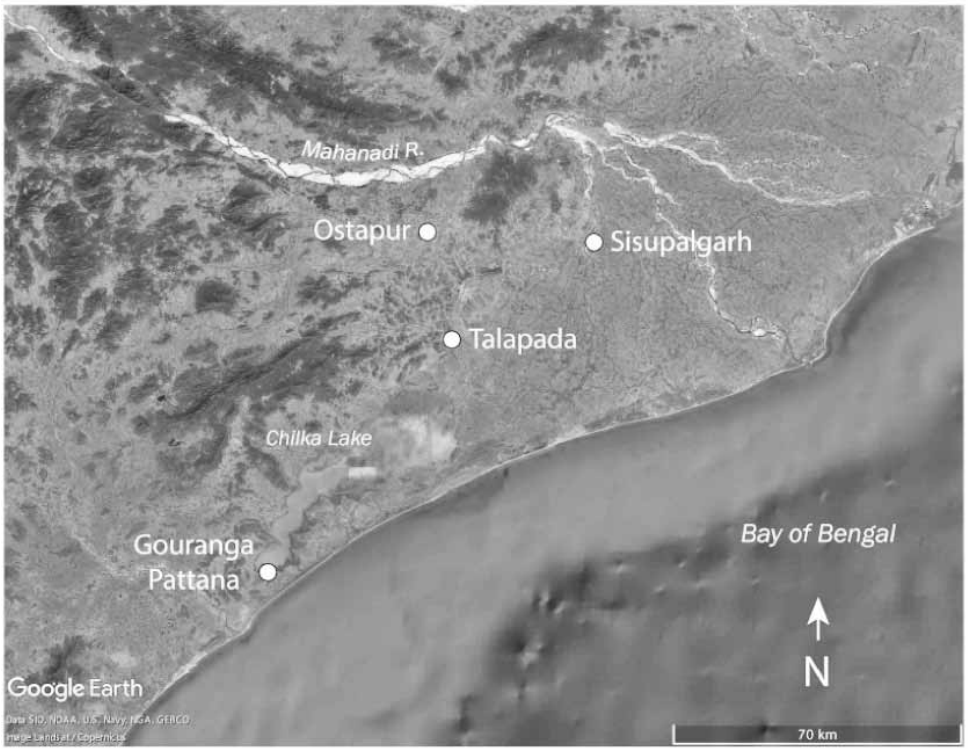

Fig. 1: Map of site location relative to Chilka Lake and other early historic excavated settlements in coastal Odisha

both food and ornaments by the late 2nd millennium BCE as indicated in the faunal analysis of Chalcolithic sites in coastal Odisha.[7]

Chilka Lake provided an ideal opportunity for land-sea interfaces in the Initial Urban period (8th century BCE to 4th century BCE) and the Early Historic period (3rd century BCE to 4th century CE) for periodization.[8] In the coastal Odisha region, the development of urbanism is demonstrated by large sites such as Sisupalgarh,[9] Jaugadh,[10] and Radhanagar[11] as well as smaller contemporaneous town-sized sites such as Talapada[12] and Lathi[13]. Urban centers and towns were connected in a network of regional interaction with shared cultural traditions marked by pottery styles, architectural types, and food remains as seen through the presence of recovered animal bones both domesticated and wild along with varieties of botanical remains. There also is evidence for contacts beyond the coast itself, with iron and semi-precious stone beads indicating contact with the western hilly zones. The presence of widely-traded goods such as rouletted ware and knobbed ware throughout the archaeological sites of the eastern coastal plain also indicate that traders were moving through the region, and that routes of travel would have included not only land transportation but boat transport as well.

Although village-level settlements were undoubtedly an important part of the economic and social landscape of the Early Historic period, to date there has been little systematic investigation of such sites, either inland on the coastal plains or on the coast itself. The site of Gauranga Patana thus represents an important opportunity to evaluate a smaller site within the regional economic network in which ancient people made use of a convenient location as a basis for resource procurement and exchange activities. The site is now located in the agricultural fields of a village of the same name (UTM location 2156965 N, 303337 E; Fig. 2). The site is located at a cleft between two hills that makes it easy to identify from the lake water, and there is an infill of arable land coming gently down to the shoreline that today is very fertile and used for growing vegetables. The nature of the fill and the gentle gradient still visible suggest in the past there was a channel extended inward between the hills. This must have provided safe anchoring of boats during the cyclonic storms often experienced in the East coast of India.

