AN ARCHAEOLOGICAL STUDY OF FARMING COMMUNITIES ON THE NORTHERN SHORES OF LAKE VICTORIA NYANZA, UGANDA

by

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An Archaeological Study of Farming Communities on the Northern Shores of Lake Victoria Nyanza, Uganda

I declare that this thesis is my original work. Where secondary information is used, it is carefully acknowledged and referenced in accordance with the requirements of the University of Pretoria.

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Abstract

The goal of this study was to explore the archaeology of farming communities on the northern shores of Lake Victoria Nyanza, Uganda. The study explored the process of transition to farming, and the settlement history and subsistence structures of communities of both the Late Stone Age (LSA) and the Early Iron Age (EIA). Further, the study explored the LSA–EIA relationship and compared the archaeology of the northern shores of Lake Victoria Nyanza with the archaeology, as it is widely understood, of the lake's eastern and western shores. The study used survey, excavation, flotation, and dating methods to collect data from the Busia and Namayingo districts. It also performed ceramics, lithics, bone point, stable isotope, osteoarchaeological, faunal, and botanical analyses. The study identified 24 new archaeological sites of which five were excavated—three were Kansyore LSA sites, one was an LSA–EIA site, and one was a Late Iron Age (LIA) site. Well-preserved LSA and EIA burials dating from 6634 to 6479 BC and from AD 339 to 437 were excavated systematically for the very first time in Uganda. Further, the study identified a new Kansyore phase, namely, the Middle Kansyore phase, dating from 3465 to 3495 BC. This study was the first of its kind to confirm the presence of ceramic hunter-gatherers and EIA farmers in the study area and to indicate that there was no evidence of contact between the Kansyore LSA communities and the later EIA communities. Further, the study offered insights into the lifeways of each group and clearly indicated that the transition to farming resulted from a combination of factors such as population movements and the environment. The outcomes of this study contributed directly to the big debate on the regional and global understanding of the transition to farming. The study concluded that the northern shores of Lake Victoria Nyanza had been occupied by Pre-ceramic hunter-gatherers, Kansyore LSA and EIA to LIA farming communities who had had no contact with their predecessors. Although information on this area has the potential to provide answers to many future questions about the lifeways of past communities, this potential may be thwarted by the activities of harvesters who operate in the area and depend on the harvesting of sand and shells to make a living. This study recommends that the government should emphasise the importance of cultural impact assessments to be conducted by companies involved in mining or any other development that is likely to hinder the survival of cultural sites. This study had to make use of purposive survey approaches because of limited funds and time, as a result of which most of the sites in the area under study remained unknown archaeologically; therefore, future researchers should conduct surveys in this area. Finally, sensitisation of the locals about the importance of preserving their culture and heritage should be part and parcel of every future project to avoid site destruction by local people.

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CHAPTER 1

INTRODUCTION

1.0 Introduction to the Study

The world over, the advent of agriculture is recognised as one of the 'big' questions in prehistory (Binford 1983: 26; Clutton-Brock, Harlan, Harris & Hillman cited in Robertshaw 1993: 358). Historically, the shift to farming was thought to be the result of specific forces such as the ecological crisis, demographic pressure, new social networks, evolutionary mechanisms, climatic change, technological innovations, the appearance of controllable animals and plant variants, and intensive husbandry (Childe 1952; Binford 1968; Bender 1978; Rindos 1980; Hayden 1990; Layton *et al*. 1991; Layton 2001: 297-299). Traditionally, the transition to farming was thought to be uniform, but available data from many parts of the world (East Africa included) indicated pronounced regional variation (Cowan & Watson 1992; Gebauer & Price 1992: 3; Kusimba & Kusimba 2005 Robb 2013: 657). In eastern Africa, a shift to farming was traditionally attributed to the processes of demographic, linguistic, economic and technological changes brought about by moving populations associated with the spread of Bantu languages (Oliver 1966; Posnansky 1968; Phillipson 1976). However, the process of change was complex and not only a simple episode of population replacement, and some factors might have operated independently of one another (Vansina 1994: 17–18; Ehret 2001; Lane *et al.* 2007). This complexity has made it hard to comprehend the process of transition to farming in many parts of East Africa and in Uganda in particular. Although this study's focus was on farming communities, it is important to note that these communities did not live in isolation but had contact with pre-existing communities. For example, communities in the Great Lakes region had contact with communities such as pre-ceramic Late Stone Age (LSA) and Kansyore-ceramic-using (LSA) hunter-gatherers.

The LSA in East Africa dates from 65,000 BC to AD 1000 (Ambrose 1982; Mabulla 1996; Shipton *et al.* 2018). Pre-ceramic LSA hunter-gatherers are usually depicted as small, highly mobile groups with immediate-return economic systems (Marean 1992; Ambrose 1998; Dale *et al.* 2004). LSA sites are distributed in the Central Rift Valley and eastern Kenya (Ambrose 1998, 2001; Kusimba 1999), northeastern and central Tanzania (Mehlman 1989; Kessy 2005; Prendergast *et al.* 2007; Prendergast *et al.* 2014) and southwestern, northeastern and central Uganda (Nelson & Posnansky 1970; Robbins *et al.* 1977; MacLean 1994-1995). Some of the LSA sites have been found on land with poor soil and on top of steep hills (MacLean 1994-1995: 298), in overhanging rock shelters, sometimes near water sources (Sutton 1968: 65; Mehlman 1989), and at elevations up to 2000 m (Ambrose 2001). LSA communities subsisted on what they could hunt and gather (Ambrose 1998, 2001) and they preferred forest, bush and savanna habitats (Onyango-Abuje 1977; Gifford-Gonzalez 1985; Ambrose 1986a).

Kansyore LSA, on the other hand, dates from 6000 BC to AD 500 (Lane *et al.* 2006; Lane *et al.* 2007; Dale & Ashley 2010; Prendergast *et al.* 2014) and is characterised by both lithics and Kansyore ceramics. Excavated Kansyore ceramics have been found to be heavily fragmented and decorated with horizontal and vertical bands of walked punctates, comb impressions, and zigzag motifs (Dale & Ashley 2010). Using detailed decorations, stratigraphy and dating as a basis, Dale (2007) and Dale and Ashley (2010: 42–43) divided Kansyore into an early period (6000–5000 BC) and a late period (1000 BC–AD 500). Kansyore ceramics have been recovered from both open-air and rock shelter sites (Prendergast 2008: 192; Dale & Ashley 2010: 27). These ceramics have also been found on the lake shores of western Kenya (Robertshaw 1991; Onjala *et al.* 1999; Karega-Mũnene 2002; Ashley 2005), Lake Eyasi in the Tanzania Rift Valley, the southwest shore of Lake Victoria Nyanza in Tanzania (Soper & Golden 1969; Mehlman 1989; Prendergast *et al.* 2007; Prendergast *et al.* 2014), southwestern Uganda (Chapman 1967; Kyazike 2016, 2019) and southeastern Sudan (Robertshaw & Mawson 1981). Kansyore sites located in the Victoria Nyanza basin have been indicated as the core area, and those outside as the periphery (Prendergast 2008).

Kansyore LSA sites around Lake Victoria Nyanza have been divided into shell midden sites (used as dry-season camps), and riverside sites (repeatedly used as base camps in the rainy season) (Prendergast 2008: 190–191, 277). The Kansyore LSA subsistence economy involved the specialist exploitation of shellfish, fish, terrestrial wild, and latterly (ca. 1550 BC onwards) also domestic taxa (Prendergast 2008). The level of economic and social complexity that has been identified, together with a number of other indicators, suggests the inhabitants were delayed-return hunter-gatherers, leading to the development of Dale *et al.*'s (2004) idea of the 'ownership model' (see also Prendergast 2008: 277). This model rests on the repeated use of sites, rich deposits of cultural materials and the presence of storage vessels (Dale *et al.* 2004: 362), all of which suggest a sense of 'ownership' within Kansyore-using communities. Delayed-return economies, increased sedentism, and small-scale inequalities are also common characteristics contained in this model (Dale *et al.* 2004: 368; Dale & Ashley 2010: 26–27). Sites in the core Victoria Nyanza area are also notable for the later introduction of domesticates (from around 1000-500 BC), apparently within a continuous cultural tradition rather than through major population shifts (Prendergast 2008: 299). This is suggested by the presence of the remains of caprines in Kansyore levels at WadhLang'o, Gogo Falls and Usenge 3, which Prendergast (2008: 300–301) thinks could not be the result of only the occasional consumption of exchanged animals. As this evidence indicates, Kansyore LSA communities were already practising many of the so-called hallmarks of farmers—sedentism, exploitation of domesticates, low-level social inequality as well as long-term storage.

Farming has always been associated with Early Iron Age (EIA) communities in East Africa who used Urewe ceramics. Urewe is the oldest EIA pottery found in the Great Lakes region and it dates between ca. 500 BC and AD 800 (Clist 1987: 48; Ashley 2010: 144; Reid & Ashley 2014). This pottery was initially described as 'dimple-based' (Leakey *et al.* 1948) and later renamed after the site type (Posnansky 1961a: 183). Urewe pottery is usually heavily decorated with parallel grooves in horizontal bands that often incorporate circles, loops and triangles, and cross-hatching and dots are often found on or just below the rim (Leakey *et al.* 1948). Urewe pottery has been found over a wide area extending over roughly 400 000 km² across the Democratic Republic of the Congo, Rwanda, Burundi, Uganda, Tanzania and Kenya (Clist 1987: 38). It occurs in both open-air and rock-shelter sites (Soper 1971b:7). The sites tend to be located in wetter riverine and lake-shore settings, or margins of sub-mountain forests and islands (Posnansky 1961a: 185; Reid 1994/95: 311).

Urewe users subsisted on domesticated animals and plants as well as hunted and gathered resources (Posnansky 1961a: 185). However, some scholars have argued that the evidence of plant domesticates is scarce (Sutton 1994-1995: 264; Karega-Mũnene 2002). Nevertheless, a recent archaeobotanical study in Rwanda by Giblin and Fuller (2011: 253–256) has identified seed remains of domestic crops dating to the first millennium AD. Therefore, the absence of domesticated plants can perhaps be attributed to poor data collection methods. In an effort to collect as much data as possible, the present study used multi-disciplinary methods (including the archaeobotanical data collection method) to identify domesticated plant remains, which are scarce in the Lake Victoria Nyanza region. Urewe-ceramic-using communities are said to have lived in semi-sedentary villages which, according to Vansina (1994-1995: 18), were neither socially nor economically self-sustaining because of the unavailability of local resources. As such, the farming communities required regular relations among small clusters of villages (Vansina 19941995). However, evidence of the relationship between early farming communities and their LSA predecessors remains unclear (Sutton 1994-1995:264–266); to some, this relationship is modelled on a pattern of assimilation (Phillipson 1993), but to others it is a more fluid and dynamic process (Lane *et al.* 2007: 78).

Archaeological studies around Lake Victoria Nyanza show that the transition to farming took diverse forms. Kansyore shell midden sites and stratified multi-period sites have been identified and associated with transition to farming on the eastern side of the lake (Lane *et al.* 2007). Excavation conducted in these two types of sites in Kenya (Onjala *et al.* 1999; Dale 2000, 2007; Ashley 2005; Lane *et al.* 2006; Lane *et al.* 2007; Prendergast 2008) revealed that the transition to farming was gradual, localised and variable. This suggested that transition to farming did not occur through major population shifts as thought earlier. The reverse, however, seemed to be true on the western side of the lake where the transition from LSA to EIA seemed to have been abrupt and direct (Posnansky *et al.* 2005; Tibesasa 2010; Kessy *et al.* 2011). In this area, evidence was found that pre-ceramic LSA materials were replaced by EIA materials. Nevertheless, there have been limited attempts, if any, to understand the relationship between LSA and EIAcommunities around the northern parts of the lake, and to compare this relationship with differing relationship patterns in the adjacent areas. In addition, evidence of subsistence on resources such as fauna and flora has been scarce in many archaeological sites on the western shores and islands of Lake Victoria Nyanza. This can be attributed to inadequate sampling techniques; for example, few excavations have made use of flotation. As such, there remains a large gap in existing knowledge of the precise nature of the LSA–EIA transition and its effect on foodways. Instead, the focus has historically been on inorganic materials such as diagnostic Urewe ceramics (EIA) or Kansyore ceramics (LSA).

The northern shores of Lake Victoria Nyanza are characterised by varied ecologies, from undulating hills and swamps in the west up to central Uganda, to drier plateaus and steep hills towards the Uganda–Kenya border, and up to Kenya. The area west of the Nile River has been researched from as early as the colonial period (Brachi 1960; Posnansky 1961a) up to recent times (Reid 2002; Kiyaga-Mulindwa 2004; Kessy *et al.* 2011). The present study was carried out on the northern shores of Lake Victoria Nyanza, specifically in the area that lies between the Nile River in the west and the Uganda–Kenya border in the east. The area lies between two ecozones—high rainfall in the west and significantly drier conditions in the east. Culturally, it also lies at a crossroads; historical linguistic studies (Stephens 2007) show the meeting of four major language groups, namely, Luganda, Lusoga, Lunyole and Rushana. Therefore, this area acts as both an ecological and cultural frontier between west and east. The area has never been explored archaeologically before, despite being located between two historical centres of research to the west and the east which show markedly different processes of transition to farming. The present study sought to explore the archaeology of the study area (i.e. the northern shores of Lake Victoria Nyanza) using micro-historical patterns in order to provide a key to understanding any differences and to address the issue of change and continuity in the Lake Victoria Nyanza region. Moreover, the location of the study area between these two contrasting ecological and social landscapes offered a unique opportunity to not only contribute to the existing regional knowledge base, but to also directly feed into broader discussions around the mechanisms and factors involved in the transition to a farming lifestyle. The location also offered the opportunity to study the settlement history and subsistence structures of both LSA and EIA communities and the relationship between LSA and EIA. The present study relied on multi-disciplinary methods to collect data on, for example, fauna, botanics, manufacturing and technology, and it conducted use-trace, osteoarchaeological and stable isotope analyses to provide direct evidence, which was often missing previously. This study was guided by the following questions:

- What is the archaeological record of LSA and EIA communities on the northern shores of Lake Victoria Nyanza, Uganda?
- What is the evidence of the subsistence structure of LSA and EIA communities on the northern shores of Lake Victoria Nyanza? What does this indicate about the relationship between the two communities in this area?
- How does the archaeology of the northern shores of Lake Victoria Nyanza compare with the existing wider understanding of the eastern and western shores? How can

this knowledge contribute to a larger understanding of the mechanisms of the transition to farming in eastern Africa?

The study of transition to farming is a globally important issue because it provides answers to ‘big’ questions on the origins of agriculture, as well as on the process of the spread of food production and what it involved in terms of human interactions and adaptations. The present study was therefore important because it provided information on the history of this area beyond what has been provided by historical linguistic studies (e.g., on oral traditions). This study did a detailed and comprehensive practical assessment of a new body of data on ceramics, lithics, fauna, flora, bone point, and osteoarchaeological and stable isotopes in the Holocene period. This assessment was combined with an examination of the available extant literature and archaeological evidence from other studies done in East Africa.

1.1 Structure of the thesis

Chapter 2 provides detailed information on previous research conducted on LSA and EIA farming communities from a global-regional perspective. The cultural sequence, from LSA through to the Iron Age, is outlined, with a focus on the specific areas studied. Evidence discussed includes that relating to archaeology, linguistics, palaeoecology, isotopes and ancient DNAs. Following closely on the literature reviewed in Chapter 2, Chapter 3 discusses archaeological approaches to understanding hunter-gatherer societies (including immediate- and delayed-return hunter-gatherers) and approaches that explain the transition to farming, including the Bantu migration hypothesis, moving and static frontiers, and mosaics.

Chapter 4 provides details on the palaeoenvironment and present environments in East Africa. It also presents the survey methods used in the present study and results obtained. Chapter 5 discusses excavation methods at different sites and the relevant results obtained. Details of human burials are also given in this chapter. The sixth and seventh chapters detail the evidence collected through examining ceramics, lithics, fauna, flora, osteoarchaeological isotopes, stable isotopes, bone-point manufacturing technology, and use-trace analysis. It also provides interpretations of each artefact group. Chapter 8 presents a discussion and interpretation of the study results, whereas Chapter 9 describes the study’s contributions, draws conclusions and makes suggestions for future research.

CHAPTER 2
PREVIOUS RESEARCH

2.0 Introduction

This chapter gives an overview and synthesis of evidence concerning the Holocene LSA and EIA communities. It starts from a wider perspective by looking at LSA studies done on East Africa, and narrows down to studies done on the Great Lakes region and the shores of Lake Victoria Nyanza, with a focus on previous LSA studies, chronology, distribution, features, and early ceramics.

2.1 Later Stone Age Studies in East Africa

As cited in Robertshaw (1990b), Wayland and Leakey were the first researchers to conduct research on stone tools in Uganda, Kenya and northern Tanzania in the 1920s. Their research focused on establishing dated sequences for stone artefacts, using Europe and South Africa for comparative purposes due to limited existing data within the region (Robertshaw 1990a: 8). This work culminated in the development of a diffusion framework in a bid to explain the relationship between East Africa and Europe and other parts of Africa. Research at that time was based on 'normative' archaeology guidelines (Robertshaw 1990b: 80), and qualitative data analysis was preferred over quantitative analysis. Any form of variation in regard to artefact types at that time was read as representing a different group of people (Robertshaw 1990b). However, variations in cultural patterning were believed to result from differences in the environment and raw materials, and such variations were not necessarily seen as representing different groups of people (O'Brien cited in Robertshaw 1990b). Besides, Robertshaw (1990b) notes, the earliest researchers were largely concerned with Stone Age periods and paid little attention to materials (e.g., pottery and bones) associated with them (see also Sutton 1990: 30). Robertshaw (1990b: 81) further notes that faunal remains recovered from archaeological sites were intentionally used for relative dating purposes rather than for examining environmental or diet-related issues at that time. This shows that very few studies were concerned with the diets of the communities of that time. Furthermore, only identifiable stone tools were analysed and the rest were discarded (Mehlman 1989: 78; Leakey cited in Robertsaw 1990; Kessy 2005). Nevertheless, the work of the earliest scholars laid a strong foundation for later scholars to build on (Kessy 2005). In the paragraphs below, detailed information on pioneering work on the LSA in the Great Lakes region and East Africa in particular is provided in order to situate the present study.

Robertshaw (1990b: 79) reported that stone tools in East Africa were first collected in 1893 by the geologist Gregory and that, according to Gregory and Leaky, these tools were categorised as Neolithic but were not necessarily indicated in a well-established sequence. However, in 1924 a systematic work on stone tools was published, establishing the sequence of archaeological industries/stone cultures (Wayland, 1924). Wayland correlated his sequence with the European glacial sequences due to a lack of similar work on East Africa and the Great Lakes region to refer to. His aim was to provide a method of relative dating that would help determine the chronological relationship between stone tool cultures in Europe and those in other parts of Africa (Robertshaw 1990b). Based on these correlations, Wayland postulated that Uganda was inhabited as far back as when Europe was inhabited. Wayland's hypothesis was later picked up by Leakey (cited in Robertshaw 1990b) who established an almost complete cultural sequence for the Stone Age (Robertshaw 1990b: 80). However, Robertshaw argues that Leakey's description of the Stone Age periods overlapped with the times when pottery appeared and food production was introduced (see also Sutton 1990: 30). Using this framework, Leakey described characteristic type series of tools such as large backed blades and burins typical to those used in East Africa. He tied each culture he identified to palaeoclimatic sequences of pluvial linked to Europe and South Africa. Leakey's approach was categorised as 'normative' archaeology (Robertshaw 1990b). According to Robertshaw (1990b), archaeology in this case was looked at as a positivist discipline, sharing much with palaeontology, where culture was considered not to be different from animal species. Therefore, cultures were defined by the presence of fossils directors or highly specific artefact types found in clear stratigraphic contexts (Robertshaw 1990b). Robertshaw (1990b: 80) argues that, according to this approach, it was next to impossible to find different toolkits being made by the same group of people at different sites. Also according to this approach, change was accounted for by temporal differences between different groups of people. This approach led to a poor understanding of the real causes of change in the cultural process as well as to a lack of absolute dating techniques. It further resulted in the establishment of multiple cultural schemes by archaeologists, which brought about more confusion since such schemes could not be supported by archaeological findings.

The pluvial hypothesis was, however, criticised by Solomon (1939) who argued that this hypothesis rested on a slender foundation without sufficient data to support the suggested correlations. In addition, it was realised that different areas studied had different prehistories based on different environments and varying raw materials; therefore cultural variability could be ascribed not only to the differences between groups of people but also to environmental factors (O'Brien 1939). According to geologists, the climatic history of East Africa, which was marked by local and regional tectonic and climatic events, could explain the variations (Aliment cited in Kessy 2005). Based on all these considerations and also the discovery of new dating techniques to establish absolute dating, the pluvial hypothesis collapsed. Despite its collapse, it laid a strong foundation for future historians and archaeologists studying East African. By 1960, a new wave of change in political as well as scientific spheres set in, and absolute dating techniques were discovered. These enabled archaeologists to date sites accurately and to excavate single-occupation open sites that had not been excavated previously (Robertshaw 1990b: 85). Archaeological research after 1960 also underwent a change in theory which was directed by New Archaeology which challenged 'normative' archaeology (Robertshaw 1990b). This led to discarding the idea of diffusion that had dominated the era of relative dating (Robertshaw 1990b). With New Archaeology came the development of archaeological methods and theory that improved data recovery and archaeological interpretations (Kessy 2005). Although New Archaeology was not fully incorporated into East African archaeology, its ecologically based models for interpreting cultural evolution were employed (Robertshaw 1990b: 86). With the ecological paradigm, changes in material culture were now looked at in terms of cultural, technological, functional, and ecological factors (Mabulla 1996: 82; Kessy 2005). Animal bones which were previously considered as indicators of dating were now taken to indicate diet and subsistence in human adaptational systems and were therefore areas worth studying (Robertshaw 1990b: 86).

