INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & STUDIES

IJIRS

A Contribution To The Peopling And Environmental Changes In The Upper Tana River Basin (Kenya) After The Introduction Of Farming And Iron: A Multi-Disciplinary Approach

ISSN 2319-9725

Dr. Lazarus Ngari
Department Of History, Archaeology And Political Studies
Kenyatta University
P.O Box 43844-Oo100 Nairobi

Abstract: *Archaeology always seems an exciting and romantic subject when you read about the Magnificent tombs of ancient Egypt and early humans sites in Eastern Africa. Most archaeological sites are less spectacular but that does not make them less fascinating to archaeologist, historians and scientists. This paper covers archeological, linguistic, environmental, historical and other sources of data which have shaped interpretation of the expansion of Bantu speaking people into the Upper Tana River Basin(Kenya) and the impacts of this expansion. Today there are new issues and approaches, in data management and presentation such as new forms of spatial analysis which I integrate in this paper. Results of this research indicate that the peopling of this region by Bantu speech communities predates the expansion of historical communities occupying this region.This has had a number of implications which have continued to generate different debates on who, when and how the Central Kenya was occupied in the last two millennium.*

1. Introduction:

To understand the history of Upper Tana, we need to know the 'peopling' of the area: who were the inhabitants of the area, and at what time in the late prehistory and early history of the area did they settle there? Between circa 5000 BP and 1000BP, the Upper Tana and its environs were inhabited by at least four different groups, namely, a) the original inhabitants of the area with prehistoric/later stone age ancestry, b) a southern Cushitic speaking people who is responsible for the earliest introduction of domestic stock in East Africa around 5000BP (the Pastoral Neolithic) (Ambrose 1982, Bower and Nelson 1998),c;) an Eastern Cushitic speaking group that expanded into East Africa circa 3500BP., and is ancestral to the present day Orma, Somali, and Borana groups (Ehret 1974; Ehret and Posnansky 1982), d) and the earliest Bantu or Bantu speaking iron using peoples who expanded into the Upper Tana area between 2000BP and 1000BP (Cummings 1978, Soper 1979, Wandibba 1986). This paper is based on several studies conducted between 2001-2004 and again in 2011-2012 in addition to literature produced over the years.

2. Archaeological Evidence:

Archaeological evidence regarding human settlement in Central Kenya dates back to the Early Stone Age, with evidence from the two sites at Lewa, north of Mount Kenya, which is associated with Acheulian hand axes (Wandibba 1986). Similarly, there are Middle Stone Age settlements represented by a rock shelter dated 100,000 - 40,000 BP. Late Stone Age/Neolithic occupations have been reported near Kanjeru School in Tharaka, dated ca. 40,000 - 2,000 BP. (Mbae 1992). Evidence of Neolithic sites has been reported at Kiambere Dam on the Tana River within the research area (Wandibba 1986).After this, there is little archaeological details on earlier phases and the rest comes from iron-using Bantu material culture correlates.

The Iron Age in East Africa, divided into the Early and Later Phases, is recognized and defined largely on the basis of pottery traditions/wares and characteristics of iron technology (Waane 1979,Phillipson 1985). The Early Iron Age spans from first millennium BC to 1000 AD/3000BP-1000BP and is associated with the introduction of iron technology and new pottery styles, which do not have local antecedents. The Later Iron Age spans from 1000BP onwards and is associated with the expansion of historical/direct ancestors of present communities living in East Africa, and the development of distinct socio-economic and cultural entities evident in the recent history.

Surveys and excavations by Cumming (1978), Soper (1979) and Mahlstedt and Diblasi (1978) have adduced evidence of Early Iron Age sites in Tharaka, Tigania, Igembe and Ithanga, which date back to about the 3rd century AD/1800BP. Between 1500BP and 1000BP, Early Iron Age developed into Later Iron Age with Gatung'ang'a complex as the major variant found to the east, south and west of Mt. Kenya from Meru to Nyeri. Chyulu Hills to the south west also provide a related pottery in Ukambani(Soper 1982). Similarly, Kiriama *et al.* (1996) and Ngari *et al.* (1999), Ngari (2004) have carried extensive survey in the Upper Tana and reported evidence of pottery and iron smelting associated with both Early and Later Iron Age. More recently M'Mbogori (2006, 2012) conducted researches and confirmed most of what I had discussed before especially on the pottery.

Henry Cumming (1978), excavated two Early Iron Age sites at the Grand Falls within the Upper Tana. The two sites yielded Late Stone Age stone tools and Early Iron Age pottery, which was represented by Kwale Ware, although the typical Kwale wide-mouthed shallow bowls were absent. Overlying the Early Iron Age/Kwale pottery at the Grand Falls was a second type of pottery that is common in Central Kenya, and is associated with sites that are somewhat younger than the "classic" Early Iron Age sites. The major forms of decorations in this pottery are two or three bands of rocker stamping or rows of punctations on the necks of the vessels. Apart from pottery, Cumming reports the presence of some iron froth (slag) at Grand Falls II site. At Grand Falls I site was the only evidence of iron found in the deposits. This indicates, at least iron manufacturing or use in the Upper Tana by the end of the first millennium AD/1500-1000BP.

From these archaeological data, a significant historical picture of human existence in the region can be sketched. It is however, still difficult to establish with certainty the history of the inhabitants, especially the distinct cultural and linguistic groups that have lived in the area over the past two millennia**.** Below is a map of Kenya showing River Tana Basin and important landmarks in the region.

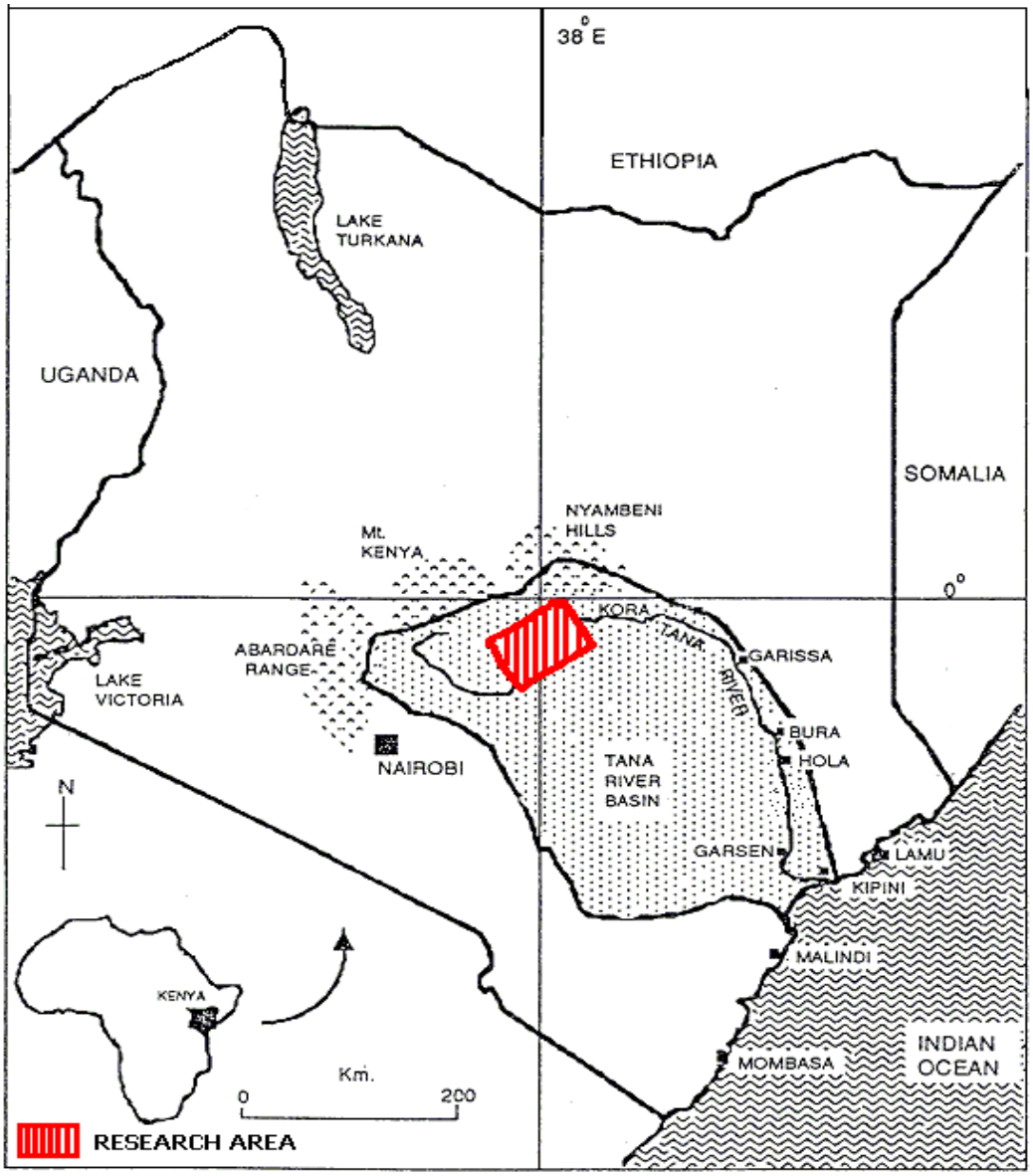

Figure 1: Map of Kenya showing the Tana River Basin and the study area.