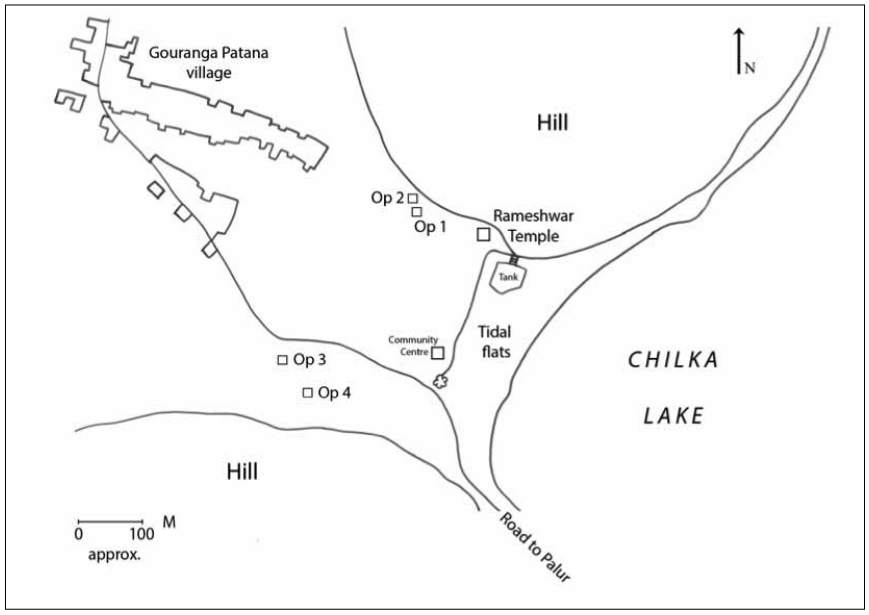

Fig. 2: Site map showing trench locations

The archaeological site was first visited on the basis of surface pottery a number of years ago by Kishor Basa of Utkal University. In 2015, excavations were taken up in a joint project between Utkal University and Deccan College, with the assistance of personnel from Ravenshaw College, Cuttack. Four different areas were excavated: Operations 1 and 2 in agricultural fields on the northern side of the site, and Operations 3 and 4 in agricultural fields on the southern side of the site. Prior to beginning each excavation unit, all pottery and other artifacts were meticulously collected from the surface of the designated trench location. Excavations proceeded in standard units recorded on individual locus sheets, and all pottery, shell, and artifacts were hand-picked from the sediments. Sixteen soil samples were collected for flotation from Operation 1.

Operation 1

Operation 1 consisted of a single 5 x 5 m trench labeled A, located in an agricultural field on the northern side of the site (Pl. 2). The soil matrix was dark and sandy with tree roots and *kankar* (calcium carbonate) fragments of the kind typically found in agricultural fields. Ancient cultural materials consisted of abundant quantities of both pottery and shell (primarily the genus *Meretrix*, see faunal section below). At 21 cm below modern ground surface (locus A4), the trench was reduced in size to 2.5 x 5 m. No structures or features were found in the trench, but the excavators reported several unworked sandstone fragments up to 35 cm in size and several bricks in the 5-7 cm size range in the upper 30 cm of the trench. The amount of pottery and shells declined significantly below 0.5 m. At 1.04 m (locus A9) the trench was further reduced to 2.5 x 2.5 m in size. At 1.3 m below modern ground surface, there was neither pottery nor shell and the excavation terminated at 1.5 m.