Consequently, researchers started to positively identify cattle bones that had been found and associated with Stone Age lithic assemblages (Sutton 1966: 41; Marean 1992; Robertshaw 1990b). This resulted in the finding of large assemblages of faunal remains that enabled a reconstruction of butchery and subsistence practices (Marean 1992). This reconstruction generated an informed hypothesis about seasonal land use, and further resulted in understanding regional subsistence and settlement patterns (Gifford *et al.* 1980; Ambrose 1984a). Despite these developments in Stone Age research, the LSA remains one of the most poorly researched periods in the Great Lakes region and in Uganda in particular. The paucity of research in Uganda has been attributed to the country's political situation during the 1970s and 1980s (Reid 2002) as well as to the nature of its soils which are acidic and thus hinder preservation of organic cultural materials (Young & Thompson 1999). Uganda, just like many other African countries, lacks well-dated and well-established reliable cultural-stratigraphic frameworks particularly for the Stone Age period and food producers (Shipton *et al.* 2018: 2). All these factors put together have perhaps resulted in a poor understanding of LSA subsistence and settlement patterns.

2.1.1 LSA Features

The LSA marked the first widespread use of lithic materials (e.g., tiny blade tools), and the period was dominated by bipolar technology (Kessy 2005; Phillipson 2005). Typologically, most of the microliths were often fitted into handles and were sometimes used together to form composite tools (Phillipson 2005: 92). Most artefacts were small in size and included backed pieces that were geometric in shape (i.e., crescents, triangles and trapezoids). The LSA in East Africa has been variously characterised by cultural enactments such as burying the dead, using bone tools, making pottery and ostrich-eggshell beads, and using bows and arrows, symbolism, and personal adornment, all of which suggest the importance of identity, especially as foragers became more territorial (Mabulla 1996; Ambrose 1998; Kusimba 2002; Phillipson 2005: 92; Dale 2007: 55). Behavioural and cultural changes have been discussed based on these features. Changes in lithic production, symbolic material culture and subsistence diversification are thought to be thresholds of human cognitive and social behaviour (Ambrose 2002; Jacobs *et al.* 2008; Lombard & Parsons 2011; Henshilwood 2012; Wadley 2015).

Technologically, the LSA was dominated by blade core technology/bipolar technology (Mehlman 1989; Shipton *et al.* 2018). Despite this dominance of bipolar technology, there are many lithic variations that are thought to have resulted from the use of raw materials and from ecological factors (see Phillipson 1977a; see Kelly 1992 on mobility). The causes of these variations are not quite clear and a discussion of the issue is beyond the scope of the present study. Although the LSA is known to be characterised by, for example, the use of pottery and bone tools and the practice of burials that indicate that foragers were becoming territorial (Mabulla 1996; Ambrose 1998; Kusimba 2002; Phillipson 2005: 92; Dale 2007: 55), such pieces of evidence are still rare in many parts of East Africa, including Uganda. As such, LSA communities have continuously been referred to as small and highly mobile groups with immediate-return economic systems. However, Dale *et al.* (2004) and Dale (2007), while conducting research at the Siror site, observed the existence of a group of hunter-gatherers associated with the aforementioned characteristics. These hunter-gatherers were different from the highly mobile groups traditionally known in East Africa. In the paragraphs below, LSA hunter-gatherers groups using ceramics in East Africa are reviewed.

2.1.2 Early LSA Ceramics in East Africa

Pottery was first recovered at Gamble's Cave in the Kenyan Rift Valley (Leakey 1931); however its occurrence there was thought to be intrusive (Bower & Nelson 1978). Pottery, although sparse, was also documented around Lake Turkana at various sites such as Lothagam, Lowasera, and at many sites in northern Kenya (Lynch & Robbins 1977; Phillipson 1977a; Robbins 1984; Barthelme 1985). The pottery from the Turkana region was dated 9000 to 4000 BP (Barthelme 1977, 1985; Lynch & Robbins 1977; Phillipson 1977a; Robbins 1984); however, Koch *et al.* (1997) note that the dates were obtained largely from less reliable materials such as bone apatite or shell. The pottery from Turkana was also found to have an association with bone harpoons, wild terrestrial remains and abundant fish remains. The pottery was decorated with wavy and dotted lines (as was the pottery in North Africa), a finding that forced Keding (2017) to conduct a detailed analysis of pottery that was excavated from this region in the 1970s and 1980s for comparison purposes. Keding's (2017) detailed analysis reveals that the early fisher – hunter–gatherer pottery of the Lake Turkana region is typologically connected to Khartoum pottery and is therefore part of the complex of pottery decorated with wavy lines. The study's tentative dating (5000 BC) fits in well with the dates that were provided in the 1970s and 1980s. Based on this analysis of especially pottery features, Keding (2017) suggests the adoption of pottery by fisher-hunter-gatherers from Northeast Africa. Besides, more ceramics (Nderit ware) that are associated with early pastoralism (commonly referred to as pastoral Neolithic ceramics) were also identified at Lothagam North (GeJi9) and Jarigole (GbJj1) sites in Turkana (Grillo *et al.* 2020). Based on a combined chemical and isotopic analysis (Grillo *et al.* 2020: 1), the pottery is found to date from ca. 3000 BC to AD 800 and is believed to have been used to prepare milk, meat and plant foods.

More LSA pottery, known as Kansyore, has been recovered around Lake Victoria Nyanza (Robertshaw 1991; Dale *et al.* 2004; Dale 2007; Dale & Ashley 2010), and, using bone apatite (Robertshaw 1991) and charcoal dating material (Dale 2007), this pottery was dated to be from 6000 BC to AD 500. As described in the section 2.1.3 below, the pottery has been associated with abundant lithic materials, wild terrestrial remains and abundant fish remains, as was the case with the pottery from Turkana. Because of this pottery's association with these materials, its users are believed to have been less mobile (Dale 2007). Based on the similarities of the decoration of ceramics of the Early Kansyore phase recovered from trench 1 at the Siror site and those from the north, Dale (2007: 283–284) suggests that there was contact between the two fisher-hunter-gatherer communities. However, Dale argues that this contact was minimal, indicating long-distance exchange/interaction networks and not actual movement (see also Prendergast 2008). This argument seems to be supported by the evidence recovered from the Lothagam North Pillar site where a communal cemetery accommodating about 580 individuals was identified dating to 3000 BC (Hildebrand *et al.* 2018). According to Hildebrand *et al.* (2018), contact was brought about by uncertainties of living at a 'moving frontier', requiring these early herders to move often. Their moving was speeded up by environmental shifts, and these movements encouraged people to strengthen social networks. Scholars, therefore, posit that the Lothagam North Pillar site was an area of interaction and that it served as a tangible reminder of shared identity (Hildebrand *et al.* 2018). Both ceramics and burials in the Turkan region seem to indicate there was interaction of some kind between the ceramic users in this region and the people of North Africa. However, the nature of this interaction remains debatable. To some scholars (e.g., Hildebrand *et al.* 2018), the evidence at this site informs one about a 'moving frontier' whereas to others (Dale 2007), it reminds one about interaction networks such as long-distance trade. The section below provides details about hunter-gatherers using Kansyore LSA ceramics.

2.1.3 Kansyore LSA Hunter-Gatherers

Kansyore hunter-gatherers, according to Dale (2007) and Dale *et al.* (2004), are a group of mid-Holocene foragers who systematically differed in terms of mobility, economy and social organisation from other foraging societies like the Hadza of Tanzania, the Ju/'hoansi of the Kalahari desert, the Mbuti of central Africa as well as prehistoric foragers. Kansyore hunter-gatherers occupied various parts of East Africa (see Table 2.1). These hunter-gatherers are associated with lithics and large quantities of highly decorated ceramics (i.e., Kansyore ceramics) dating from 6000 BC to AD 500 (Lane *et al.* 2006; Lane *et al.* 2007; Dale & Ashley 2010; Prendergast *et al.* 2014). The stone tools associated with Kansyore pottery include small quartz crescents and bipolar cores, small numbers of obsidian, basalt, chert, quartzite, and other igneous rocks (Seitsonen 2004; Lane *et al.* 2007). They have been found in the presence of abundant faunal remains, which are thought to suggest intensive occupation (Prendergast 2010: 84). Kansyore pottery is also associated with ostrich-eggshell beads, ochre, and bone points. The origins of these hunter-gatherers remain unclear, but some connections have been made with hunter-gatherers in North Africa based on pottery decoration, technology and form similarities of their ceramics (Chapman 1967; Dale 2007). However, Keding (2017) questions Dale's (2007) identification of similarities between Early Kansyore and North African ceramics and instead regards the Late Kansyore phase to be more appropriate in this case. Some historical linguistic evidence suggests that these hunter-gatherers belonged to the eastern Sahelian language cluster (Ehret 2002), a finding that awaits archaeological verification.

Kansyore pottery was first reported in the 1930s when Leakey (1936) excavated shell midden sites on the shores of Lake Victoria Nyanza and found coarse, decorated pottery. The pottery was associated with a few nondescript stone tools and a large amount of mollusca and fish remains, causing Leakey to conclude that the diet of the people was such that it did not require the use of implements. This coarse pottery was, however, not called Kansyore until in 1967 when Chapman situated it at Kansyore Island (from where it obtained its name). Since then, Kansyore pottery has been reported at many sites, detailed information of which is given in the publications of Collett and Robertshaw (1980), Mehlman (1989), and Robertshaw (1991). More detailed information is provided by Dale (2007) based on a large-scale review and synthesis of the Kansyore tradition.

Recovered Kansyore pottery tends to be heavily fragmented and hard to reconstruct. It is decorated with horizontal and vertical bands of walked punctuates, comb impressions, and zigzag motifs (Dale & Ashley 2010). However, some undecorated shards have also been observed in Kansyore assemblages. At the Siror site in western Kenya, for instance, 67% to 70% of the Kansyore ceramics recovered were undecorated (Dale 2007). Common vessel forms include open hemispherical bowls with rims turned inwards, and polygonal bowls (Robertshaw 1991). Ashley (2005) (see also Dale 2007) notes that most vessels are medium-sized 'unrestricted' and 'open-mouthed' bowls and 'restricted and hemispherical or closed' bowls.

In Kenya, Kansyore pottery has been recovered from open sites such as Gogo Falls (Collett & Robertshaw 1980; Robertshaw 1991; Karega-Mũnene 2002), WadhLang'o (Onjala *et al.* 1999; Ashley 2005: 265; Lane *et al.* 2006; Lane *et al.* 2007), Ugunja, Haa, Yala/Siaya 1 and 2, Usenge 3 (Ashley 2005; Lane *et al.* 2006; Lane *et al.* 2007) and Siror (Dale 2007). In Uganda, it has also been identified at Ndali (Schmidt *et al.* 2016) and Kansyore Island (Chapman 1967; Kyazike 2016). Kansyore pottery has also been found in Kenya at shell midden sites such as Launda, Kanjera West, Kanam East, Kanam 2, and White Rock Point near the shores of Lake Victoria Nyanza (Robertshaw *et al.* 1983) as well as at Usenge 1, 2, 4, 5 and 6 (Lane *et al.* 2006). It has also been recovered from rock shelters very close to Lake Victoria Nyanza but also distant from it. Closely located rock shelters include the Nsongezi rock shelter (Pearce & Posnansky 1963) located on the western side of the lake in Uganda, the Chole rock shelter (Soper & Golden 1969) located on the Mwanza Gulf, and Nyang'oma (Soper & Golden 1969) located at the southern end of Lake Victoria Nyanza in Mwanza, Tanzania. The rock shelters that are far from Lake Victoria Nyanza include Mumba-Höhle (Mehlman 1989) on the shores of Lake Eyasi, Tanzania, the Nasera rock shelter (Mehlman 1989) in northern Tanzania, and the Chabula rock shelter (Thorp 1992) at the Divue River, Naguru Hills, Tanzania (see Table 2.1). Other rock shelters, for example, Itohom and Lulubo, are located in eastern Equatoria southern Sudan (Robertshaw & Mawson 1981).

Table 2. 1: Kansyore sites and associated dates

Country	Site and location	Site type	Date and material	Source
Sudan	Itohom, eastern fringe of the Imatong Mountains	Rock shelter	AD 1620±65 (charcoal) AD 1730±65 (charcoal)	Robertshaw & Mawson (1981: 59)
	Lulubo, between Juba and Torit	Rock shelter	AD 1750 ±60 (charcoal) AD 865±115 (charcoal)	Robertshaw & Mawson (1981: 67)
Kenya	Luanda East, bank of Lambwe River	Shell midden	6290±245 BC (bone apatite) 4790±80 BC (shell)	Robertshaw *et al.* (1983)
	Kanjera West	Shell midden	389±310 BC (bone apatite)	Robertshaw *et al.* (1983:35)
	Kanam East & Kanam 2	Shell midden	No date	Leakey (1935 in Robertshaw *et al.* 1983)
	White Rock Point	Shell midden	2155±260 BC (bone apatite)	Robertshaw *et al.* (1983)
	Gogo Falls, southern Nyanza	Multi-component, open	5350±500 BC (burnt tooth) 3855±185 BC (bone apatite) 1070±100 BC (charcoal) 1663±115 cal. BC (obsidian) 667±194 cal. BC (obsidian) 524±65 cal. BC (obsidian) 146±65 cal. BC (obsidian) 1530±75 BC (charcoal) 1220±70 BC (charcoal) 80 ±65 BC (charcoal) 50±70 BC (charcoal)	Gowlett *et al.* (1987) Collett & Robertshaw (1980) Robertshaw (1991) Karega-Mũnene (2002)
	Nyarindi, northern Nyanza		No date	Owen (1941)
	Got Ramogi 2a, northern Nyanza	Shell midden	No date	Lane *et al.* (2006)
	Haa, northern Nyanza	Open	No date	Ashley (2005) Dale (2000, 2007)
	Ojolas, northern Nyanza	Rock shelter	No date	Soper & Golden (1969)
	Usenge 1, near Lake Saru, northern Nyanza	Shell midden, also with Urewe	AD 341±40 (charcoal)	Lane *et al.* (2006) Lane *et al.* (2007) Dale & Ashley (2010)
	Ugunja, northern Nyanza	Open	No date	Mosley & Davison (1992) Dale (2000, 2007)
	Pundo	Shell midden	5030±60 BC (charcoal	Lane *et al.* (2006)

Country	Site and location	Site type	Date and material	Source
	northern Nyanza		4930±60 BC (charcoal) 5050±40 BC (charcoal)	
	Siror on Nzoia R. rapids,northern Nyanza	Open	4420±35 BC (charcoal 4244±47 BC (charcoal) 4455±35 BC (charcoal 955±37 BC (charcoal 939±36 BC (charcoal) 5465±35 BC (charcoal) 5785±35 BC (charcoal)	Dale (2000, 2007) Dale *et al.* (2004)
	Usenge 3, near Lake Saru, northern Nyanza	Open, also with Urewe	1290±70 BC (charcoal) 1360±40 BC	Ashley (2005: 248) Lane *et al.* (2006: 133, 2007: 66)
	Salasun northeast side of Mt. Suswa, Central Rift Valley	A two-occurrence site	730±150 cal. BC (Ap) AD 635±135 (Co) 4645±235 cal. BC (Ap)	Bower & Nelson (1978) Bower *et al.* (1977: 133)
	Seronera		No date	Bower (1973)
	Rangong, northern Nyanza	Rock shelter	No date	Gabel (1969)
	WadhLang'o, southern Nyanza	Multi-component open-air site	1900±30 BC (charcoal) 1820±35 BC (charcoal) 1790±35 BC (charcoal 39±28 BC (charcoal) 0±35BC/AD (charcoal l in K/PN level)	Ashley (2005) Onjala *et al*. (1999) Lane *et al.* (2007) Prendergast (2008)
	Usare, southern Asembo Bay, northern Nyanza	Shell midden	1060±60 BC (bone collagen); however the date needs to be considered with caution.	Lane *et al.* (2006: 134)
Uganda	Nsongezi, southwest Kagera region	Rock shelter, one shard of Kansyore recovered in the same layer as Urewe	AD 1025±150 ; However, the dating is of the layer underlying the one where Kansyore was recovered.	Pearce & Posnansky (1963)
	Hippo Bay, near Entebbe	Rock shelter, one shard	No date	Brachi (1960)
	Kansyore Island, on rapids of Kangera region, west of Lake Victoria	Open-air site	No date	Chapman (1967) Kyazike (2016, 2019)
	Ndali, western Uganda	Open-air site	AD 950	Schmidt *et al.* (2016)
Tanzania	Capri Point , Rocky peninsula projecting into Mwanza Gulf to the south of Mwanza	Open site, and only one Kansyore shard recovered	No date	Soper & Golden (1969)

Country	Site and location	Site type	Date and material	Source
	town			
	Chabula, Divue River, Nguru Hills	Rock shelter	1075±85 BC (charcoal)	Thorp (1992)
	Chole, eastern side of Mwanza Gulf	Rock shelter	No date	Brachi (1960) Soper & Golden (1969: 38)
	Karagwe	Open site	No date The shards are questionable.	Soper & Golden (1969)
	Kitulu, Iramba	Rock shelter, one large shard	No date Collected from the surface	Soper & Golden (1969)
	Mumba-Höhle, northeast shore of Lake Eyasi	Rock shelter	(Kansyore) 2910±100 BC (charcoal) (Kansyore) 2940±70 BC (charcoal) 2240±20 BC AD 107±60 (charcoal) (Kansyore) AD 170±80 (charcoal) AD 240±25 (charcoal) AD 181±153 (charcoal)	Mehlman (1989) Prendergast *et al.* (2007) Bräuer (cited in Prendergast *et al.* (2014: 9) Prendergast (2008) Prendergast *et al.* (2014)
	Nasera, Serengeti Plains north	Rock shelter	3450±150 BC (bone apatite) 2770±150 BC (bone collagen)	Leakey (1935) Mehlman (1989)
	Nyang'oma	Rock shelter	690±120 BC (charcoal)	Soper & Golden (1969)
	Nyankila, north of Chole		No date	Soper & Golden (1969)

Judging from the site locations (indicated in Table 2.1), the most research has been conducted on lake shores in western Kenya (Leakey 1936; Robertshaw 1991; Onjala *et al.* 1999; Karega-Mũnene 2002; Ashley 2005). The second-most research has been done on the southern shores of Lake Victoria Nyanza and other parts of Tanzania (Soper & Golden 1969; Mehlman 1989; Prendergast *et al.* 2007; Prendergast *et al.* 2014), whereas the third-most research has been done in southwestern Uganda (Chapman 1967). Kansyore site distribution (see Table 2.1) suggests that, of all the countries (i.e., Kenya, Sudan, Uganda, and Tanzania), the least research on Kansyore has been done in Uganda since Chapman's (1967) work. However, research in Uganda included the work of Schmidt *et al.* (2016), which, though limited, identified a new Kansyore site, expanding the geographical distribution of Kansyore sites, and the works of Kyazike (2016, 2019) on Kansyore Island, which did not identify a new site. Despite the new information which indicates that Kansyore-ceramic-using communities are LSA hunter-gatherers (Dale *et al.* 2004; Dale 2007), Kyazike (2016, 2019) posits that Kansyore-ceramic-using communities belong to the Neolithic period. However, the fact that Kyazike does not define the term Neolithic and does not provide a detailed ceramic analysis to support this claim, leaves readers in the dark. Therefore, Chapman's (1967) work is the only detailed report ever published as far as Kansyore Island in Uganda is concerned. The only other detailed Kansyore ceramic analysis conducted so far has been in western Kenya (Dale 2007), and research on Kansyore LSA hunter-gatherers in this location has received ongoing attention. This situation calls for a more detailed analysis of Kansyore ceramics to be done so as to provide detailed data for comparison purposes.

Many Kansyore sites are found around Lake Victoria Nyanza and its tributaries (see Table 2.1) and even where the sites are not close to the lake, they are close to a water source. This seems to reinforce the idea that locales with rich and predictable resources were chosen by hunter-gatherers (Horn 1968). Predictable resources are thought to have allowed groups' sustained occupation of or repeated visits to specific areas (Prendergast 2010; Prendergast & Lane 2010). This is thought to have led to increasingly complex societies (Woodburn 1982; Dale 2007), an idea that seems to be supported by archaeological excavations conducted around Lake Victoria Nyanza (Robertshaw 1991; Ashley 2005; Lane *et al.* 2006; Dale 2007) that show rich and textured contexts. A large amount of pottery, lithics and faunal remains have, for instance, been recorded at Siror (Dale 2007), Gogo Falls (Robertshaw 1991), and WadhLang'o (Ashley 2005; Lane *et al.* 2006; Dale 2007; Lane *et al.* 2007).

Prendergast *et al.* (2007) have noted that excavations conducted on some sites that are located far from Lake Victoria have produced thin contexts with sparse examples of Kansyore pottery. The same scenario has been observed at some midden sites around Lake Victoria (Robertshaw *et al.* 1983). According to Prendergast (2008), the reason for the sparse pottery at the midden sites could be because these sites were occupied for short periods. Compared to the midden sites, the riverside sites produced thick archaeological deposits. Prendergast (2008: 191) and Prendergast and Lane (2010) suggest that the sites were occupied on a seasonal basis, with midden sites being occupied for short periods of time during the dry season and riverside sites being occupied during the long rainy season. This argument is based on data on the behavioural traits of fish and the relative abundance of species in Kansyore assemblages at the Kansyore sites at specific times of the year (Prendergast 2008). Prendergast argues that the riverside sites could have been used repeatedly or occupied over long periods of time whereas the midden sites could have been used on a temporary/seasonal basis and were not selected repeatedly.