3. Linguistic Evidence:

Linguists who have studied the modern Bantu languages spoken in the Upper Tana (such as the Kikuyu ,Meru , Kamba ,Tharaka, Mbeere and their various dialects) have categorized/grouped this language as E50,Bennett 1973/74, 1983; Nurse and Rotland 1993).This is after earlier classification by Malcom Guthrie(1998) On the basis of lexical phonological and ethnographic criteria, they define 'E50'/Thagicu as a group of dialects of very closely related languages that are spoken in the East and South of Mt. Kenya, and north-eastern Tanzania. The term "Thagicu" was reported among the Kikuyu, Meru, Kamba, Embu Mbeere, and Tharaka as early as the beginning of the last Century (Dundas 1908; Mcgregor 1909 and later, Ehret 1974 cited in Mbae 1992). Linguists, who have studied the languages spoken in Central Kenya, argue that, originally the

Kikuyu migrated from 'Chagichu', a term or place alluding to Thagicu. In Mbeere there is a region called ' Thagicu'. Indeed, this term is variously referred to by many of these people. The northern Thagicu (E50) includes the Tharaka and the Meru cluster, while the Southern Thagicu covers the rest of the dialects (Ngari 1992). In Tanzania, the Sonjo and Segeju represent this group. It is assumed that E50 evolved somewhere in Central Kenya highlands, before Sonjo and Segeju found their exit into modern Tanzania.(Nurse and Rotland 1992).These debates would necessarily lead us to ask ,who are these Bantu speech communities and where are they coming from?

4. Recent Debates Concerning The Spread Of Iron Using Bantu Speakers:

Early European visitors to Africa south of the equator noted similarities among the languages they found. A German, Wilhelm H.I, Bleek coined the name Bantu for all languages spoken in southern Africa that were neither Bushmen nor Hottentots. It was also astonishing for these early scholars to realize that even the culture was equally related. Yet it is the very idea of trying to explain this similarity that has created the Bantu debates/ question (Schoenbrun 2001: 2). It is, therefore, the scholars such as ethnologists, historians, historical linguists and archaeologists who created this intellectual question concerning Bantu expansion.

Research and theory addressing this question after 1980 has been revolutionary. The contributions of linguistics especially Nurse and Spear (1985), Ehret (2001) in methodology have been recognized and elicited new debates. The uses of comparative and grotto-chronological linguistics have given these debates new impetus. The most revolutionary linguistic views in the recent times concerning Bantu expansion is that propounded by Ehret (2001: 5) and perhaps the recent work of Boeston(2004,2005).The later did a comparative study of Bantu pottery vocabulary and compared these to some archaeological theories concerning Bantu culture expansion into Africa and drew important conclusions based on certain hypotheses. This way he revises some earlier assumptions about where and when pottery was first invented and the possible expansion trends of its makers .Ehret views concerns the use of cognation to extrapolate the geographical distribution of Bantu. Ehret addresses a revised genetic classification of virtually the entire population of Bantu languages and dialects. His concern is how the Bantu language came to be spoken in almost half of Africa. He concurs with earlier views that there is no single event or events that can account for this expansion. What is revolutionary about it is that he rejects the idea of having a Western (magharibi) and Eastern (mashariki) Bantu stream. Following a number of earlier

studies he argues that the earliest Bantu languages emerged across the equatorial rainforest, to be followed considerably later by the emergence of one of their descendants languages on to the savanna (south of equatorial forest) where its speakers slowly 'reclimated' and then dispersed broadly over eastern, central and southern Africa. He argues that the western branch is more homogenous than the eastern one owing to the latter's interaction with early and later migrations of Eastern Saharan and Sudanese groups as contrasted to the western branch where earlier and later immigrants were Bantu.

His methodology has been criticized by eminent Bantu scholars such as Spear, Vansina and Wandibba (2001). The latter for example wonders how a group of speakers who have separated recently would have a higher cognation rate than those who separated along time. This is against the generally accepted notion. In this regard therefore, Ehret arguments lack enough evidence and conviction.

That the Bantu speech communities needed to be're-educated' by speakers of central Sudan and eastern Sahara linguistic groups in cereal cultivation in order to spread is improbable (Oliver 2001). It is also intriguing and quite unlikely that such cultural transfer should have begun on the southeastern rather than the northeastern borders of the old Bantu world. Indeed archaeological evidence does not support Ehret at all (Oliver 2001). There should also be a paradigmatic shift from the view that everything revolutionary in Africa has its genesis from the north to the recognitions of Africans involvement in early cereal crop husbandry. Indeed, iron working kilns and Chifumbaze EIA pottery is confirmed to have been a single process (Phillipson 1985, Oliver 2001). The ages from East Bantu speech communities, especially areas around the inter-lacustrine region predates those of arrival of Central Sudanic and Eastern Saharan languages in the Great lakes region. The little linguistic evidence is that certain crops and animals were borrowed but certainly, the Bantu speakers came from West Africa as full-fledged farmers capable of colonizing various microenvironments suitable for crop cultivation. Their knowledge of iron technology also gave them advantage over previous Khoisan groups and earlier Cushitic and Central Sudanic pioneers especially in Kenya and Tanzania.

Linguistic evidence suggests that between about 2500BP and 1500BP, agriculturalists colonized almost the entire region surrounding the great lakes. There is not doubt that these early farming iron-using communities of the Great lakes region spoke Bantu languages. Their smelting sites are associated with a pottery style(Urewe), whose derivatives later spread

widely throughout eastern and southern Africa where Bantu languages are now spoken (lliffe 1995:35).

Pollen analyses suggest extensive deforestation of the Lake Victoria region from the late first millennium BC possibly in part for agriculture and iron technology. In Rwanda there are indirect indications that both iron working and pottery ware were associated with sorghum, millet and keeping of goats and from at least the 3rd century AD/1800BP cattle, showing that the Bantu Speech Communities had added of their forest agriculture a new range of food-producing activities suited to Savannah life. Such a combination could have permitted population growth and might explain why Bantu speakers come to prevail over the Nilo-Saharan speakers from whom they probably gained their new agricultural skills and livestock.

Archaeological evidence provided for the existence of previous groups of farmers or metal workers is minimal. There is no evidence at all of seeded agriculture and animal husbandry, or pottery manufacture anywhere to the south of Lake Victoria before the coming of Iron Age. Therefore, it was the iron-working producers of Chifumbaze EIA pottery who pioneered the spread of Bantu.

However, the first farmers and herders in Kenya and Tanzania Rift valley were Cushitic from Ethiopia. They moved into the Rift Valley around 4000 years ago. Later Central Sudanic speakers followed the same direction but it was the later expansion of Bantu and Nilotic communities during the second millennium AD that has shaped the history of East Africa. Historians and ethnographers often tell familiar evolutionary story of sedentary farmers displacing or replacing mobile foragers. They tell also of complex set of symbiotic relationship and this justifies borrowed vocabulary (lliffe 1995).

Because the Bantu speakers were farmers they selected microenvironments where they utilized their skills and build their villages, and cultivated the surrounding grounds. When these grounds were exhausted they simply moved to the next suitable microenvironments. They thus avoided arid plains and concentrated on areas with fertile soils. However, after 1000 BP more settlement agriculture took place due to increasing population (Newman (1997). Where they could not expand anymore, they became innovative and increased the ability of a given environment to support the increasing human population (Schmidt, 1978). Thus the carrying capacity was increased through social and technological innovation. This contrasts Neo-Malthusian perspective that easily explains earlier behavior of Bantu expansion.

It is the intention of this paper to show the relationship between Upper Tana Bantu speakers with the rest in Eastern Africa. Since the main focus is the last two thousand years I briefly discuss both the Early Iron Age and the later Iron Age pottery traditions while reflecting on certain occasions on the spread of Iron using Bantu speakers of Eastern Africa and the relationship with their neighbours. First, I however consider the environmental background of this work to help consider the environmental parameters for the peopling.

5. Environmental Background:

Schoenbrun (1994) attributes vegetation change in Eastern Africa between *Ca*. 4000BP and 1000BP to human action, climatic shift, and internal succession patterns. He has ably demonstrated to paleo-ecologists, archaeologists and historians the value of a truly inter-disciplinary approach to environmental change. This paper considers the contribution of other specialists in Bantu studies discourse. It is worthwhile to note that Bantu speakers entered Eastern Africa during this period.

Hastenrath (2001) argues that during the pasts two centuries there have been climatic changes in East Africa. Evidence comes from historical accounts of lake levels, observation and analyses of glacier variations, wind and current observations in the Indian Ocean, as well as rain gauge measurements. However, the reconstruction of climatic history back into the 19th century and before has been based on much scarcer and largely indirect evidence of aquatic sediments. Instrumentation is basically a 20th century phenomena. Hastenrath argues that during the mid 19th century the lake levels and glacier were more according to explorers account. He attributes this to the circulation of winds (2001:214), which, by then encouraged higher precipitation. After 1880's, present climatic sequence of East Africa began. This again is due to regional evolution of conditions of wind that caused glacier to decrease or increase at times.

Sager, Cumming and Meeker (1997), Johnson, Kelts and Odada (2000), have studied the Holocene history of Lake Victoria. The data shows that the Lake has been fluctuating. At the centre of analysis is seismic conditions, diatom analysis, fish species, isotopic composition of aquatic cellulose and initiation of Nile outflow and recent history of environmental degradation. These studies also show that there has been major desiccation and shifts in lake conditions influenced both by human and climate as evidenced from cores collected from the lake representing different times. Stagger, Cumming and Meeker (1997)

identify the following climatic fluctuations over the last 11,400 years based on Lake Victoria diatom assemblages as follows: -

(i) Variably dry = 14,000 – 10,000 yr BP
(ii) Humid = 10,000 –7200yr. B.P
(iii) More seasonal = 7200-2200yr. B.P and
(iv) More arid = 2200-0 yr BP, with a "little ice age" event = 600-200 yr. BP.

The lakes of East Africa are important indicators of environmental and climatic change in long time scales. The lakes register the pulse of rainfall variability in the equatorial tropics, hence historical records of their fluctuations can potentially provide a spatially and temporally detailed picture of this variability prior to the availability of actual rainfall measurements (Nicholson and Yin 2001: 387). The expansion of Bantu into many parts of Eastern Africa has been argued to have been caused by the changing environment, that is, populations moving from drying areas to areas of high agricultural potential.

