

A preliminary study of Knobbed ware from Odisha

**Sila Tripathi¹, Girish Prabhu¹, Sunil Ku Patnaik², Subrata Ku Acharya³, Uma Kanta Mishra³,
Rudra P Behera⁴, Gopal Ch Pradhan², Baba Mishra⁵, Dibishada Garnayak⁶, Anam Behera⁷
and Saumya Ranjan Sahoo⁸, Sachin Joshi⁹**

¹CSIR-National Institute of Oceanography, Dona Paula, Goa, 403 004

Email: sila@nio.org

²Odishan Institute of Maritime and Southeast Asian Studies, Odisha State Museum,
Bhubaneswar, 751 014

³Dept. of History, Ravenshaw University, Cuttack, 753003

⁴Dept. of Archaeology, Govt. of Odisha, Bhubaneswar, 751 014

⁵Govt. College (Autonomous), Bhabhanipatna, Kalahandi, 766 001

⁶Archaeological Survey of India, Bhubaneswar, 751 014

⁷Dept. of Ancient Indian History, Culture and Archaeology, Utkal University,
Bhubaneswar, 751 004

⁸Odisha State Museum, Bhubaneswar, 751 014

⁹Dept. of Archaeology, Deccan College, Pune 411 006

Abstract

Archaeological explorations and excavations through the length and breadth of the Indian subcontinent have revealed several distinct types of pottery which facilitated reconstruction of the past. In archaeology, studies of pottery play a key role in providing information about the period and cultural sequence of the site and contacts with other regions, whether local or outside. Pottery like Northern Black Polished Ware (NBPW), Rouletted ware (RW) and other early historical period pottery, for instance, Knobbed ware (KW), has played a significant role in the maritime trade of South Asia and Southeast Asia. In comparison with other pottery, distribution and studies on KW are very limited. KW has been recovered from excavations of many sites of Odisha and elsewhere in India. During recent explorations along the Odisha coast, KW sherds have been collected from several sites of Odisha. In this paper, an attempt has been made to understand the distribution of KW in Odisha, its period and role in the maritime trade of Odisha in particular and India in general.

Keywords: Knobbed ware, Rouletted ware, NBP ware, Maritime trade, Early Historic period

Introduction

Pottery is made of clay, and its classification is determined by the composition of clay, the manner in which it was prepared and the temperature at which it was fired. Clay pottery is different from celadon and porcelain regarding manufacturing, painting and designing. In the Indian context, various types of pottery have been recovered from different archaeological sites starting from the Neolithic and Chalcolithic periods to the modern time. Pottery has even been termed according to the site name such as Harappan pottery, Malwa pottery, Kayatha, Jorwe, etc. and classified on typology, designs and paintings: for instance, Northern Black Polished ware (NBPW) and Painted Grey ware (PGW), Red Polished ware (RPW), etc. Finding of a particular type of pottery at several sites signifies contacts amid the people, or it might have reached to different places as an article of trade and commerce. Therefore, pottery has been considered as pivotal to archaeology and played a significant role in understanding contacts among people over the centuries.

In India, almost every distinct type of pottery, namely NBPW, RW, RPW has been studied related to typology, distribution, period, etc. (Ghosh 1989; Roy 1986; Sinha 1969; Nigam 2014; Dhavalikar 1999; Schenk 2006). But KW has not been studied in comparison with other pottery of the Indian subcontinent, though KW has been reported along with RW from some sites of Odisha. The term KW has been applied to this pottery because a boss or projection is found at the centre of the base along with a number of concentric circles around the knob. This ware has different fabrics such as black and red ware, black ware, dull red ware, grey ware, fine grey ware, and red ware. The KW sherds are thin to medium fabric both ill and well fired. Mostly bowls are found in KW. KW was reported for the first time from the excavations of Sisupalgarh (Lal 1949), and subsequently from Jaugada (Jaugarh) (IAR 1956-57), both the sites are in Odisha.

During recent explorations and excavations over the length and breadth of Odisha, KW has been found at Manikapatna (Pradhan 2007), Radhanagar (Patnaik 2015), Talapada (Mohanty *et al.* 2014; Mohanty *et al.* 2012-13), Budhigarh, Asurgarh-Narla, Manmunda-Asurgarh, Kharligarh (Mishra 2010a; Yule 2006; Tripathy 2001 & 2007; Tripathy and Joglekar 1997-98; Singh Deo 2004-05), Narisho (Pradhan 2011), Bidyadharpur and Korkora (Fig. 2g-h) (Pradhan 2008), Taraporegarh (Behera *et al.* 2015) Jira River valley and from many other sites (Fig. 1). In addition to Odisha, KW has also been discovered from Chandraketurgh, Tamralipti, Mangolkota, Tilpi, Harinarayanpur, the early historic sites of West Bengal coast (Jahan 2012; 2002) and Dantapur (Subrahmanyam 1994), Gopalapatnam (IAR 1993-94), Kalingapatnam of Andhra Pradesh and Agiabir and Sarai Mohana of Uttar Pradesh (Singh and Singh 1999-2000; Singh and Singh 2004). Taking into account the findings of KW from the above sites of Odisha, in this paper, the distribution and probable period of KW has

been discussed, and the role played by KW in the maritime trade of Odisha in particular and India, in general, is also detailed.