Prendergast's (2008) argument relating to the riverside sites is based on the relatively complete cultural sequence observed in the stratigraphy, according to which these sites were well-known places. Prendergast (2008) has also noted that the *Barbus* genus was abundant at riverside sites such as WadhLang'o and Gogo Falls. This specie spawns in swift-flowing and rocky upper parts of rivers where there are quiet pools created by rapids or waterfalls at the onset of the rainy season (Stewart 1991; Marshall & Stewart 1995). *Barbus* species have been reported at almost all riverside sites (Chapman 1967; Mosley & Davison 1992; Dale 2007). Prendergast (2008) posits that fishers deliberately settled on river banks with the spawning season in mind; therefore they must have been skilled in capturing techniques specifically designed to take advantage of the spawning run. Prendergast indicates that most southern Nyanza middens have many fish species (e.g., lung fish) that are mostly caught during the dry season (Prendergast 2008; Prendergast & Lane 2010; Seitsonen 2010). Prendergast (2008: 284) is of the opinion that specialised groups settled at midden sites and that non-specialist groups settled at riverside sites because of the diverse array of wild fauna and, eventually, domestic animals. These settlers are thought to have obtained domestic animals in exchange transactions with pastoralists or to have bred animals on site. Prendergast (2008: 287) further posits that Kansyore fishers developed a sense of ownership of strategic fishing grounds at the river rapids which they repeatedly used. This opinion is based on the fact that building weirs at river rapids and developing other valued assets required investment of labour and skill. Such activities suggest thick occupations spanning long periods at riverside sites, which Dale *et al.* (2004) and Dale (2007) interpret as repeated site use. Sites repeatedly used are elaborated by storage vessels, specialised tools and resources like bone points and fish, which have also been considered as markers of a delayed-return system among the Kansyore hunter-gatherers (Prendergast 2008).

Building on Dale *et al.*'s (2004) idea that the hunter-gatherers stored fish in Kansyore pots for future consumption, Prendergast (2008: 288–289) speculates that fish could have been salted in Kansyore pots. However, Ashley and Grillo (2015) argue, based on Kansyore ceramic morphology and considering the size of large fish species, that the ceramics were not fit for storage purposes. The weight of lung fish has been estimated to be between 9 and 11 kg (Prendergast 2010: 91); therefore, Ashley and Grillo assume that the fish were large in relation to the size of average Kansyore vessels. Moreover, most Kansyore ceramics have unrestricted mouths, and such vessels are considered unsuitable for storage. Ashley and Grillo support the opinions of Ingold and also of Rice (which they cite) that Kansyore hunter-gatherers used storage not for practical reasons but perhaps for building social capital. Ashley and Grillo add that social storage is intended for the short term and fulfils a social purpose. At these sites, pots and other vessels were used to hold food and drinks prepared for consumption, which confirms the idea of building social capital through food provision, sharing and consumption, emphasising the importance attached to social bonds and networks. Ashley and Grillo conclude that the idea of storage for social purposes ties in better with Kansyore ceramic morphology than does the idea of storage for practical purposes because Kansyore sizes suggest food and drinks were shared on a small to moderate scale (i.e., for sharing and consuming at family or extended family level). Ashley and Grillo's ideas that Kansyore ceramics facilitated social storage and capital help to unveil the truth about ceramic use and help to build a picture of social organisation within communities using Kansyore ceramics.

The presence of Kansyore ceramics has been associated with repeated site use; therefore Kansyore LSA hunter-gatherers fit in well with Woodburn's (1982) delayed-return model. Delayed-return economies, increased sedentism, social storage, resource acquisition and small-scale inequalities are common characteristics put forward in this model (Dale *et al.* 2004: 368; Dale & Ashley 2010: 26–27; Ashley & Grillo 2015). The characteristics of Kansyore sites and storage vessels have led Dale *et al.* (2004: 362) to entertain the thought that these hunter-gatherers had a sense of 'ownership' (see also Prendergast 2008: 277; Prendergast 2010: 84).

Chronologically, Kansyore is one of the earliest pottery traditions in East Africa, covering a period of almost 6 000 years. The earliest Kansyore pottery comes from Luanda (dated 6290±245 BC, 4790±80 BC); however, dating was done on bone apatite and shell, both of which are considered to be somewhat unreliable dating material (Dale 2007: 22) (see Table 2.1). More early dates of charcoal samples (5465±35 BC, 5785±35 BC) come from Siror (Dale 2007; Dale & Ashley 2010: 28) and from Pundo (5050±40 BC) (Lane *et al.* 2006) (see Table 2.1). The latest dates are of charcoal materials— those that come from Ndali in Uganda are dated AD 950 (Schmidt *et al.* 2016), those from WadhLang'o in Kenya are dated 39±28 BC, those from Usenge 1 in Kenya are dated AD 41±40 (Ashley 2005; Lane *et al.* 2006), and those from Mumba in Tanzania are dated AD 240±25, AD 181 ±153, AD 170±80 and AD 107±60) (Prendergast 2007; also see Table 2.1). Dale (2007) and later on Dale and Ashley (2010) have divided Kansyore into the early period (6000–5000 BC) and the late period (1000 BC–AD 500) based on ceramic decoration, stratigraphy, and dating (see Figure 2.1). Further, Dale (2007) and Dale and Ashley (2010) have identified a middle period representing a gap of 4 000 years for which there is a lack of direct evidence. However, this division has not been widely adopted due to limited Kansyore research in the region. As a result there is little information about the Kansyore tradition in the period between 5000 and 1000 BC, which the present study intends to shed light on.

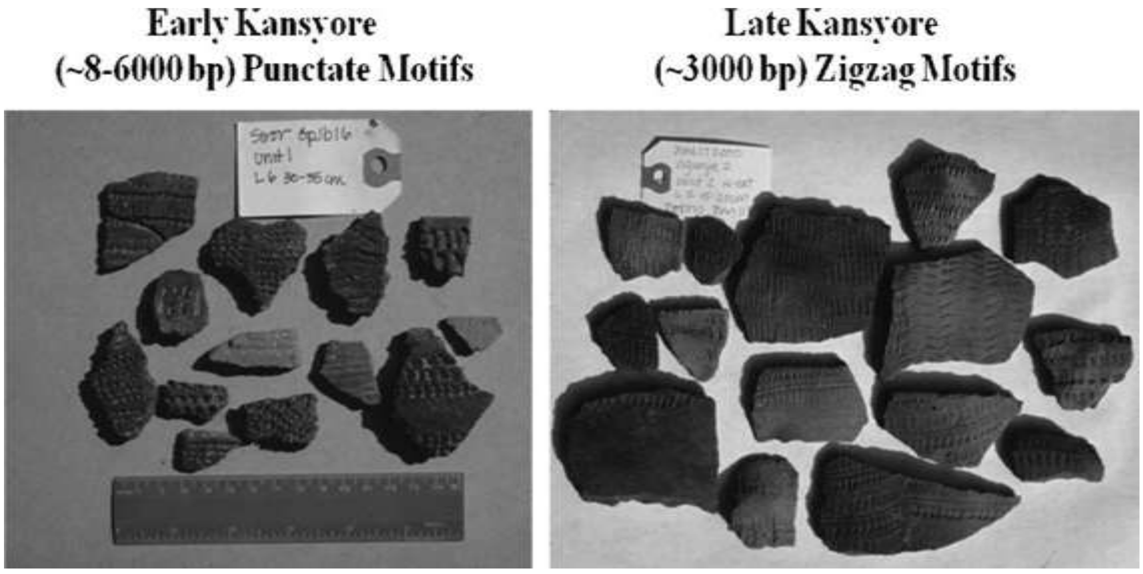


Figure 2. 1: Division of Kansyore based on detailed decoration

Source: Dale and Ashley (2010: 36)

Kansyore sites around Lake Victoria Nyanza are notable for the early introduction (from around 1000–500 BC) of domesticates, apparently within a continuous cultural tradition rather than through major population shifts (Prendergast 2008: 299; Prendergast 2010). This is suggested by the presence of a relatively large quantity of caprine remains in Kansyore levels at WadhLang'o, Gogo Falls and Usenge 3 which, according to Prendergast (2008: 300–301), could not be the result of the occasional consumption of an exchanged animal. Kansyore LSA communities are therefore thought to have already been practising many hallmarks of farmers (e.g., sedentism, exploitation of domesticates, low level of social inequality, long-term storage). Dale (2007) posits that it was possible for Kansyore hunter-gatherers to adopt a food-producing lifeway since they were living similar lifestyles. In the section below, details on the transition to food production are provided.

2.2 Early Iron Age (Urewe-Using) Communities in the Great Lakes Region

Urewe is the oldest EIA pottery found in the Great Lakes region, dating between ca. 550 BC to AD 750 (Clist 1987: 48; Ashley 2010: 144; Reid & Ashley 2014). Some older-dated pottery (1250±120 BC, 1080±110 BC, 1470±120 BC, 1665±205 BC) has also been recovered, but these samples are thought to have been obtained from old wood (Schmidt 1978; Clist 1987: 45; Ashley 2005). Other older-dated pottery (470±50 BC) (Ashley 2005) (463±19 BC, 1046±30 BC, AD 752±20) (Tibesasa, Shipton, *et al.* in prep.) was recovered from the Malanga Lweru and Nkuba rock shelters respectively. However, Ashley (2005: 184) has discounted the older date she has established based on geographical information and the fact that the samples were recovered from a site that had only a few Urewe shards. On the other hand, Tibesasa, Shipton *et al.* (in prep.; see also Table 2.2) posit that old dates may not be erroneous but may portray early contacts between Urewe and LSA communities on the northern shores of Lake Victoria Nyanza, Uganda. It is possible that old Urewe sites still exist in some undiscovered locations.

Urewe ceramics have been discovered at a number of sites since the exploration of Leakey *et al.* (1948) (see Table 2.2).

At first, Urewe pottery was described as 'dimple-based' (Leakey *et al.* 1948) and later it was renamed after the site type (Posnansky 1961: 183a) after learning that not all Urewe ceramics had dimples. The pottery is characterised by thick bevelled rims, dimple bases, heavily decorated with parallel grooves in horizontal bands that incorporate circles, loops and triangles, and often cross-hatching and dots on or just below the rim (Leakey *et al.* 1948; Posnansky 1961a; Stewart 1993: 22). The ceramics are well made and highly crafted, and some exhibit black slips or are burnished, aspects that suggest high levels of manufacturing investment (Posnansky *et al.* 2005). It seems that Urewe ceramics were of great significance to the society because their production required a high level of time investment and care (Posnansky *et al.* 2005: 82). Urewe vessel forms specifically are characterised by a range of bowls (hemispherical, with closed or open mouths), globular jars with everted necks, and sometimes beakers and bowls with carinated shoulders, and collared jars (Leakey *et al.* 1948; Hiernaux & Maquet 1960: 47; Nenquin 1967b; Van Grunderbeek 1988; Ashley 2005: 171 ff). The fabric of Urewe ceramics varies according to region—black slips and/or burnishing and cross-hatched decorations are common in the areas of Nsongezi (western Uganda) whereas slightly coarse with varied decorations are common in the far east of western Kenya (Posnansky 1961a: 183). In table 2.2 below, Urewe ceramics sites and dates in the Great Lakes region are presented.

Table 2. 2: Urewe ceramics in the Great Lakes region: Sites and dates

Country	**Site and location**	**Date**	**Reference**
Burundi	Mubuga V	1210±145 BC	Van Grunderbeek (1982); Clist (1987); Van Grunderbeek *et al.* (2001)
	Mubuga IV	AD 405±59	Van Grunderbeek (1982); Clist (1987)
	Mubuga IX	AD 240±55	Van Grunderbeek (1982)
	Rwiyange I	1230±145 BC 905±285 BC	Van Grunderbeek (1982); Clist (1987) Van Grunderbeek *et al.* (2001)
	Mirama I	AD 160±120	Van Grunderbeek (1982)
	Mirama III	AD 1380±110 530±85 BC	Van Grunderbeek (1982); Clist (1987)
	Muguza	1665±205 BC	Van Grunderbeek *et al.* (2001)
Rwanda	Ndora	AD 250±100	Clist (1987)
	Cyanauza	AD 300±80	Clist (1987)
	Rutare	AD 230±50 AD 295±60	Clist (1987)
	Kabuye I	AD 355±30 AD 195±145	Clist (1987)
	Kabuye II	AD 545±35 AD 610±125	Clist (1987)

Country	Site and location	Date	Reference
	Kabuye III	AD 400±30 AD 265±160	Clist (1987)
	Kabuye IV	AD 225±30 AD 615±120	Clist (1987)
	KabuyeVIIIb	AD 285±50	Clist (1987)
	Kabuye XV	AD 460±55	Clist (1987)
	KabuyeXXXV	AD 320±25	Clist (1987)
	Gahondo I	AD 295±25	Clist (1987)
	Gahondo III	AD 525±25	Clist (1987)
	Remera I	AD 220±30	Clist (1987)
	Remera III	AD 220±30	Clist (1987)
	Gisagara	AD 255±30	Clist (1987)
	Dahwe I	AD 240±25	Clist (1987)
	Nyaruhengeri I	AD 380±50	Clist (1987)
	Ngoma I	AD 665±30	Clist (1987)
	Ngoma III	AD 285±75	Clist (1987)
	Gasiza I	AD 685±85	Clist (1987)
	Mucucu II/3	AD 430±270	Clist (1987)
	Mutwarubona I	AD 290±360	Clist (1987)
	Mutwarubona II	AD 310±180	Clist (1987)
	Kabusanze	AD 425-573 cal. AD 417-554 cal. AD 263-538 cal. AD	Giblin *et al.* (2010)
Tanzania	Katuraka	450±115 BC AD 60±115 AD 120±110 1250± 120 BC 550±115 BC 1080±110 BC AD 170±100 1470±120 BC 610±100 BC 520±110 BC	Schmidt (1978); Clist (1987)
	Kemondo Bay	150±230 BC AD 540±110	Clist (1987)
	Kemondo Bay II	AD 150±110 AD 80±130 AD 10±150 200±210 BC AD 300±140	Mgomezulu cited in Clist (1987)
	Makongo	AD 985±100 AD 910±100 AD 40±100	Clist (1987)
Uganda	Nsongezi rock shelter	AD 1025±150	Nelson & Posnansky (1970); Crane & Griffin cited in Clist (1987)
	Kansyore Island	Not provided	Chapman (1967); Kyazike (2016)

Country	Site and location	Date	Reference
	Chobe 14A	AD 290±125	Soper (1971d:85)
	Entebezamukusa	AD 60±60	Ashley (2005)
	Malanga Lweru	AD 480±60 470±50 BC	Ashley (2005)
	Lulongo	Not provided	Ashley (2005)
	Luzira	Late first millennium AD	Ashley (2005)
	Luka	Not provided	Ashley (2005)
	Namushenyu	Not later than end of first millennium AD	Ashley (2005)
	Sanzi	2640±70 BC 750±60 BC 900±60 BC AD 780±60 1970±100 BC	Ashley (2005)
	Nkuba rock shelter, Bussi Island	AD 752±20 1046± 30 BC 463± 19 BC	Tibesasa, Shipton *et al.* (in prep.)
Kenya	Ganga	AD 190±160	Soper (1969)
	Urewe	AD 390±95 AD 270±110 AD 320±110	Robertshaw (1984)
	YalaAlego	AD 400±235	Robertshaw (1984); Clist (1987)
	Usenge 3	AD 390±40	Ashley (2005)
	WadhLang'o	AD 208±27 AD 204±28 AD 252±28 AD 209±28 AD 466±26 AD 501±28	Ashley (2005)
	Gogo Falls	80±70 BC 50±70 BC AD 250	Robertshaw (1991: 171); Karega-Mũnene (2002: 84)

The occurrence of Urewe ceramics is widespread, extending over an area of roughly 400 000 km² (Clist 1987: 38), from the Kivu region in the west (Van Noten cited in Stewart 1993: 24), to the lakes (Lake Edward/Rutanzige and Lake Albert/Mobutu Sese Seko) in the western Rift Valley, to the Chobi area in northern Uganda (Soper 1971b, 1971c 1971d), to western Kenya in the far east, to Lolui island on Lake Victoria Nyanza, and to northwestern Tanzania (Clist 1987: 38; Stewart 1993). These ceramics occur in both large open-air sites and rock shelters/caves. The sites have largely been identified in wetter riverine and lake-shore settings or margins of sub-montane forests and islands (Posnansky 1961a: 185, 1968: 3; Reid 1994/95: 311). Although the Urewe sites have been found in well-watered areas, Stewart (1993: 33) notes that they have not been found in significant numbers at habitation sites in the Great Lakes region; however, this finding needs to be tested. Urewe sites are located in areas that receive at least 1 000 mm of rain per year, and this, according to Ehret (cited in Stewart 1993) and Posnansky (1968: 3), is enough to sustain root and tuber crop cultivation. This is thought to have promoted a semi-sedentary lifestyle in the long run (Posnansky 1968). Ehret's idea seems to be supported by the findings of MacLean (1994/95) in Rakai where Urewe sites have been identified mostly in low-lying areas and fertile regions, whereas LSA sites have been found on hilltops with rocky ground that is not fertile.

The Urewe users are believed to have subsisted on domesticated animals and plants as well as hunted and gathered sources (Posnansky 1961a: 185, 1968: 3). However, evidence about domesticated plants and animals is still scarce (Sutton 1994/95: 264; Karega-Mũnene 2002). For instance, the efforts of Wetterstrom (1991) to recover archaeobotanical remains from the Gogo Falls site in eastern Africa were unsuccessful—only wild plants were recovered. This was attributed to crop processing methods, site function and soil biogeochemistry (Young & Thompson 1999). However, a recent archaeobotanical study on early-farming 'Iron Age' archaeological sites in Rwanda has identified remains of domestic crops such as pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*) and sorghum (*Sorghum bicolor*) dating to the first millennium AD (Giblin & Fuller 2011: 253–256).

Domesticated pearl millet (*Pennisetum glaucum*) was also discovered at the Lulonga River in the Democratic Republic of the Congo, dating around 2 200 years ago (Kahlheber *et al.* 2014). However, according to Reid (199/95: 305), such pieces of evidence are small and may not lead to meaningful conclusions. Bulk samples from the burial of an adult individual associated with Urewe pottery at the Kabusanze site in Rwanda produced charcoal and charred remains of *Polygonaceae*, a family of wild flowers which, according to Giblin *et al.* (2010: 279), suggest the continued use of gathered plants (see also Tibesasa 2010). Despite limited evidence of domesticated plants, Giblin and Fuller (2011: 263) argue that there is a need for continued research incorporating archaeobotanical sampling strategies in the Great Lakes region because the solving of small puzzles can lead to the development of more detailed subsistence histories.

Besides botanical remains, evidence of domesticated animals on Urewe-using sites is also scarce. However, some pieces of evidence of cattle (*Bos* spp.) and sheep/goat (*Ovicaprids*) have been recovered from sites such as WadhLang'o dating to AD 280–700 (Lane *et al.* 2007: 70–71) and Usenge 3 dating to AD 410–600 (Lane *et al*. 2007: 74–75; Kay & Kaplan 2015). Although evidence of cattle and sheep/goat has been recovered from the Togo rock shelter in the Democratic Republic of the Congo (Misago & Shumbusho 1992), details have not been provided, making it hard to derive meaningful information on farming from it. Archaeological evidence of farming (other than plant or animal remains) includes sickles, grindstones, and storage facilities (Phillipson 2005: 171). Phillipson, however, argues that such instances do not provide any information on the social-cultural context of their use and that they could have been used for processing wild plant foods. Also, indirect evidence, for instance, relating to permanent or seasonal occupations, may point to the storage of produce, which may be indicative of farming practices (Phillipson 2005). However, Phillipson opines that such conclusions often fall short of conclusive proof. From the studies reviewed here, it is clear that knowledge on subsistence economies in the Great Lake region is constrained by a lack of plant and animal remains/assemblages found at secure and well-stratified sites. Importantly, the present study used archaeobotanical and isotopic sampling strategies to address this concern (see Chapter 7).

It is worth noting that Urewe-using communities have been identified at open-air sites (e.g., Urewe, Yala Alego, WadhLang'o, Gogo Falls in Kenya, Katuruka, Kemondo Bay in Tanzania, Kansyore Island, Chobi, Namusenyu, and Sanzi in Uganda) (see Table 2.2). These communities have also been identified at rock shelters with multi-period occupations in the region. Examples are Tonga (Misago & Shumbusho 1992), Rangong, Randhora and Nyaidha (Gabel 1969), Nsongezi (Pearce & Posnansky 1963), Namusenyu (Ashley 2005) and Nkuba (Tibesasa 2010; Tibesasa, Shipton *et al.* in prep). Rock shelters have largely been associated with hunting and gathering communities that are mobile in nature. According to Ashley (2005: 229), the presence of Urewe ceramics at such sites suggests short-term occupations, which does not support the pre-existing notion of a settled lifestyle but instead portrays a much greater level of mobility and economic variability. Although Ashley's (2005) argument seems to be valid, the short-term occupations may also suggest initial contacts between the hunting-gathering and farming communities as suggested by Lane (2004) in his 'moving frontier' interpretation.

Burial evidence of Urewe-using communities has also been recovered in the Great Lakes region at sites like Tongo in the Democratic Republic of the Congo (Misago & Shumbusho 1992) and at Kabusanze in Rwanda (Giblin *et al.* 2010). However, some burial evidence, such as that at Tongo, lacks details, which makes it hard to interpret it meaningfully. The finding of burials at some Urewe sites seems to suggest a settled lifestyle, contradicting Ashley's (2005) suggestion of short-time occupation by Urewe users. A settled lifestyle is thought to facilitate increased childbearing because pregnancy, nurturing, and closely spaced births hinder mobility (Phillipson 2005: 171). Interestingly, at some Urewe burial sites, such as Kabusanze, two individuals were recovered together with Urewe ceramics, iron adornments and exotic artefacts dating to AD 400 (Giblin *et al.* 2010; Watts *et al.* 2020). Interpretations relating to exchange, health, wealth and violence (Giblin *et al.* 2010) suggest that the Urewe users deliberately buried their dead. If this was the case, then it suggests that Urewe-using communities had a settled lifestyle and a sense of ownership (Dale *et al.* 2004; Dale 2007). However, identification of such burial contexts, according to Giblin *et al.* (2010), rests more on chance than on deliberations, and many more such results are needed to fully understand the Urewe-using lifestyle.