Such evidence shows that dramatic fluctuations occurred during the 19th century, suggesting a period of continent-wide desiccation in the first decades and markedly wet conditions in the last few decades. A number of lakes dried up while others were at their lowest levels e.g. Lake Naivasha, Lake Malawi, Lake Chiuta and river Ruvuma were merely swamps. These droughts were severe enough to force migrations of people and create warfare among various African groups Nicholson and Yin 2001: 387). Comparison of this record with the pre-colonial history of east Africa recounted in oral traditions testifies to the importance of rainfall and drought in agricultural and pastoral societies .In the six centuries before *AD* 1895, evidence for drought-induced famine ,political unrest, and large scale migrations of indigenous peoples is attested by Lake Naivasha fluctuation records and oral tradition records from east Africa.(Webster 1979,Verschuren 2000 *et. al*).It is not wrong therefore to attribute the expansion of the last waves of historical communities into the Upper Tana in the late 18th century and early parts of the 19th century due to these phenomena (Mwaniki 1974; Muriuki 1974, Mbae 1992).

By mid 19th century many lakes were rising, for example the level of Lake Malawi rose by 6 metres higher. By 1870's all lakes had risen. This continued into the 1880 or 1890s. It is not surprising to find that therefore, geographical reports by explorers like Krapf (1967) talk of

forests, larger glaciers occupying Mt. Kenya and Mt. Kilimanjaro and wetter environments enabling viable agricultural practices.

However, it should be noted that, the climatic interpretation of the lakes history requires a rigorous understanding of the water balance of each lake. This is because lakes integrate conditions over large and diverse regions, and together with the surrounding topography, they produce regional-scale climates that are superimposed upon and interact with the large-scale patterns. Equally, the conversion of lake level changes to rainfall depends on the relative magnitude of water balance terms as well as on lake geometry and basin characteristics (Nicholson and Yin, 2001).

Thus very little data from the East African lakes is used to interpret environmental change in the Upper Tana. It is, however, noted that fluctuation of lake levels, glacial increase and decrease are important climatic indicators that influence vegetation change for they affect the hydrological regimes of the surrounding areas and the subsequent human adaptation.

6. Vegetation Changes in the Upper Tana: Ethnographic and Historic Discussion:

It is apparent that the vegetation of Upper Tana has changed within the last two millennia. This change is attributed to changes in land use and increased human and animal densities. From an oral reconstruction of the past vegetation of the area, and using the succession theory/concept of vegetation change (Clayton 1961; Burrows 1990), it appears that the lowland areas of the Upper Tana were actually savannas with scattered trees probably inhabited by grazers. Vegetation alteration can be witnessed by change in the following properties; species composition, structure, physiognomy, and spatial and temporal patterns. The geographical location of this paper is the region drained by the Tana currently inhabited by the Kamba,Mbeere and Tharaka.It is presently a semi-arid area but constituting of varied eco-climatic zones due to elevation ,drainage, soils, human action, etceteras. On the more moist and fertile hill slopes, woodland and wooded savanna grassland was common. The remnant of wooded grasslands is evident from the forest reserve at Kiangombe established in 1942 (Brokensha and Riley 1977). Such vegetation exists in Mumoni in Mwingi and Kijege in Tharaka. In the absence of pollen diagrams the evidence of vegetation change is based on oral accounts and observations from documented past vegetation types and plant species (Brokensha *et al.* 1977; Riley *et. al.* 1988). Oral accounts of the Mbeere people confirm the above opinion that there has been a temporal change in vegetation types (species variation overtime).

They confirm that certain tree species that were once dominant especially in the 19th and early 20th century (Pers. Communication) have today become rare. Brokensha *et al*. (1977) have documented that they found some species in protected areas (Sacred groves and Kiangombe Forest Reserve) that were non existent in other parts of Mbeere. They also found that *Ficus sycomorus* (**Mukuyu**), *Syzygium guineense* (**Muriru**) and *Croton marcostachyusi*, though widespread in other areas, were much smaller in size than in the protected areas. This shows spatial vegetation changes within the Upper Tana. This is an indication that the trees may have been used extensively. During my survey in October 1998, among the species Brokensha and Riley had found to be widespread in 1977, only *Ficus sycomorus* was found among the riverside vegetation.

According to Brokensha and Riley (1977) the present vegetation cover is different from what it was once, or even what it could now be, were it not for the impact of cultural practices that have imposed changes on its original characteristics. This is demonstrated by planting of exotic plant species in the recent past. Although the authors recognized the contribution of human activities on the vegetation change, they did not consider the influence of human activities on the climate via the vegetation change.

Two ecological constitutions including broadleaved *Combretum-Acacia* open wooded savanna in the moist areas and dry thorn-bush scrub *Acacia-Cammiphora* savanna were described from Mbeere district, (Brokensha *et al*. 1977). Today, the vegetation has greatly changed with the *Combretum Acacia* wooded savanna being replaced by cropland with scattered Acacia species that are mostly dwarfed. On the lowlands, in place of *Acacia Commiphora* savanna, one finds a semi-desert or bare ground and this is an indicator of both physiognomy (appearance) and structural change in vegetation (complex to simple). Here the substrate is more prominent than plant cover.

The influence of human activities on the vegetation is further confirmed by the fact that among the 38 plant species that I collected during my survey, the present inhabitants of the Upper Tana listed utilization for each. There was a clear preference for each plant species to a particular use. It was established from oral interviews that it was only after a specific plant species became rare that the next plant species in rank was sought. This put heavy utilization/harvesting pressure on that particular species. This is one of the processes that have led to reduction of some species and degradation of the vegetation.

In 1925, the then Governor of the Kenya colony, Sir Coryndon, noted that firewood was easily obtained in Mbeere, unlike in other districts (Maher 1938). During the October 1998 survey, it was observed that firewood was scarce and people resorted to using of maize stalks for cooking. Therefore, 73 years ago, trees for firewood were readily available, but not so today. In the absence of an adverse change in the local climate, this is further evidence that there has been vegetation change influenced by human activities. Furthermore, Maher (1938) provides evidence of once richer and more abundant plant resources than is the case now. These processes of change began earlier especially when the modern farming communities started to inhabit the area beginning around 2000years ago.

In terms of population density, Ishiara is more densely populated compared to Kamanyaki location, hence a lesser pressure on the plant resource utilization/harvesting in Kamanyaki. In addition, land adjudication has been completed in Ishiara while it was found to have just started in Kamanyaki in Tharaka district. It has been argued that land adjudication resulted in protection of plants in Mbeere district. However, this was found not to have had any positive impact on the vegetation. In most cases, it is believed to have accelerated the degradation process, as new homesteads that followed land adjudication required raw materials that were harvested from the allocated plots.

A comparison of the vegetation of Ishiara, Katama, Tharaka and Kamanyaki locations further reinforces this perspective. It was observed that whereas the Ishiara area was devoid of large trees, Kamanyaki location on the other hand had high tree cover. It is however expected that once land adjudication is complete, a large number of trees will be felled for construction, charcoal burning, as well as to give way for cultivation, leading to a situation similar to that in Ishiara. Thus, vegetation change has greatly been influenced by human activities. This observation confirms the findings of Brokensha and Riley (1977), that the derived nature of the vegetation in Mbeere has been predominantly the result of Mbeere people's traditional cultural activities, and changes of these activities, for which the Upper Tana communities are largely responsible.

After 1000BP, major activities that may have impacted negatively on the environment were livestock grazing, cultivation, and iron working and wild fires. Among the industrial activities was iron smelting. Most iron smelting sites are located on the hill slopes . This was probably due to the abundance of firewood on the hill slopes. Lowland areas had savanna grasslands and were therefore unsuitable for the location of iron smelting that required a lot of charcoal. This

activity required specific plant species as a ethnographic findings confirms. Any industrial activity necessarily causes an environmental impact. However, the magnitude of the impact depends on the size of the industry, and the impacts of the manufactured products. For this study, raw materials in the industrial process are assessed together with other land-use activities that the iron using population used to impact negatively on the Upper Tana environment

Many of the mentioned trees are not ubiquitous, indicating that though present they seem to have been over utilised in charcoal production. However, according to Kusimba (pers. comm.), who has done related research at the coast, the role of fire might be more important in mounding tropical environments than domestic and industrial activities. Burning to eradicate pests like ticks or clearing land for agriculture (slash and burn) seems to have played a more important role in tropical Africa. The fact that many African communities did not cut trees for wood fuel, as dry wood was readily available reinforces this view. He thus differs with the hypothesis of Van der Merwe's (1982) and Schmidt's (1978) hypotheses that iron working and the subsequent agriculture revolution it brought in tropical Africa degraded the environment. Oral evidence suggests that the area now occupied by Mbeere and Tharaka had a lot of grassland and that the present stunted acacia and other scrub vegetation are a new colonization in the region. This type of vegetation can support browsers, hence the presence of more goats than sheep and cattle, whereas the opposite used to be the case in the past.

I consider the role of humans and that of fire to have played a similar role in determining vegetation change. Vegetation reflects a balance between climate, soil, water, animal life and pressure exerted by man over time. Grassland, scrubland and open forests in the tropics have evolved with periodic fires. This is one of the regular characteristic features of tropical savanna (Heady and Heady 1982). Fire has been extensively used in the savanna to clear vegetation for cultivation, grazing and to control pests. It is believed that most savannas are anthropogenic systems derived from deforestation and repeated burning (Clayton 1961). The combination of fire and grazing influences are the determinants of the species composition of grasslands.

Frequent burning affects the development of species and the composition of the vegetation. The interaction of climate and soil tends to make recovery much slower, and with some kinds of vegetation, resilience may be non-existent (Dasmann *et al*. 1974). In semi-arid or arid areas like Mbeere, recovery is slower since succession is slowed down by the absence of adequate soil moisture, and the presence of relatively small numbers of species adapted to arid conditions (Heady and Heady 1982).