Sisupalgarh

Sisupalgarh is the first fortified urban centre of Odisha located in the vicinity of Bhubaneswar. The remains of the fortification wall, monolithic pillars, and eight large gateways can be seen today. The Archaeological Survey of India (ASI) has excavated Sisupalgarh and findings include NBPW, RW, KW, black and red ware, terracotta and stone beads, terracotta bullae, iron caltrops, punch marked coins, imitating Roman, Andhra, Huvishka and Puri-Kushan coins. On the basis of the above notable findings, it has been suggested that Sisupalgarh was occupied between 3rd century BCE and 4th century CE (Lal 1949; Ghosh 1989). KW (Fig. 2a), the most distinguished pottery recorded during the excavations of Sisupalgarh in period II which was datable to 200 BCE-100 CE, was found along with RW, bright red polished ware with applied and incised decorative designs. The characteristic features of KW of Sisupalgarh were grey or greyish black colour with or without concentric circles on the inner base but having a knob at the centre, and the dominant type were bowls. A few KW sherds of reddish colour have been reported from period IIA and III levels. In the upper levels the KW becomes cruder without any slip and not finished (Lal 1949; Dhavalikar 1999; Ghosh 1989).

Sisupalgarh was again excavated by the Deccan College, Pune, and the University of California, Los Angeles, USA which discovered a jetty joining the moat. It was required to cross the moat to enter into the fort (Mohanty and Smith 2008; Mohanty and Smith 2009). Further, it was presumed that the royal family was residing in the fortified area whereas common people were living outside of the fortified area. Moreover, a Pre-Asoka Stupa was recovered during the excavations outside the fortification (Ota 2007) of Sisupalgarh. The excavation also revealed KW, NBPW, RW, glass, terracotta and stone beads, terracotta bullae, etc. The KW, along with black burnished ware and red burnished ware, was found at the bottom layer. In the upper layers, the KW decoration was replaced by the Rouletted designs. Both, KW and RW were well made in terms of their quality. These findings suggest that the antiquity of Sisupalgarh is much older than previously known as suggested by Lal (1949), but now it shows that period of Sisupalgarh can be stretched two to three centuries more in both directions. The discoveries of recent excavations provide light on the history of Sisupalgarh which was earlier unknown (Mohanty and Smith 2008).

Jaugada

Jaugada was the provincial Mauryan fortified capital and located on the bank of the River Rushikulya, which has been identified as Samapa of Asoka. The fortification can be seen even today. On account of agricultural activities, the whole site has been flattened. The excavations carried out by the ASI near the eastern gateway yielded habitational remains of two periods. The findings of the

period I consist of dull red ware of medium to coarse fabric with or without slip, black and red ware, mostly of fine and well-burnt fabric, and the common shapes were the dish and bowl; and a red polished ware. Other finds include varieties of beads made of shell, bone, carnelian, agate, crystal, quartz, etc., with post holes (IAR 1956-57). KW made its appearance in period I (Fig. 2b). The period II findings comprise of KW, which continued from the period I but in period II, the fabric of KW had degenerated. The other finds include brick and stone structures, beads made of semi-precious stone, shell and terracotta, pottery of period I, copper and iron objects, PMC and Puri-Kushan coins. The occurrence of Puri-Kushan coins in Period II not only suggests an era of prosperity when these coins were in currency but also sets the upper limit of the Period (Mohapatra 1986). To ascertain the findings of KW both at Sisupalgarh and Jaugada explorations carried out and at these sites and small KW sherds were found (Fig. 2c-d).

Manikapatna

Manikapatna port is situated on the bank of the Chilika Lake. The Odishan Institute of Maritime and Southeast Asian Studies (OIMSEAS), Bhubaneswar, carried out excavations at Manikapatna between 1989 and 1993. The excavation findings can be divided into two periods, for instance, period I is datable from 2nd century BCE to 5th - 6th centuries CE, afterwards, probably the site was uninhabited for some centuries and period II is from 9th to 19th centuries CE. The period I findings comprised of RW, KW, red glazed ware, stamped ware, grey ware, Puri-Kushan coins and a Kharosthi inscription on a potsherd (Pradhan 2007). The RW of Manikapatna is made of fine fabrics of well levigated clay, whereas the KW belongs to black slipped ware, greyish and red ware. Chinese Porcelain, Celadon ware, Chinese copper coin, and Sri Lankan coin with the legend 'Srimad Sahassamalia', which were found in the upper levels of Manikapatna, belong to Period II (Pradhan 1995-96). Celadon ware of Manikapatna was assigned to the 13th - 14th centuries CE and belongs to the Song and Yuan dynasties respectively, whereas Chinese Porcelain belongs to the Yuan and Ming dynasties (Pradhan *et al.* 2000). The coastal explorations brought to light terracotta ring wells on the shore of Chilika which submerge during high tide and are exposed in low tide (Sila Tripathi and Vora 2005). The archaeological finds and literary documents indicate that Manikapatna port played an important role in the maritime history of Odisha from the early historical period to 18th century CE.