Operation 2

Operation 2 consisted of a single 2.5 x 2.5 m trench labeled B and was located 20 m northwest of Operation 1 in an adjacent agricultural field. The soil matrix was blackish-grey and compact, breaking into lumps 15-20 cm in size in the upper portions of the excavations. Cultural materials consisted of shells (again, predominantly *Meretrix*). A significant quantity of pottery (32.4 kg) was recovered in Locus B2 at 5-30 cm below modern ground surface, but the excavators noted that the concentration of pottery was on the eastern side of the trench which may be in part due to the location of the trench on the edge of an agricultural field. The quantity of pottery decreased after 60 cm below modern ground surface; however, the levels from 60-70 cm below modern ground surface had a nearly 4:1 ratio of shell weight to pottery weight, suggesting that the earliest use of the area was for shell-fishing and that the use of pottery grew only afterwards. By 1.5 m below modern ground surface, the quantity of shell and pottery had reduced to nearly zero and can be interpreted as the equivalent of natural soil.

Operation 3

This excavation took place in an agricultural field 50 m from the base of the Dipadandi Hill that flanks the site's southern side. Prior to the excavation, the field (which measured approximately 30 x 21 m in size) was divided into nine equally sized grids of 10 x 7 m each. The grids were systematically collected for all surface materials. Shell was found in each of the grid squares indicating the widespread association of marine products with ancient habitation debris (Pl. 3). Grid 1 of the Operation 3 area was selected for excavation, consisting of a single trench C measuring 2.5 x 2.5 m. The soil matrix was brown and compact, and contained pottery and shell although in much smaller quantities than in Operations 1 or 2, with the pottery being exceptionally small and abraded. By 60 cm below modern ground surface, no further cultural material was found and the excavation terminated at 70 cm.

Operation 4

Operation 4 consisted of a single 1.5 x 1.5 m trench labeled D and located in an agricultural field with a high surface density of sherds and shells 55 m east of Operation 3. The soil matrix was compact and dark brown with roots throughout. Cultural materials consisting of shell (predominantly *Meretrix*) and small, abraded fragments of pottery appeared in the uppermost 50 cm of the deposit and diminished thereafter. By 90 cm there were no cultural materials and the trench was stopped at 1.0 m below present ground surface.

Architectural Evidence

Although a few small fragments of bricks and sandstone were recovered in Operation 1, no architectural or structural features found in the course of the excavations and the amount of bricks and stones were too few to have come from any collapsed structure or nearby construction. Laterite crumbs (0.5-2 cm in size) of the kind common to inland coastal sites, and indicative of the trimming of laterite blocks, also are almost completely absent among the excavated materials. Several small fragments of daub with a maximum of 4 cm in size were recovered which suggested the use of organic materials in construction. Presumably the architecture at the site was of perishable materials such as thatch and bamboo as was also seen at the lowest levels of the Early Historic site of Talapada[14].

Ceramics

The pottery was the primary means by which the site was dated to the Initial Urban and Early Historic periods. The consistency with the excavated remains from Sisupalgarh and Talapada was remarkable, indicating a widespread use of similar forms in the coastal Odisha region. The volume of pottery also was comparable to the amount per cubic meter in the excavations at Sisupalgarh and Talapada. The sherds in Operations 1 and 2 were in good condition, with Early Historic pottery sherds up to 12 cm in size and with good preservation of slip and diagnostic elements such as rims and decoration. From the total of 118 kg of pottery collected in the excavations, a total of 2515 diagnostic sherds (rims, bases, and decorated sherds) were recovered and sorted. The dominant shape of the pottery represented by the fragments consisted of small and medium jars with plain or rolled rims in oxidized (red) ware; the frequency of jars to bowls overall was a ratio of 9:1. Common and distinctive shapes are shown in (Fig. 3).

On the basis of the pottery, the occupation at Gauranga Patana can be divided into three phases.