The ancestors of the Mbeere, Kamba and Tharaka prior to colonialism were mixed farmers, hunters and gatherers as confirmed by oral traditions. The three communities are confined to lowland areas and remnant hills whose original vegetation was forest and savanna grassland. They kept goats, sheep and cattle. In addition to domestic animals, there were numerous wild animals. Probably due to stability and increased food resources, the number of both domestic and wild animals increased significantly. The human population also increased tremendously during peacetime. The result of high animal population/density was that the area became overstocked, and this led to vegetation degradation. The Mbeere people, for example, could not move to the highlands where the Embu, who were agriculturists, had settled, as this would have caused conflicts on land resources utilization. The Mbeere were also driven out of the Igairori in Meru and Mt. Kenya region. This led to concentration of the Mbeere people on the lowlands. In response to increased population density, the Mbeere started cultivating more food crops resulting in clearing of large areas. The tool used to clear land was fire, which was also used to control pests (personal observation and communication with local farmers).

It has been established that the Mbeere people practiced shifting cultivation with slash and burn as the mode of cultivation. This practice was observed during the study. In addition, fire was used to control pests. Uncontrolled use of fire in rangeland areas elsewhere in the tropics has led to degradation of the vegetation, especially when the timing is before the vegetation has set seeds. Maher (1938) noted that there were frequent uncontrolled grass fires in Machakos and Embu (Mbeere) districts. Wild fires were therefore also responsible for much of the vegetation change that has occurred in Mbeere. Mworia-Maitima (1997:409-417) discusses a similar situation in Western Kenya using evidence from Lake Simbi pollen, charcoal, grass cuticles and grass phytoliths.

The Mbeere before land adjudication farmed a parcel of land for two seasons and then moved away. Due to increased population, the land became scarce, forcing people to remain in one place. As a result, there was heavy pressure on the vegetation that led to disappearance of some grass and tree species that could not withstand heavy grazing pressure. In response to scarcity of grass, the number of sheep and cattle that are mainly grazers decreased while that of browsers likes goats increased. This situation remains the same today.

The negative environmental impact of upper Tana bloomery process would have been considerable were it not that there were few **Aturi's** (blacksmiths) in the past. There were two blacksmiths per sub-location, serving a population of about 800 people. This, however, does not

mean that there wasn't any environmental change in vegetation cover as discussed here. According to oral evidence, areas like Igamba Ng'ombe (meaning, where cattle mows) had many cattle. The characteristic vegetation according to oral evidence was rich savanna grass particularly *Heteropogon contortus* (used for thatching and grazing) interpersed with big trees on river courses (Riley and Brokensha 1988). Iron working, fire, together with poor farming methods, over-grazing and persistent droughts has altered the vegetation cover of the area. What we have today is colonization of less desirable stunted growth. This has resulted in secondary succession because there was stress. It has not culminated in a return of vegetation with species composition, structure, etc. resembling the original vegetation.

It is argued here that a combined effect of overgrazing, slash and burn cultivation, and wildfire may have caused large areas to be deprived of its vegetation. This led to erosion and soil infertility. In response to the grazing pressure and burning, those species that could not withstand these activities were replaced by more tolerant species. These are opportunistic species that were either unpalatable or annuals which germinated and produced seeds within the rainy season. As such, the ground was bare of vegetation most of the time. Fire may result from farming activities in the course of burning dry vegetation to give way to agriculture. The neighboring forest or grassland may catch fire and burn extensively. Fire tends to destroy bush and promote growth of grass. It also favours those species that best resist damage (Jones 1987).

If set on fire at the wrong time of the year, it could encourage the invasion of savannas by shrubs and trees. The results of fire are usually long lasting. In case of savanna, biotic succession sets in and follows a more or less regular and predictable sequence after burning. Grazing, too, favours those species of grasses and forbs that are least damaged by defoliation. However, most of these species may be of no economic significance to the animals as they are unpalatable. This situation was made worse by introduction of a money economy in the 20th century. There was a need to produce more crops and rear more domesticated animals to pay taxes, purchase merchandize produced by European industries, and educate children, among other demands.

One of the views advanced here is that the vegetation change has been a result of human activities. The oral account indicated that the vegetation and climate of the area has become hotter and drier (pers comm. with chief Njagi). Those species that initially thrived in moist/cool conditions were replaced by those species that can withstand dry soil conditions. It is therefore observed that it was human activities that initially prompted environmental change. This in turn modified the microclimate of the area triggering vegetation change as a feedback. Evidence of

this climatic change is also shown by the absence of seasonal course streams that were abundant in the past.

This could have been brought about by the increased areas of bare ground, which reflect back much of the solar radiation as heat. The vegetation has the opposite effect of absorbing most of the radiation. This is because chlorophyll has a light-harvesting complex (LHC), which contains chlorophyll a and b. In this case there is little light reflected back. On the other hand, bare ground reflects more light with the resultant increase in evaporation. This reduces the soil moisture and increases the air temperature that results in change in vegetation type (Dassmann *et al.* 1974).

Since there are only two main ways of studying vegetation change, that is, observation of generation of plants from bare lands to forest colonization/information gathered from informants about vegetation change and studying of the fossil, present in continuous sedimentary sequences, the former was considered because terrestrial landscapes like the Upper Tana lacks undisturbed fossil record (Burrows 1990:16).

Utilization of land resources has had, and is presently still having ecological effect on the vegetation types in Mbeere and elsewhere. This has led to those species that were ecologically dominant being replaced with other species that become dominant in the changed microclimate. This is regarded as fluctuating replacement (or change), which is a series of rather unpredictable shifts in species composition.

7. A Chronology of Vegetation and Socio-Economic Change:

The table below summarizes the socio-economic history of the Upper Tana communities. It should however be noted that the interpretation of this sequence of events, particularly for the period prior to 1900's(Ngari 2004) on little supporting archaeological and historical data mainly coming from my recent research work (Ngari 2004) and occasional reference from oral historical accounts.

According to Table 6.1, the subsistence economy of the period between 1000-1600AD was mostly hunting and gathering and probably incipient agriculture. The earliest inhabitants, namely the Gumba together with Athi, hunted and foraged as suggested in this paper argued here that the Gumba practiced agriculture based on cereal production. It is also probable that the Gumba adopted cattle keeping from Eastern Cushites. Thereafter, mixed farming became

a feature of the people who emerged from the interactions of the Bantu, Eastern Cushites and earlier hunter-gatherer populations.

The period 1600-1900 AD witnessed the expansion and settlement of populations ancestral to the present day groups including Mbeere, Tharaka, Kamba, Meru and Embu. These people continued to hunt and gather, in addition to practicing agriculture and exchange with their neighbours and distant communities. Earlier populations were acculturated and they became integral part of the modern Bantu speaking people.This was either through peaceful assimilation, conquests or probably annihilation.

The period 1900-1950 AD was a period of formal colonization in Kenya. The period witnessed commercialization of all aspects of production to meet colonial demands such as paying taxes. These activities included slash and burn agriculture, herding and to a lesser extent hunting and gathering.

The above data provide a meaningful relationship between peopling, environment and subsistence pattern of the Upper Tana communities. Indeed the above hypotheses can be tallied to pollen analysis evidence coming from Crescent Island core in Central Kenya where pollen dating from 1000BP shows similar trends (Lamb *et al*., 2003: 285-292).

TIME PERIOD	VEGETATION	SUBSITENCE-ECONOMY
Post 1950 –present/55BP (Contemporary Tharaka, Mbere, Kamba)	Mostly stunted shrub Vegetation. Isolated forests on Hilltops and River valleys. Exotic tree species on farms	Some opportunistic hunting/ Gathering. Herding (40 anima on the average) for bo commercial and domestic nee Shifting/slash-burn agricultu (2year cycle). Intensive/ Commercial exploitation of plant resources e.g. charco burning
1900-1950 AD/105-55BP (Early colonial period)	Grassland dominated vegetatio With baobab as the dominant Tree species. Fairly den forests at High elevations and alo rivers.	Hunting and gathering beginnin to diminish, hunting for commercial items fairly commo Intensive herding and farming significant. Slash and burn agriculture fairly common with a 5-10 year cycle.
1600-1900 AD/400-105BP (Expansion and settlement c populations ancestral present	Dense forest vegetation in higher elevations and river valleys. Trees interspersed wit bush grassland in open areas	Hunting for animal products in regional and international trade very common. Hunting/ gathering a significant compone

day groups)	as a consequence of increased settlement and shifting cultivation.	for subsistence, slash and burn Agriculture. Trade with the coastal people
1000-1600AD/1000-400BP Gumba who were probab the incipient Bantu people settle here.	Minimal effect on natural environment, since mar of these people mainly exploite natural resources.	Hunter-Gatherer and probably incipient agriculture. They gathered honey and were probab the first smelters.

Summarised chronology of the peopling, vegetation and subsistence-change in the Upper Tana in the 2nd Millenium AD/after 1000BP

8. Oral History and Ethnography:

Oral and historical accounts of Upper Tana (Lambart 1950; Sutton 1971; Mclntosh 1971; Muriuki 1975; Were and Wilson 1991) indicate that the Kikuyu, Meru, Tharaka, Mbeere, Embu, Ndia, Gicugu and the Kamba entered their present habitat from the coast, although only the Meru and Tharaka traditions specifically say so. Another view is that some speakers of Kikuyu, Embu, Kamba and Mbeere probably moved north from Taita hills and Kilimanjaro areas without having passed through Shungwaya and the Lower Tana (Matheka 1992,Nurse and Rotland, 1992. Rottland and Nurse main concern however is the evolution of these groups somewhere in Central Kenya before their linguistic kins-the Segeju and the Sojo exited to Tanzania. Recent archaeological evidence (Soper 1976, 1980, 1982) supports this perspective given the relationship between pottery wares found in Central Kenya, Kilungu, Taita and North-Eastern Tanzania especially Pare and Kilimanjaro areas.