Radhanagar-Kankia

Radhanagar-Kankia, locally known as Radhanagar, is located on the right bank of Kelua, a tributary of the River Brahmani, about 90 km away from Bhubaneswar. Radhanagar is surrounded by a number of Buddhist sites, i.e. Langudi, Tarapur and Vajragiri and other important Buddhist sites such as Ratnagiri, Lalitgiri and Udayagiri are within the radius of 20 to 30 km. Radhanagar was excavated by the OIMSEAS between 2010 and 2013, and the findings are datable from 4th and 3rd centuries

BCE to 5th and 6th century CE. The findings include remains of the fortification, brick structures, different types of pottery namely dull red ware, black slipped ware, gray ware, decorated ware, KW (Fig. 2e), BPW, RW and Red slipped ware. A number of KW sherds of bowls were found in phase II and early stage of phase III which are datable to the early historic period between 4th and 3rd centuries BCE and 2nd and 3rd centuries CE. All the KW sherds of Radhanagar belong to fine red and grey ware (Patnaik 2015). ~~KW sherds were found from Radhanagar before the excavations.~~ The pottery of Radhanagar consists of basins, bowls, dishes, lids and wide mouth jars. The coarse grit dull red ware was probably used by the Buddhist monks who lived in the surrounding forests and retreats (Mishra 2000). The other findings of the excavation comprised of PMC, Kushan copper coins, head of a Buddha image, terracotta objects including beads, human and animal figurines, ornaments, hopscotch, and one terracotta pendant inscribed in early Brahmi script which reads as 'Saddabhu Tissa' which is palaeographically dated to the 2nd and 1st centuries BCE (Patnaik 2017). The discovery of Roman bullae from Radhanagar suggests that it had both internal and external trade contacts.

Talapada

Talapada is situated 500 m southeast of Golbai Sasan, the Neolithic and Chalcolithic site, across the River Malaguni, approximately 42 km south of Bhubaneswar. In the year 2013, four different areas of Talapada were selected for excavations by the Deccan College, Pune, in collaboration with other institutes. The excavations brought to light evidence of three distinct periods, among them the uppermost phase belongs to the medieval period, in the second phase light red ware consisting of jars, bowls, cups with grooved and stamped decorations were recorded. The lowest level was approximately 1 m below the ground surface where well fired, burnished vessel pieces belonging to red ware, reduced black ware and KW with decorative motif were recovered. In addition to the above pottery, RW, metal, terracotta and stone artefacts, pieces of steatite bowl, bricks, tiles and structural remains have been discovered during excavations of Talapada. In addition to local products, some non-local artefacts such as the fragment pieces of steatite bowl have been found from Talapada. More importantly, the recording of bricks and tiles are larger in quantity in comparison with Sisupalgarh findings. Therefore, further study on Talapada is warranted which would provide understanding of the contacts with neighbouring regions during the early historical period. The fortification, stone structures, ceramics, terracotta artefacts and other discoveries of Talapada resemble Sisupalgarh findings in every respect (Mohanty *et al.* 2014 and Mohanty *et al.* 2012-13). During recent explorations KW sherds also found from Talapada (Fig. 2f).

Budigarh

Budigarh is located on the right bank of the River Rahul, a tributary of the River Tel. The

excavations of Budigarh revealed a wide variety of pottery, semiprecious beads, terracotta objects, iron implements, coins, sculptures, faunal remains and human skeletons (**Ref. 00**). Among pottery, KW, Burnished Black Slipped Ware, Red Ware, Grey Ware, and NBPW have been recorded during explorations and excavations. A number of KW sherds of different fabrics have been collected from Budigarh (Fig. 3a); the height of the knobs of KW was measured and found that the height of the knobs varies from 9mm to 1.04 cm, whereas the concentric grooved circles around the knob varies from twelve, eight, and seven. One of the KW sherds has an 'X' shaped graffiti mark (Singh Deo 2004-05), which are commonly found in the early historical pottery of the region (Mishra 2010a). The ceramic assemblage of Budigarh comprised of dishes, bowls, basins, dish-on-stands, vessels and lids. Most of the dishes of Budigarh are made of Burnished Black Slipped Ware whereas bowls are made of red ware and dull red ware (Mohanty and Mishra 2005). The other two sites namely Kharligarh and Asurgarh-Narla are located close to Budigarh and findings of Kharligarh and Asurgarh-Narla are also comparable with those of Budigarh.

Asurgarh- Narla

Asurgarh-Narla is located on the eastern bank of the River Sandul. The Rupra Railway Station and the Narla village are situated very close to the site. Asurgarh-Narla is one of the important sites of western Odisha, the site was well planned, and the fortification with moat still exists. ~~The existence of the tank near the site suggests that water was supplied from the tank to the site.~~ The excavation of Asurgarh-Narla revealed different types of pottery such as NBPW, RW, KW (Fig. 3b), Black and Red Ware, Black Slipped Ware, Fine Grey Ware, Red Slipped Ware, Black Polished Ware, semiprecious stones beads, bead moulds, pendants, PMC, copper coins, terracotta figurines, glass bangles, amulets, ornaments, and iron implements (Mishra 2010b). Among the pottery, except some inferior quality of NBPW sherds, others recorded from the site were of fine fabric. The pottery comprised of bowls, dishes, dish on stand, and vessels. On the basis of findings and remains of successive occupations, N. K. Sahu (1982) has suggested the date of Asurgarh-Narla could be datable between 3rd century BCE and 5th century CE. Similarly, a silver coin hoard containing more than five hundred coins was found from the site, and those are datable from pre-Mauryan period to the Gupta period. The findings suggest that Asurgarh-Narla site was deserted after 5th and 6th centuries CE.

