

Exploring South Indian Iron Age megalithic burial site for its habitational and spatial distribution over the Kaveri landscape at Koppa, Karnataka, India

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Intensive archaeological explorations during 2013–2015 in an area of 9 sq. km, centring Koppa megalithic burial site in Karnataka, India have resulted in studying the landscape and land use, cultural activities and distribution, and settlement pattern of Iron Age. Combination of archaeological and geographical data has helped in constructing a cultural and political ecological model. Here, the Iron Age society seems to have witnessed a frequent occupational shifts across the core and offsites/hinterlands depending on the available natural resources at distinct locations for sustaining their subsistence economy and leading a dispersed settlement pattern way of life.

Keywords: Burial space, habitational space, Iron Age, settlement pattern.

SOUTH Indian megaliths are both sepulchral and non-sepulchral in nature, characterized by surface and subsurface types, but with a deposit of common types of grave furniture, coinciding with the introduction of iron technology in various Iron Age zones of the Indian subcontinent^{1,2}. Therefore, they largely belong to the Iron Age culture that flourished during the second and first millennium BCE^{3–6}. The term ‘megalith’ represents the funerary custom, which has occupied a predominant part of a wide range of cultural activities since late Neolithic to Recent. Studies at Sanganakallu⁷ and Maski⁸ have pushed the antiquity of burials with stone appendages, and few ceramic materials of Iron Age to late southern Neolithic period dating 1200–1400 BCE and cal. 1895–1756 BCE. Megalithism is still a living heritage among tribes like Munda, Kurumba, Khasi, etc. spread across various parts of India⁹. The megalithic site explored in the present study, i.e. Koppa, belongs to the Iron Age period. There are no absolute or relative dates for Koppa, but the excavations have exposed a common types of grave furniture like any other well dated megalithic sites elsewhere across the Indian subcontinent. Therefore iron implements, black and red ware, and three-legged high-necked jars endure

as a diagnostic Culture Materials in attributing these burials to be South Indian Iron Age.

Society and economy

The society and economy of South Indian Iron Age was largely engaged in the production of ceramics, metallurgy, pastoralism, agriculture and burial monuments. The ceramics assemblage consisted of pots, basins, jars and bowls of red slipped, black polished, black and red, dull red, russet coated painted and micaceous red varieties for their domestic and grave utilities¹⁰. Urns and sarcophagi were also made to store cremated human skeletal remains and ash. Iron was smelted in large quantities and other metals like copper and bronze in small quantities. Habitational sites have yielded evidence for iron smelting in the form of furnaces, slag, ore and terracotta pipes (tuyeres) and crucible fragments². Iron was used to make tools, implements and weapons for carpentry, agriculture, domestic purposes, hunting and warfare. Copper and bronze were used for ornamental and decorative purposes, such as horse ornaments, bangles, rings, bowls, bells and handles for iron dagger¹¹. Food grains found in the megaliths throw light in their diet and suggest that they had both wet and dry cultivation in practice. Rice (*Oryza sativa*), ragi (*Eleusine coracana*), hyacinth bean (*Lablab purpureus*), millet (*Setaria*), wheat (*Triticum* spp.), koddo millet (*Paspalum scrobiculatum*), horse gram (*Macrotyloma uniflorum*), black gram (*Vigna mungo*), green gram (*Vigna radiata*), cotton (*disambiguation*), barley (*Hordeum vulgare*), etc. seem to have been their main crops^{6,9,11}.

Recent investigations at Maski have substantiated the practice of urn burial custom associated with lithic appendages during the late southern Neolithic period⁸. Probably, megalithism, an ideological and ritual custom of disposing the dead and honouring them with a monumental and social identity, developing into a complex sepulchral and non-sepulchral phenomenon became distinguishable during the Iron Age. Hand in hand, these enduring social factors gave rise to non-perishable

