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Settlement and subsistence pattern of Neolithic culture in Kurnool district of Andhra Pradesh: A preliminary study

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Abstract
The present paper is an attempt to a preliminary analysis of settlement and subsistence pattern of Neolithic culture in Kurnool district of Andhra Pradesh for which primary and secondary data has been utilised. The material culture of Neolithic culture in the region comprised pecked and ground stone and blade tool industries along with varied pottery fabrics represented in the different shapes mostly utilitarian character for domestic and social purposes. The other cultural material comprised the evidence of plant remains and cereals, millets and pulses i.e., horsegram is found at various sites. Whereas, animal remains comprised cattle sheep/ goats, fowl, dog, pig of domestic variety and wild fauna of several deer species, sambar and along with acquatic fauna of pila, mulluses etc.

Keywords: settlement, subsistence, neolithic culture, kurnool district

Introduction

In the field of archaeology the term "settlement pattern" refers to physical remains of past human communities and their networks in a given geographical area. As such it is the evidence of particular cultural people used to interpret the way they lived together in a defined area and interacted with each other. Settlement pattern as a concept was developed by social geographers in the late 19th century referring how people lived across a given landscape, up on particular resources, i.e. water, arable land, transportation networks, etc. by choosing and how they connected with one another and the term is still in use in geography of all flavor. In archaeological interpretation settlement pattern studies can be traced back to the work of Morgan and Mindeleff (Parson 1972:128) [32] but it was Willey's work (1953:1) [51], a breakthrough in the growth of settlement studies, as he defined 'settlement patterns as strategies pertaining to functional interpretation of archaeological cultures since they reflect the natural environment, the level of technology on which the people operated and various institutions of social interaction and centers which the culture maintained. Several such studies have been taken up by various scholars across the world in view of explaining this method which helped in their studies and mention may be made of such attempts been Adams (1965) [1], Chang (1958) [5], Coe (1957) [7], Green (1967) [18], Trigger (1965) [41], Flannery (1976) [10], etc., however, the latter's attempt synthesize how settlement pattern and settlement system differ in the application of theory and practice in archaeological studies. While dealing with the determinants of settlement patterns, Trigger's (1968) [42] explanation has been useful in research at three levels, i.e., individual building level, community level and zonal level in view of different categories of sites dealing with space and time interlinked by socio-cultural pattern and system of strategies. In India too several scholars have made attempts to reconstruct the settlement and subsistence patterns of prehistoric and proto historic cultures (Bhaskara Murti 1984; Chitalwala 1979; David Raju 1990; Dhavalikar 1977b; Jayaraj 1983; Murty 1966; Paddayya 1982; Raju 1981; Shinde 1984; Vara Prasada Rao 2002 and Venkatasubbaiah 1992) [4, 6, 8, 9, 22, 23, 31, 33, 40, 43, 44]. The present paper is an attempt to present a preliminary analysis of settlement and subsistence pattern of Neolithic culture in Kurnool district of Andhra Pradesh for which primary and secondary data has been utilized.

Kurnool district had been the native soil for different cultures starting from Palaeolithic times and it was Captain Newbold who discovered (1844) [30] the occurrence of prehistoric remains in the Billa Surgam caves near Bethamcherla followed by Robert Bruce Foote's (1884a, 1884b, 1885, 1916) [13, 14, 15, 16] pioneering work at the same site became an important area for the study of prehistoric economics and subsequently, a number of attempts have been made by various scholars not only in locating Stone Age sites but also carried out trial excavations (Gogte *et al.* 1986; Murty 1974,1975, 1985; Murty and Thimma Reddy 1976; Nambi and Murty 1983) [17, 24, 25, 28, 29] followed by Issac's (1960) work on Stone Age Archaeology was a comprehensive study in the present area. However, in view of Proto historic cultures, investigations were under taken by individual scholars and team of Archaeological survey India brought to light several Neolithic, Chalcolithic amd Megalithic sites, especially in the drainage area of Kunderu river (IAR 1962-63:67; Allchin 1962 [2]: 221-24; IAR 1958-59:11; IAR 1962-63:2; 1964-65: 3;IAR 1963-64:4; IAR 1967-68:3-5; Sarma 1968 [37]: 68-83 and 1967:75-94) [36] and more recently intensive field works carried out in the lower part of the district covering south-western and south-central parts (Venkatasubbaiah 1998: 8-12 [45]; 2004:25-29 and 2008:20-27; Varaprasada Rao 2002; James Blinkhorn and Others 2010:1-14 [21]; Shipton and Others 2010:24-36) [45, 43] resulted in locating several such sites.