In addition, Urewe ceramics have been identified in non-domestic contexts, such as at iron-working sites (where vessels were deliberately buried underneath the smelting furnace) (Schmidt 1978; Ashley 2010: 145), at rock shelters, such as Louli (that cannot support long-term habitation) (Posnansky *et al.* 2005), at burial sites (Giblin *et al.* 2010; Tibesasa, Krüger *et al.* in prep.), and at sealed pit shafts, such as Urewe-type sites (where complete Urewe pots have been recovered) (Leakey *et al.* 1948). To Ashley (2010), such pieces of evidence suggest that Urewe ceramics were used for many activities other than daily activities (e.g., cooking, liquid storage, serving) and perhaps represent specific socially charged events (see also Robertshaw 2012: 104). Ashley's suggestion above seems to be supported by evidence—an elaborately decorated open bowl was identified at Louli Island that showed evidence of repair (Posnansky *et al.* 2005). According to Ashley, this suggests that the bowl was valued beyond its original use. This suggestion is supported by the presence of different forms, decorations and sizes that have been identified at Urewe sites. Such variables are therefore worth studying to cast light on functions of Urewe ceramics beyond daily activities.

2.3 Previous Studies Conducted in the Study Area and on the Other Shores of Lake Victoria Nyanza

As noted in Chapter 1, the study area was located between the eastern shores of Lake Victoria Nyanza (i.e., in western Kenya) and the western shores of the lake (i.e., west of the river Nile in Uganda). The area is characterised by varied ecologies that are assumed to have provided subsistence in various forms and different opportunities to the inhabitants. However, this remains an assumption because limited archaeological studies have been conducted in this area. The data used in the present study was based on archaeozoological evidence obtained by Jones (2020). Jones examined hunter-gatherer groups' responses to Terminal Pleistocene and Holocene climatic shifts, social and economic variability through time, and comparisons between archaeological sequences in distinct eastern African ecozones (i.e., semi-arid versus humid settings). The study of Jones (2020) revealed that Kansyore hunter-gatherers occupied Namundiri A (northern shores of Lake Victoria, Uganda) between ca. 4500 BC and 3700 BC. Based on the site location of the study and faunal data, Jones proposes that the inhabitants along the lake shores up to the arid phase in the mid-Holocene period around 3000–2000 BC had stable lifeways and that the lake edges were abandoned after this period to pursue fishing along the inland rivers. Jones suggests this was the way the hunter-gatherers reorganised themselves in response to changing climatic and environmental conditions. Although Jones's study provides information on Kansyore hunter-gatherer groups, the settlement history of the area remains unclear.

Other available studies conducted in the area that the present study focused on, are historical linguistic studies by, for example, Schoenbrun (1993) and Stephens (2007). Stephens examined the changing deployment of ideologies of motherhood in social networks and the organisation of agriculture, hunting and fishing in the late first millennium AD. She noted that climatic changes had a great impact on the types of food people in this area and neighbouring areas could successfully grow. Stephens (2007: 217) also found that change and continuity of the social institutions of motherhood and of networks through motherhood cut across clan lineage, and linguistic and ethnic boundaries, resulting in a community's success. Although her study did not focus on farming, which is the focus of the present study, her findings are relevant in that they showed there were interactions of some kind among the people in this area right from the late millennium AD to the 19th century. Based on archaeological evidence (Jones 2020) and linguistic evidence (Stephens 2007), it can be said that the area in which the present study was located, was occupied by hunter-gatherers and by farming communities. However, the relationship between the two communities and the transition to farming remain unclear.

Previous studies conducted on other shores of Lake Victoria Nyanza (e.g., the eastern shores in western Kenya) indicate that some sites (e.g., WadhLang'o) were chronologically settled in, first by pre-ceramic hunter-gatherers, then by hunter-gatherers who used Kansyore ceramics and then by farming communities (in the Late Holocene period) which included pastoralists using Elmenteitan traditions and farmers using Urewe ceramic traditions (Lane *et al.* 2006; Lane *et al.* 2007). These communities are thought to have been interconnected in one way or the other based on evidence of lithic, faunal and ceramic materials (Lane *et al.* 2007). Studies on the eastern shores suggest that the transition to farming was gradual and not abrupt. On the other hand, occupation of the western shores, except for Kansyore Island and Ndali site, which were first settled by pre-ceramic/immediate-return hunter-gatherers and then by Urewe-using farming communities, suggested an abrupt change in the area (Chapman 1967; Schmidt *et al.* 2016). Few of the studies conducted in all these areas focused on the relationship between the LSA and the EIA communities, which has made it hard to understand the process of the transition to farming in Uganda. The northern lake shores (where the present study was conducted) is located between two areas with different settlement histories/evidence, and the exploration of this area has the potential to contribute to existing knowledge about the settlement histories of the northern shores of Lake Victoria Nyanza in relation to the lake's eastern and western shores and to East Africa at large (see chapters 4, 5 and 8). The present study aimed to cast light on the settlement, relationship and subsistence structures of both LSA and EIA communities on the northern shores of Lake Victoria Nyanza, Uganda in order to explain the transition process of farming.

CHAPTER 3

THEORETICAL AND STRUCTURAL FRAMEWORK

3.0 Introduction

This chapter aims to outline various theoretical and conceptual components that the present study relied upon. The frameworks advanced here have previously been used in the interpretation of data collected around the topics of this thesis, which include hunter-gatherers' socio-economic and settlement structures, and conceptual approaches to perspectives on transition to farming. The chapter concludes by considering the applicability of these frameworks to the present study.

3.1 Archaeological Approaches to Understanding Hunter-Gatherer Societies in the Holocene Period

Hunter-gatherer societies have traditionally been considered as undifferentiated irrespective of the varied ecogeographic conditions in which they lived. Hunter-gatherers have, for instance, been portrayed as living a wonderful life in which they were fully satisfied with what nature availed them and with living a mobile egalitarian lifestyle (Lee & Devore 1968; Sahlins 1974; Gowdy 2004). However, this portrayal has increasingly come under scrutiny because of the new ideas and evidence that show a spectrum of behaviour. Some hunter-gatherers were wanderers with no boundaries, others were constrained by boundaries, others returned seasonally to specific villages, whereas still others behaved more like farmers in terms of social structure, occupation of sites on a semi-permanent basis, and exploitation of specific resources (Murdock 1967; Kelly 2013: 77). Other hunter-gatherers lived alogside farmers (Kusimba 2005). These intermarried and conducted intensive exchange of labour and food with allied farmers (Kusimba 2005:346) although their histories remain poorly studied. These variations, according to Stiles (2001), come about due to independent variables such as historical, ecological and social contexts, and dependent variables such as the type and characteristics of hunter-gatherers' subsistence that have a certain outcome.

Two broad categories of hunter-gatherers in the Holocene period have been recognised—those with more elaborate social systems and those with less elaborate and more egalitarian social systems (Barnard 2004; Cumming 2014). These have sometimes been described as foragers vs. collectors (Binford 1980), simple vs. complex (Hayden 1990), egalitarian vs. non-egalitarian (Kelly 1995), generalised vs. specialised (Price & Brown 1985), non-storing vs. storing (Testart 1982), and immediate-return vs. delayed-return categories (Woodburn 1982). The reasons behind the intensification, however, remain unclear. To some (e.g., Cohen 1977; Binford 1983; Keeley 1988; Kelly 1995, 2013), the causes include climate change, reduced mobility, increasing population density, extreme latitude, and seasonality leading to resource unpredictability and stress. Others (e.g., Hayden 1990; Aikens & Akazawa 1996) suggest abundant resources, competition, and specialisations, among other things, as the causes of intensification.

In the present study, Woodburn's (1980, 1982) explanations of immediate-return and delayed-return socio-economic systems were employed to interpret the data collected from hunter-gatherer sites on the northern shores of Lake Victoria Nyanza. The choice was based on the fact that Woodburn's explanations have been tested on similar hunter-gatherer materials from neighbouring Kenya (Dale *et al.* 2004; Dale 2007). However, other scholars with similar constructs as those of Woodburn (1982) were consulted too.

3.1.2 Immediate-Return Hunter-Gatherers and Archaeological Signature

Woodburn (1982: 422) defines immediate-return hunter-gatherers as societies whose subsistence systems were aligned to the present. They consumed all the hunted or gathered food on the same day or a few days after obtaining it, without necessarily processing it (see also Binford 1980). These hunter-gatherers, according to Bird-David (1990) (see also Sahlins 1974; Gowdy 2004), perceived their environments as rich and kind, provided one's lifestyle remained based on the principles of mutual aid and communal goodwill. Immediate-return hunter-gatherers are believed to have lived in small mobile groups, oriented their social systems to the present, and needed little technology for their sedentary life (Woodburn 1988; Kelly 1992, 2013; Lee 1992, 1993; Binford 2001; Roscoe 2002). They rarely experienced violence because disputes were solved through group fission rather than fighting (Lee & DeVore 1968; Kelly 2013). Immediate-return hunter-gatherers were flexible and relied on a variety of procurement strategies (Testart 1982) that resulted in resource diversification (Smith *et al*. 2013). Generally, immediate-return hunter-gatherers did not elaborately process or store their food, they had no fixed camps or ritual sites, and they did not have social institutions to enforce social norms and rules (see Table 3.1). They had short-term commitments with people, they emphasised sharing, and they had free and open access to resources. The hunter-gatherers belonging to this group, based on ethnographic data, include the Hadza of Tanzania, the Ju/'hoansi of the Kalahari desert, the Mbuti and Efe of northeast Zaire/eastern Congo, and the Jarawa and Sentelinese of Andaman (Kelly 2013).

Archaeological signatures of immediate-return hunter-gatherer economies and social organisations include tools and weapons that are simple, portable and easy to acquire and replace (Woodburn 1980: 99, 1982). The sites that the immediate-return hunter-gatherers occupied tended to be small, and, probably because they were occupied briefly, no evidence of permanent structures and only scanty material artefacts have been found (Lee & DeVore 1968). These hunter-gatherers had no elaborate social systems and no leaders, and the sick/injured were often abandoned due to lack of individual commitment (Woodburn 1980, 1982; Stiles 2001).

3.1.3 Delayed-Return Hunter-Gatherers and Archaeological Signature

Delayed-return hunter-gatherers were those hunter-gatherers whose social and subsistence systems were oriented to the past, the present and the future (Woodburn 1980: 97–98; Prendergast 2008). Hunter-gatherers in this category were characterised, for example, by practising social stratification, leading a semi-sedentary lifestyle, burying their dead, using ceramics, occupying sites seasonally, practising resource specialisation, and constructing structures (Binford 1980; Kelly 1983; Price & Brown 1985; Woodburn 1988). The lifestyle of hunter-gatherers in this group was based on the environment they lived in (Kelly 1983). Kelly (1983) proposes that hunter-gatherers living in seasonal environments stored food and put much effort into collecting information on the location and the temporal availability of resources. According to Woodburn (1980: 98–99), such hunter-gatherers included part-time hunters, sedentary hunter-gatherers, fishermen, trappers, beekeepers, and others whose activities required labour investment.

Examples of these hunter-gatherers include the Ertebolle of southern Scandinavia (Rowley-Conwy 1998), the Calusa of southern Florida (Widmer 1988), the Jomon of Japan (Habu 2004), the ‘aqualithic’ peoples of North Africa (Haaland 1995, 1997; Garcea 2006), the Yangsi of China (Higham 1995), and the Okiek of East Africa (Dale *et al.* 2004; Dale 2007). According to Testart (1982), these hunter-gatherers stocked food while in abundance and used efficient techniques to get and store food for use during the season of scarcity. They depended on each other and had a strongly bounded kinship that was created by the constant transmission of important goods and services (Woodburn 1980). They offered great assistance to the sick, the frail, and the elderly, and they got involved in competition and conflict over important assets (Woodburn 1980: 106). They also had an elaborate religious life, and their residence patterns correlated with the characteristics of sedentism, population densities and socioeconomic inequalities (Wright 1978; Woodburn 1980: 107; Testart 1982).

These hunter-gatherers practised some forms of exchange and sharing of subsistence resources over broad areas, maintained ruling lineages in positions of authority (Wright 1978; Price & Brown 1985: 5), and invented pottery technology (Price & Brown 1985; Jordan & Zvelebil 2009: Kaner 2009; Yirka 2016). As far as exchange is concerned, Whallon (2006: 260) is of the opinion that exotic goods could have been obtained indirectly from other people and that such exchanges were not related to usual subsistence means but to special-trip procurement or trade and exchange. To Whallon, this points to dynamism and interaction within hunter-gatherer groups as well as with other groups. In southwestern Asia, for instance, cultural sequences indicate a long process of meaningful economic, cultural and social modifications among hunter-gatherers (Moore 2014a, 2014b: 155; Arranz-Otaegui *et al*. 2016: 14001). Here, pre-pottery groups started the cultivation of wild and domesticated cereals at divergent times (Arranz-Otaegui *et al.* 2016). Delayed-return societies also had ownership rights over valued assets (Dale *et al.* 2004).

The archaeological indicators of delayed-return systems include architecture, well-defined house structures, heavy-duty artefacts (e.g., grinding-stone tools, storage pits), and frequency of burials/existence of cemeteries (see Table 3.1). Other indicators include vast faunal remains, the presence of pottery, a thickness of archaeological deposits, manufacturing activities, evidence of workshop-level production of goods (e.g., beads, earrings, and fishhooks), large-sized settlements, non-local tree species, and intra-site spatial organisation (Woodburn 1980; Arnold 1999; Habu 2004; Matsumoto 2005; Marshall 2006; Garcea 2006).

3.1.4 East African Immediate/Delayed Economies

The majority of hunter-gatherers in East Africa have been depicted as small, highly mobile groups with immediate-return economies. Hunter-gatherers in this category are associated with LSA tools/microlithic technology, few or no ceramics, and a lack of clear evidence of structures (see Table 3.1). These hunter-gatherers are believed to have inhabited rock shelters and open landscapes or open hilltops that enable high visibility. These sites were occupied for short periods and enabled easy movement (Gabel 1969; Robbins 1972; Ambrose 1984a, 1984b, 1998; Marean 1992; Marean *et al.* 1994; MacLean 1994). The hunter-gatherers in this category exploited a wide range of wild terrestrial animals. Eburran hunter-gatherers of the Central Rift Valley belong to this category and are also believed to have exploited a wide range of terrestrial mammals. Further, they preferred sites near the forest/savanna ecotone at higher altitudes during the mid-Holocene dry phase (Ambrose 1998: 386–387) and lower altitudes during the early Holocene wet phase. According to MacLean (1994), hunters of this kind preferred land with low agricultural potential such as the tops of steep hills characterised by poor soils, suggesting they did not stay in such places for long. This seems to support Binford's (2001) idea of high residential mobility and the use of sites for short periods. However, Tryon *et al.* (2016) express the opinion that Binford's idea is possible if the costs of mobility among the immediate-return hunter-gatherers are outweighed by the increase in returns gained from exploiting the broader landscape. The immediate-return hunter-gatherers largely subsisted on animals that were highly mobile and they used tools that were not superior (see Table 3.1) but could easily be repaired (Ambrose & Lorenz 1990). Such tools included blade- and small flake-based industries made on cores with plain platforms, ground bone tools and perforated ornaments. Ethnographically, the hunter-gatherers in this category are represented by the Hadza and Mbuti of eastern and central Africa.

Some other LSA hunter-gatherers have, however, been identified along the lake shores and river banks, and they seemed to have practised a degree of seasonal settlement or to have settled for much longer periods than the other groups discussed before. These hunter-gatherers largely depended upon fishing, and they used pottery of distinctive decoration (Robertshaw 1984; MacLean 1994; Tryon *et al.* 2016). These groups include Turkana-pottery-using hunter-gatherers identified at the FxJj12 north site (Barthelme 1977: 35) and Kansyore-pottery-using hunter-gatherers. Turkana pottery is characterised by a wavy-line decoration that is olive black in colour and has a gritty texture, and it has been found together with a number of uniserial bone harpoons, large amounts of fish bone, terrestrial mammals, and human skeletons (Barthelme 1977: 35–37). This suggests that these hunter-gatherers were completely different from those traditionally known, and, therefore, they could have been part of the delayed-return hunter-gatherer economy, as was the case with the Kansyore-pottery-using hunter-gatherers (Dale *et al.* 2004; Dale 2007; Prendergast 2008; Dale & Ashley 2010). This assumption is based on their diet, residential mobility and material intensification (see Table 3.1). The use of pottery (e.g., Kansyore) by these hunter-gatherers is believed to be a sign of intensification since it is suspected to have been used for storage and boiling purposes, which helped to manage scarcity by widening the resource base as well as increasing nutrient returns (Stahl 1993; Carmody & Wrangham 2009; Morgan 2012; Speth 2015). Ethnographically, the Okiek hunter-gatherers of Kenya are examples of hunter-gatherers in the delayed hunter-gatherer category, and Kansyore hunter-gatherers are examples known archaeologically in East Africa (Dale *et al.* 2004).

Dale *et al.* (2004) and Dale (2007) investigated the material characteristics of delayed-return hunter-gatherers in Africa through ethnoarchaeological research among the Okiek and through an archaeological study of the Kansyore hunter-gatherers. They recognised delays in return but without hierarchy among these groups. The Okiek focused, for instance, on bee-keeping, honey storage and hunting in the Mau escarpment which availed them an opportunity to exploit different forest types at different seasons (Blackburn 1982; Dale *et al.* 2004). The Okiek's delay was built into their subsistence return and distinctive social systems (Woodburn 1982). For instance, they relied on honey stored in ceramic vessels and a variety of hunted herbivores in periods of scarcity which could sometimes last up to a year. They also practised limited sharing, owned resources, used sites repeatedly, built houses and displayed some forms of inequality between men and women and between older and younger men, although with no hierarchy and class system (Dale *et al.* 2004). These characteristics indicate that the Okiek had a specialised hunter-gatherer economy that required a lot of time investment.

Based on evidence from Kansyore sites, Dale *et al.* (2004) argue that Kansyore hunter-gatherers fall into an intermediate category of moderate delayed-return hunter-gatherers. The evidence reflects seasonal use of resources and ownership of property which allowed revisiting of the same place (Dale 2007). Kansyore ceramic decorations and the large quantity of ceramics found are also regarded as emphasising a degree of labour investment and technological elaboration that are characteristic of items that are owned rather than shared (Dale 2007: 271). Increasing social complexity among the Kansyore hunter-gatherers is also indicated by the presence of human burials (see Table 3.1). Although human remains are believed to be indicators of social complexity and have been recovered at several sites including Uguja (Ashley 2005; Lane *et al.* 2007), Siror (Dale 2007), Gogo Falls (Robertshaw *et al.* 1983; Robertshaw 1991), Kansyore Island (Chapman 1967), Mumba-Hohle (Mehlman 1989), Nyang'oma and Chole (Soper & Golden 1969), no details have been provided. To date, the presence of human remains has been under-studied and this situation is often attributed to intrusive and/or recent burials. Therefore, further exploration of the repeated evidence of human remains is important since burials are often associated with ownership resulting from cultural attachment to the landscape.

Table 3. 1: Archaeological indicators of hunter-gatherers with immediate to delayed economies and social organisations

Immediate return model (Woodburn 1980, 1982)	**Ownership model** **Moderate delayed return (Dale *et al.* 2004: Table 15-5; Dale 2007)**	**Delayed return model (Woodburn 1980, 1982; Dale *et al.* 2004: Table 15-2; Dale 2007)**
1.Small, mobile groups 2. Use of relatively simple, portable, utilitarian, easily acquired, replaceable tools 3.No storage or processing of food 4. No involvement of skilled labour 5. Low artefact density 6.Absence of permanent structures, storage facilities, specialised dumps 7.Generalised resource base	1.Repeated use of sites 2. Relatively high density of archaeological material 3. Presence of ceramic storage vessels 4.Rich and predictable resources 5.Specialised tools 6.Little inequality combined with the absence of: large sites, 7. Permanent structures, 8.Exotic items, 9. Specialised discard of trash, 10. Elaborate material culture.	1.People hold values over valued assets 2.Large sites occupied longer and/or repeatedly 3.High artefact density 4.Permanent structures 5.Specialised trash dumps 6. Exotic items 7.Designated burial areas 8.Specialised tools requiring labour investment 9.Resour ce specialisation

From the available information, Kansyore hunter-gatherers fit the theories that predict social-economic complexity in abundant-resource areas (Hayden 1990; Aikens & Akazawa 1996) in terms of activities that enable storing (Testart 1982). These hunter-gatherers also fit the model that predicts large, semi-permanent occupations where resources are predictable. Taken together, these conditions enabled easy adoption of farming by hunter-gatherers (Price 1995: 143; Marshall 2000; Dale *et al.* 2004: 345). The existence of hunter-gatherers with delayed- and moderate-return economies is significant for the present study because it casts light on the nature of hunter-gatherers in the centuries prior to the emergence of farming on the northern shores of Lake Victoria Nyanza, Uganda.

3.2 Transition to Farming

The transition to farming is one of the most important occurrences in human cultural history. Human beings are believed to have practised hunting and gathering for millions of years whereas farming and food production emerged only between 10 000 and 5 000 years ago and spread to many parts of the world (Weisdorf 2005). Many theories have been put forward that attempt to explain the invention of farming and the reasons why humans shifted from hunting and gathering to farming (Weisdorf 2005: 564). At first, farming was thought to have appeared in the dry plains of Mesopotamia where oases attracted humans, domesticable plants and animals during dryer times. As such, there was competition for water resources, and humans were forced to domesticate plants and animals (Childe 1952). This perception has, however, been challenged based on the facts that climatic changes were too slow to trigger agriculture adoption and that agriculture appeared in areas where no major climatic conditions had occurred (Braidwood cited in

Weisdorf 2005). It is thought that, despite the challenges of farming, the transition to farming was embraced when communities moved from areas where farming was established already, from where it spread through diffusion and population movement, displacing the hunter-gatherers during the Holocene period (Weisdorf 2005).