Manamunda-Asurgarh

is located on the right bank of the River Mahanadi in Boudh district. The site was first reported by R. D. Banerjee. This site has been explored and excavated many times. The present Manamunda-Asurgarh village is located on the ancient site. The fortification brick wall of Manamunda-Asurgarh has been damaged by frequent floods of the River Mahanadi. In 1981-82, Sambalpur University and

the Deccan College, Pune, jointly carried out excavations of Manamunda-Asurgarhand the findings include NBPW, KW, red ware, iron implements and brick structures. The site was again excavated by Sambalpur University between 1983 and 1990 and the findings comprised of brick structures, brick pillars around the periphery of the site. The ceramic assemblage comprised of NBPW, KW (Fig. 3c) Black Slipped Ware, Red Slipped Ware, fine grey ware and red ware with a grey core. Graffiti marks were noticed on a number of sherds. The other discoveries are semi-precious stone beads, copper bangles; punchmarked coins datable to the 2nd century BCE. The findings of Manamunda-Asurgarh are datable from the 4th-3rd centuries BCE to the 3rd century CE (Pradhan 1992; Mishra 2010b).

Kharligarh

Kharligarh, the early historic site is situated at the confluence of the Rivers Rahul and Tel in Tentulikhunti block of Bolangir district bordering the Kalahandi district. It has a rectangular fort, the moat running in an north to south direction and a flight of steps leading to the river bank. In the adjoining site of Kharligarh, a number of rural settlement sites have been discovered. The excavations revealed brick structures and a large variety of pottery comprising of KW, Burnished Black Slipped Ware, Black Slipped Ware, and Black and Red Ware. The dominating pottery is bowls and dishes. All the pottery was wheel turned and made of well levigated clay. The shapes consist of bowls, dishes, jars, basins, miniature pots. The other findings include PMC, Kushan coins, beads, metal bangles, earrings, copper Kushan coins, querns, choppers, microlithic artifacts, terracotta spindle whorls, beads and smoking pipes, and iron implements (Mishra 2010b). The iron implements of Kharligarh resemble those of Sisupalgarh. The findings of Kharligarh can be divided into two phases, datable between 200 BCE and 400 CE. The explorations of Bileikani in the district of Kalahandi also, have yielded red KW, BRW, RW, Iron slag, arrowhead, knife, nail, ring stone, chopper, microlithic, and terracotta figurines (Mishra 2010b; Tripathy 2001 and 2007).

Narisho

Narisho is situated on the right bank of the River Prachi, a tributary of the River Mahanadi about 55 km from Bhubaneswar. The excavations of Narisho have brought to light various types of pottery which include both handmade and wheel made, and comprised of KW; red slipped ware, black slipped ware, grey ware, red ware and black ware. All the above types of pottery are found in six layers, but KW is found only in layer six, whereas remaining types of pottery are found in other layers also. Four dish sherds of KW of medium fabric with concentric grooves surround the knob recovered from Narisho. Semi-precious stone beads made of carnelian, agate, chalcedony, bullae, pendants, ear ornaments, sling ball, gamesman, stone saddle, iron chisels, copper bangles have also been recovered during the excavations. The other findings of Narisho are the beads made of

terracotta, stone, glass, bone, metal and shell. In terms of pottery and other findings, Narisho can be compared with Sisupalgarh (Pradhan 2011).

Besides the findings of KW from the excavations of the above sites of Odisha, the recent explorations of Bidyadharpur, Korkora, Arjunagada, Bantalahuda, Maryakud (Tripathy 2000), Nehena, Bileikeni, Gourangapatna and many other sites of Odisha have also brought to light KW sherds. Moreover, to reassert the finding of KW in Sisupalgarh and Jaugada, and Dantapur of Andhra Pradesh, subsequent explorations were also carried out at Sisupalgarh, Jaugada and Dantapur which yielded KW sherds. Apart from coastal sites, the early historical hinterland sites namely Tentulipali/Karmapadar (Kurumapadar) in Boudh district and some sites in Kalahandi district, namely Urlukupagarh, have been explored and excavated, and KW, NBPW, an ivory comb have been found, and these finds shed light on hinterland contacts (Yule 2006). All these sherds found from the explorations were compared regarding their fabric, design and typology.

Besides Odisha, KW has been reported from other countries. For instance, the excavations of Wari-Bateswar of Bangladesh (Jahan 2012) and Khao Sam Kaeo of Thailand have yielded KW. Moreover, knobbed vessels made of high-tin bronze with a central knob or cone with concentric circles surrounding the knob which are similar to KW has been reported from Ban Don Ta Phet (Bellina and Glover 2004) and Khao Sam Kaeo (Glover and Bellina 2011) of Thailand as well as Wari-Bateswar in Bangladesh (Jahan 2012; 2002). These are made of high-tin bronze, regarding thickness these are very thin less than 1 mm thick and designed with incised decorations on the vessel. High-tin bronze knobbed vessels are also reported from Agiabir, Uttar Pradesh, which are thicker than those of Wari-Bateswar and Ban Don Ta Phet and suggested that these were used for domestic purpose (Singh and Chattopadhyay 2001-02).

Discussion and Conclusion

The study of KW from the EHP sites of Odisha shows that NBPW and RW are not the only indicatives of early historic pottery; the finding of KW from many sites of Odisha and other parts of India and abroad clearly suggests that KW was also a significant pottery and played a comparable and noteworthy role similar to that of NBPW and RW. It is not clear why KW was not emphasized like NBPW and RW. If the distribution of KW is considered, it has been reported from more sites of Odisha than other parts of India. All the excavated sites of Odisha from where KW, NBPW, RW have been found, are either fortified sites or satellite sites, and archaeological material of these sites are also similar. Since the excavation findings of the sites of Odisha have been published in earlier papers, only pottery information has been referred to.