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architectural developments, following late southern Neolithic residential constructions in perishable materials like wattle and doab, indicating transformation of structural usage of space from secular to ritual¹². So far, more than 3000 megalithic sites have been identified across the Deccan plateau and burials range from 5 to 1000 at these sites¹. There are regional variations in the distribution of megalithic types, and in proximity with natural resource points and habitational sites. For example, at Hallur, burial sites have spread across 5–3 km west of the habitational site, separated by the River Tungabhadra¹³. This shows defined spatial selection; burials are erected in the vicinity of rock formations and habitational sites over the river bank. On the contrary, burial and habitational spaces are adjoining, as in the residual hill sites like Maski and Brahmagiri^{14,15}. Therefore, the distance between the living and burial space would have been the least consideration for iron age communities, as they can be spotted in a close proximity. This indicates their varying capacities in the movement of labour, extraction and shifting the required natural resources and cultural materials from distance among the habitation, burial and natural resources locations. In this background, construction of burial monuments is both a matter of laborious and skilled activity.

The problem of settlements sites

Locating habitational space associated with the burial space which flourished during the Neolithic and Bronze age Europe (5th–2nd millennium BCE) and Iron Age Asia (2nd–1st millennium BCE) has still remained a common problem^{11,16}. Probably, this problem would not have existed if the houses were built with perishable materials like the burials, i.e. megaliths. However, two theoretical frameworks, i.e. of environmental and cultural potentiality have to address this problem. First, the ‘landnam’ process has modified the natural landscapes at resource availability locations; when the resources were exhausted, the inhabitants abandoned and shifted their settlements to suitable unexploited environments. Such evidences have been covered by forest regeneration, partly accounting for a small number of habitational evidences¹⁶. Second, the society was largely made up of nomadic or semi-nomadic pastoral communities, resulting in flimsy settlement deposits^{17,18}.

However, in India such arguments began to be questioned, after locating large habitational sites at Hirebenkal¹⁰ and well-established habitational stratigraphy at Mahurjhari in 2002 (ref. 19). The 21st century researchers studied land use, cultural distribution, and settlement pattern to infer the cultural and political ecological model at the area level in Iron Age sites of humid subtropical and semi-arid zones of the Deccan plateau, e.g. Mahurjhari¹⁹, Sanganakallu⁶, Maski⁸, Hirebenkal²⁰, Tekkala-

kota²¹ and Hampi–Daroji area/EHLTC project area²² on the Tungabhadra. They have shown that increasing aridity during the Iron Age resulted in settlement shifts and expansions towards stable water bodies and maintaining reservoirs of natural, modified rock pools to irrigate newly introduced wet cultivation like rice, new millet, wheat, barley and banana, hand in hand with dry cropping of new millet, hyacinth bean and horse gram. The spatial and water control by certain stratified sections of the people led to the establishment of chiefdom like polity, and megaliths became symbolic elements of socially stratified political status. All these factors have been used to determine the settlement size, site usage and subsistence patterns in central and southern Deccan.

Such studies are needed in other climatic zones of Deccan region as well. Especially in the high- and lowlands of tropical wet climate and tropical dry deciduous zone of Coorg and Mysore plateau where more than 200 megalithic sites are present¹¹. Among them, Kushalanagara, Kudige, Ramaswamy Kanive, Heggedehalli and Koppa are five densely spread megalithic sites across the riverbanks of the Kaveri (Figure 1). The present author has initiated explorations at the above-mentioned sites since 2013. As a pilot study, the investigations have begun at Koppa.

Aims and methods

Locating habitational space with reference to the burial space and exploring cultural activities and natural resources in the outer peripherals have been the aims of the present study. Ancient landscape modifications and their settlement patterns were also studied along with mapping the resource availability points and building cultural and political ecological model of Iron Age society of the area. A total area of 3 × 3 km (9 sq. km) has been surveyed through pedestrian surface survey method, orienting north–south, by random sample collection of cultural materials with the aid of topography maps, handheld GPS and elevation profiles from Google Earth.