The period AD1000 to 1950/1000BP-55BP, has been extrapolated upon by Muriuki (1975) and Mwaniki (1982) on the basis of oral traditions among the contemporary groups living in the area today, and some archaeological data (Siiriainen 1971). These studies suggest various references to

the people who inhabited the area, namely, the Gumba, Athi, Eastern Cushites, and Proto-Bantu. According to Muriuki (1975), oral traditions among present day Bantu inhabitants of the area suggest the presence of two groups of hunter-gatherers referred to as the Gumba and the Athi. While the Gumba are said to have made pottery and iron tools, the Athi gathered honey and forest products. It is noteworthy that Muriuki does not make any reference to these groups as being direct ancestors of the present Bantu inhabitants of the area. On the basis of excavations and archaeological data found at Gatung'ang'a, Siiriainen (1971) purports that the iron-users and pottery makers were probably earlier Bantu speakers. It has also been suggested that these inhabitants may have been "Eastern Cushites" (Mwaniki 1982). Thus, it appears that the history of the Upper Tana prior to 1900 was not well known prior to my study (2004) and their relationship with Eastern Cushites and the Bantu inhabitants of the area.

Muriuki (1975) notes that the occupation of Central Kenya by ancestors of Embu, Chuka, Mbeere, Ndia, Gichugu and Kikuyu started in Meru, a conclusion that tell us that Meru was inhabited for a long duration prior to the occupation of the rest of Central Kenya. However, the length is not known, but may have lasted several centuries suggesting that E50 language may have evolved here.

We must, however, note that the linguistic studies have not established the language group that occupied the region. One still wonders whether 'Thagicu' denotes Bantu speakers presently living in Meru district, the presupposed Cushitic and Nilotic stock, or an amalgam of all the language groups (Mbae 1992:37). Fadiman (1973) points out that a group of Bantu migrants who arrived by the middle of the 18th century in the area known as Tharaka met another people living there, a section of whom he contends were variously called 'Thagicu', Daiso', Daicho' and Gumba. However, the question as who the Thagicu were is still a nagging one. Clearly, evidence elicited by archaeological work and that of historical linguistics seem to concur on one aspect that there is a possibility of Bantu having lived in Central Kenya probably for a longer period than that suggested by oral sources. Later migrants may have affected a smaller group of people. Mwaniki (1982) argues that Thagicu may merely be a reference to the Thagana migrants, where the term ‘Thagana’ refers to Tana River, which the Bantu migrants followed from the east to the foothills of Mount Kenya and the surrounding eastern and southern vicinity.

Brown (1979, 1995) work on the subject of iron working in Kenya and among the Mbeere adds some clarity about peopling in the Upper Tana. Whereas the discussions cover many

communities in Kenya, which leave one wondering from which communities certain generalizations are drawn from, there are significant contributions. With regard to regional iron working industries, Brown gives a general picture based on oral traditions and linguistic analysis which tends to show that central Kenya Highland industry is closer to Kenya/Tanzania border industry than to the Coast one. What is surprising is that she acknowledges this as a flawed argument in her writing. Brown says it is possible what she is telling is not true (Brown 1995: 159-160). Prior to this, Orde- Brown (1925) had done a technological recording of iron production in the Upper Tana but without concentrating on the history and social aspect of this technology but there are certain parallels that one sees when comparing similar aspects of the same craft at the Kenya Coast.

Riley and Brokensha (1977) and Ngari (1992) used oral and ethnographic evidence to study the iron- working of the Upper Tana and how much it was dependent on the environment. These discussions were not detailed. Further attempts were made by Ngari *et al.* (1999) to study the origins of this craft. The direction pointed to the Gumba but this was yet to be proved archaeologically. Heady and Heady (1982) and Kusimba (1999) have addressed the issue of vegetation succession in the tropics emphasizing the role of human activities and fire in the process. These studies are important in understanding vegetation change and human mobility and interaction with nature in the Upper Tana. Maher (1938), Riley and Brokensha (1977) have specifically described environmental degradation in some parts of the Upper Tana. However, their study covers the 20th century only. Nevertheless, these studies offer suggestions in the interpretation of the role of culture in the evolution of the vegetation change in the first and the 2nd Millennium AD/2000BP-55BP.

9. Discussions and conclusions: Upper Tana Iron Age in the East African Context:

The Tana River valley pottery styles have been described by Cumming (1978),Kiriama et *al.* (1996) Soper (1979) and Ngari *et al*.(1999). Cumming's Grand Falls site yielded pottery related to Kwale and a Late Iron Age type in addition to slag and fossils. At the lower Tana, particularly at the Delta, Abungu (1989) examined Triangular Incised Ware, and he preferred to use the Tana ware. Phillipson (1993) further analysed some pottery in lower Tana valley at Wenje site. All these relate to Bantu speakers pottery especially Kwale type and its various later variants, and it appears that the Tana River was an important route for Bantu expansion. That there is a direct relationship between the Bantu pottery of Eastern-Africa and that of the

Upper Tana is confirmed by the present work. I briefly discuss peopling by Bantu speaking and iron using communities by means of available evidence to confirm this relationship.

10. Peopling:

One of the goals of the study is to establish the identity of the first iron using communities of the Upper Tana. My research in of the Upper Tana indicates that before the introduction of iron technology, Late Stone Age people were present here. This perspective was also suggested by Wandibba in 1986.Introduction of iron technology went hand in hand with a new form of pottery. This type was bevelled, fluted and comb-stamped. Such sites are also found elsewhere in Eastern and Southern Africa (Chami 1994)

By correlating historical discussions with archaeological and my ongoing research, associated with iron working sites in Central Kenya, it appears that the people who were directly linked to iron smelting is a group called the Gumba. They are significant because they are reported to have made tuyeres and to have lived in "Gumba holes". Linguistic evidence indicates that Bantu language was spoken in Chuka prior to 13th century AD/800BP (Mwaniki 1982). Yet, historical records say the Meru and the Tharaka reached their present home around 1750 AD/255BP (Mbae 1992). It is possible, therefore, to infer that the earliest inhabitants referred to as the Gumba were Bantu given the above archaeological, linguistic and historical evidence.

This area attracted human settlement from quite early because of resources provided by the Upper Tana River and its tributaries, which included favourable climate which, allowed two seasons of cultivation. Due to this, it has been suggested that Thagicu/Daiso/E50 group of languages evolved here (Nurse and Rotland 1992). This language is spoken in Central Kenya and in some parts of Tanzania, and includes Meru, Kikuyu, Embu, Kamba, Segeju and Sojo.

Evidence from Cumming (1978) suggest that at about 1500 BP. or later, Early Iron Age pottery developed into Upper Tana pottery type, which is characterised by up-turned bevelled rims, necked pots with fluting below the neck with Triangular Incised Ware, *ziz-zag* decorative motif being the most prominent. Other forms of decorations in this pottery are punctuation, grooving and, rocker-impressions amongst others. In lesser quantities are bowls and elaborate decorations of the Early Iron Age pottery.

There is evidence of a general cultural continuum represented by Gatung'ang'a, Maore, and Upper Tana wares stemming directly from Kwale E.I.A variant or having direct relationship with its makers. The areas covered by these wares are those areas now occupied by the

following peoples: Gatung'ang'a/Upper Tana: Meru, Embu, Chuka, Mbeere, Kikuyu, Tharaka and Kamba (all linguistically related). Maore: Chagga, Gweno, Pare, and Taita.

This archaeological picture may usefully be compared with the work of Nurse and Phillipson (1975) and Soper (1982) on the linguistic classification of the North-Eastern Bantu. One may clearly draw a parallel between the archaeological continuum and Nurse and Phillipson on conclusion that north-eastern Bantu languages, including Thagicu, are sufficiently similar to have a common ancestor within the last 1000 years. Further linguistic work by Nurse and Rotland (1992), adds the Sonjo within the Thagicu cluster which he calls E50 group. Other linguistic evidence of importance is that of Karega -Mutahi (1977).

The relationship between ceramic products and cultural groups has been suggested in Africa (Van Noten 1979). The fact that I excavated pottery from the Upper Tana with similarity in over 50% shape form and decoration style with that of Bantu of East Africa is enough evidence to suggest and support the relationship between Upper Tana pottery and that of Bantu of East Africa). Additionally, oral traditions of the Kamba and the Weithaga Kikuyu clan from Murang'a trace their origin from Mt. Kilimanjaro area.

11. Key Observations:

The Tana River archaeological sites during the first millennium belong to the Early Iron Age. Many are located close to the river valley(s) but subsequent once appear to spread out far and out of the rivers due to a number of reasons such as population pressure, resource availability and security among others. This pattern is clearly represented by the following GIS images (figures 1-5). The sites typology/age and location parameters are presented in figures 2-5below. These include Early Iron Age (E.I.A), Later Iron Age (LIA), and Historical, with LIA sites being the majority. The Early Iron Age sites are located near water courses; Late Iron Age near the river courses but also spread out in gentle slopes; historical sites on hill-side and hilltop especially on Kiburu hill. Settlement sites appear to be small and are represented by several earthworks with Kwale type of pottery (EIA) being present (Ngari 2004).