Different fabrics such as black and red ware, black ware, dull red ware, grey ware, fine grey ware, and red ware have been found both from exploration and excavations. Moreover, the KW sherds are

thin to medium fabric and both well and ill fired. As far as the shapes of KW are concerned, mostly bowls are found. In the course of study, many KW sherds were handled, and it is observed that the height and thickness of knobs and the concentric circles also vary. For instance the height of the knobs of Budigarh was measured and found that it varied from 9 mm to 1.04 cm, whereas the concentric grooves of circles around the knob vary from twelve, eight, seven and some less than seven. It is not that all the KW has the knob with concentric circles, for instance the KW of Bileikani (Fig. 3d) does not have concentric circles.

The archaeological material from the excavated and explored sites indicates the existence of close contacts among all urban centres like Sisupalgarh, Jaugada, Talapada, Radhanagar, Manikapatna, Asuragarh-Narla, Manamunda-Asuragarh Budigarh and Kharligarh with rural satellite sites like Narisho, Lathi, Gourangapatna, Arjunagada and many other sites. Further, it is evident that all the urban centres were elaborately planned, fortified and associated with Buddhism. However, in western Odisha, a number of sites have brought to light KW, but there is no evidence of Buddhism. Another fascinating aspect observed regarding the finding of this pottery; it has been reported all over the province except the northern part Odisha, which borders West Bengal. Moreover KW has been reported from Bengal region. In order to understand the history of KW, it is, therefore, essential to explore the unexplored area such as northern Odisha and vital to excavate and re-excavate sites like Jaugarh, Asuragarh-Narla and some other sites. The growth of urban centres both in coastal and hinterland areas was possible because of the existence of trade and exchange of materials. It cannot be ignored that from western Odisha items such as finished beads, raw material and KW might have come to trade centres and ports (Fig. 4) of Odisha and those might have been transhipped to other countries (Sila Tripathi 2017). The recovery of semi-precious stone beads from the hinterland sites suggests that these sites had contacts not only with the ports of Odisha but also with Andhra and Southeast Asia; and the findings of Bhutiapali and Asuragarh-Narla confirm the statement. More archaeological research in this respect will unravel unknown hidden aspects pertaining to the role of pottery in the maritime trade of early Odisha.

As regards the origin and period of KW, this and associated ceramics such as black burnished ware and red burnished ware (Mohanty and Smith 2008; Mohanty and Smith 2009) were recovered from the early levels of Sisupalgarh. Earlier KW has been dated to 300 BCE, but the recent excavations suggest that the earliest date can be pushed back two to three centuries more. And RW was reported immediately after the KW at Sisupalgarh as well as associated with NBPW and RW. Probably KW originated from the black burnished ware and red burnished ware. Similar evidence is also found in western Odisha. Regarding the date of the KW, it predates the RW at Sisupalgarh, and on the basis of stratigraphy and findings, it could be dated to 500 to 400 BCE (personal communication R. K.

Mohanty). Similarly, in Radhanagar KW has been recorded in phase II and early levels of phase III which is datable to 300 BCE. Since no scientific dating of KW has been carried out, therefore, it is difficult to date the pottery precisely.

With regard to usage of KW, Glover has suggested that KW could have been associated with Buddhist rituals but not used as a utilitarian pot (Glover 1998; 1996 and Glover and Bellina 2011) and the presence of knob and concentric circles on this pottery probably could be as a *mandala* or a schematic cosmological symbol signifying mount Meru surrounded by oceans. Further, Tambiah (1984) has opined that the symbols of this ware pertain to Buddhism. Since KW has been found from maximum Buddhist sites of Odisha except for western Odisha, therefore its association with Buddhism cannot be ignored unless some new approaches and evidence come to light. Moreover, a comprehensive study of KW is critical to understand its distribution in the Indian subcontinent and regional contacts. In order to understand the source of raw material of KW to trace the provenance, period, as well as manufacturing techniques of the pottery, scientific analysis should be carried out and is the need of the hour.

Acknowledgements

Authors are thankful to the Director, CSIR-NIO for support and encouragement for the study. We thank Prof. R. K. Mohanty, Deccan College, Pune, Dr. V. Selva Kumar of Tamil University, Thanjavur, and Dr. Shahnaj Husne Jahan of University of Liberal Arts, Bangladesh (ULAB) of Bangladesh, Mihirendra Pratap Singh Deo and my colleagues for sharing information on KW and the anonymous reviewers for their comments and suggestions and Sujal Bandodkar and S. B. Chitari for preparing figures. The present study was carried out under the Ocean Finder Project Funds: PSC 0105, of CSIR-NIO. This is NIO's contribution.