Besides, farming is also thought to have been invented by fishing communities residing in resource-abundant regions which allowed them leisure time to undertake plant experimentation (Sauer cited in Weisdorf 2005). Farming was seen as more preferable than foraging, but in the 1960s it was discovered that farming was more time-consuming and labour-intensive than thought previously (Lee & DeVore 1968). Therefore, it is argued that hunter-gatherers would not have taken up farming if conditions had not forced them to do so (Binford 1968; see also Chapter 1). As such, the transition to farming is believed to have happened in specific places; in other parts, hunter-gatherers remained passive receivers in the transition process (Clark 1965). However, available data from different parts of the world suggest variations in the transition to farming (Cowan & Watson 1992; Gebauer & Price 1992: 3; Kusimba & Kusimba 2005; Robb 2013: 657). Therefore, hunter-gatherers played an important role in the transition.

3.2.1 Transition to Agriculture: Approaches

The hunter-gatherers in Europe were not considered to have played a big role in the transition to farming because all innovations were thought to have come from the Near East where local hunter-gatherers were able to transition to farming before it spread to other parts. Farmers emigrated from the core colonising areas that had not been farmed and everything concerning the conditions of existing hunter-gatherers was ignored (Zvelebil & Dolukhanov 1991). This was believed to have been archaeologically witnessed by the introduction of new cultigens, domesticates and cultural changes that were in sharp contrast to the characteristics of the earlier occupations of hunter-gatherers. However, sometimes evidence of this was limited. Prior to the farmers' movement from the Near East, they had acquired knowledge and tools and had domesticated all the major European crops such as wheats, barley, peas and lentils as well as animals such as cattle, goats, pigs and sheep (Price 2000). The farmers also started living in permanent villages and in rectangular houses, and had religious objects and structures, among other things. These were thought to have appeared simultaneously with the arrival of new farming populations (Price 2000). Although direct evidence relating to plants and animals was sometimes lacking, these plants and animals were assumed to be present since they were part of 'a package' (Robb 2013).

However, in the 1970s and 1980s, all the above ideas were challenged. For instance, it was argued that hunter-gatherers in other parts of the world also played an active role in the transition to farming (Higgs 1972; Clarke 1976; Clark 1980; Dennell 1983, 1985; Barker 1985). Some scholars (e.g., Zvelebil 1986) argued that settlement in Mesolithic Europe was just a perception rather than real and that potential cultigens and domesticates existed in Europe before farmers did. They further argued for the existence in most parts of Europe of dynamic and evolving hunter-gatherer societies that exerted their own influence on later socioeconomic farming developments. As challenges to and criticisms against traditional models of transition to farming piled up, a more sophisticated version of colonisation was developed (Piggot 1965; Sherrat cited in Zvelebil & Dolukhanov 1991), according to which colonisation was believed to have occurred in stages. For example, fertile regions were thought to have been colonised first and sub-optimal areas later. This suggests that some hunter-gatherers in some areas remained independent of colonising farmers and could have adopted farming locally (Zvelebil & Dolukhanov 1991). This suggestion is based on the hypothesis that some hunter-gatherers were already practising tenets of farming which, according to Zvelebil and Dolukhanov (1991), could have facilitated a gradual transition from one type of economy to another.

Zvelebil and Rowley-Conwy (1984), based on Alexander's (1978) model of 'moving and stationary' frontiers, developed a frontier concept that redefined the frontier as a zone of interaction between foraging and farming communities. It was said that the extent of such an interaction zone was so great (over hundreds of kilometres) and the time of interaction so long that light could be shed on the nature of transition and of the local groups that participated in it (Zvelebil & Dolukhanov 1991). As such, three phases of transition to farming have been considered; the availability phase, the substitution phase and the consolidation phase (Zvelebil & Dolukhanov 1991). In the first phase, farming is known to hunting and gathering groups and there is exchange of material and information, but although the societies operate independently of each other there is adoption of some farming elements. In the substitution phase, farming practices replace hunting and gathering strategies and it is in this phase that real socioeconomic transition takes place. Lastly, in the consolidation phase, the society becomes dependent on agriculture and is marked by extensive and intensive growth of food production. This means that, although farming is spread through migration, there is no displacement or absorption of hunter-gatherers; instead, transition is slow, and farming can be adopted in a piecemeal way since the two groups interact at different levels. Transition to farming in the third phase is therefore a slow process and involves the adoption of exogenous cultigens and domesticates by the local hunter-gatherer populations who, according to Zvelebil and Dolukhanov (1991), may have already been engaged in managing local resources. These scholars believe that during this process, mixed hunting-farming societies emerge that show a continuation of their population, social and economic traditions.

In contrast to traditional studies which indicated that hunter-gatherers did not contribute anything to the transition to farming (Clark 1965), some scholars (Zvelebil & Dolukhanov 1991; Robb 2013; Khalidi *et al.* 2018) found that hunter-gatherers were active players in the process of transition. Some hunter-gatherers are believed to have made choices; some rejected incorporating material things from farmers, others selectively incorporated farming elements, whereas others became part of the farming world but remained foragers, among other things (Robb 2013). In southern France, foragers adopted agriculture but retained many material traditions (Guilaine & Manen cited in Robb 2013). In Poland, people added pottery and a few animals to their assets (Nowak cited in Robb 2013). Therefore, although the transition to farming may have been the result of the influence of colonising migrants, the process was slow and hunter-gatherers only adopted material things depending on their purposes in their society. Evidence from southeastern Europe suggests that interaction took place between the Iron Gates foragers and farmers in the nearby areas. This suggestion is based on the presence of both Neolithic and other materials at LepenskiVir (Price 2000a&b). According to Tringham (cited in Price 2000c), the nature of subsistence evidence suggests that foragers were the more dynamic partners in the interaction process. These evidences continue to show that transition to farming was complex and involved many factors such as colonisation, environment and contacts.

A wide range of sources beyond traditional archaeology (e.g., stable isotope and ancient DNA) have been used to shed light on the transition to farming. As the use of stable isotope and ancient DNA analyses has made it possible to cover new ground relevant to the present study's topic, details of these are provided here. Stable isotope ratios of bone collagen from human and animal populations help, for instance, in reconstructing the diet, habitat selection, climate and water balance in prehistoric animal and human communities (Ambrose 1986a: 707). Different types of food have different carbon and nitrogen compositions and, therefore, characteristics that are influenced not only by diet but also by climate and physiology (Van der Merwe cited in Ambrose 1986a). Variations in the isotopic composition of food resources can be used to distinguish between human beings who consume animal products and those who consume plant foods, and to distinguish between marine plants and terrestrial plants (Ambrose 1986a). This permits differentiation between pastoralists and farmers, and between grain farmers and non-grain farmers, for example.

In South Africa, several studies on the settlement, diet and mobility of Holocene hunter-gatherers and farmers have been conducted (Van Noten 1974; Sealy *et al.* 1986; Van der Merwe 1992; Sealy 2006; Zhu 2016) and interesting conclusions have been reached. For instance, Sealy (2006), using stable isotope analysis of human skeletons, has revealed that hunter-gatherers who were buried on the Robberg Peninsula and the adjacent Plettenberg Bay between 4 500 and 2 000 years ago ate a lot of marine foods. Based on varied d^{15}N values of skeletons from Robberg/Plettenberg Bay older than 2500 BC, Sealy (2006) argues for the emergence of exclusive territorial groups. This suggests a less mobile lifestyle than previously documented in the area. Sealy's study casts light on settlement pattern, diet, mobility, and interaction as well as on social organisation which, in the long run, sheds light on the transition to farming in this area.

Ancient DNA studies have also been used increasingly to shed light on the transition to farming. In 2009, ancient DNA analysis of 74 skeletal remains from eight middle-Neolithic periods was conducted in Scandinavia, and the results indicated that there was no continuity between hunter-gatherers and modern Scandinavians (Malmström *et al.*

2009). According to Malmström *et al.* (2009) and also Richards *et al.* (2003), this finding seems to continue support of the population replacement hypothesis, which suggests that the transition to farming in that area was a result of moving farmers. This line of thinking is further supported by Skoglund *et al.*'s (2012) finding that 249 million base pairs of genomic DNAs from the remains of three roughly 5000-year-old hunter-gatherers matched that of afarmer from Scandinavia. The results were genetically similar to extant north Europeans whereas the results of another farmer from Scandinavia were similar to those of extant southern Europeans. Skoglund *et al.* (2012: 446) concludes that migration from southern Europe catalysed the spread of agriculture and that the admixture of this expansion eventually shaped the genomic landscape of modern-day Europe.

Another study of 54 hunter-gatherers and farmers from Spain, however, indicated that Neolithisation was random rather than uniform (Hervella *et al.* 2012). Based on statistical and multivariate analyses of mitochondrial variability, Hervella *et al.* suggest that dispersion had different impacts on the geographical regions; something they believe disagrees with traditional models of replacement. They posit that the transition to farming as well as relationships and interactions between the hunter-gatherer and farming communities were more complex than earlier thought. The results of both the stable isotope and ancient DNA analyses show that the transition to farming was not uniform and was a result of a combination of factors.

3.2.2 Transition to Farming in Eastern Africa and the Bantu Migration Hypothesis

In East Africa, farming has long been associated with population movements which are thought to have resulted in displacement and or assimilation of the hunting and gathering populations. A group of people who spoke related languages and were known as Bantu (a term coined by Bleek in the 1850s) is said to have left their west-central African homeland between 5 000 and 1 500 years ago (Bostoen 2018) and colonised East African hunter-gatherers. These Bantu-speaking people, whose language was based on a vocabulary of general roots, are believed to have worked using iron, fished and possessed canoes (Guthrie 1959; Eggert 2005). They were also thought to be predominantly root-crop cultivators (Schoenbrun 1993) and to have lived a sedentary lifestyle. This lifestyle is said to have resulted in population growth (Phillipson 2005: 171) which, in the long run, resulted in migration due to deforestation and soil exhaustion (Garcin *et al*. 2018). However, Clist *et al.* (2018) argue that there was no marked density on sites in West Africa that could have caused deforestation at the time of the so-called migrations. Nevertheless, the Bantu-speaking communities were thought to have introduced their languages, new sedentary lifestyles, and technological innovations, such as pottery-making, farming and uses of metals, to the areas they migrated to (Bostoen 2018).

From the 1850s (Bleek cited in Vansina 1994 and Eggert 2005), linguists (e.g., Greenberg 1955; Guthrie 1959) speculated on the origins and dispersal of Bantu speakers irrespective of their differences in terms of area location (Eggert 2005). Their assumptions were based on a comparison of lexical resemblances in fundamental vocabulary which indicated that the languages had a common origin but had subsequently diversified. They determined degrees of relationship between and borrowed features in these languages as well as elements of culture content and physical environment. Their studies were purely linguistic, but to these Murdock (1959) added socio-economic and sociocultural elements that were of interest to non-linguists. As such, historians and archaeologists incorporated the linguistic results into their own schemes without testing them. Murdock claimed that agriculture was established along the Niger River around 4500 BC and that crops such as barley and/or wheat were grown, but the findings of Purseglove (cited in Stahl 1984: 10) dispute this based on the fact that barley and wheat grow best in temperate zones and not in tropical regions.

Nevertheless, the Bantu-speaking people in East Africa started to be associated with different plants and technological innovations in the 1960s. Posnansky (1961b), for instance, associated Bantu-speaking people with banana and yam crops as well as a knowledge of iron-working (see also Clark 1962: 220). To Posnansky, iron-working was a very important element in Bantu dispersal since, as Clark (1962: 212) puts it, it provided tools to make effective inroads into forests. Posnansky also associates Bantu people with specific ceramics such as 'dimple-based' Urewe and 'channelled' pottery which, according to him, were evidence of the rapid expansion of Bantu-speaking people. This opinion was based on the uniformity that was observed in this kind of pottery in Uganda, Rwanda, Kavirondo, and Katanga (Posnansky 1961; Clark 1962: 221). Based on the fact that dimple-based wares were often found in more thickly vegetated areas utilised for intensive arable agriculture, Posnansky (1961: 185) suggests that dimple-based pottery users were agriculturalists who migrated and who possibly practised a mixed economy and augmented their food supply by hunting, fishing, and food gathering. Oliver (1966), after reconciling the views of Greenberg and Guthrie on the locations of the so-called Bantu who were thought to be agriculturalists, provides an interpretation suggesting that their dispersal happened in successive stages. The central Benue Valley proposed by Greenberg was, for instance, considered as the original homeland whereas a nuclear area suggested by Guthrie was considered as a secondary centre. Oliver has also partly supported and modified Murdock's (1959) speculations on agriculture in tropical and subtropical areas and reinforced the idea that the Bantu languages were spread by people who were superior technologically (see also Sutton 1994: 5–6).

Oliver's idea of superior technologies is supported by archaeological evidences at several sites in Uganda and Rwanda where the dimple-based wares found were associated with Bantu-speaking people. These wares were found immediately above the quartz flakes of the later Stone Age sites, a finding which, according to Posnansky (1968: 3), indicates a movement from outside East Africa. Iron was also found on the dimple-based ware sites in Kenya which, according to Posnansky (1968), points to the importance of iron-working to Bantu-speaking people, as stressed by Oliver (1966). Migration was said to explain how different languages and socio-economic items came to be where they were. In other words, the Bantu-speaking people were believed to have moved with their farming 'package' of sedentism, domestication of animals and plants, iron technology and pottery, among other things (Oliver & Fagan 1975: 93; Phillipson 1976: 16). The movement of these people and their farming package was thought to be rapid and coherent (Phillipson 1976: 3). Concurrent with this movement was the movement of the Bantu language and culture. For instance, the moving groups were archaeologically linked to specific pottery types in East Africa such as the 'dimple-based' and/or Urewe pottery of the Great Lakes region (Leakey *et al.* 1948; Posnansky 1961a) and Kwale on the coast and its hinterland (Soper 1982; Helm 2000). This pottery was called 'channel ware' in Zambia (Fagan & Van Noten, 1963).

Pottery styles were used to reconstruct a single stylistic tradition with a number of facets, and a comparative analysis of Iron Age pottery was subsequently carried out (Huffman 1970; Soper 1971). The purpose of this analysis was to identify the interrelationship between various subgroupings and to show their relevance to the date and direction of the spread of the Bantu-speaking people. Interestingly, the appearance of any of these pottery types at any site was taken to indicate the presence of Bantu-speaking people and therefore the presence of farming since it was part of the package. However, Huffman (1970: 18) argues that it is not clear whether pottery, iron works, a semi-sedentary village pattern, and food production appeared together or came from different directions at different times. He also expresses the opinion that more than one item could have been present although he does not favour this kind of interpretation. Schmidt (1978: 287–88) points out that assumptions underlying the migration model have never been thoroughly tested, implying that the model has loopholes.

Besides, Ehret (1998), a linguist historian, attributes the transition to farming to many complex environmental, social, and economic factors, and to interactions between different populations. This implies that transition to farming cannot be fully attributed to moving populations. Ehret's thinking on interaction is based on the borrowing and modification of loan words. He believes that the Great Lakes region was populated by hunter-gatherers and southern Cushitic agro-pastoralists before the appearance of Bantu groups. The southern Cushites grew grains and reared domesticated animals and occupied drier savanna areas where herding could be undertaken. He also believes that foragers could have existed in the space of Cushitic settlements, suggesting some kind of interaction. Ehret (1998) also argues that although Bantu continued to grow plants adapted to humid forest environments, they were in contact with non-Bantu groups from which they learned iron manufacturing, cattle raising and grain cultivation (see also Hakansson 2000). However, all these claims have not been tested and are therefore not theoretically defensible. The thinking behind these claims is taken to be circular since they are descriptive in nature, and the descriptions are based on assumptions and conclusions that reinforce the initial assumptions (Vansina 1994-1995; Robertson & Bradley 2000). Anomalies in both archaeological and linguistic data eventually changed scholars' views on the idea of a package and on the overwhelming superiority the Bantu speaking people over the earlier settlers.

By the 1990s, the traditional explanations of the transition to farming, which showed that farming was the result of a rapid single-wave migration of Bantu-speaking people, were being widely challenged, often because archaeologists failed to test the linguistic assumptions against the archaeological data before simply accepting them—and the reverse was also true for linguists (Eggert 2005). In addition, the transition to farming was believed to have happened in very many different ways. Scholars, such as Vansina (1994), have argued that advances in farming were slow and did not require large-scale movement until the last centuries. Vansina posits that three stages were involved in the adaptation to farming; the initial stage during which farming had just been adopted, the intensification stage where farming became the main source of food, and the innovation stage where farming systems were mature. According to Vansina (1994: 19), farming practices could have spread without actual migration and that some hunter-gatherers could have been practicing intensive huntingalready and could have lived a semi-sedentary lifestyle. All they needed to do was borrow different useful elements one after the other at different times, which could have been done without major population movement. Vansina's (1994) argument is based on pieces of evidence obtained from the Enkapune ya Muto rock shelter in the Kenyan Rift Valley where hunter-gatherers are believed to have first added pottery to their stone toolkit roughly 5000 years ago (Marean 1992). These hunter-gatherers are thought to have begun to eat and perhaps herd some goats acquired from their neighbours.

Other historical linguistic studies show that before 2500 BC several central Sudanic-speaking societies that practised mixed agriculture resided in eastern Africa (Ehret 1991; Schenburn 1993). These societies are believed to have raised and milked cattle and grown sorghum and most probably *Pennisetum millet* and, based on the presence of loan words, are thought to have influenced the Bantu cultivators (Ehret, 1998; Schenburn 1993). The proto-Bantu speakers are believed to have learned words for 'cow' and 'porridge' from the Sog whom they culturally interacted with (Schoenbrun 1993, 1998). These groups are also believed to have been linked to each other by exchange acivities, intermarriages and cooperative subsistence economies (Schoenbrun 1998: 83). Interactions, together with environmental circumstances, are thought to have led to changed lifestyles and diets, leading to the formation of centres of multi-ethnic expertise in the Lake Victoria Nyanza region (Schoenbrun 1998). The internal development of the lexicon concerned with food production practices sheds light on different foodways and the diverse cultural contexts in which farming communities lived (Wrigley 1987). The historical linguistic studies conducted in the 1990s clearly indicate that the transition to farming happened in different ways, although migration continues to be emphasised. Some scholars (e.g., Hall cited in Robertson & Bradley 2000) argue that language, people and material cannot be treated as a package deal, suggesting that the Bantu migration model and its relation to farming should be questioned.

For instance, scholars of the 2000s (e.g., Robertson & Bradley 2000) have emphasised that migration was a process rather than an event and that hunter-gatherers gradually adopted the traits that defined the Early Iron Age (EIA). Robertson and Bradley propose a continuity model to replace the migratory model that advocates awkward observations, for example, that difficult topography could have strained population movement. Robertson and Bradley also express the opinion that migrating Bantu speakers could have used local hunter-gatherers as guide posts, given the harsh and unwelcoming environment. This suggests some form of interaction, as has also been suggested by Kusimba and Kusimba (2005) who believe that East Africa's most populated areas were complex multi-ethnic and multi-economic regions in the last 2000 years. They believe that several communities practised different economies, religions, inventions and vocations and that these were bound together by friendship, clientship, knowledge, and personal and social identity. Their ideas seem to be supported by Lane *et al.* (2007) who investigated the WadhLang'o and Usenge3 sites in Kenya and questioned the widespread cultural replacement by Bantu-speaking communities. Based on new evidence of fauna and dating recovered from the two sites, these authors propose the existence of long-term interaction with regional variations. There seems to be a consensus among modern-day scholars to deconstruct the traditional Bantu model based on the available evidence that suggests that the process of migration might have involved small-scale migrations, diffusion, continuity, interaction and innovation rather than large-scale movement of people as was traditionally thought. Despite this consensus to deconstruct the traditional Bantu model, there is still a lack of direct archaeological evidence to confirm these claims in East African countries, inclusive of Uganda.

3.2.3 Transition to Farming on the Shores of Lake Victoria Nyanza

This section deals with the transition to farming on the eastern shores (in western Kenya), southern shores (in Tanzania) and western shores (west of the River Nile in Uganda) of Lake Victoria Nyanza. Archaeological studies at the different shores of Lake Victoria Nyanza show that transition to farming took diverse forms. For instance, Kansyore shell middens (e.g., Luanda, White Rock, Kanam, Kanjera, and Usenge 3) and stratified multi-period-occupied sites (Gogo Falls and WadhLang'o) have been associated with the transition to food production in the Lake Victoria basin (Robertshaw *et al.* 1983; Robertshaw 1991; Onjala *et al.* 1999; Karega-Mũnene 2002). The sites have Kansyore LSA, pastoral Neolithic, EIA Urewe, and Middle Iron Age (MIA) horizons, and sometimes they include pre-ceramic LSA and historical occupation phases. Archaeological evidence in this region has revealed varied materials belonging to various communities that coexisted and sometimes overlapped in time and space at some sites. At Gogo Falls in western Kenya, for example, Kansyore ceramics known among hunter-gatherers were found in the same deposits with pastoral Neolithic Elmenteitan, Akira ceramics and EIA Urewe ceramics (Robertshaw 1991; Karega-Mũnene 1996, 2002). Three dates (80±70 BC, 50±70 BC and 80±65 BC) were recovered from squares 26, 27 and 28 that possessed all three types of pottery (Karega-Mũnene 2002: 84), suggesting some form of contemporaneity. This occurrence was, however, interpreted as accidental mixing due to loose deposits rather than as a contemporaneity of different traditions at this site (Robertshaw 1991: 113). Karega-Mũnene (2002: 129) suggests that co-existence makes the relationship between the phases difficult to understand and explain. More recently, however, a series of new surveys and excavations have been conducted around the Winam Gulf (e.g., by Onjala *et al.* 1999; Ashley 2005; Dale 2000, 2007; Lane *et al.* 2006; Lane *et al.* 2007) where well-preserved stratigraphy allows a clear description of the transition to farming.