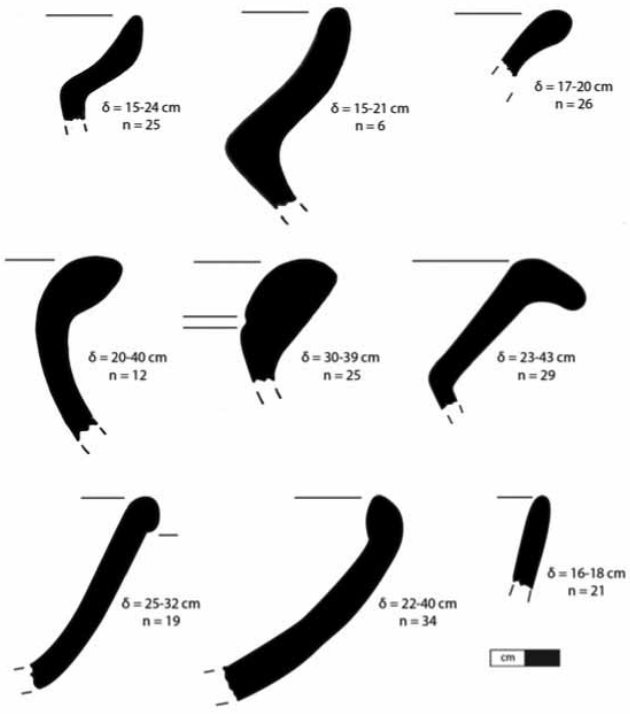

Fig. 3: Most common vessel shapes from excavated contexts at Gouranga Patana. Jar sherds are in oxidized (red) ware; bowl forms are reduced (black) ware, predominantly slipped

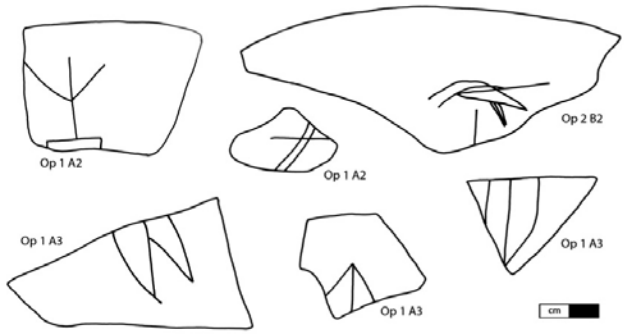

Fig. 4: Graffiti sherds from Gauranga Patana

The earliest phase (century 7/6th-3rd centuries BCE) was represented by "knobbed" wares, scoring decoration, and graffiti (Pl. 4 and Fig. 4; Table. 1). Some forms of this early pottery were very well-preserved in the upper layers, but some were abraded, suggesting that ancient inhabitants were actively utilizing local deposits (and disturbing them perhaps for the construction of wells or recovering earth for use in construction). There were no instances of knobbed ware or circular ridge bowl base design in the Operation 3 and 4 materials, which suggests that the occupation of the southern portion of the site was later than the areas of Operation 1 and 2. The late Early Historic phase of occupation was represented by string-cut bases and wares with waffle-like design or appliqué rope design. The quantity of such wares was lower than the amount of decorated pottery from the early levels, and the string-cut bases that are found in considerable abundance at Sisupalgarh were found only in Operation 3 of Gauranga Patana and that too in a very small number (n = 3).

Within the period of Early Historic occupation represented by the upper 50-60 cm of deposits at Gauranga Patana the pottery variability suggests that the site was more than a simple outpost or temporary encampment as there was a range of vessels in simultaneous use. Operation 1, for example, locus A3 (at 16-21 cm below modern ground surface and thus below the plow zone) had 39 different forms recorded, representing a minimum of 50 vessels, and Locus A6 (at 50-67 cm below modern ground surface) had 20 different forms representing at least 22 different vessels. In Operation 2, Locus B2 (at 5-30 cm below modern ground surface) had 58 different forms recorded representing a minimum of 59 different vessels, Locus B3 (at 30-47 cm below modern ground surface) had 60 different forms representing a minimum of 62 different vessels, and Locus B4 (at 47-60 cm below modern ground surface) had 40 different forms representing a minimum of 40 different vessels. The robust and diverse corpus of vessel forms was thus comparable to the most

Table. 1: Decorated wares in the Gauranga Patana assemblage. Knobbed wares, circular ridge bowl bases, and graffiti are typical of the earliest period of occupation, while string-cut bases, rope applique designs and waffle-stamped wares begin *c.* 3rd century BCE on the basis of comparative appearances at Sisupalgarh