Case study: Koppa

Location

Koppa is an Early Iron Age megalithic burial site (75°98'23.34"E, 12°43'88.97"N) located on the right bank of the west to east-flowing Kaveri river in Periyyapatna Taluk, Mysore district, Karnataka, India (Figure 1). Geographically, the site falls in a meeting line of high- and lowland regions of eastern pediments of Coorg plateau with a tropical wet climatic condition and plains of Mysore plateau with a tropical dry deciduous climatic condition at the upper reaches of the Kaveri. The surface is covered by red loamy and clayey soil of lateritic origin,

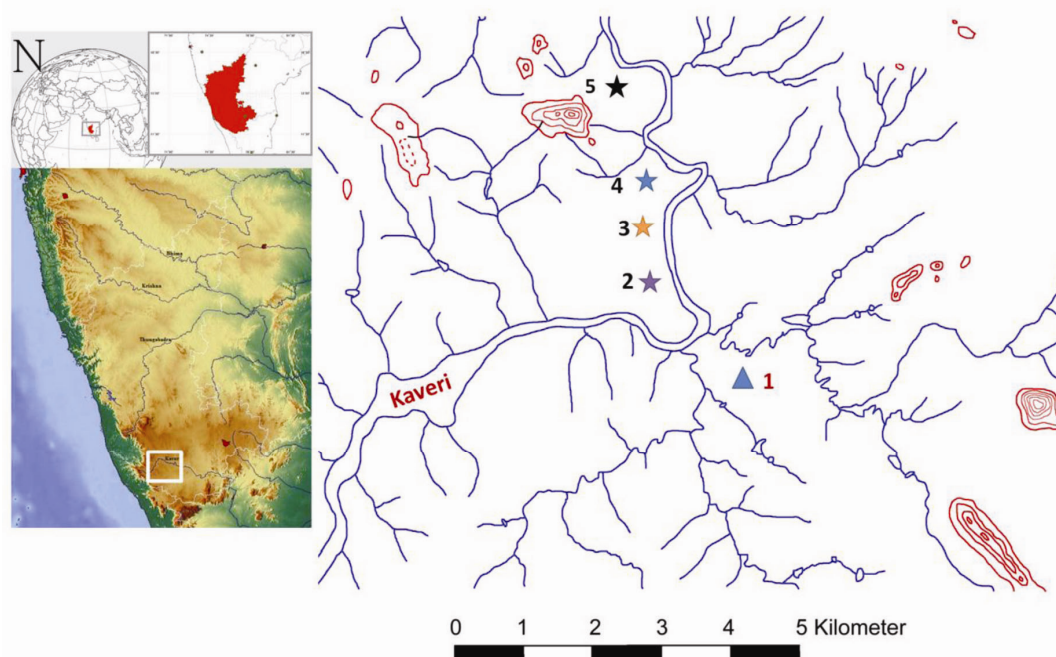


Figure 1. Distribution of Iron Age megalithic sites on the Kaveri riverbanks, bordering Coorg–Mysore districts in Karnataka. 1. Koppa, 2. Kushalanagara, 3. Kuddige, 4. Heggadehalli, 5. Ramaswamy Kanive.

bamboo and teak vegetation, with a series of low elevated granitic escarpments on which the megaliths are erected.

Previous works

Cole, Superintendent of Coorg region, noticed the site in 1868: ‘There were about 500 Cromlechs, occupying a distance of nearly half a mile’²³. Seventeen burials of slab cist chamber with eastern porthole and urn burials enclosed by a stone circle were opened, from which he retrieved a pot full of paddy husk (*O. sativa*) and ragi (*E. coracana*), ceramics of red slipped ware, black and red ware and corroded iron objects as grave good depository.

A century later, Subbayya²⁴ conducted excavation during three seasons in 1975–76, 1976–77 and 1983–84. Overall, 29 burials were exposed; 15 stone circles, 11 cists, 2 twin chambers cists and a cairn. Three-legged jars, globular-bodied pots of red ware and iron implements like spearhead, arrowheads, lances, javelin heads and flat iron axes were recovered from the burials. Currently, these artefacts are displayed in the Archaeology Museum, University of Mysore, Karnataka. Decisive discovery from the last seasonal excavation was uncarbonized pieces of husk and broken spikelets intermixed with soil in a three-legged jar, rice-husk impressions preserved on metal objects and an entire spikelet of rice adhering to an iron fragment. They were cultivated type of rice (*O. sativa* Linn) and kernels were removed from paddy, i.e. the dehusking operation had possibly occurred outside the burial²⁵.