The Area

The district lies between the Northern Latitudes of 14° 53' 45'' and 16° 18'30'' and between the eastern Longitudes of 77° 24'15'' and 79° 39'45'' in the west-central part of Andhra Pradesh state and is bounded by Anantapur district in the south, Kadapa district in the south-east, Prakasam district in the east and Mahabubnagar district of Telangana state in the north and Raichur and Bellary districts of Karnataka state in the north-west and west respectively, and it has an area of 17,658 sq.km. It is bounded by the rivers Tungabhadra and Krishna in the north, geographically divided into four natural divisions, the south-western plains of black soils covering the taluks of Alur and Dhone lying west to the Erramalas, the western granite terrain comprising the taluks of Adoni, Yemmiganur and Pattikonda, the eastern valley of Nallamalas and Erramalas comprising Kurnool, Nandikotkur, Atmakur and part of Nandyal taluks and the south-southeastern Kunderu valley covering the taluks of Koilkuntla, Banaganapalle, Allagadda and the remaining part of Nandyal taluk. It forms part of the south-eastern portion of the Deccan geologically delineated the portion of Peninsular India that falls within the frame of eastern hills of Eastern Ghats situated in the centre of a basin occupied by rock formations namely Cuddapah and Kurnool systems popularly known as the Nallamalas and Erramalas, however, a branch of it known as Veligondas serve as the eastern boundary between Kurnool and Prakasam districts. The principle rivers that flow in the region (Fig.1b) are the Tungabhadra and it's tributaries such as the Handri, the Bhavanasi the Kunderu and its tributaries such as Vakkileru, Jurreru and other hill streams joining the tributaries, whereas the former river joins Krishna on it's right bank. The region is a stable shield of ancient rocks belonging to Archaean or Lower Pre-Cambrian, Upper Pre-Cambrian or the Cuddapah system, Upper Pre-Cambrian to Cambrian or Kurnool system and the Recent and sub-recent soil, alluvium and cave deposits. The soils of the region are broadly divided into black cotton soils and red or brown soils, however, loams and sandy soils come across in the granite terrains. Calcareous tufa occurs in the limestone tracts in which calcareous nodules occur abundant over limestones, calcareous shales and basic and fractured rocks, which support luxuriant bamboo vegetation. The flora of the region comprised Southern Tropical dry deciduous forests, Southern thorn forests and Hardwickia binata. The climate is characterized by hot summers with a rainfall of 624.4 mm. per annum.

Sites and their Distribution pattern

The present study has been made on the available data of Neolithic sites located through scientific explorations by several scholars from time to time and the data gathered by the present scholar comprised the following site list with dimension in hectares given in brackets of each site, i.e.,