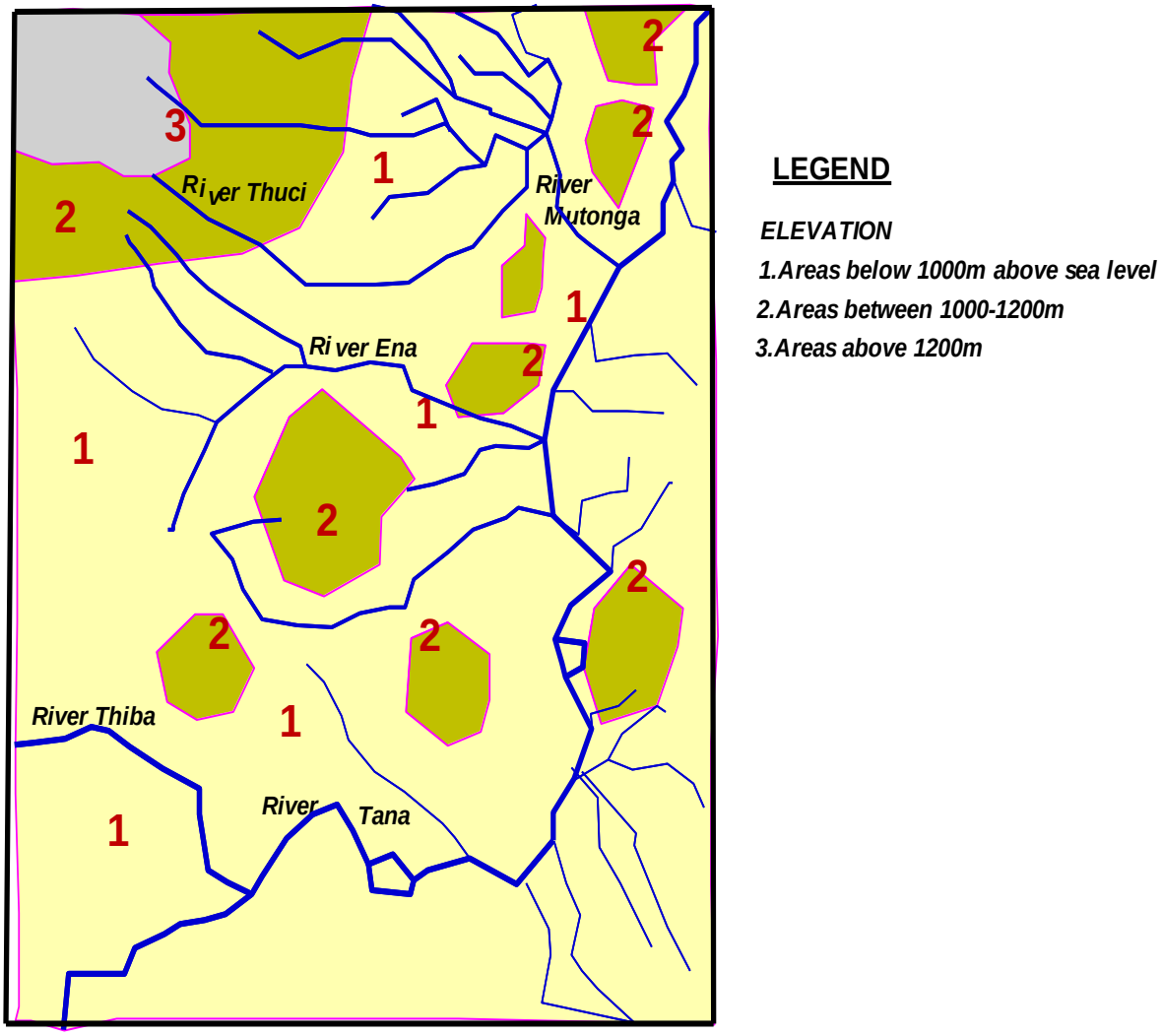

Figure 2: Elevation and drainage map of the Research area

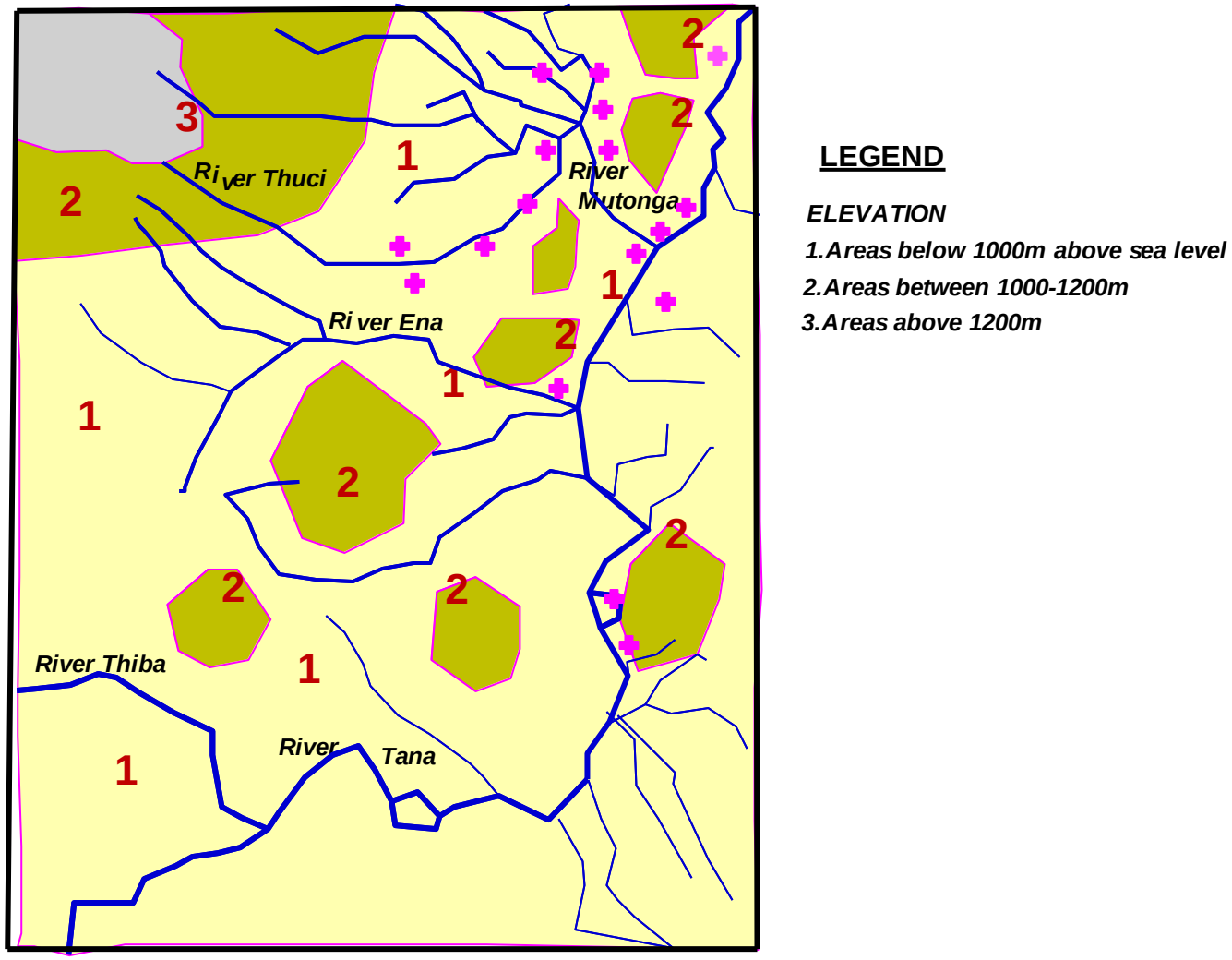

Figure 3: Early iron sites in relation to drainage and elevation

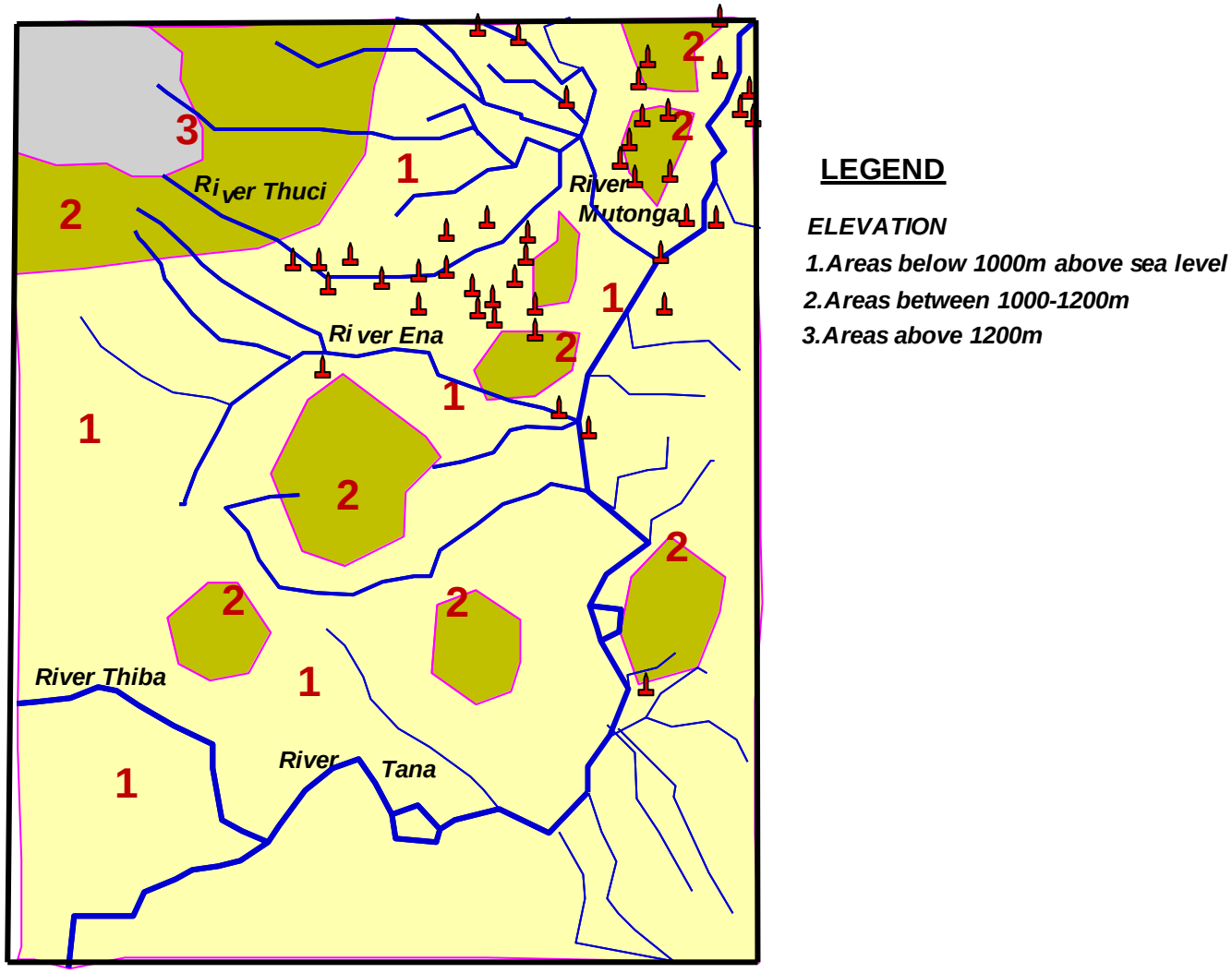

Figure 4: Distribution of Late Iron Age sites

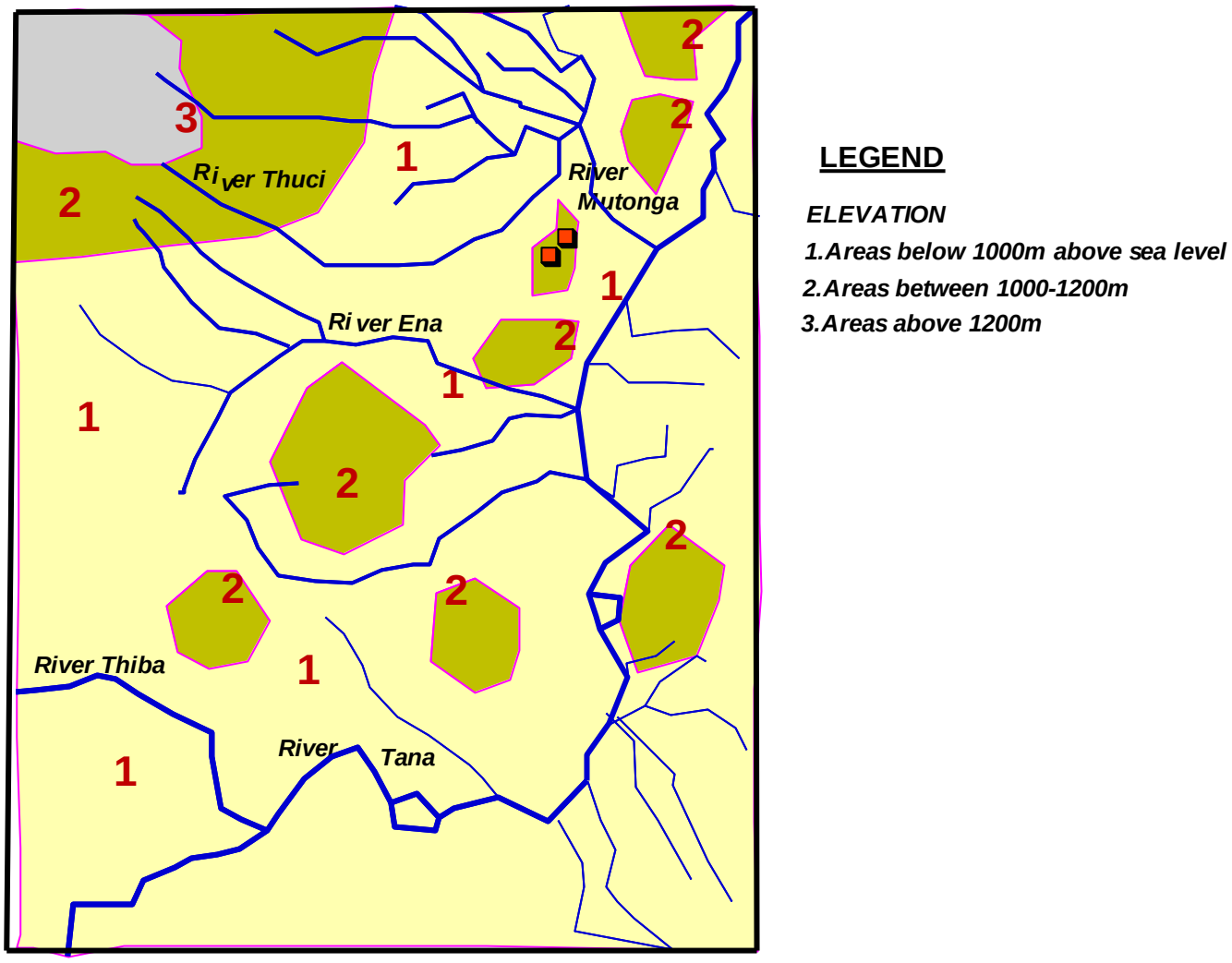

Figure 5: Distribution of historical sites

Conclusions:

This paper attempted to reconstruct the history of the Upper Tana Iron communities beginning Circa AD 0 to 1900/2000BP-105BP using archaeological, linguistic, ethnographic and historical records. Main research objectives included identifying the distribution of archaeological sites and how these relate to the peopling of the Upper Tana. The study also sets out to relate the Bantu speaking communities of the Upper Tana with the rest of East Africa. All these objectives were achieved using the available resources and methodologies. The Geodata skills such as Access DataBase method of creating site inventory/record list were useful in providing meaningful management and utility of all gathered data. Equally important in clarifying and making data visual and processing it and presentation was the Geological Information System software (MapInfo) and Power-point.

References:

1. Abungu, G.H.O. (1989) "Communities on the River Tana Kenya. An Archaeological Study of Relations between the Delta and River Basin 700 - 1800 AD". Unpublished Ph.D. thesis, University of Cambridge.
2. Ambrose, S.H (1982) Archaeological and linguistic reconstructions of history in East Africa. In Archaeological and Linguistic Reconstructions of African History, Ehret, G & M. Posnansky Berkeley: University of California press. Pp 104-157.
3. Bennet, P.R (1973/74) "The Barlow manuscript: An early contribution to Thagicu dialectology". Afrika und Uberesee, vol 57.
4. Bostoen, Koen (in press) 'Pots.Words and the Bantu Problem:On Lexical Reconstruction And Early African History'.A Paper submitted to the Journal of African History.
5. Bower, J, and Nelson, C.M (1998). "Early pottery, and pastoral culture of the Central Rift valley, Kenya". Man 13: 554-566.
6. Bower, J.C ; Nelson, C.M ; Waibel, A.F and Wandibba, S (1977). The University of Massachusset. Later Stone Age/Pastoral Neolithic comparative study in Central Kenya: An overview. Azania 12: 119-146
7. Brokensha, P. (1971,1973-80). "Mbeere Papers" Manuscript available at the institute of African Studies,University of Nairobi.
8. Brokensha, D. and Riley, B.W. (1977) "Vegetation Changes in Mbeere Division". Embu Working Paper No. 319 Nairobi; I.D.S. University of Nairobi.
9. Brokensha, D. & Riley, B.W. (1988) The Mbeere of Kenya. Vol. I Changing Rural Ecology. Lanham: University Press of America.