Recent works

In 2013, an area of 1 × 1 km, focusing the burial site was surveyed, and this resulted in locating the habitational space²⁶. The habitation area of 10 acres is located to the south of RFIII at a distance of 500 m (Figure 2). The primary parameters to identify the location as an habitational space are based on the occurrence of potsherds of incised and plain dull red ware, red slip ware, black ware, micaceous red ware and black and red ware, in the absence of any filed boulders or stone slabs, which may have been used as accessories for the megalithic burial constructions. Chip-stone lithic and debitage of quartz, tool sharpeners, sling ball and spindle whorls in intermittent occurrence are considered as circumstantial evidences for habitational activities (Figure 3). Modern village expansion and agricultural activities have resulted in a drastic reduction in the number of burials; only 73 burials have sustained on the series of four granitic escarpments.

In 2014, further explorations continued with an aim to study cultural distribution and activities in the outer peripherals of the site, by further extending the study area to 3 × 3 km. This survey resulted in locating two clusters of small megalithic burials at two localities within a distance of 1.5 km from the core burial area. The megalithic types are the same as those found in the core burial complex, i.e. stone circle verities. Locality 1 (12°26′11.46″N, 75°59′03.06″E): 500 m east of the habitational location, an urn burial marked by a capstone enclosed by a stone circle. Locality 2 (12°26′00.42″N, 75°58′36.78″E): 800 m

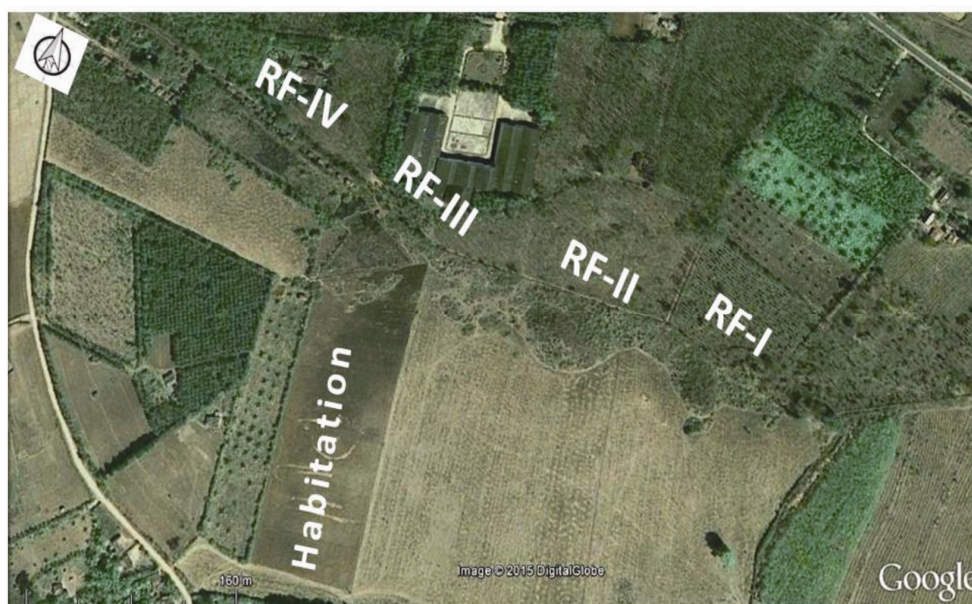


Figure 2. Granitic escarpments (Rock formations (RF) I–IV) stretching 550 m SE–NW in regular intervals, on which megaliths are densely constructed by extracting locally available field boulders for encircling and querying for cist chambers. Habitational space is located 500 m south of RF-III. Not to scale.

southwest of the habitational location, three slab cist burials enclosed by stone circles were found, and small pieces of ferrous bloomery slag (Figure 3 *d*) and three diorite nodules of rich iron mineral traces (Figure 4) were retrieved.