Excavations at WadhLang'o, for example, produced five phases of site activity, including the lower-most deposit of silty loam associated with Kansyore ceramics, three deposits associated with Elmenteitan ceramics of the pastoral Neolithic tradition, and a series of mixed ashy/loam deposits associated with Urewe pottery in Unit B. Similarly, Urewe and MIA ceramics co-existed in Unit A (Ashley 2005: 273–283; Lane *et al.* 2007: 65). This was followed by an hiatus and the uppermost layers that were associated with historical Luo activity. Irrespective of the hiatus, some form of continuity was indicated by the use of raw materials and technology for ceramics and lithics (Lane *et al.* 2007: 66–71). Also, at sites with Elmenteitan levels in the Lake Victoria Nyanza basin, evidence of a large quantity of both domestic and wild fauna and of fish (e.g., *Barbus* and *Clarias*) was recovered (Marshall 1991). Besides, the dates recovered from such sites indicate an overlap (Lane *et al.* 2007: 66, Table 2), confirming the co-existence of different traditions. Furthermore, analyses of lithic materials at sites (e.g., Usenge 3) where different ceramic traditions were found in co-existence, suggest continuity in technology (Lane *et al.* 2007). The economic and technological evidence at both WadhLang'o and Usenge 3 points to significant levels of continuity across the horizons (Lane *et al.* 2007: 75–76). These two sites have, therefore, revealed that the transition to farming involved interactions between different communities and that this process occurred in a gradual and localised way rather than through a major population shift as earlier thought (Lane *et al.* 2007: 78; Prendergast 2010; Seitsonen 2010).

In a study conducted at Siror (a single-component site in western Kenya), two trenches produced LSA materials; lithics and bones in the lowest levels and Kansyore ceramics, bones and lithics in the middle and upper levels (Dale 2007: 124ff, 207ff). The lowest levels (17–22; 85–129 cm) were associated with immediate-return hunter-gatherers. A few Kansyore ceramic items were observed in the middle levels in both trenches, and human burials (in addition to lithics and faunal remains) only in trench 1. Though the Siror site is not connected to the transition to farming, Dale (2007) notes continuity and connectivity between pre-ceramic hunter-gatherers and ceramic-using hunter-gatherers. Dale (2007: 207) wonders whether the archaeological patterns observed at the Siror site are examples of technological adaptation, replacement or assimilation of human groups or part of the movement of people into East Africa. Based on ceramic decoration similarities between Kansyore ceramics and the ceramics of North Africa, Dale (2007: 256) is of the opinion that Kansyore sites represent influxes of people from groups north and northwest of Lake Victoria Nyanza due to climatic fluctuations. Dale (2007: 256) further opines that the later dates at the Siror site mean that the Kansyore hunter-gatherers were living alongside the food producers and therefore could have had relationships or contacts of some kind with them around ca. 2000 BC. If what Dale (2007) thinks is true, it means that transition to farming was complex in that it involved contacts/interactions, among other things, on the shores of Lake Victoria Nyanza in western Kenya.

Dale's (2007) idea concerning contacts seems to be in agreement with the findings from an isotopic study on herbivores during the occupation of people belonging to the Elmenteitan (a pastoral Neolithic) tradition at Gogo Falls, Lake Victoria Nyanza basin, Kenya (Chritz *et al.* 2015). Here, very few C_3 browsers or mixed C_3 and C_4 feeders were recovered, suggesting a landscape dominated by C_4 grasses, which, according to Chritz *et al.* (2015), draws attention to herder relations with hunter-gatherers. This implies that social factors may have played an important role in the subsistence diversity at this site. This could have contributed to long-term interactions between pastoralists and hunter-gatherers (Clark 1980; Lane 2004; Prendergast *et al.* 2013).

As regards the issue of interaction, Frahm *et al.* (2017: 717), using X-ray fluorescence (XRF) on obsidian, investigated social contacts and exchange between the Holocene populations (Kansyore forager-fishers and Elmenteitan pastoralists) in the Lake Victoria Nyanza region. Their findings suggest changing interaction spheres that are relevant to understanding forager-fisher social identities and subsistence strategies during periods of economic and demographic change. Their study further suggests that the late Holocene fisher-foragers in the Lake Victoria region maintained sophisticated social contacts with mobile herders and sedentary farmers across several centuries. These scholars propose that the existence of obsidian in Kansyore assemblages reflects changes in patterns of cultural exchange through time. Such studies suggest that transition to farming could have been the result of interaction, shifts in diet, and many other factors.

In Tanzania, excavation of the Chole rock shelter in the southeastern part of Lake Victoria Nyanza produced Kansyore LSA ceramics in close association with Urewe and rouletted wares (Soper & Golden 1969). These authors regarded this occurrence as an admixture of materials, making it hard to understand LSA–EIA relations. Despite this occurrence, four stages of occupation were observed; LSA represented by Kansyore and stone tools, EIA (Urewe), LIA (roulette), and very recent material (Soper & Golden 1969). The same scenario was observed at the Seronera site in Tanzania where Kansyore ceramics were associated with Nderit (pastoral Neolithic) wares (Bower 1973), suggesting interactions of some kind.

On the western part of Lake Victoria Nyanza, excavations of sites such as Kansyore Island (Chapman 1967; Kyazike 2016) and the Nsongezi rock shelter (Pearce & Posnansky 1963; Nelson & Posnansky 1970) produced LSA artefacts, and Kansyore and Urewe pottery in the mixed deposits, making it very difficult to explain LSA–EIA relations. However, some studies (e.g., Posnansky 1961) have revealed that some caves around Lake Victoria Nyanza were occupied by a small group of people who subsisted on hunting and fishing and that the earliest pottery they used was Urewe. This seems to suggest that farming was introduced by way of population movement since Urewe ceramics were part of the ‘package’. More archaeological surveys on Bugala, Bufumira, Bubeke and Bukasa islands on Lake Victoria Nyanza also revealed evidence of Middle Stone Age (MSA), LSA and IA represented by occasional Urewe ceramics (Fagan & Lofgren 1966). Excavations, such as those at Tonje cave (BV18) on Buvuma Island, recovered dimple-based (Urewe) ceramics and LSA materials (Nenquin 1971: 392). Although studies during and immediately after colonisation revealed cultural materials from MSA, LSA and EIA (some of which were found in mixed context), no attempt was made to understand if there was a relationship between these materials since by then such mixtures portrayed disturbances of some kind.

Other studies, for instance, the study in the Rakai District, revealed that most LSA sites were located in areas unsuitable for agriculture and settlement, whereas EIA sites were in areas best suited to agriculture and settlement (MacLean 1994). The former areas basically had poor soils and were located on steep hills whereas the latter areas were Urewe (EIA) sites with fertile soils and gentle slopes. Based on these settlement patterns, MacLean explains subsistence strategies of LSA and Urewe (EIA) users in the area. MacLean (1994: 299) argues that the low agricultural potential of LSA sites suggests a hunting-gathering economy, but that the idea of pastoralism towards the end of LSA cannot be ruled out. On the other hand, Urewe EIA sites, according MacLean, seem to support the assumption that Urewe makers practised agriculture. Based on these findings, MacLean deduces that LSA communities subsisted on hunting and gathering whereas EIA communities subsisted on agricultural produce. Although MacLean’s conclusions are based on survey results and not on excavations, they do seem to suggest that there was no contact between hunter-gatherers and farmers.

Few studies have so far been conducted on the period preceding Urewe. On the other hand, more information is available on the period after Urewe (Ashley 2005). Nevertheless, one study on the period preceding Urewe has revealed three occupation phases; Pleistocene, Holocene and historical (Posnansky *et al.* 2005). Posnansky *et al.* have found that the island was not occupied by LSA groups from the Pleistocene period up until the advent of the occupation by Urewe-using communities. This suggests the area was a lake during this period. However, finger millet was possibly cultivated because grinding hollows as well as stones that seemed to demarcate field boundaries have been found, suggesting the presence of EIA farmers (Posnansky *et al.* 2005). Nevertheless, no direct evidence has been recovered, be it related to fauna or flora, a fact that has been attributed to sampling methods used and other factors (Young & Thompson 1999). Based on the available archaeological evidence, the LSA hunter-gatherers were the first occupants on the shores west of the Nile River, followed by EIA Urewe-ceramic-using communities. Archaeological excavations at the Nkuba rock shelter on Busi Island have revealed the presence of LSA materials (lithics) in the lower-most levels of trench 1, and of EIA materials (Urewe) associated with lithics, bones and carbonised seeds in the other levels (Tibesasa 2010). Tibesasa observes that all bones and seeds collected were wild, suggesting that Urewe users continued to subsist on gathered resources. Tibesasa's study further reveals that people on this island had contact with the mainland and perhaps with the coast because two cowry shells have been recovered. Re-examination of the Nkuba rock shelter by Tibesasa *et al.* (in prep.) has confirmed the dominance of lithics in the lower part (layer 3) of trench 1 and of Urewe ceramics in the middle part (layer 2) of the same trench. Based on the cultural sequence observed, these scholars conclude that the transition from the Stone Age to the Iron Age at the Nkuba rock shelter was a two-stage process; the first process was when Urewe ceramics was introduced and the second process was when the use of iron was introduced. However, at Lwala near Lake Victoria Nyanza, a mixture of LSA and Iron Age materials has been revealed in the upper levels, and solely lithics in the lower levels (Kessy *et al.* 2011). Based on the continued use of bipolar technology that was consistent at all levels, Kessy *et al.* suggested continuity.

Recent surveys and excavations at the Ndali crater, Lakes region, western Uganda (Schmidt *et al.* 2016) have revealed the presence of human burials associated with Kansyore and Boudiné wares (also known as Chobi wares) (Soper 1971). Boudiné wares, which date to the first half of the first millennium AD (Schmidt *et al*. 2016), are commonly found from the Chobi area to the Victoria Nile. Soper (1971: 87) dates Boudiné wares as partly contemporary and as partly later than Urewe wares. Isotopic analysis of the bone collagen, bone apatite and human tooth enamel of remains excavated at the Ndali site indicated that the hunter-gatherers ate a mixed C_3 and C_4 agricultural diet together with hunted game and/or fish (Schmidt *et al.* 2016). Irrespective of whether the skeletal remains belong to Kansyore hunter-gatherers or Boudiné-ware users, Schmidt *et al.* believe that hunters and fishers in this area may have practised some agriculture. Nonetheless, given the period which coincided with the appearance of domesticated plants believed to have been introduced by moving populations, the mixed C_3 and C_4 diets suggest that there was some form of contact, which in the end might have resulted in the transition to farming. Important to note is that environmental studies done in the first half of the first millennium AD suggest the existence of open environments, which can be attributed to the influence of farmers (Lejju 2012).

From these pieces of evidence, it is clear that there existed an ethnically and economically diverse frontier consisting of groups that engaged in different spatial and temporal relationships involving competition, conflict, exchange, symbiosis and/or assimilation. All the studies and findings point to the complex nature of the transition to farming and to the questionability of the reliability of suggestions relating to large-scale population movements. New analytical and interpretive models, such as the 'moving frontier' model (Lane 2004) and Kusimba and Kusimba's idea of 'mosaics' (Kusimba & Kusimba 2005), have revealed a need to shift from big/macro explanations to micro explanations based on local and gradual change.

3.3 The Moving and the Static Frontier Models

The frontier model was first conceived by Turner while investigating the expansion of European settlement across North America in 1893. He reflected on the past to explore how expansion to the American west altered people's views on their culture. Turner believed that the presence of the frontier made America individualistic, self-reliant, and democratic. His model was later picked up by Alexander (1977, 1978) who integrated it into archaeological theorising and interpretation. Alexander was interested in the spread of farming across Europe between the 7th and 3rd millenniums BCE, and he was knowledgeable about frontiers in other continents, including Africa. Illustrating the nature of frontiers at different moments in history, Alexander noted that frontiers varied; sometimes they were open and fluid and at other times they were fixed and vigorously defended; sometimes they could be challenged and at other times they could be taken for granted. As such they gave rise to varied kinds of social relations between frontiers and could result in varied forms of material expression (Alexander 1977, 1978).

Alexander identified two stages of a frontier that are relevant to archaeologists, namely, initial moving frontiers and later static frontiers. He explained that when the hunter-gatherer-fishers and farmers first came into contact, new changes, threats and contests brought about by the introduction of farming and its associated technologies appeared on socio-political, economic and cultural landscapes (Alexander 1977). The initial movement was basically on a small scale and possibly involved specialised members of the farmers who pioneered the exploration and who perhaps had no intention of subduing the pre-existing landscape. As time went by, the farming groups' relationship with the land and its pre-existing inhabitants underwent an important transformation. As such, the static frontier occurred when usable land was taken up and the limits of climatic tolerance of plants and animals reached (Alexander 1978).

However, Dennell (1985: 132) suggests that static frontiers may have developed between hunter-gatherers and farmers in areas where hunter-gatherers experienced no advantage in either acquiring or developing agricultural resources or in areas that agriculturalists did not regard as worth colonising. Two types of static frontier were identified; an open static frontier and a closed static frontier (Dennell 1985). In the case of the former, a symbiotic relationship is expected involving the exchange of goods across the frontier. There also appeared to be a parasitic kind of relationship where hunter-gatherers sometimes stole agricultural goods or resources (Dennell 1985: 135; also see Figure 3.1). The closed static frontier is marked archaeologically by a lack of exchange and evidence of warfare (see Figure 3.1). A closed static frontier is characterised by the discrete spatial distribution of sites and artefacts, and the absence of any indication of exchange. Dennell (1985: 134) notes that studies applying this model are rare, especially when it comes to investigating prehistoric hunter-gatherer and farming relations.

The 'moving frontier' model that Lane (2004) applied in the Great Lakes region and the Rift Valley offers a way of explaining relations between different hunter-gatherer and farmer communities. For example, at the initial stage of the contact, both hunter-gatherers and farmers are believed to have interacted and exchanged wild products for domesticates (Lane 2004). The archaeological material signature of this phase often shows minimal change; for instance, there will be occasional traces of exotic items such as domesticated fauna and plants and non-indigenous raw materials, among others. However, as time goes by, the farmers' relationship with the landscape and hunter-gatherers will change into a 'static frontier' (Lane 2004). At this stage, evidence of hunter-gatherer subsistence will disappear from the archaeological record, skeletons showing evidence of violent death will appear, and there will be evidence of an increase in agricultural practices, among other things (Lane 2004).

According to this model, foragers are expected to change when food producers impose their unchanged way of life; in other words, foragers passively receive all the innovations from farmers. Some ethnographic data have continued to support this idea. The Okiek in East Africa, for instance, are believed to have taken up farming when, in the 1900s and 1920s, European farmers and Kipsigis pastoralists moved into their range area and cleared their forested land for cultivation (Dale *et al.* 2004). However, some pieces of evidence have shown that this may not always be the case (Gifford-Gonzalez 1998, 2000). These authors indicate that herders in high-risk environments, for instance, may have been in equal relationships with foragers since they possessed knowledge of the landscape, climate, and resources. Although this was the exception, archaeological evidence has shown that some hunter-gatherers seemed to have been in contact with neighbouring farming communities, resulting in their transformation (Sadr 2002).

Headland and Reid (1991) propose that Middle to Late Holocene foragers followed an economy based heavily on trade relationships with neighbouring food producers. They further argue that symbiosis observed between the hunter-gatherers in Southeast Asia, South Africa, central Africa and each of their farming neighbours reflect a subsistence strategy that has been followed by most hunter-gatherers for millennia (Headland & Reid 1991: 333). However, Sadr (2002: 44), while excavating five rock shelters near Thamaga in South Africa, noted that whereas some hunter-gatherers were largely assimilated, others remained independent. This suggests that hunter-gatherer/farmer frontiers took various forms, but what is interesting is that all these can be observed in material culture. For instance, mixed material culture recovered from many sites may indicate contacts/frontiers of some kind. The contacts are thought to have resulted in a slow and gradual process of transition to farming (Lane *et al.* 2007; Crowther *et al.* 2017). In Figure 3.1, Dennell's (1985: 135) illustration of the mosaics/interaction interpretive model is portrayed.

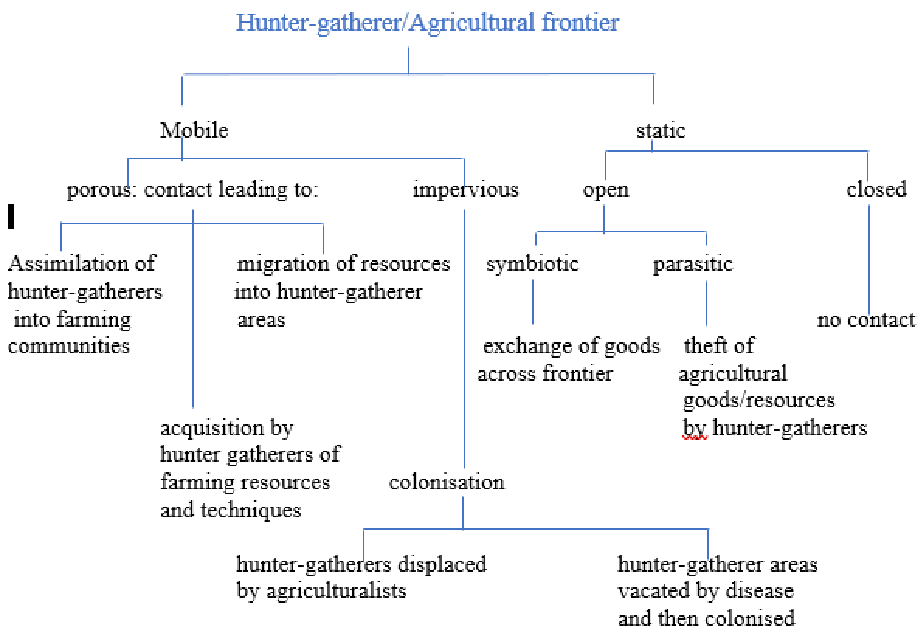


Figure 3. 1: Different forms of hunter-gatherer-farmer interaction

Source: Dennell (1985: 135)

3.4 The Mosaics Interpretation Model

The proponents of the mosaics interpretation model argue that people of diverse origins can practise and invent different ways of life that display different levels of political complexity and different ritual and economic specialisations that interact with each other (Kusimba & Kusimba 2005). Such communities are bound by friendship and clientship, alliances, knowledge, and concepts of personal and social identity, but that conflicts and competition are sometimes part and parcel of the mosaics (Kusimba & Kusimba 2005). Guyer and Belinga (1995) are of the view that kinships, status, space, and demography are also part of the mosaics. Kusimba and Kusimba (2005) offer explanations for diverse cultural deposits found at contemporaneous sites during this period. They explain that trade and other forms of interaction bring overlap in archaeological deposit distributions (Kusimba & Kusimba 2005: 413; also see Figure 3.1) and that such interactions keep boundaries fluid, reduce competition and conflicts, and have an impact on the cultural and ecological landscape. Nevertheless, these authors admit that ways of identifying the cross-cutting alliances and interactions are not easy.

Basing their arguments on ethnographic, archaeological, linguistic and oral history, Kusimba and Kusimba (2005) have tried to show how archaeologists can understand the mosaics of social interaction using examples from the Central Rift Valley, the Great Lakes region and the Taita-Tsavo region. They explain that different groups of people living in different ecological regions were involved in different activities. In the Great Lakes region, for instance, diverse ecological areas of forests, grasslands, woodlands, mountains, and swamps as well as rivers and lakes served as sources of different resources, resulting in interactions such as communication relating to and the trade of unique goods (Kusimba and Kusimba 2005). The Great Lakes region is also seen as having been occupied by different communities, including fishing-hunting-gathering communities archaeologically associated with lithic tools and Kansyore pottery (MacLean 1994), Bantu-speaking communities archaeologically associated with Urewe pottery (Posnansky 1961b), and ironworking (Schmidt 1997) as well as Cushitic- and Sudanic-speaking communities associated with the herding of cows and goats and the production of cereal crops (Schoenbrun 1998). Schoenbrun (1993, 1998) and Ehret (1998) suggest that Bantu-speaking people learned cattle-keeping, grain agriculture, and ironworking from central Sudanic speakers, suggesting the existence of diverse groups of people involved in different activities and being bound by many factors.

The application of the mosaics model by Kusimba and Kusimba (2005) in the Great Lakes region, Rift Valley and Taita-Tsavo region therefore offers a way of explaining different cultural materials that are found in co-existence, and the findings of their study seem to suggest that the transition to farming was the result of a combination of factors. Archaeologically, the applicability of the mosaics model is observed at sites with mixed deposits; however, unfortunately, such sites have traditionally been interpreted as displaying disturbance of some kind, and, therefore, archaeologists have not been afforded an opportunity to understand the mosaics that were involved in the transition to farming.

3.5 Chapter Summary

Based on a diverse set of evidence, indications are that there are different patterns of transition to farming in different parts of Lake Victoria Nyanza, which suggests that much remains to be learned about this topic. As not much research in this regard is being carried out, the importance of the present study is perhaps not to be disputed.

Chapter 3 discussed different explanations put forward by scholars on immediate-, moderate- and delayed-return hunter-gatherer settlements and social and subsistence structures. Early Kansyore sites on the shores of Lake Victoria Nyanza are good sites for testing anthropological explanations, for example, the explanations of delayed-/moderate-return hunter-gatherers by Woodburn (1982), Dale *et al*. (2004) and Dale (2007). Explorations in the study area have provided some pieces of evidence on the settlement lifestyle of Kansyore LSA communities. As discussed, Late Kansyore and EIA sites prove to be appropriate sites for testing Lane’s (2004) moving frontier model and Kusimba and Kusimba’s (2005) mosaics model. Archaeological and ethnographic evidence provided in this chapter guides the interpretation of the applicability of the models/explanations to the present study. Data from archaeological and ethnographic evidence indicates that the transition to farming was brought about by a combination of factors, the importance of which, in the case of the northern shores of Lake Victoria Nyanza, is explored in the following chapters.