10. Brown, J. (1979) "Iron Working in Southern Mbeere". Vol. 2, No. 2 (Reprint): Institute of Africa Studies, University of Nairobi.
11. Brown, J (1995) "Iron working In Kenya". Cambridge: University Press.
12. Brown, J.A. (1989) "The Beginning of Pottery as an Economic Process", in S.E. Van der Lelew and R. Torrence (eds.) What's New? One World Archaeology - 14 pp. 203-224. London: Unwin Hyman.
13. Burrows, Colin J. (1990) Processes of vegetation change. London: Unwin Hyman Chami, F. (1994). The Tanzania Coast in the first Millenium A.D. Studies in African Archaeology 7. Uppsala: Society Archaeological Upsaliensis.
14. Chittick, H.N. (1969) "An Archaeological Reconnaissance of the Southern Somali Coast" Azania 11, 1018.

15. Clayton, W.D. (1961) "Derived Savanna in Kabba Province, Nigeria", Journal of Ecology Vol. 49 p. 59-95
16. Cumming, H. (1978) Two Iron Age Sites in the Grand Falls area, Meru District. Azania 13: 193-194.
17. Dasmann et al. (1974). Ecological Principles for Economic Development. London: John Wiley & Sons Ltd.
18. Ehret (1974) Ethiopians and East Africans: The problems of contacts. Nairobi: East African Publisher
19. Ehret, G and Posnansky, M (1982). The Archaeological and Linguistic Reconstructions of African History. Berkeley; University of California press.
20. Fadiman, J.A. (1973) "Traditional Warfare Among the Meru of Mt. Kenya". Ph.D. Dissertation, University of Wisconsin.
21. Glazier, J. (1972) "Conflict and Reconciliation Among the Mbeere of Kenya" Ph. D. Dissertation, University of California, Berkeley.
22. Guthrie, M. (1970) "Some Developments in the Prehistory of the Bantu Languages", in J.D., Fage & R.A. Oliver (eds) Papers in African Prehistory. Cambridge: Cambridge University Press.
23. Haaland,R (2004) "Iron-smelting- A vanishing Tradition:Ethnographic study of this craft in South-West Ethiopia" Journal of African Archeology.Vol 2 (1) pp 65-79.
24. Hamilton, A.C. (1982) Environmental History of East Africa London: Academic Press.
25. Hastenrath,S (2001). "Variations of East Africa Climate During the Past two Centuries" in Climatic change 50:209-217.
26. Heady, H.F. (1966) "Influences of Grazing on the Composition of Themeda Triandra Grassland", Journal of Ecology, vol 54, 1966. p. 705-729.
27. Heady, H.F. and Heady E.B. (1982) Range and Wildlife Management in the Tropics. London: Longman.
28. Horton, M.C. (1984). The Early Settlement of the Northern Swahili Coast". Ph.D. Dissertation University of Cambridge
29. Jones, R.K. (1987). Arid and Semi-Arid Rangelands. Guidelines for Development. Morrilton: Winrock International
30. Johnson, J.C, Kitts, Odada, E. (2000). "The Holocene History of Lake Victoria, In Ambio: A Journal of Human Environment Vol.29. No.1, Feb.2000.