Landscape, land use, cultural distribution and settlement pattern

Overall surface surveys in 9 sq. km area over the Kaveri ecological landscape at Koppa resulted in exposing the Iron Age cultural density and activities distribution. Locating their burial, habitaton and offsite distribution over the geographical map followed by intensive explorations have provided a database to study their ancient landscape modifications over the given natural landscape, natural resources locations and their settlement pattern. Table 1 and Figures 5 and 6 provide a detailed elevation profile of the study area. It is a plain landscape but with uneven sloping and elevation from 863 to 822 m amsl towards the river, with unevenness profile of -67.8 to $+67.6$ m. The river and its stream channels on the west, south and north mark the lowest elevation and the granitic rock formations on which the megaliths are erected mark the highest elevation zone stretching for about 550 m north-east–southwest. The two vital natural resources, rock and water, are at the highest and lowest elevation levels, and they seem to have avoided their occupations on the immediate water banks and elevation dropping levels, and preferred to sustain their core cultural activities on the maximum elevation levels. This is the same as in locatiy-2, inhabiting closer to south stream but placing themselves at the elevated location at a differential distance of

500 m from the water body and 1000 m from the core cultural activity zone.

Four series of low-elevation (860 to 850 m amsl, i.e. 2–10 m high from its surroundings) granite rock formations/outcrops are found stretching 550 m from southeast to northwest with regular intervals of 50–70 m. This is the only available resource location for extracting rocks for their burial construction. Where they have queried the escarpments to prepare slabs for chamber construction and used readily available field boulders for encircling the cist, urn or pit. Megaliths are densely erected across the top, slopes, plains and even on the space between the outcrops, where red mixed black clayish soil, bamboo and grass vegetation, facilitating cattle grazing (Figure 7). All these natural factors and human adoptions over the ecological resources suggest that they defined their burial space on the very combination of resource locations and exploited it in multiple episodes and varying standards, and this could have resulted in landscape modifications during the Iron Age.

The habitational space is a relatively plain 10 acre arable land to the south of RF-III at a distance of about 500 m, covered by red clayish and brown loamy soil, which is alluvium in texture. Dry cultivations expose the cultural materials to a lesser extent; this may also suggest a thick site formation or intensity of cultural material deposition. As this area is slightly elevated from the river channel, it is practically impossible to drain the agricultural fields through the canals, and hence agriculture currently depends on rainfall and groundwater. Similar condition might have prevailed during the Iron Age; wet and dry cultivation depending on rain water. On the other hand,



Figure 3. *a-c*, Artefacts from the habitation area at Koppa: *a*, Geometrical and non-geometrical microliths of quartz. *b*, Potsherds of dull red ware, black ware and slipped red ware. *c*, Sling ball of granite, tools or tool edge sharpeners (?), fragments of spout and spindle whorl. *d*, Iron slag from locality.