Locus	Circular ridge bowl base	Knob	Knob and circular ridge bowl base	Graffiti	Graffiti and circular ridge bowl base	String-cut base	Rope	Waffle
Op 1 A surface	1	2		1	1			1
Op 1 A1	4			1				
Op 1 A2	6			2	2			1
Op 1 A3	3	1	1	2	1		1	
Op 1 A4	4	1						1
Op 1 A5	9							1
Op 1 A6	3		1					3
Op 1 A7	1							
Op 1 A9	1							
Op 2 B1	3							
Op 2 B2	4		1	2				3
Op 2 B3	15			2				1
Op 2 B4	3			3			2	
Op 2 B5							1	
Op 3 C surface						1		
Op 3 C1						1		
Op 3 C2						1		
Site total	57	4	3	13	4	3	4	11

sherd-rich loci of both Sisupalgarh and Talapada.

The final phase of pottery, which appears to have been deposited after a gap of occupation, occurs only in Operations 3 and 4 as evidenced by a spout fragment and elaborate grooved rims in gray ware that elsewhere in Odisha are associated with the medieval period (e.g. at port site of Manikapatana and in the surface levels of Sisupalgarh). The low number of medieval sherds may be because of differential demands for hinterland products at the time, or because sailing ships of the period may have been better able to withstand open ocean conditions as is suggested by the more intensive medieval occupation at the site of Manikapatana on the Bay of Bengal.[15] The current village of Gauranga Patana itself is a relatively recent development, as the cultivation of vegetables for market was made possible only after the installation of tube wells and a paved road in the early 21st century. Informal site reconnaissance also revealed 7 sherds of porcelain ware, although these were all plain white sherds and could not be dated.

Overall the occupational sequence at Gauranga Patana was shallow: whereas at Sisupalgarh the cultural deposit was a maximum of 6.7m and at Talapada 3.3 m, the occupational deposit in the areas excavated at Gauranga Patana was a maximum of 1.3 m with the majority of the cultural material coming in the upper 50 cm. It also is interesting to note the ceramic forms and culinary items that are not present at Gauranga Patana: large jars were very few in number, and there were almost no food-processing items such as grinding stones, mortars or pestles found in the excavations. The large quantities of shells indicate that matters of food preference along with environmental variability may have resulted in a reduced use of rice and other food grains. In Operations 3 and 4 the ratio of jars to bowl rims was more than 30:1 suggesting that in the latest phase of the occupation, eating vessels were not made of pottery but were perhaps instead made of perishable materials such as wood, or made of metals that were subsequently recycled.

Artifacts and Antiquities

Very few antiquities were found in the excavations (Pl. 5). One fragment of a bone point measuring 2.5 cm was recovered from Operation 2 locus B3; there was one elongated terracotta bead with a string line impression from the same locus. In Operation 3 locus C2 one jasper bead was recovered. Interestingly, one stone celt fragment was found in Operation 2 locus B4, perhaps brought to the site in Early Historic times as a souvenir or curiosity (similar celts also were recovered from Early Historic levels at Talapada and Sisupalgarh). The upper levels of the excavations in Operations 1 and 2 yielded about two dozen pottery fragments trimmed to a circular shape (worked sherds or 'hopscotch's'). One circular fragment of a flat copper piece measuring 1 x 1 cm was recovered from the flotation of Operation 1 locus A5. Overall the antiquities of the site suggest a relatively practical repertoire of daily-use goods, with the exception of an elaborate leaf-design molded shred of unknown date found on the site surface in the griddled collection of Operation 3.