31. Karega Mutahi (1977) "Sound change and the classification of the dialects of Southern Mt. Kenya." Ph.D Thesis: Nairobi University.
32. Kirathe, J.N. (1999) “Conservation of Kenya’s Most Rare and Unique Gallery Forest” in EANHS Bulletin Vol. 29. No. 1 & 2 pp. 7-9.
33. . Kiriama, H.O. (1987) “Iron Smelting Slag from Mwitu Tradition in Kenya”, in Southern Africa Archaeological Review Vol XV.
34. Kiriama et al (1996) “Iron working in the upper Tana Valley,Kenya,” in G.Pwiti and R.Soper,Aspects of African Archeology.Harare:University of Zimbabwe Publications.
35. Klumpp, D (1987). “Maasai Art and Society: age and sex, time and space, cash cattle”. Ph.D dissertation, Columbia University.
36. Krapf, L.J (1967). Travels, Researches and Missionary Labour during an 18 year residence in Eastern Africa. 2nd ed. London: Franc Cass and co. ltd.
37. Kusimba , C.M. (1999) The Rise and fall of Swahili States. London & New Delhi: Altamira Press.
38. Lamb,H.Darbyshire, I and Verschuren,D. (20003) “Vegetation response to rainfall variation and human impact in Central Kenya during the past 11,000 year” Holocene 13,2pp285-295.
39. Lambart, H.E. (1950) System of Land Tenure in Kikuyuland Unit Part I. History of Tribal Occupation of the Land. Cape Town: O.U..P.
40. Maher, C. (1938) Soil Erosion and Land Utilization 1-11. Development of Agriculture. Ministry of Agriculture: Government Printer.
41. Mahlstedt, T.F. & Diblasi, N.C. (1978) "Archaeological Survey of the Ithaga Hills, Eastern Highlands of Kenya: Preliminary Analysis". Azania XIII : 192-193.
42. Matheka, P (1992) "The political Economy and History of famine in Machakos District during colonial Era". MA Thesis: Kenyatta University
43. Mbae, P.N. (1992) "A Political History of the Meru, 1750 - 1908", M.A. thesis, Kenyatta University
44. Mclntosh, B.G. (1971) The Settlement of East Africa. In Ogot B.A. and Kieren, J.A. (eds) Zamani, Nairobi E.A.P.H.
45. Muriuki, G. (1975) A History of the Kikuyu, Nairobi: E.A.P.H.
46. Mwaniki, H.S.K (1974) Embu Historical Texts. Nariobi: E.A.P.H.
47. Mwaniki, H.S.K (1980). The Living History of Embu and Mbeere to 1906. Nariobi K.L.B.

48. Mwaniki, H.S.K (1982). “A Pre-colonial History of Chuka of Mount Kenya. C. 1400 – 1908” Ph.D. Thesis, Dalhousie University.
49. Mworia-Maitima, J, (1997) “Prehistoric fires and land-cover change in western Kenya: Evidence from pollen, charcoal, grass cuticles and grass phytoliths.” Holocene 7.4 pp 409-417
50. National Museums of Kenya (1997) Coastal Sites and Monuments: Nairobi, NMK
51. Survey of Kenya (1970). National Atlas of Kenya. Nairobi: Kenya Government.
52. Nderitu J.(1999) The Gallery forest of the Tana River in ENHS Bulletin, NMK
53. Ngari, L.K. (1992) “Some Aspects of Indigenous Industries amongst the Mbeere C. 1850 – 1963. Unpublished M.A. Thesis. Kenyatta University.
54. Ngari, L K et al (1999).“Research finding from the Upper Tana”. In Chemi-Chemi, Vol.I. No.I
55. Ngari, L.K. (2004) “Environmental and Ethnoarchaeological contexts for the advent of iron technology and the expansion of bantu speaking in the Upper Tana, Central Kenya, Circa AD 1000-1950” Unpublished Ph.D Thesis, Kenyatta University.
56. Nicholson, S.E (1998) “Historical fluctuations of Lake Victoria and other lakes in the northern Rift Valley of East Africa,” In J.T Lehmann, (ed). Envoronmental Change and Response in East African Lakes, 7-35.
57. Nicholsan, S.E and Yin, X (2001) “Rainfall conditions in equatorial east Africa During the nineteenth century as inferred from the record of Lake Victoria” in Climatic Change: 387-398
58. M'Mbogori, Freda. N. (2006). (2012) Population and ceramic traditions: revisiting the Tana ware of coastal Kenya (7th–14th century AD) Azania: Archaeological Research in Africa, Taylor & Francis
59. M'Mbogori, Freda. N. (2006). Late iron age economies of Mount Kenya region A case study of Kiburu, Kangai and Kanyua archaeological sites.
60. Nurse, D. (1980) "Bantu Migration to East Africa: Linguistic Evidence". I.A.S. Seminar Paper No. 138, University of Nairobi.
61. Nurse, D. & Phillipson, D. (1975). "The North - Eastern Bantu Languages of Tanzania and Kenya. A Classification" Kiswahili 45/2, 1-28
62. Nurse, D and Rotland, F. (1992) "Engaruka and the Sonjo"Azania XXVII p. 1-5.
63. Orde-Brown,G.St (1925). The Vanishing Tribes of Kenya.” Monograph pp, 129-131,143-149.

64. Phillipson, D.W (1975) "The chronology of the Iron Age in Bantu Africa". Journal of African History 16, 1-25
65. Phillipson, D.W. (1977) The Later Prehistory of Eastern and Southern Africa London: Heinemann.
66. Phillipson, D.W. (1993) African Archaeology. Cambridge: Cambridge University Press.
67. Platt, et.al. (1966) Savanna Ecosystems, Cambridge: C.U.P
68. Riley, B.W and Brokensha, D (1988). The Mbeere of Kenya. Vol. II Lanham: University press of America..
69. Schoenbrun,D.L (1994) "The Contours of Vegetation Change and Human Agency in Eastern African's Great Lakes Region : Ca 2000 BC to Ca AD 1000" in History in Africa.21,269-302
70. Schmidt, P.R. (1974) "An Investigation of Early and Late Iron Age Cultures through Oral Traditions and Archaeology: An Interdisciplinary Case in Buhaya, Tanzania". Ph.D. Thesis, Northwestern University.
71. Schmidt, P.R (1978) Historical Archaeology: A Structural Approach in an African Culture. Westport: Greenwood Press..
72. Siirianen, A. (1971). "The Iron Age Site of Gatung'ang'a Central Kenya" In Azania 5.
73. Soper, R.C. (1967). "Kwale: An Early Iron Age Site in South Eastern Kenya". Azania.
74. Soper, R.C. (1971). "A General View of the Early Iron Age of the Southern Half of Africa. Azania 6:5-37.
75. Soper, R.C. (1976). "Iron Age Archaeological sites in the Chyulu Hills,Kenya"Azania,XI pp83-116
76. Soper R.C (1979)."Iron Age Archaeology and Traditional History in Embu Mbeere and Chuka Areas of Central Kenya". Azania 14: 31-59.
77. Soper R.C (1980) "Bantu Migrations in East Africa: Archaeological Evidence". Institute of African Studies, University of Nairobi, paper No. 139.
78. Soper R.C (1982) Bantu Expansion into Eastern Africa: Archaeological Evidence". In Ehret, A. and Posnansky, M. (eds). The Archaeological and Linguistic Reconstruction of African History. 223-238 Berkeley: University of California Press.
79. Sutton J.E.G. (1971). "The Settlement of East Africa". in Ogot, B.A. and Kieren, J.A. (eds) Zamani. Nairobi: E.A.P.H.

80. Sterger, J.C, Cumming,B and Meek,L (1972). “A high Resolution 11,400 year Diatom Record from Diatom Record from Lake Victoria, East Africa” in Quartenary Research.47, 81-89
81. Taylor,D and Merchant,R, (1994-1995), “Human Impact in the Interlucustrine Region: Long-term pollen records from the Rukiga Highlands.”Azania XXIX-XXX.
82. Van Noten (1977). "The Early Iron Age in the Interlucustrine Region". Paper to VIIth Pan-African Congress of pre-history.
83. Van Noten, F. (1979). The Early Iron Age in the Interlucustine Region: The Diffusion of Iron Technology. Azania 14:61-80.
84. Verschuren, D, Tibby, J, Leavitt, R.P and Roberts, N.C (1999) “The Environmental History of Climate-sensitive Lake in the former “white Highlands” of Central Kenya. Ambio Vol 28 No 6. A journal of Human environment.
85. Waane, S.A.C. (1979) "The Distribution of Iron Age Pottery in East Africa. Ethnoarchaeological Approach" Ph.D. Dissertation, University of Illinois.
86. Wandibba, S (1986). Meru District social-cultural profile. Government of Kenya. Ministry of Economic Planning: Government Printer.
87. Wandibba, S (1999). The Past and the present in the Present: Ceramic Ethno archaeology in Kenya. Inaugural Lecture. Nairobi: University of Nairobi..
88. Were G.S. & Wilson, D. (1991) East African Through a Thousand Years. Nairobi: Evans Brothers