CHAPTER 4

ENVIRONMENT, SURVEY METHODS AND RESULTS

4.0 Introduction

To start off the discussion in this chapter about the environment, survey methods and results, the present and past climate conditions of Lake Victoria Nyanza and the location under study are described. Next, the chapter discusses the land-use patterns in the study area and also gives a brief overview of survey methods used in studying the shores of Lake Victoria Nyanza. The last part of this chapter discusses the survey methods used in the present study and ends with a presentation of the survey results obtained.

4.1 Present Climate Conditions at Lake Victoria Nyanza

Lake Victoria Nyanza, the largest lake in Africa and the second largest freshwater lake in the world, is located in the Great Lakes region between the western and eastern Rift valleys. It covers an area of 69 000 km^2, bridging 400 km north–south and 240 km east–west (Kendall 1969; Stager *et al*. 2003; Okungu *et al*. 2020). Lake Victoria Nyanza is situated on the equator in its northern reaches and is in one of the wettest areas of the densely populated region. The lake's shoreline covers a distance of roughly 3 500 km and includes innumerable small, shallow bays and inlets characterised by a range of environments such as papyrus swamps, wetlands, grasslands, and riparian vegetation. It has, for instance, spots of moist evergreen forest edged by continuous semi-deciduous forests that start at the east of the Nile River and extend westwards along the northern and western shores across the Uganda–Tanzania border. These forests also cover Lake Victoria Nyanza's islands (Kendall 1969; Atlas for Social Studies Uganda 2015). Vegetation in the southeastern and eastern parts of the Lake Victoria Nyanza basin is mainly wooded grassland characterised by broad-leaved trees (*Combretum* species) and tall grass of, for example, the *Hyparrhenia, Loudetia, Cymbopogon* and *Bothriocloa* species (Kendall 1969: 126). The diversity has influenced settlements, subsistence activities, and technologies, among other things.

Lake Victoria Nyanza influences the climates of bordering areas, which extend roughly 100 km inland from the lake shores. The prevailing east–west winds over Lake Victoria Nyanza make the western side of the lake receive higher rainfall than areas to the east of Jinja (National Environment Management Authority (NEMA) 2009), including the current area of study. Rainfall patterns at Lake Victoria Nyanza, especially in the eastern and southeastern parts, are bimodal with shorter rainfall period extending from March to May and longer rainfall period from August to November. The highest rainfall measured 1 940 mm, the mean is 1 514 mm, and the lowest rainfall measured is 1 080 mm (Uganda Bureau of Statistics 2009/2010). The modern climate of Lake Victoria Nyanza area has attracted settlement of people from different parts of the country and neighbouring countries, and this may have been the case in the past too.

4.2 Past Climate Conditions at Lake Victoria Nyanza

Palaeoenvironmental data largely obtained from studies of pollen, diatoms and isotopes in lake-drawn sediment cores indicates that Lake Victoria Nyanza has gone through many changes in terms of its water level during the Terminal Pleistocene and Holocene periods (Kendall 1969; Stager & Johnson 2000; Marchant *et al.* 2018). Reconstructions of lake level fluctuations have revealed that Lake Victoria Nyanza's water levels rose during the postglacial warming period (12000 BC) and that levels lowered in cooler and drier conditions during the Terminal Pleistocene period (11000–9000 BC). These conditions resulted in a greater expansion of grasslands and reduction of forests and woodlands compared to subsequent periods.

Lake Victoria Nyanza experienced humid conditions in the Early Holocene period (roughly 2500–6300 BC). This period was exceptionally rainy due to strong northerly and southerly monsoon winds (Von Rad *et al.* 1999; Talbot & Laerdal cited in Stager *et al.* 2003: 178). By the Early/mid-Holocene period (6300–5800 BC), rainfall was more seasonally restricted and this is associated with a major reduction in the intensity of water column Stager & Johnson 2000) due to the abrupt weakening of monsoon winds (Sirocko *et al.* 1996; Staub-Wasser cited in Stager *et al.* 2003: 179). Between about 5800 and 3800 BC, a second humid phase associated with seasonally restricted rainfall that was more torrential in nature, was experienced. Rainfall was, however, lower compared to the rainfall during the Early Holocene phase because of the sustained weakening of dry monsoon winds (Stager *et al*. 2003). From 3800 to 700 BC, there was a decline in the lake's water levels, and the lake became shallow because of the reduced rainfall and the accumulation of sediments in the lake. Dry conditions between 3200 BC and 2000 BC saw further declines in lake water levels, expansion of grasslands, and shrinkage of forests and woodland (Marchant *et al.* 2018). From 700 BC to AD 1800 (Late Holocene), the lake was shallower and the lake margins were encroached by papyrus swamps and expanding grasslands. Major droughts occurred around AD 750–1350, coinciding with Europe's medieval warm period. The major environmental shifts in the Early to Late Holocene periods have been linked to changes in monsoon activity, solar variability, marine circulation and/or natural climatic change (Stager *et al.* 1997), and anthropogenic activities (Kendall 1969; Marchant *et al.* 2018).

Recent studies in the area have shown that the rise and decline of the water levels of Lake Victoria Nyanza are associated with the growth and movement of people (Tryon *et al.* 2016: 100). During the humid phase (Early Holocene) when the lake levels had risen, there was a growth of diverse fisher-forager communities whose members adapted their settlement patterns and created new technologies to take advantage of aquatic resources (Prendergast & Beyin 2017). This has been evidenced by data on fisher-forager sites, such as Siror, that have been found around Lake Victoria Nyanza dating to this period (Dale 2007). A reduction in fisher-forager communities was observed (Prendergast 2008) in the mid-Holocene period when the lake's water level had declined due to decreased seasonal rainfall that made this period drier than the Early Holocene period. This situation coincided with the beginning of the introduction of domestic stock in northern Kenya around 2000 BC as well as with the southward expansion of pastoralist communities to southern Kenya around 1000 to 500 BC (Marshall 1990). In respect of this period, very few Kansyore sites have been observed, seemingly suggesting that the fisher-forager communities were slowly shifting to farming.

During the Late Holocene period (700 BC–AD 1800), Lake Victoria Nyanza is said to have been shallow, with papyrus occurring in its margins. Further, there was a reduction in forest cover and an increase of grasslands around the lake. This has been attributed to the arrival of new subsistence systems, crops, migrants and technologies which resulted in a significant phase of change in land cover (Kendall 1969; Kiage & Liu 2006; Marchant *et al*. 2018: 6). Although there have been human activities on the shores of Lake Victoria Nyanza right from the Early Holocene period, their impact seems to have been felt most in the Late Holocene period.

Both the present and past climatic conditions at Lake Victoria Nyanza as discussed above provide the present study with information on how climate change has been influenced by both natural and anthropogenic activities. Population growth, settlement, subsistence, and technologies, among other things, have had a great impact on land cover and the water levels of the lake. It has become clear that, right from the Terminal Pleistocene period, through to the Holocene period and modern times, Lake Victoria Nyanza’s shores have been settled by people involved in different subsistence activities, including fisher-forager and early farming communities. It is against this background that a survey was conducted on the northern shores of Lake Victoria Nyanza in eastern Uganda to identify the sites where such communities settled.

4.3 Location of the Study Area

The location of the study was the area between the Nile River and the Uganda–Kenya border in the districts of Busia and Namayingo in the Busoga subregion, eastern Uganda (see Figure 4.1). The Busia District is located approximately 196 km from Kampala, the capital city of Uganda (Uganda Bureau of Statistics 2009/2010). It is approximately 29.34 km by road south of Tororo, the nearest big town (https://www.globefeed.com consulted on 10 July 2020). The district has a total land area of 743 km^2 and lies north of Lake Victoria Nyanza. It borders the Tororo District to the north, Busia County in Kenya to the east, Bugiri District to the west, and Namayingo District to the southwest. The Busia District has one county, namely, SamiaBugwe, which has two political constituencies, namely, Samia Bugwe North and SamiaBugwe South. It has 10 subcounties; Busitema, Buteba, Busia TC, Bulumbi, Dhabani, Masafu, MasabaBuhehe, Lunyo and Lumino. Investigations in this district were conducted on the shores of Lake Victoria Nyanza in the villages of Namundiri A in the Majanji Parish, Budecho in the Bwaniha Parish, and Lukaba and Bulosi in the Busime Parish, all in the Lumino and Lunyo subcounties. The villages where sites were identified are about 19 to 20 km from Busia town and can be reached by car via the Dhabani–Majanji road.

Namayingo is located along the equator, approximately 95 km by road southeast of Jinja, which is the largest city in the Busoga subregion. It is situated 1 213 m above sea level, and has a total land area of 533 km^2 (Atlas for Social Studies Uganda 2015). It borders Bugiri District to the northwest, Busia District to the northeast, the Republic of Kenya to the east and southeast, the Republic of Tanzania to the south, and Mayuge District to the west and southwest. The district is made up of nine subcounties; Banda, Buhenda, Buswale, Buyinja, Namutumba, Namayingo TC, Lolwe, Bugana and Sigulu islands. Investigations in the district were conducted in the villages of Namaboni and Lugala A, which are located on the shores of Lake Victoria Nyanza in the Lutolo and Lugala parishes, Banda subcounty, respectively. The sites are about 13 km from the Majanji lake shore landing site. The sites in both the Busia and Namayingo districts are on the shores of Lake Victoria Nyanza.

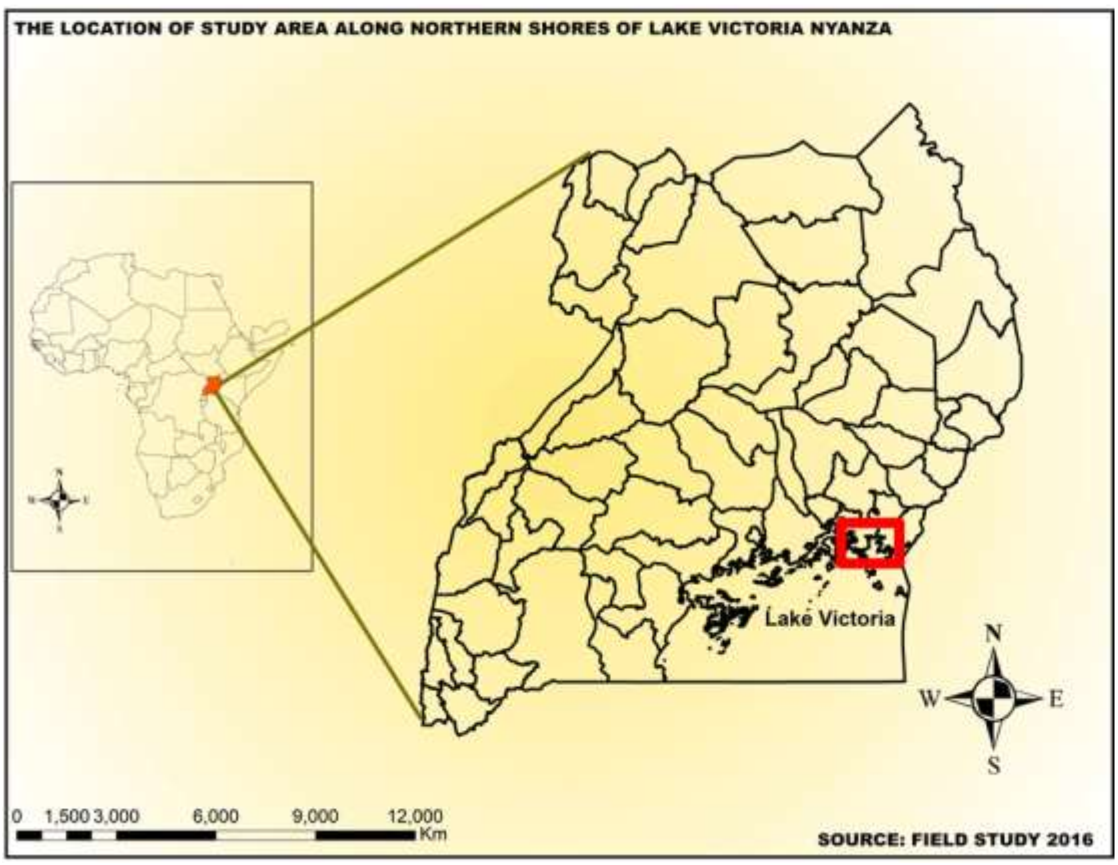


Figure 4. 1: Map of Uganda showing the study area

4.4 Land Use and Geology of the Study Area

Land use refers to the way land is developed and used in terms of types of activities allowed such as agricultural, industrial and residential (Nuwagaba & Namateefu 2013). Land-use types in the Busia and Namayingo districts around Lake Victoria Nyanza include agriculture, forestry, and fishing. The major land-use type in both districts is subsistence crop production, and fishing is done on the shores and islands of Lake Victoria Nyanza. Agriculture in the two districts largely depends on rainfall and basic implements such as hoes and pangas, thus determining the quantity and quality of production. Other land uses include shell mining, bricklaying, livestock rearing, settlement building, sand harvesting, quarrying, gold mining, and charcoal burning. Gold mining, especially in the Namayingo District, has attracted migrants from different parts of Uganda and neighbouring countries, and these migrants are engaged in different activities. Land use has substantially changed due to the fragmentation of the landscape, which is the result of the increase in the population. The population increase has come about because many people come from different parts to settle on the shores of Lake Victoria Nyanza for the economic opportunities offered by, for instance, the fishing industry and the transport business. Unfortunately, some of the land uses in the Busia and Namayingo districts, such as grazing, mining of sand, gold and shells, charcoal burning, urban settlement, and bricklaying have led to land degradation.

Geological rocks, such as basalts, andesites, phonolites, conglomerates, grit, tuffs and rhyolites, are found in the area (NEMA 2009)**.** Granites, dolerites and felsites are yet other rocks found there. Different kinds of soil in the Lake Victoria Nyanza area include acric ferralsols, gleysols, luvisols, leptosols, lixic ferralsols, nitisols, petric plinthosols, planosols and vertisols (NEMA 2009). Different soils support different plants, and these can include, among many others, bananas, coffee, cotton, and millet. Soils in the Busia District are largely ferrallitic and are mainly sandy loams with no clearly defined horizons (Uganda Bureau of Statistics 2009/2010). Another group of soils that closely resembles ferrallitic soils is ferrisols. This group of soils represents an earlier stage in the development of ferrallitic soils and appears on crystalline basic rocks that possess better agronomic qualities. They are strongly weathered, red/yellowish in colour, and possess resistant minerals like quartz and kaolinite (Uganda Bureau of Statistics 2009/2010; NEMA 2009; Fungo *et al.* 2011). However, most soils in the study area are acidic and not very fertile, and this has determined settlement patterns there.

4.5 Survey on the Northern Shores of Lake Victoria Nyanza

A survey on the northern shores of Lake Victoria Nyanza was conducted in the districts of Busia and Namayingo, eastern Uganda. The two districts were selected because no archaeological study had been done there before. Secondly, these districts are very close to Kansyore LSA sites, such as Siror, Haa, and Usenge 3 in Kenya (Lane *et al*. 2006; Lane *et al.* 2007; Dale 2007; Dale & Ashley 2010; Ashley & Grillo 2015: 3, Figure 1), so it was hoped that sites of this kind could also be recovered in these districts. While Kansyore sites have been identified to the east in Kenya, none have really been found further west in Uganda, especially in the area to the west of the Nile River, despite surveys conducted in this very area (Reid 2002; Kiyaga-Mulindwa 2004; Chami & Tibesasa 2010). Therefore, this was an interesting location because of its patchy coverage and its position between two contrasting archaeological patterns. The decision to conduct the present study in this area was aimed at bridging the gap in research on the eastern and western shores of Lake Victoria Nyanza.

During an initial reconnaissance trip in 2015, evidence was found of LSA, EIA and LIA sites, especially in shell and sand-mining trenches along the northern shores of Lake Victoria Nyanza. Therefore, in 2016, the survey team returned to the area and a survey was conducted in both the Busia and Namayingo districts for four weeks—two weeks in each district. Two subcounties (i.e., Lumino and Lunyo) were considered for study in the Busia District, and one subcounty (i.e., Banda) was considered for study in the Namayingo District. The selection of parishes was based on their proximity to Lake Victoria Nyanza. In Lumino subcounty, the Majanji Parish was selected for survey, and villages such as Majanji, Maduwa A, Maduwa B, Namundiri A, Namundiri B, and Magombe were surveyed. In Lunyo subcounty, the Busiime Parish was selected for survey, and villages such as Lukaba, Buloosi, and Budecho were surveyed. In Banda subcounty, Namayingo District, the parishes of Lugala and Lutolo were selected for survey in which the villages of Namaboni and Lugala were surveyed respectively.

4.5.1 Survey Methods

Drewett (1999: 44) points out that some available field methods may not necessarily fit the set aims and objectives of a study and may not produce answers to the set questions. For example, in some areas a systematic survey may prove to be problematic and sometimes a waste of time due to inaccessible land for survey because of the built environments, rivers and hostile landowners. Uganda is currently facing land-ownership challenges where a class of elites is grabbing land from locals through surveying and through processing land titles without the locals' knowledge or consent. As such, people in Uganda are skeptical of strangers walking across their pieces of land. Furthermore, an initial reconnaissance in 2015 and previous studies conducted west of the Nile River (Robertshaw 1991, 1994; Reid 2002; Kiyaga-Mulindwa 2004; Ashley 2005; Giblin 2008; Iles 2009; Tibesasa 2010) reveal that a systematic survey is next to impossible in such natural and political environments.

A purposive survey was employed in the present study based on the hypothesis that the lake shores and the river banks had abundant predictable resources that attracted settlement and economic activities such as fishing and game ambushing (Tryon *et al.* 2016). The survey in the Busia and Namayingo districts concentrated on the shores of Lake Victoria Nyanza, some of which were covered largely by tall grass, swamps and forest shrubs. As it was important to develop a survey strategy that would be efficient for locating sites for excavation, a systematic road-, open-ground-, and path-based survey and flexible, informant-led approaches were employed to recover sites. Places such as road cuts, paths, and sand and shell-harvesting trenches were traversed and inspected by the survey team for archaeological remains (see Figure 4.2). In this case, sites with concentrations of worked stone artefacts, ceramics of LSA, EIA and MIA, and slag, among other things, were considered as sites. In ploughed areas, site measurements were taken using a tape measure to obtain the site extent, after which the survey team systematically walked through the site, locating, collecting and plotting artefact spread.

Figure 4. 2: Survey team walking through open cultivated garden at Lukaba 2 site

Informal interviews were also carried out among the elders living in homesteads close to the lake shores to enquire whether there were known concentrations of pottery or slag, and later verification of the details was done by archaeological inspection of the mentioned areas. The survey team carried along some archaeological samples, for instance, pottery, slag, and lithics, to enquire from the elders if they had any knowledge about these. In rare cases, test pits were dug in areas with poor visibility to document the occurrences of cultural materials. These survey strategies are often used in areas with poor visibility (Bisson 1992: 235; Lane et al. 2006). Although these strategies do not reveal a lot about past settlement patterns and in many cases lead to biased results because areas that are not open are always left out, they reveal a range of sites of different levels of complexity.

Once a site was found, it was allocated a site number and a GPS location, and detailed information (e.g., cultural characteristics, site type, position, site activity, land owner, myth, traditions and historical associations, visible archaeological remains seen or collected) was recorded on a survey form (see Appendix 1). The sites that had cultural materials that were of interest to this study were mapped using a tape measure and a total-station machine (see Figure 4.3), whereas others were just measured and not mapped to estimate their size. Diagnostic ceramic samples falling in the LSA, EIA MIA and LIA periods were collected and analysed at the camp site and later stored at the Uganda National Museum. Other materials (e.g., slag, grinding stones) were just recorded and not collected. Sites with high concentrations of LSA and EIA ceramics were earmarked for excavation in this study

Figure 4. 3: Site Mapping at Namundiri A site, Busia District

4.5.2 Survey Results

The survey covered a total area of approximately 32.5 km^2, encompassing part of the Lumino, Lunyo and Banda subcounties in the Busia and Namayingo districts and stretching from the village of Hateka at the Uganda–Kenya border in the east to the village of Lugala in the west towards the Nile River. Twenty-four sites were identified (see Figure 4.4). Of these, one site produced both LSA and EIA cultural materials (4.2%), three sites produced LSA and LIA materials (12.5%), eight sites produced only LSA materials (33.3%), one site produced EIA and LIA materials (4.2%), two sites produced MIA and LIA materials (8.3%), and nine sites produced only LIA materials (37.5%) (see Table 4.1). High concentrations of sites (n = 19) were clustered in the parishes of Majanji (n = 10) and Busiime (n = 9) in the subcounties of Lunino and Lunyo respectively (see Figure 4.4). Very few sites (n = 5) were recovered from the parishes of Lutolo (n = 3) and Lugala (n = 2) in the Banda Subcounty west of the Majanji and Busiime parishes (see Figure 4.4). The site pattern observed may be attributed to survey methods that were employed that emphasised areas of high visibility, suggesting that the results should be considered with caution because they did not provide the general picture of the survey done in this area. Despite this shortfall, the survey results provided an indication of the situation on the northern shores of Lake Victoria Nyanza since the present study was the first of its kind in this area.