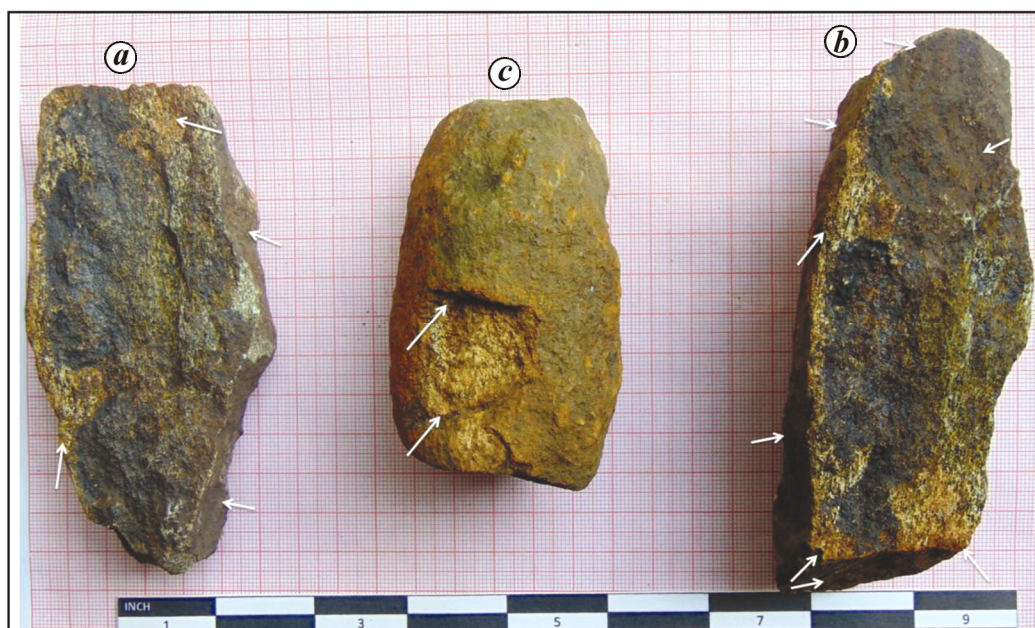


Figure 4. Diorite nodules collected from locality 2 found associated with bloomery slag pieces having traces of iron minerals. Probably they were used as ore for iron extraction.

there are no springs, or provision to modify the suitable locations into rock pools. This is in contradiction to the water reservoir systems of the Iron Age residual hill sites of semi-arid region.

Both locality 1 and locality 2 are on plain land situated within 500 m to 1 km radius centring core habitational

and burial areas. Both the localities have a small cluster of similar types of stone circle burials. The absence of any rocky outcrops in the vicinity favours the fact that rock as a raw material may have been transported from the core burial complex area and water from the streams. Locality 2 is a central location between the north of west

Table 1. Elevation profile of the study area (right bank of Kaveri), Koppa, Karnataka

Figure no.	Orientation	Distance (km)	Geo-coordinates	Max elevation (m amsl)	Minimum elevation (m amsl)	Average elevation (m amsl)	Surface unevenness (m)
5	East–west	3	12°25'52.09"N 75°59'31.01"E to 12°26'52.69"N 75°58'12.35"E	863	822	848	+67.6 to –33.8
6	North–south	3	12°27'5.37"N 75°59'30.30"E to 12°25'49.97"N 75°58'15.97"E	856	832	842	+52 to –67.8

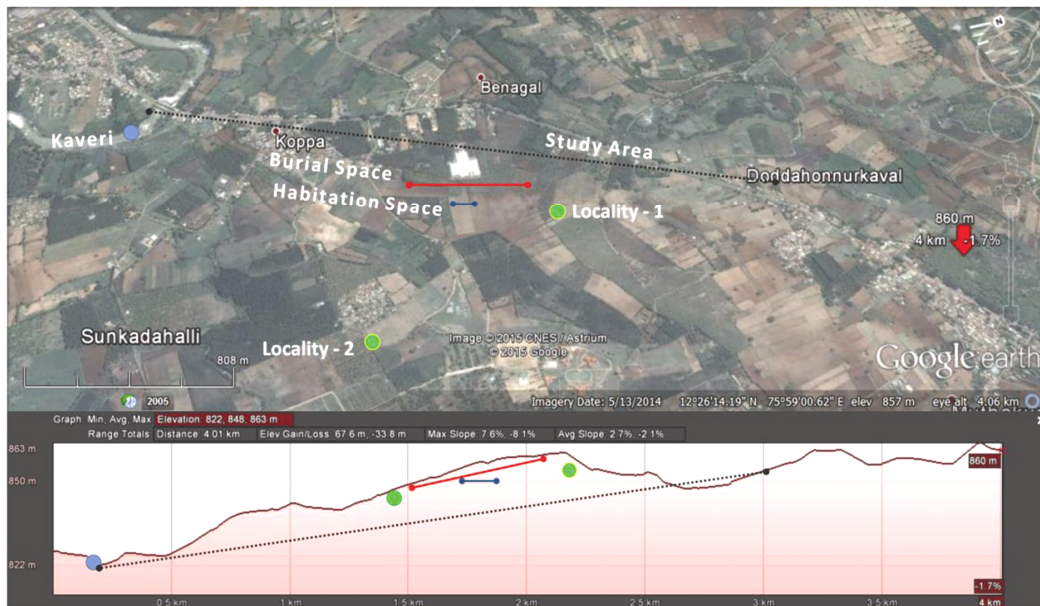


Figure 5. Elevation profile of total 4 km area orienting west–east, including 3 km study area centring Koppa site, with Iron Age cultural diffusion and land-use location points over the given landscape. See Table 1 for key details. Courtesy: Google Earth.