1. Adoni (15°37′28″N;77°16′23″E: 0.90),
2. Allagadda (15°41′55″N; 78°24′45″E:0.24),
3. Amadala (15°17′20″N; 78°18′E:0.90),
4. Bastipadu (15° 47′ 05″N; 77° 58′ 20″E:IAR2008-09:8:0.24),
5. Bijanuru (15°40′N;78°25′55″E:0.09),
6. Bijinavemula (15°15′30″N;78°18′E:0.36),
7. Bondaladinne (15°11′30″N;78°14′20″E:0.25),
8. Bodemmanuru (15°04′N;78°24′55″E:0.50),
9. Budidapadu (15°43′30″N;77°54′30″E:IAR1962-63:2:0.25),
10. Chetnapalli (15°40′02″N;77°87′20″E:0.24),
11. Cherlopalle (15°10′N;78°05′E:0.45),
12. Chintalapalli (15°44′N;78°17′E: 0.30),
13. Chindukuru (15°38′N; 78° 27′E: 0.30),
14. Chinnakopperla (15°43′10″N;78°20′E:0.30),
15. Chinnampalle (15°43′10″N;78°15′50″E:0.35),
16. Daivamdinne (15°49′N;77°35′25″E: 0.56),
17. Devanuru (15°43′30″N;78°15′50″E:0.35),
18. Gaddamankampalli (15°16′25″N;78°08′40″E:IAR1963-64:4:0.30),
19. Gorantla (15°38′15″N;77°49′30″E:IAR2008-09:8:0.35),
20. Gudekal (15°44′29′N; 77°28′30″E: Ashmound),
21. Hattibelagallu (15°22′N;77°13′20″E:IAR1958-59:11;1964-65:3:0.24),
22. Hothramandinne (15°12′10″N;78°14′10″E: 0.42),
23. Inagandla (15°51′30″N;77°40′25″E:0.40),
24. ilurukothapeta (15°14′30″N;78°15′45″E:0.09),
25. Injedu (15°05′10″N;78°25′E:1.00),
26. Joladarasi (15°20′30″N;78°20′30″E: 0.33),
27. Kakarawada. I and
28. Kakarawada. II (15°02′55″N;78°25′35″E: 0.30 and 0.80),
29. Kambadahal (15°49′40″N;77°37′30″E:0.14 and Ashmound and 0.24),
30. Kanakavedupeta (15°51′45″N;77°34″E:0.80),
31. Kalugotla.KKL (15°37′30″N;78°04′45″E:0.22),
32. Kalugotla,KNL (15°′35″N;77°58′05″E:Venkatasubbaiah 2013 [50]: 53-64:0.24),
33. Kontalapadu (15°38′N;78°09′E: 0.30),
34. Kuppagallu (15°43′50″N;77°14′E:0.80),
35. Lingadahalli (15°58′N;77°12′E:ashmound),
36. Lingamdinne (15°05′10″N;78°17′E:0.30),
37. Mandlem (15°51′35″N;78°19′45″E:0.12),
38. Mantralayam (15° 57′N;77°25′55″E:0.35),
39. Mayaluru (15°06′10″N;78°21′20″E:0.30),
40. Mettupalle (15°14′N;78°06′E:0.24),
41. Muchchalpuri (15°09′N;78°17′E:0.20),
42. Mukkamalla (15°09′N;78°15′E;0.30),
43. Nagaladinne (15°55′N;77°34′E:0.12and0.24),
44. Neravada (15°47′30″N;77°58′05″E:0.20),
45. Nichchenametla (15°13′N;78°08′E:0.24),
46. Nidzuru (15°52′N;77°59′E:0.30),
47. Nilunagondla (15°14′50″N;78°14′55″E:1.20),
48. Owk (15°04′N;78°09′E:0.24),
49. Pandipadu (15°45′05″N;78°00′E: 0.45),
50. Patapadu I and
51. Patapadu II (15°19′40″N;78°09′20″E:0.80 and 0.30),
52. Peddakopperla(15°18′N;78°19′40″E:0.30),
53. Peddammanuru(15°04′N;78°26″E:0.12),
54. Penchikalapadu(15°45′05″N;77°53′45″E:IAR1962-63:2:0.80),
55. Ramapuram(15°05′N;78°05′E:IAR1980-81to1983-84:2.8),
56. Remata (15°49′30″N;78′15″E:0.20),
57. Rupanagudi (15°06′N;78°23′35″E:1.00),
58. Singanapalle (15°11′N;78°09′E:1.05),.
59. Sivavaram (15°12′30″N;78°11′E:0.27),
60. Sugunuru (15°49′N;77°31′05″E:0.42),
61. Sunkesula (15°52′N;77°49′50″E:0.20),
62. Tangadancha (15°51′30″N;78°21′15″E:0.80),
63. Tanguturu (15°21′N;78°21′E:1.25),
64. Tamdallapalle (151635N;781330E:0.45),

65. Tarturu (15°50′50″N;78°19′50″E:0.20),
66. (15°49′05″N;77°32′E:0.80;Venkatasubbaiah, 2013:53-64) [50],
67. Uyyalawada-Iand,
68. Uyyalawada-II (15°15′06″N; 78°24′E:0.24 and 0.30),
69. Veerapuram (16°20′N;78°17′15″:2.00),
70. Velagaturu (15°15′05″N;78°17′45″E:0.10),
71. Vallampadu (15°19′N;78°21′E:0.20) and
72. Vipanagandla (15°50′45″N; 78°18′50″E:0.30; Venkatasubbaiah, 1998:8-12 [45]; Murty, 1989 [27]: 66-81; Ravikorisettar *et al.* 2002 [35]: appendix III:436-478; Venkatasubbaiah 2009:7-49 [48]; 2012:36-48; Varaprasadarao 2002; Rami Reddy 1978 [34]; Sarma, 1968:68-83 [37]; IAR 2008-09:5-9; IAR 2010-11:1-4) [43].