References

- Behera, P.K. S. Hussain and G.L. Badam 2015. Taraporegarh: An Iron Age-Early Historic Circular Fort in the Middle Mahanadi Valley, Odisha, *Puratattva* 45: 178-196.
- Bellina, B. and Ian Glover. 2004. The Archaeology of early contact with India and the Mediterranean world, from the fourth century BC to the fourth century AD, in *Southeast Asia: From Prehistory to History* (I.C. Glover and P. Bellwood Eds.), pp. 68-89. London: Routledge/Curzon Press.
- Dhavalikar, M.K. 1999. *Historical archaeology of India*. New Delhi: Books & Books.
- Ghosh, A. (Ed.) 1989. *An Encyclopaedia of Indian Archaeology*, Vol. II, New Delhi: Munshiram Manoharlal Publishers.
- Glover, I.C. and Bellina, B. 2011. Ban Don Ta Phet and Khao Sam Kaeo: The Earliest Indian Contacts Re-assessed, in *Early Interactions between South and Southeast Asia: Reflections on Cross-*

Cultural Exchange (Pierre-Yves Manguin, A. Mani & Geoff Wade Eds.), pp. 17-46. Singapore: ISEAS Publishing.

Glover, I.C. 1998. The Role of India in the late Prehistory of Southeast Asia, *Journal of Southeast Asian Archaeology* 18: 21- 49.

Glover, I.C. 1996. The Southern Silk Road: Archaeological evidence for early trade between India and Southeast Asia, in *Ancient trades and Cultural contacts in Southeast Asia* (A. Srisuchat Ed.), pp. 57-94. Bangkok: The office of the National Culture Commission.

IAR - *Indian Archaeology: A Review*, 1993-94: pp. 13. New Delhi: Archaeological Survey of India.

IAR - *Indian Archaeology: A Review*, 1956-57: pp. 30-31. New Delhi: Archaeological Survey of India.

Jahan, S.H. 2012. Maritime trade between Thailand and Bengal, *Thailand Jr of Fine Arts* 3 (2): 206-228.

Jahan, S.H. 2002. Early maritime trade network of Bengal, *Man and Environment* 27 (1): 127-138.

Lal, B.B. 1949. Sisupalgarh, An early Historical Fort in Eastern India, *Ancient India* Vol. 5: 62-105.

Mishra, B. 2010a. Early historic Budigarh, Orissa: Revisited, *The Journal of Orissan History* 23: 11-22.

Mishra, B. 2010b. Theoretical aspects of early historic urbanism vis-à-vis the early urban centres of Orissa, in *Settlement and urbanization in ancient Orissa* (Baba Mishra and P. K. Dandasena Eds.), pp. 51-76. Kolkata: Indological Book seller.

Mishra, J. 2000. Radhanagar: Early historic Buddhism, Urban Structure and Trade, in *in Archaeology of Orissa* (K. K. Basa and P. Mohanty Eds.), pp.507-550. New Delhi: Pratibha Prakashan

Mohanty, P.K. and B. Mishra 2005. *From Stone Age to the Early Historic: Recent Archaeological Discoveries in Kalahandi District, Orissa, in River Valley Cultures of India* (K.K. Chakravarty and G.L. Badam Eds.), pp. 97-124. Bhopal. Indira Gandhi Rashtriya Manav Sangrahalaya.

Mohanty, P. and B. Mishra. 2002. Early historic archaeology of Kalahandi District of Orissa, in *Archaeology of Eastern India New Perspectives* (G. Sengupta and S. Panja Eds.), pp: 471-492. Kolkata: Centre for Archaeological studies and Training, Eastern India.

Mohanty, R.K. M.L. Smith and T. Matney. 2014. Excavations and Geophysical survey at the Early Historic town Talapada, Odisha (2013), *Man and Environment* 39 (2): 53-63.

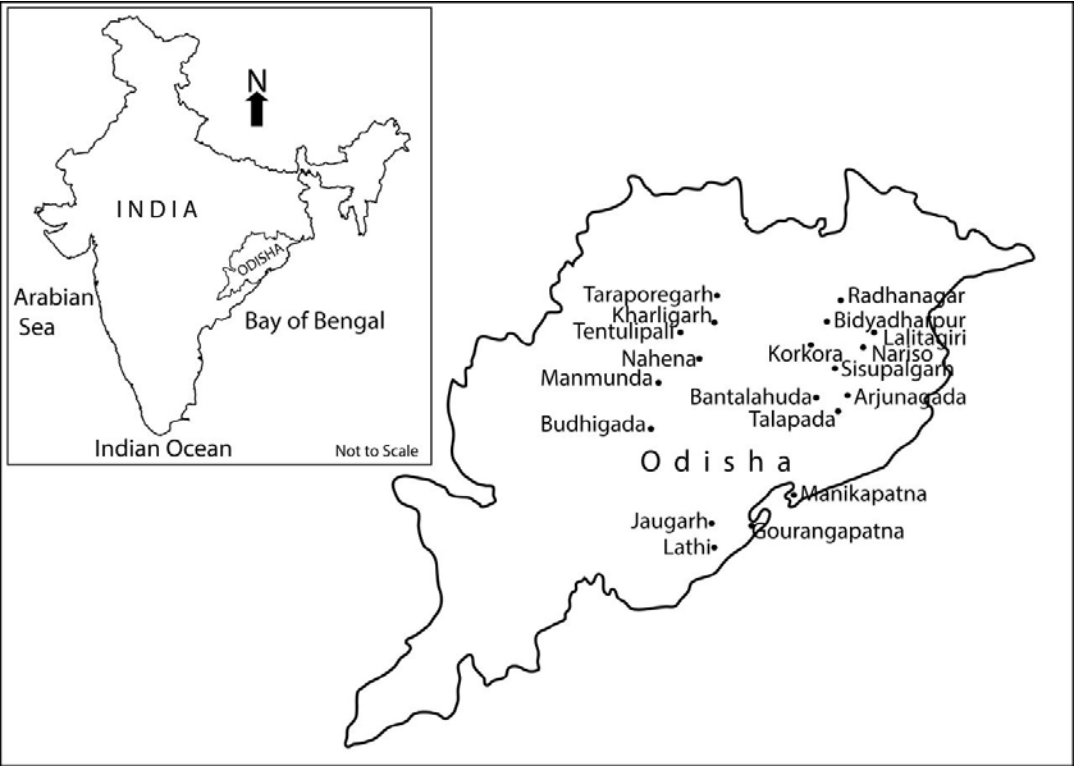
Mohanty, R.K., P.P. Joglekar, T. Thakuria, S. Ray, S. Vaidya, C.S. Midhun, R. Wannapat, V. Sabnis, G. Bedekar, T. Pradhan and Y. Mallinathpurm. 2012-13. Preliminary Report on Exploration at Golbai Sasan, Talapada and the surrounding area, Dist. Khurda, Odisha, 2010-11, *DCPRI*, 72-73: 153-166.