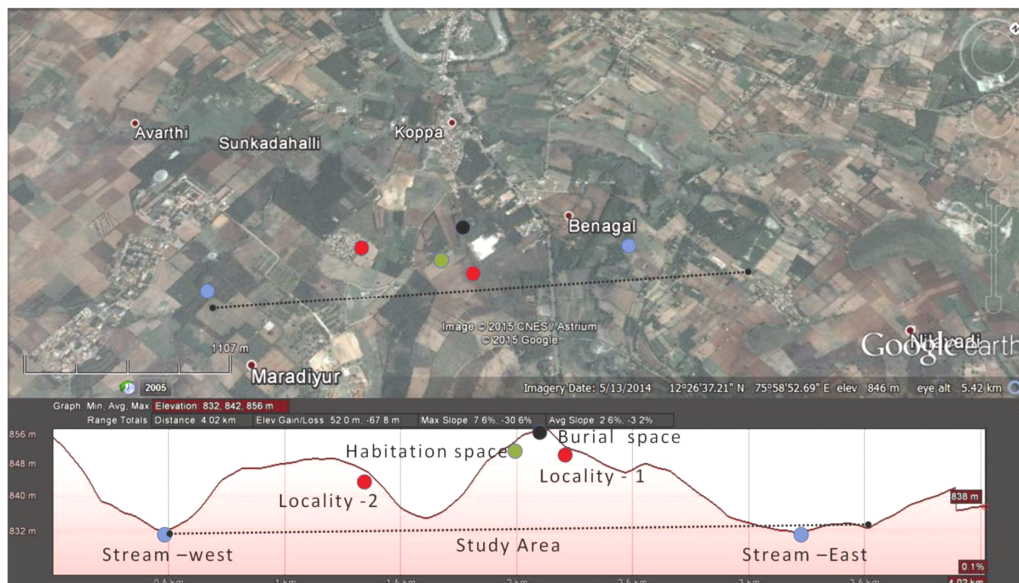


Figure 6. Elevation profile of a total 4 km area orienting south–north, including 3 km study area centring Koppa site, with Iron Age cultural diffusion and land-use location points over the given landscape. See Table 1 for key details. Courtesy: Google Earth.