The data collected also included major excavations undertaken at two sites in the region at Ramapuram (IAR 1980-81:3-7;1981-82:3-8;1982-83:3-5 and 1983-84:3-5) and Veerapuram (Sastri *et al.* 1984) [38], whereas Singanapalle had been undergone trial dig (IAR 1967-68:3-5). The Neolithic material culture represented from these sites include pottery, tools and objects of pecked and ground stone industry, blade artifacts, animal remains, plant remains along with other cultural material for the reconstruction of socio-economic and other cultural features of Neolithic culture being designated as the first village communities in the area concerned. Some of these sites possessed a multi-cultural horizons based on the occurrence of ceramics, i.e., Ramapuram (Neo-Chal.-Meg.), Injedu(Neo./E.H.), Nilunagondla (Neo./Meg.), Cherlopalle (Neo.-Chal.-Meg.), and other cultural features indicating the potentiality of the present region inview of first settled way of life in the form of villages.

Settlement Pattern

Settlement pattern is 'the manner in which human settlements are arranged over the landscape in relation to physiographic geographic environment' and 'community pattern as the manner in which the inhabitants arranged their various structures within the community and their communities within the aggregate', according to Chang (1958:299) [5]. In brief the settlement pattern is a study of the distribution of sites over a given area (Trigger 1968) [42], whereas, settlement system deals with the study of rules that demonstrate the arrangement of sites across the landscape (Flannery 1967). The location of Neolithic sites in the present area of research throw some light on the settlement pattern studies, as mentioned above, as all of them are attached to water source, either a major river or tributary or small stream, etc., hence arranged in a linear pattern which is described as a long strings of villages in ribbon band fashion. This determines a village way of life during Neolithic period as a complex of inter-related village communities bound by socio- economic ties.

a) Riverine setting

Nearness to water source is one of the most important criteria of a human settlement in view of several necessaries and it well documented in the present area as all Neolithic settlements are situated on the banks of either major rivers or tributaries of them except five sites, for eg. Inagandla, Gaddamankampalli, Mettupalle, Patapadu, Kuppagallu are confined to foot-hills, whereas, sites located in the granite terrains, e.g. Hatttibelagallu, Daivamdinne, Gudekal are located amidst the granite boulders as well as terrace but posses water source a little away. Of the 72 sites, 19 sites fall under river Tungabhadra drainage system, 5 sites are in part of Handri river system and the rest 48 sites are located in the Kunderu river system, however, the number of settlements located on it's bank are less when compared to sites located on it's streams.

A number of reasons could be assumed for the poor representation of sites on the river banks. The possible reason would have been that water flow in rainy season was unpredictable, hence the low land areas often get inundated whenever excess rainfall in their catchment areas and the excess water from the main rivers Tungabhadra, Kunderu and Handri may get flow back in to their streams. Though some sites are located on their banks but are located on high elevated grounds few hundred meters away from their banks. Captain Newbold in 1844 [30] (Andhra Pradesh District Gazetteers 1992:16-19) [3] while surveying some areas discussed about the features of river Tungabhadra, Handri and Kunderu. River Tungabhadra rise its water suddenly and its fall is equally rapid, but for the greater part of the year it is a turgid stream and its bed consists of sand and pebbles. It's banks are low and when full it is about 900 yards in breadth having a depth of water from 15 to 25 feet and it is not formidable from May to October or even November. It is crossed by means of basket boats or ferries after December. Similarly, Handri rises and falls suddenly into Tungabhadra at Kurnool due to it's short length. It's bed is of yellow sand and rock, though occasionally not fordable, it is for several months of the year a thin stream. Whereas, Kunderu flows rather great rapidity and falls into Pennar and it's bed is in many places rocky and it's valley bottom posses excellent limestone stratigraphically, hence in rainy season it inundates vigorously on both it's banks causing lot of damage to crops as the water cannot percolate.

The intensive occupation of sites attached to tributaries of main rivers might be due to limited water supply which hardly spills over from their incised channels. Added to this the water flow in these small streams is predictable, hence precautionary measures would be taken during floods. Further, these small streams hardly change their courses hence permanent settlements were possible and secure. Deep depressions are formed at meanders where water gets accumulated even in summer. Added to this it is not difficult for the past populations to divert the water of these streams to nearby fields, hence Neolithic folk occupied them more.

b) Soils

The fertility of the soils is another diagnostic factor for human settlements and it is well studied in the case of present situation. The area is traversed by Red sandy, Mixed red and black and deep black soils. The distribution pattern suggests that the Neolithic folk had occupied mostly the above mentioned soil stretches where thick vegetation is grown along the streams, foothills useful for their animals to graze and the mixed black and red soils would easily be brought under cultivation due to it's fertility as it's pH ranging capacity lies between 7.0-8.5, especially black cotton soils which have good moisture retention capacity as described by Foote (1916:183-84) [16].