- Mohanty, R.K., and Smith, M.L. 2009. Excavations at Sisupalgarh 2008, *Man and Environment* 34 (1): 47-56.
- Mohanty, R.K., and Smith, M.L. 2008. Excavations at Sisupalgarh, Odisha, Special Report 2, pp. 1-69, New Delhi: Indian Archaeological Society,
- Mohapatra, R.P. 1986. *Archaeology of Odisha*. Vol. I, New Delhi: B. R. Publishing Corporation.
- Nigam, J. S. 2014. *Ceramic traditions in Indian Archaeology (Mesolithic to Medieval)*. New Delhi: Rishi Publications.
- Ota, S.B. 2007. Evidence of a stupa at Sisupalgarh, Orissa: Re-Interpreting earlier excavation data, *Man and Environment* 32 (1): 67-73.
- Patnaik, S.K. 2017. Early historic Buddhist settlements in Eastern India: A study of Radhanagar-Kayama-Langudi culture complex, *Man and Environment* 42 (2): 42-51.
- Patnaik, S.K. 2015. *Excavations at Radhanagar (Kankia): An Early Historical Buddhist Site*. Bhubaneswar: OIMSEAS.
- Pradhan, G.C. 2008. New light on the history of Cuttack - the archaeological remains of Bidyadharpur, *Odisha Historical Research Journal* 48 (1): 48-50.
- Pradhan, D. 2007. Manikapatna Excavations (1989-1993): Cultural affinities of Southeast Asia through Archaeological Evidences, in *Kalinga-Indonesian Cultural Relations* (K. S. Behera Ed.), pp. 71-95. Bhubaneswar: OIMSEAS.
- Pradhan, D., Mohanty, P., and Mishra, J. 2000. Manikapatna: An Ancient and Medieval Port on the Coast of Orissa, in *Archaeology of Orissa* (K. K. Basa and P. Mohanty Eds.), pp. 473-494. New Delhi: Pratibha Prakashan.
- Pradhan, S., 2011. Excavation at Narisho 2008-09: A preliminary report, in *Souvenir National seminar on Cultural Heritage of Coastal Orissa* (S. K. Mitra Ed.), pp. 1-5. Kakatpur, Puri.
- Pradhan, S., 1992. A Note on a Punch-marked coin found from Manamunda Excavation, *Journal of the Numismatic Survey of India* 54(1-2): 26-28.
- Roy, T.N. 1986. *A Study of Northern Black Polished ware Culture*. New Delhi: Ramanand Vidya Bhawan.
- Sahu, N.K., 1982. Excavations at Asurgarh, District Kalahandi, in *Interim Excavation Report* (S.C. Behera Ed.), pp. 1-8. Jyoti Vihar: Sambalpur University.
- Schenk, H. 2006. The Dating and Historical value of Rouletted Ware, *Zeitschrift fur Archaologie AuBereuropaischer Kulturen* 1: 123-152.
- Sila Tripathi., 2017. Seafaring Archaeology of the East Coast of India. *Ancient Asia*, 8 (7): 1-22.
- Sila Tripathi., K. H. Vora. 2005. Maritime heritage in and around Chilika Lake, Orissa: Geological evidences for its decline, *Current Science* 88 (7): 1175-1181.

- Singh Deo, M.P. 2004-05. Black knobbed ware of Budi-Garh, Madanpur, *Journal of Bengal Art* 9 & 10: 451-455.
- Sinha, B.P. (Ed.), 1969. *Potteries in ancient India*. Patna: Dept. of. AIHC&A, Patna University.
- Singh, A. K. and P. Chattopadhyay. 2001-02. In search of High Tin-Bronze in eastern India, *Puratattva* 32: 101-106.
- Singh, P. and A. K. Singh. 1999-2000. Excavations at Agiabir, District Mirzapur (Uttar Pradesh), *Pragdhara* 10: 31-55.
- Singh, B.P. and A. K. Singh. 2004. Excavations at Sarai Mohana 1967-68 (A satellite settlement of ancient Varanasi), *Bharati* 27: 1-120.
- Subrahmanyam, B. 1994. *Excavations at Dantapuram, Andhra Pradesh, Srikakulam District*. Hyderabad: Department of Archaeology & Museums, Govt. of Andhra Pradesh.
- Tambiah, S.J. 1984. *The Buddhists saints of the forest and the cult of amulets*. Cambridge: Cambridge University Press.
- Tripathy, B. 2007. Early Historic Cultures of Orissa, *Orissa Review* 63 (4): 1-19.
- Tripathy, B. 2001. *Archaeology of Boudh District, Orissa with special reference to the Early Historic settlement pattern*. Unpublished PhD thesis, Pune: Deccan College.
- Tripathy, B. 2000. Archaeology of Boudh: Central Orissa, in *Archaeology of Orissa* (K. K. Basa and P. Mohanty Eds.), pp. 392-417. New Delhi: Pratibha Prakashan.
- Tripathy, B. and P.P. Joglekar 1997-98. Archaeological Investigation in Central Orissa, *Puratattva* 28: 117-119.
- Yule, P. 2006. *Early Historic Sites in Orissa*. New Delhi: Pragun Publication.