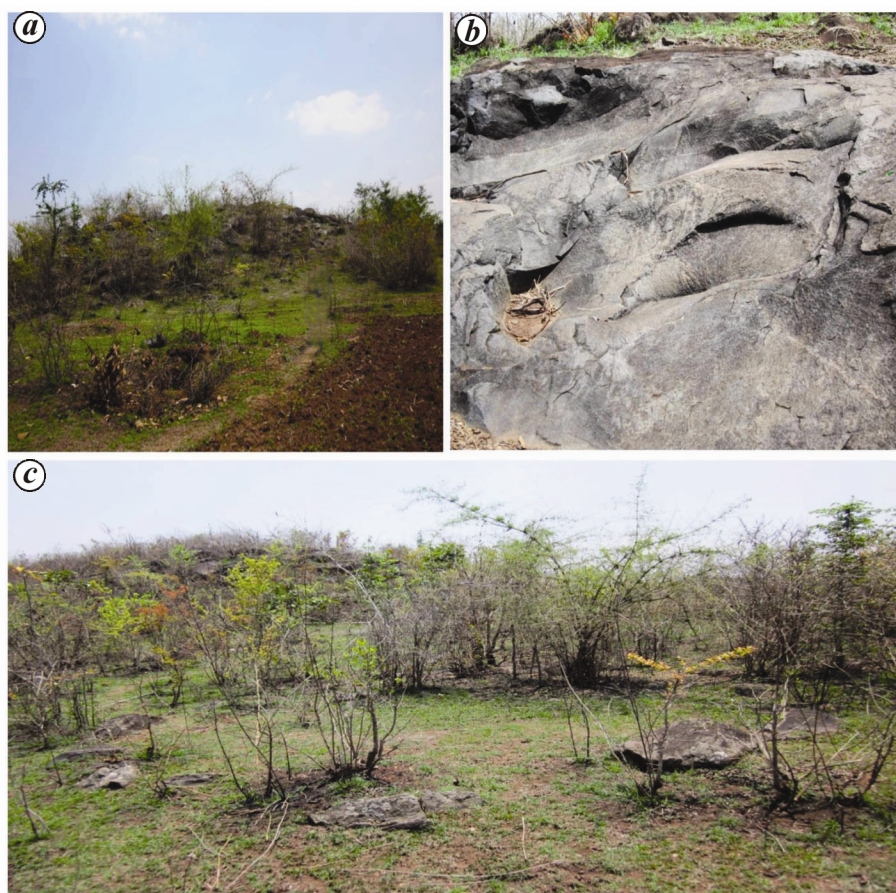


Figure 7. Granitic rock formation I at Koppa. *a*, Rock formation elevated up to 10–20 m from its surrounding surface. *b*, Quarry marks on the outcrops. *c*, A stone circle measuring 11 ft in diameter, stands testimony for mature use of space by erecting it over the rocky exposure.

stream and the core site activities. Recovery of iron bloomery slag and diorite nodules with rich traces of iron minerals, suggests the probable location for iron smelting, perhaps produced through bloomery furnace. The close proximity of smelting evidences and cluster of burials, and the absence of any such traceable habitational evidences indicate probably association of smiths frequently moving from core cultural zone to the locality, and the dead members honoured with the megalithic status in the vicinity to establish a social identity. This location is more conducive for subsistence practices due to the combination of natural factors, such as arable land covered by alluvium quality of soil, grassy vegetation and stream water drainable through canals for agriculture and animals. All these geographical factors might have stimulated in expanding their occupation at these locations and further would have functioned as hinterlands.

Conclusion

The ongoing surface survey project has gained enough evidences to consider Koppa as a habitation-cum-burial

site with major offsite activities. The overall distribution of distinct cultural activities across the given landscape and understanding their land use in the pockets suggest the selection of locations at resources availability points, which are suitable and sustainable for the burial, habitational and industrial activities.

There are no large boulder formations or inselbergs to provide natural shelters and therefore both shelters and occupations of the people were predominantly in open air. The tropical wet climate with high rainfall and wet vegetation cover gives rise to serious doubts favouring long-term settlement stability. However, the large number of burial constructions near the habitational space contradicts this hypothesis. Locality 2, a multiple resource point has possibly functioned as hinterland, exclusively for iron production and substituting the subsistence practices with core cultural complex with frequent settlement shifts.

Iron Age in Koppa seems to have had a dispersed settlement pattern way of life. Strong belief in megalithism or honouring the dead through their rituals and customs, and locating their burials on a multiple resources exploitable zone probably turned into a central place in the overall functioning of the society. Landscape modifications,

settlement patterning and grave good repository from the burials help in drawing inferences on the economic and political ecology of that age. Abundant supply of newly introduced crops like paddy and ragi in the burials substantiates large-scale production and practice of both wet and dry cultivation. Implements of agricultural use (flat axe, sickle and chisel), hunting weapons (arrowheads, spearheads) and warfare weapons (lance sword, dagger, and javelin) in good supply suggest intensification in agricultural and iron production, supported not only by technological advancement but also by the required workforce. A particular section of the stratified social layer possibly gained control over the production and resource space, and emerged as the political entity. Unlike through modification of rock pools and controlling the water supply which would have played a decisive role in structuring the economy and polity in the Iron Age sites of semi-arid zones like Maski, Sanganakallu and Hirebenkal. But, in Koppa, water may not have probably played a similar role in developing its economy and political structure. Because, the region in which Koppa is located receives abundant supply of water either by heavy rainfall and the perennial river channel from the highlands.

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