Faunal Remains

The faunal remains of the site were characterized by an abundance of shell primarily represented by the edible genus *Meretrix* (95-98% of the assemblage per locus (Pl. 6, Table. 2). The quantity of *Meretrix* shells is the highest in the levels that also had the highest quantity of pottery, signaling that the shells were brought in as the result of human activities and did not form a natural component of the soil. *Meretrix* shells were found in the excavations in all size ranges indicating that the shells were being collected for food and other purposes: the shells might have been the result of 'by-catch' or unintended capture in the course of other lacustrine activities; alternatively, the shells might have been collected with the eventual intent of turning into lime.[16] Other shell genera included *Anadara* and *Certhidae*. In addition to the abundance of shell there were other identifiable species of marine fauna including sea cow, shark, and crab. Species represented both open-water genera (such as coral) as well as species that would have thrived in Chilka Lake itself. Even though the soil underwent minute searching and later some soil was subjected to flotation, there was no recovery of fish bone remains as was found plenty at Manikpattana.[17]

Discussion

The excavations suggest that the occupational sequence at Gauranga Patana was not continuously undertaken in a single spot and that the ancient inhabitants took up different areas resulting in a lateral stratigraphy at the site. As a result, while the site is currently ascertained as four hectares in size, the whole area was not likely occupied at once and a maximum population of perhaps 50-100 individuals should be envisioned at any one time looking at the then available inhabitable landscape and along with prevalent slopey terrain.

Table. 2: Weight of shells per locus, Operation 1

Locus	Depth (cm)	Weight (kg)
A1 surface		2.7
A1	0-6	5.7
A2	6-16	7.6
A3	16-21	5.0
A4	21-32	8.0
A5	32-50	10.4
A6	50-67	3.8
A7	67-76	0.8
A8	76-104	0.4
B2	5-30	16.8
B3	30-47	10.3
B4	47-60	10.3
B5	60-70	3.8
B6	70-85	0.8
B7	85-100	0.7
B8	100-120	0.6
B9	120-150	0.2
C1 surface		0.2
C1	0-15	0.3
C2	15-34	0.3
C3	34-70	0.1
D1 surface		0.1
D1	0-32	5.2
D2	32-50	2.0
D3	50-75	0.3

The most secure stratigraphic sequence comes from Operation 1, in which there was a more or less undisturbed sequence of deposits in which the upper 50 cm represented a diverse consumption pattern of pottery and marine resources. The Operation 2 trench also has an equivalent diversity of consumption practices, but the very high concentration of pottery along with the differential preservation of pottery suggests that the deposits may represent a dump of materials (in ancient times) rather than an intact habitation or use profile. The trenches of Operations 3 and 4 rendered very few materials, and those were indicative of a slightly later time period stretching into the medieval Era.

The distinctive climate of the region likely played a role in the shifting selection of settlement locations over time as the coastal zone is prone to destructive cyclones and villages may have been obliterated from time to time. Although Gauranga Patana is located in a particularly favorable and easily-recognizable area when approaching from Chilka Lake, there are other places along the shoreline that also would have had fresh water, terrestrial resources, and sloping shorelines where boats could be easily pulled up to land. It also seems plausible that temporary settlements and trading sites might be found through exploration of the many sandbars and islands in the lake itself, where there might be traces of ephemeral occupations.

Conclusion

Gauranga Patana represents an important confirmation of Early Historic coastal activities, in which the relatively gentle environmental conditions of the lakeshore insulated traders from the more hazardous conditions of the open sea. The small populated intermittent inhabitants of the settlement seems to have depended and procured the required utility vessels from different production centres or market places as suggested by the variety of assorted type pots found during excavation. This may also show their outreach and production centre connectivity and exchange network with important Early Historic sites. A short pentagonal bicone of green jasper bead identical to that have been found from the excavation at Talpada was reported from the surrounding area of the Operation 1 and 2 at the site. The Chilka Lake shoreline had a rich environment for local inhabitants to exploit maritime and terrestrial resources, while providing a convenient and hospitable location for shoreline connectivity among sites that required little to no investment in facilities such as docks, marinas or jetties. The area of Gauranga Patana was sporadically inhabited with the majority of the habitation activities occurring in the 1st millennium BCE with very little subsequent occupation until quite recently. Limited reconnaissance in the Chilka Lake area suggests that there are many more sites like Gauranga Patana that would have been inhabited in the Early Historic period, and that further explorations and excavations are highly warranted.

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