List of Figures

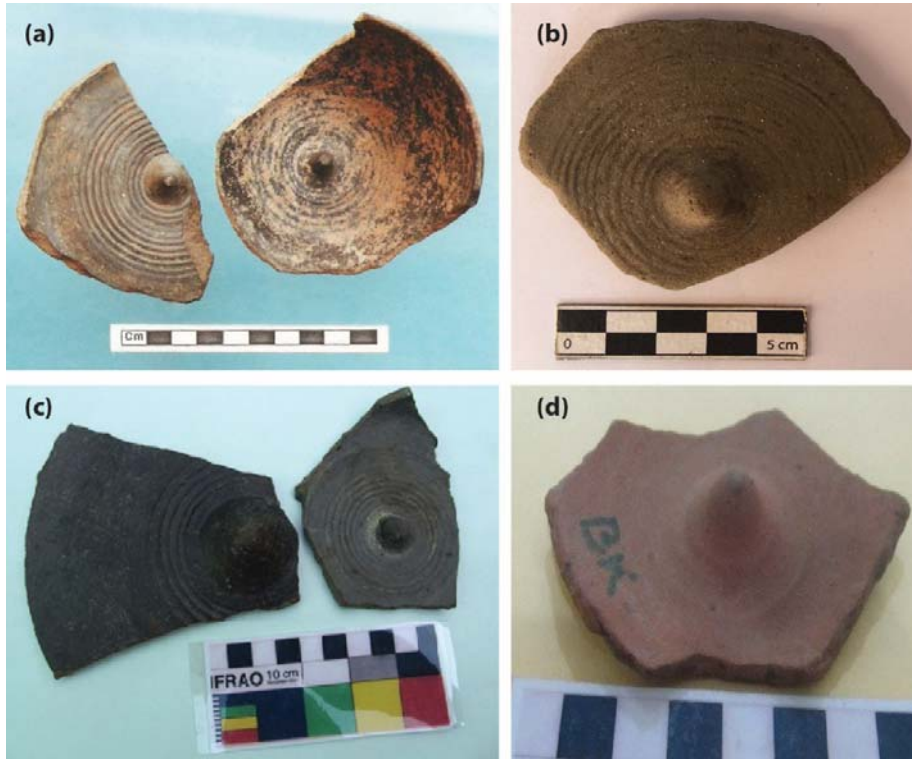
1. Figure showing KW sites of Odisha.
2. KW sherds collected from coastal sites of Odisha.
3. KW sherds collected from sites of western Odisha.
4. Ports and trade centres of Odisha.



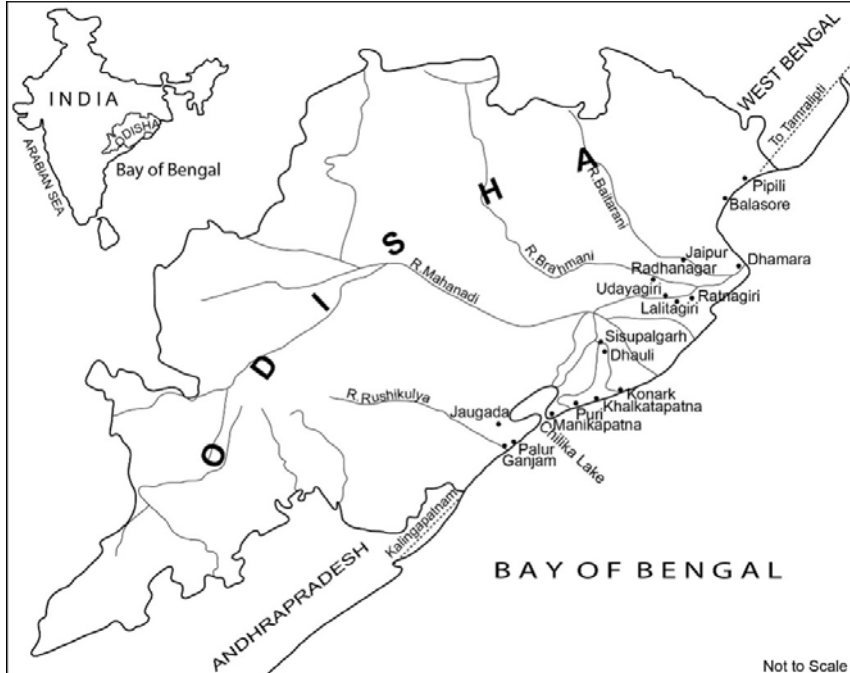
1. Figure showing KW sites of Odisha.



2. KW sherds collected from coastal sites of Odisha.



3. KW sherds collected from sites of western Odisha.



4. Ports and trade centres of Odisha.