c) Lithology

The area in which Neolithic sites are located is traversed by rock types such as granite, gneiss, sandstone, dolerite, limestone, quartzite, quartz, etc. possessing siliceous materials useful in their lithic technology of both pecked and ground stone (edge and non-edge tools consists of axes, adzes, chiels, fabricators, mullers, pounders, hammerstones, rubberstones, querns, sling balls, bored stones, etc.) and blade industry (fluted cores, blades, lunates, flake-blades, notched and other varied scrapers, etc) in order to pursue their economic ventures of pastoralism and agriculture other than the production of pottery. Most of the sites are observed with raw material nodules, dolerite flakes and blade cores suggesting the settlements being the workshops–cum-habitations, to where the inhabitants brought their required raw material to their settlements and engaged themselves in their daily activities.

d) Site Typology

The location of Neolithic settlements in the area suggest that the settlements are established in a linear fashion which generally follows resource potential. Whenever the resource potential is constant population may not migrate, however, if carrying capacity increases people migrate in search of nearby promising areas thus result in the occupation of new areas, especially those sites situated on river banks. This feature is very much evident in the present area as most of the sites are located on the bank of water sources. Of the 72 Neolithic sites, except 2 being ash mound sites, rest are categorized into six types depending on their dimension, i.e., below 0.20 hectares are Satellites (6 sites), between 0.10-0.20 hectares are Hamlets (6 sites), between 0.20-0.25 hectares are Small villages (14 sites), between 0.25-1.00 hectares are Big villages (29 sites), between 0.50-1.00 hectares are Secondary regional centers (12 sites) and above 1.00 hectares are Primary regional centers.

Subsistence Pattern

The material culture of Neolithic culture in the region comprised pecked and ground stone and blade tool industry along with varied pottery fabrics represented in the different shapes mostly utilitarian character for domestic and social purposes. The other cultural material comprised the evidence of plant remains from two major and a trial excavation conducted at Veerapuram (Sastri *et al.* 1984) [38], Ramapuram (IAR 1980-81 to 1983-84) and at Singanapalle in the region, however, the former did not yield any evidence of plant remains. Three more sites in the region were subjected for the collection of archaeobotanical remains at Rupanagudi, Injedu and Hattibelagallu (Fuller and Others 2004; Fuller and Others 2001). It comprises cereals, millets and pulses, i.e., Horsegram (Macrotyloma uniflorum) is found at Singanapalle, Injedu, Ramapuram and Hattibellagallu; greengram (Vigna radiate) at Hattibelagallu, Singanapalle, Rupanagudi and Ramapuram; browntop millet at Hattibelagallu; Brachiaria/ bristley foxtail millet at Ramapuram, Singanapalle, Hattibelagallu, Rupanagudi; Setaria Verticillata type at Rupanagudi and Hattibelagallu; Hordeum triticum/vulgare at Hattibelagallu and Ramapuram; Parenchyma of tubers? Rupanagudi, Singanapalle and Hattibelagallu; Vigna mungo or blackgram at Ramapuram and Hyacinthbean at Ramapuram, along with fruit fragments. Whereas, animal remains comprised cattle, sheep/goats, fowl, dog, pig, of domestic variety and wild fauna of several deer species, sambar, wild pig, etc. along with aquatic fauna of pila, mulluscs, etc. Plant and animal remains and location of Neolithic settlements attached to water source, surrounded by cultivable lands, suggest that that these village populations depended on domestication of animals, through pastoral way of life, along with cultivation of cereals, pulses and millets, which indirectly supported the fodder for their animal folk. Hunting wild animals, gathering plant foods and fishing were the supplementary occupation in their economy. Among the domesticated animals, cattle was the predominant one which supplied large quantity of milk, hence milk derivatives were profusely used by them other than flesh, cow dung, bones, skin, etc. The usage of pottery indicate the process of their food items into three ways,i.e. pounding, grinding and cooking. The channel spouts and other spouted vessels were useful in the service of liquids. The subsistence pattern contained two basic system of activities domestication of animals and plants supplemented by hunting, fishing and gathering.

Excavations conducted at Ramapuram and Veerapruam are the sites that have given an absolute dating of the Neolithic cultural horizons, the former been placed between 2415-2135 BC after calibration (3920+-110 BP according to 5568 BP and 1975+-113 BC according to 5730 half-life periods), whereas the latter being placed between 1670-1255 BC after calibration (3150+-140 BP according to 5568BP and 1295+-144 BC according to 5730 half-life periods) respectively (Murty 1989:72) [27]. However, the former being placed in Phase I and the latter in Phase III of Southern Neolithic culture, which needs some explanation in view of the presence and absence of ash mounds in the area concerned.

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