Ten sites recovered from the Majanji Parish included Hateka, Majanji A, Maduwa A1, Maduwa A2, Maduwa B, Namundiri A, Namundiri B, Namundiri B1, Magombe 1, and Magombe 2 (see Table 4.1). Nine sites recovered from the Busiime Parish included Lukaba 1, Lukaba 2, Budecho A, Budecho B, Budecho C, Budecho D, Bulosi A1, Bulosi A2, and Bulosi B (see Table 4.1). Three sites recovered from the Lutolo Parish included Namaboni A, Namaboni B, and Namaboni C, and the two sites recovered from the

Lugala Parish included Lugala A1 and Lugala A2. The survey on the northern shores of Lake Victoria Nyanza was primarily interested in the identification of LSA and EIA sites/settlements although other sets of data were recovered along the way. It is important to note that the present study emphasised sites that contained evidence of LSA and EIA materials. These sites are, however, rare in the Majanji parish located at the Uganda–Kenya border in the east but are more common in parishes west of it (see Figure 4.4). For instance, only two sites (Majanji A and Namundiri A) out of 10 sites contained evidence of LSA materials, and no EIA site was recovered (see Figure 4.4). The situation was different in the parishes west of Majanji where six sites (i.e., Budecho A, Budecho B, Budecho D, Buloosi A2, Bulosi B, and Lukaba 2) out of nine LSA sites were recovered from the Busiime Parish. In addition, one EIA site (i.e., Lukaba 1) was recovered. All three sites (i.e., Namaboni A, B and C) recovered from the Lutolo Parish produced evidence of LSA materials, and only one site (i.e., Lugala A1) produced evidence of both LSA and EIA materials (see Table 4.1).

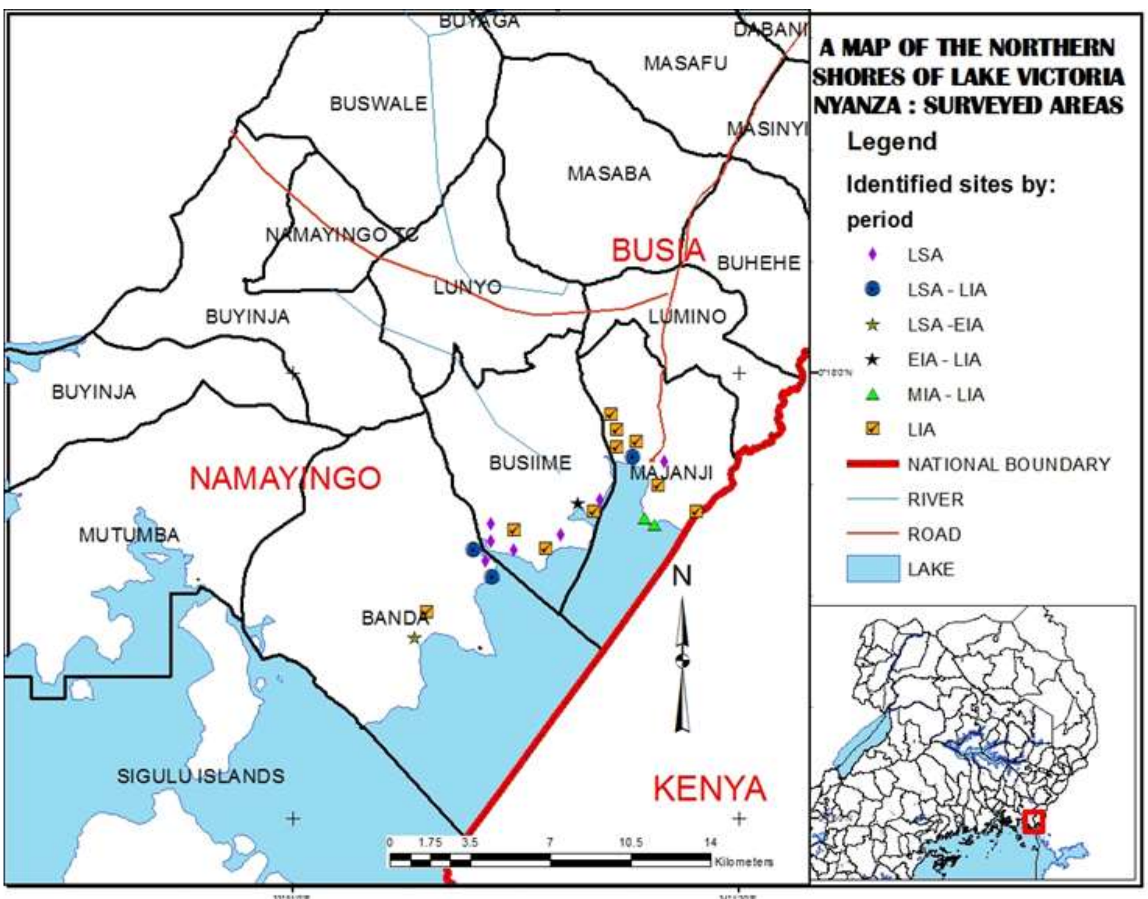


Figure 4. 4: Sites identified in the study area according to period

Table 4. 1: Sites identified in the study area according to period

Site name	GPS	Materials recovered																
		LS A	EIA	MIA	LIA	Pottery types (√)	KS	UR	EB	RO	Bones	Bone points	Furnace	Slag/ Tuyere	Lithics	Skeletons	Shells	Shrines
Hateka	00º14’44.4”N 34º00’29.8”E				x	x				√	x							
Majanji A	00º15’38.6”N 33º59’38.5”E	x									x				X			
Maduwa A1	00º14’33.7”N 33º59’17.5”E			x	x	x			√	√								
Maduwa A2	00º14’35.5”N 33º59’17”E			x	x	x			√	√					X			
Maduwa B	00º15’28”N 33º59’33.3”E				x									x	X			
Namundiri A	00º16’04.5”N 33º58’51”E	x			x	x	√			√	x				X		x	
Namundiri B	00º16’15.1”N 33º58’49.3”E				x	x				√								x

Site name	**GPS**	**Materials recovered**																
		LSA	**EIA**	**MIA**	**LIA**	**Pottery types (√)**					**Bones**	**Bone points**	**Furnace**	**Slag/ Tuyere**	**Lithics**	**Skeletons**	**Shells**	**Shrines**
						KS	**UR**		**EB**	**RO**								
Namundiri B1	00º16'15.7"N 33º58'48.1"E				x	x				√				x				
Magombe 1	00º16'39.5"N 33º58'33.1"E				x								x	x				
Magombe 2	00º16'42.9"N 33º58'34.3"E				x									x				
Budecho A	00º14'50.4"N 33º58'10.6"E	x				x	√				x				x			
Budecho B	00º14'02.3"N 33º55'40.4"E	x				x	√				x				x			
Budecho C	00º14'05.2"N 33º55'51.7"E				x	x				√			x	x				
Budecho D	00^0 14'00.9"N	x					√				x				x			

Site name	GPS	Materials recovered																
		LSA	EIA	MIA	LIA	Pottery types (√) KS	UR		EB	RO	Bones	Bone points	Furnace	Slag/ Tuyere	Lithics	Skeletons	Shells	Shrines
	033^{0} 55’45.9”E																	
Buloosi A1	00º13’51.4”N 33º56’57.7”E				x	x				√								
Buloosi A2	00º14’26.6”N 33º57’40.9”E	x				x	√										x	
Buloosi B	00º14’06.4”N 33º57’09.8”E	x				x	√									x	x	
Lukaba 1	00º14’50.6”N 33º58’04.8”E		x		x	x		√										
Lukaba 2	00º14’47.1”N 33º58’11.3”E	x			x		√								x		x	
Namayingo District																		
Namaboni A	00º13’40”N 33º55’26.3”E	x			x		√		√	X		x	x	x	x	x		

Site name	GPS	Materials recovered																
		LSA	EIA	MIA	LIA	Pottery types (√)					Bones	Bone points	Furnace	Slag/ Tuyere	Lithics	Skeletons	Shells	Shrines
						KS	UR		EB	RO								
Namaboni B	00º13’35.5”N 33º55’32.5”E	x				x	√				x	x			x	x	x	
Namaboni c	00º13’24.0”N 33º55’40.0”E	x			x	x	√			√				x	x		x	
Lugala A1	00º11’46.3”N 33º53’52.3”E	x	x			x	√	√								x		
Lugala A2	00º11’58.0”N 33º53’48.1”E				x	x				√			x	x				

Note. LSA = Late Stone Age; EIA = Early Iron Age; MIA = Middle Iron Age; LIA = Late Iron Age; KS = Kansyore; UR = Urewe; EB = Entebbe; RO = Roulette

Although the survey was limited to the shores and not much information was gathered on the spatial and temporal distribution of LSA and EIA settlements in the area, available survey results gave an indication of the LSA and EIA settlement structure. For instance, LSA communities were concentrated in the parishes of Busiime and Lutolo rather than Majanji Parish in the east and the Lugala Parish in the west. It is likely that the Busiime and Lutolo parishes were more conducive to LSA settlement than were the Majanji and Lugala parishes. On the other hand, EIA sites were rare and all were found west of the Majanji Parish (i.e., in the Busiime and Lugala parishes). The establishment of the presence of only a few EIA sites may have resulted from the survey method employed in this study, which was more focused on surveying the shores of Lake Victoria Nyanza rather than inland areas. The present study's survey results therefore remain tentative and have to be viewed with caution. It is also important to note that the few sites with evidence of EIA materials recovered in this study did not reveal much about settlement patterns. However, at Lugala A1, the survey team identified a sand-harvesting trench which, when inspected for evidence of LSA and EIA materials, revealed that the lower layers possessed LSA materials, followed by hiatus layers (30 cm) and then EIA layers, leading to a conclusion that the site was first settled by LSA hunting communities and later by EIA communities and that the two might not have interacted at all.

Evidence of LSA materials included ceramics of the Kansyore tradition (see Figure 4.5), grinding stones, lithics, shells, bones, bone points, and human skeletons. Evidence of EIA materials included ceramics of the Urewe tradition (see Figure 4.5) as well as human remains. Lithics recovered during the survey were largely of quartz material that is well-known on most Kansyore LSA sites (Seitsonen 2010). Interestingly, the recovery of human skeletons and Kansyore ceramics on LSA sites has been associated with delayed-return economies (Woodburn 1980; Dale *et al.* 2004; Dale 2007). Finding evidence of such materials on some of the surveyed sites suggested that LSA hunter-gatherers on those sites practised delayed-return economies. However, this awaits excavation approval. If the suggestion based on survey results is right, it is possible that the northern shores of Lake Victoria Nyanza were occupied by a group of LSA hunting-gathering communities that were less mobile and perhaps lived a semi-sedentary lifestyle just as their counterparts in EIA communities did.

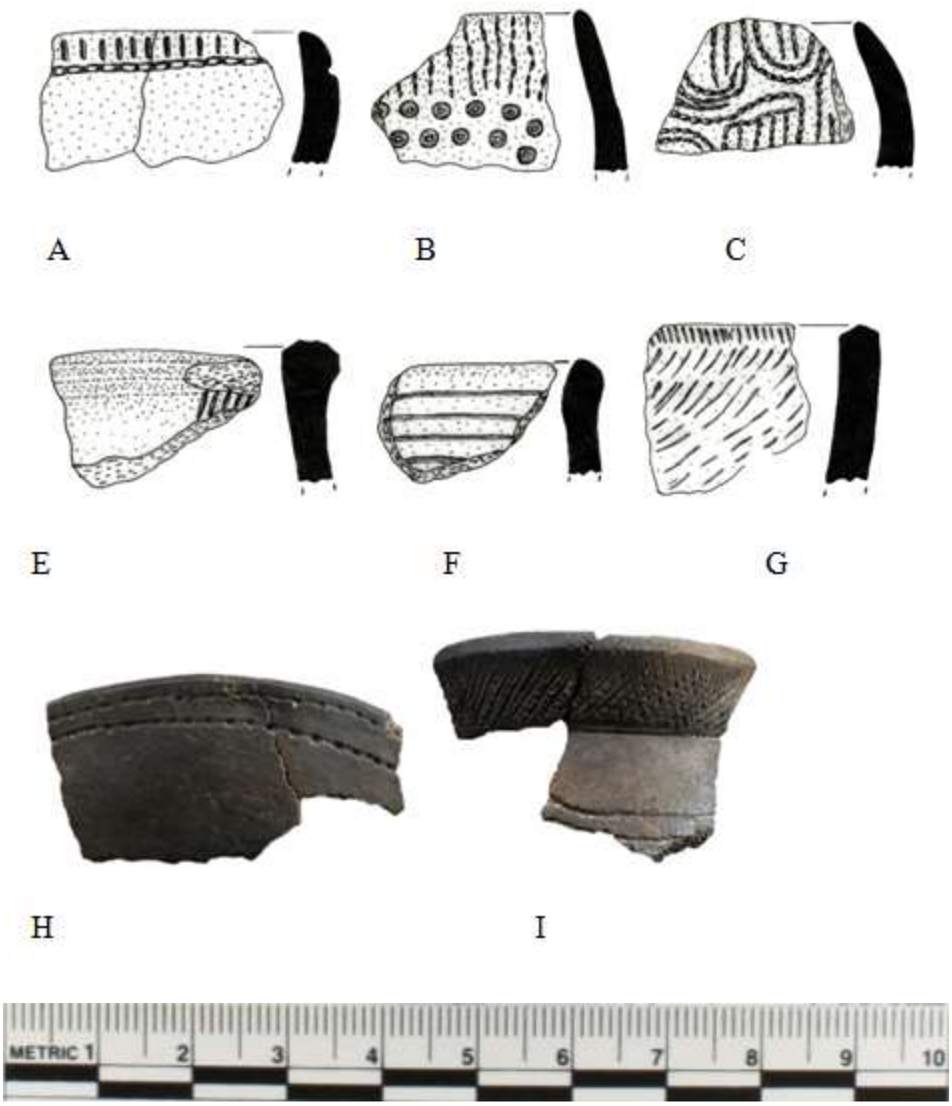


Figure 4. 5: Ceramics recovered from Namaboni B, Namundiri A, and Lugala A during survey: (A–C) Kansyore LSA; (E–I) Urewe EIA

Freshwater shells of different sizes were found across all sites with LSA materials, suggesting they could have been gathered for food during the time when the lake's water levels were high or in wet seasons. Interestingly, the shells of land snails were frequently identified at sites with EIA materials (e.g., Lugala A1), suggesting that early farming communities may have lived in different environmental conditions than the hunting-gathering communities did. Based on shells/snails evidence, it is possible that the area was drier during the EIA-farming period than during the LSA-hunting-gathering period. However, this is just an assumption that awaits proof in future. If proof is found in the near future, it will shed light on climate change, a topic of conversation whenever the Late Holocene period is discussed (Lejju 2012).

Animal bones (see Figure 4.6), fish bones, and bone points (identified in a quick field laboratory analysis) were recovered during the survey. Bone points have been associated with hunting and/or fishing (Prendergast & Lane 2010), implying that fishing and hunting were some of the activities carried out on the northern shores of Lake Victoria Nyanza. A finding of this kind was, however, very common on sites that were disturbed (most of which were LSA sites). These findings cast light on the subsistence of the communities that settled on the northern shores of Lake Victoria Nyanza, Uganda.

Figure 4. 6: Animal bones identified at the Budecho B site

It is worth noting that most of the sites discovered in this study were found in areas that were highly disturbed by different human activities such as cultivation, and sand- and shell-harvesting. Shell harvesters targeted earlier-period sites as these provided them with the shells and bones they needed for chicken feed (Moses pers. com. March 2016). By the time of the present study's survey, some LSA sites (e.g., Namaboni C) were earmarked for destruction (Moses pers. com. March 2016). Therefore, the survey team was forced to conduct a rescue operation in the form of recording as many sites as possible along the shores before all was destroyed. This denied the team the opportunity to survey other areas beyond the shores. It is important to note also that, at some sites (e.g., Lugala A1, Budecho B, and Namaboni B), the survey team recovered evidence of materials in situ at a level of about 82 cm (see Figure 4.7) and even at 2 m below the surface, suggesting that sites of this kind would not have been discovered without surface disturbance being visible. This remark is not intended to justify disturbance activities but to show how hard it is to identify sites of the early periods in Uganda since most of them are buried below the surface. Future researchers will therefore need to employ subsurface survey strategies if they are to discover sites in this area.

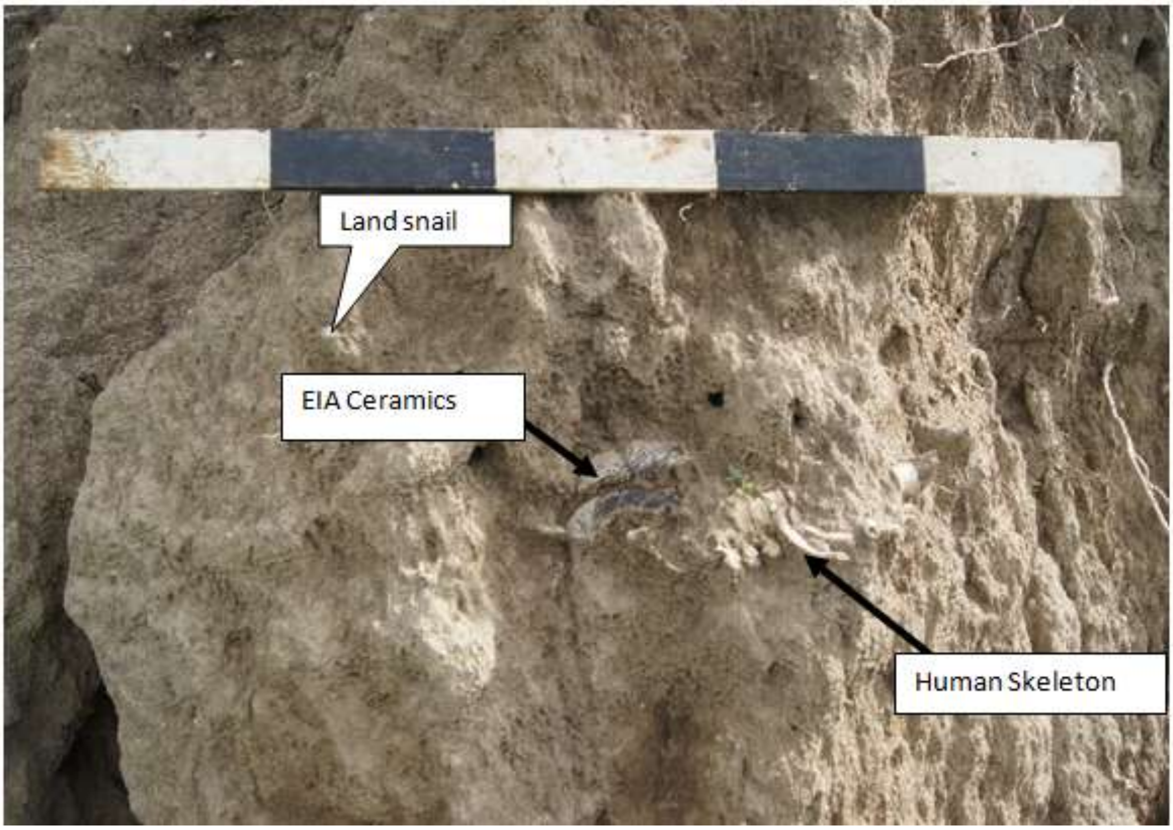


Figure 4. 7: Evidence of EIA materials found in situ at the Lugala A1 site

As noted before, most of the sites recovered during the survey were highly threatened by human activities such as sand- and shell-harvesting. Therefore, some sites (e.g., Namundiri A, Budecho A, Namaboni B, Namaboni C, Lugala A1, and Lugala A2) were earmarked for excavation. Apart from Namaboni C, which was the next site shell harvesters targeted, all other sites were under active destruction, forcing the survey team to stop survey activities immediately in order to conduct rescue excavations to avoid losing archaeological evidence of materials.

4.6 Chapter Summary

This chapter showed that the climate at the Lake Victoria Nyanza basin was the result of diverse features (e.g., topographic, basal elevation and latitudinal range) that exerted strong control over biodiversity distributions and human activities. An exploration of the past climates at Lake Victoria Nyanza showed that repeated dessication had a strong influence on the socio-economic organisation of hunter-gatherers who depended on terrestrial and lacustrine resources. The occupation of the lake's shores depended on the expansions and contractions of the lake's levels, which, according to Tryon *et al.* (2016), acted as push-and-pull factors for human populations.

The spatial distribution of sites revealed that the northern shores of Lake Victoria Nyanza were occupied by both LSA hunter-gatherers and EIA farming communities. The LSA settlements were concentrated in the Busiime and Lutolo parishes west of the Majanji Parish that is right at the Uganda-Kenya border in the east. Also, EIA settlements were observed west of Majanji in the parishes of Busiime and Lugala. The temporal distribution of LSA and EIA settlements indicated that LSA hunter-gatherers using Kansyore ceramics were the first to settle in this area after a period of no settlement (indicated by a hiatus), and that EIA farming communities also settled there. This suggested that the two communities did get in touch with each other on the northern shores of Lake Victoria Nyanza despite finding material evidence closely associated with each other on the surface. Finding evidence of LSA and EIA materials close together suggested disturbance (which was observed throughout the study area at most sites recovered during the survey).

CHAPTER 5
EXCAVATION METHODS AND RESULTS

5.0 Introduction

This chapter discusses excavation methods and results. It starts by giving an overview of excavation methods previously used in the Great Lakes region and then moves on to methods used in the present study. Excavation results for each site follow.

5.1 Excavation Methods

Excavations in the Great Lakes region combined both test pit and larger trench methods (Robertshaw 1985, 1991; Karega-Mũnene 2002; Kiyaga-Mulindwa 2004) for purposes of testing the depth of deposits as well as understanding the patterning of human activities. In such studies, excavations always used either arbitrary spits (Karega-Mũnene 2002) or archaeological layering, and sometimes both (e.g., Prendergast 2008). For the present study, five sites in total were chosen for excavation because they were highly threatened by shell and sand harvesters. Excavation units/trenches took the form of 2x2 m trenches and in rare cases 1x1 m trenches. Excavations followed natural layering where possible. Where natural stratigraphy was not discernible, arbitrary spits of 5 to 10 cm were dug, even up to 19 cm where the sediment was too hard to break and required the use of trowels. In such cases, excavation intervals were difficult to control.

Sites producing evidence of LSA and EIA cultural materials were prioritised. Excavations took place at the Namundiri A and Budecho A sites in the Busia District from mid-April to mid-May 2016 as well as in May 2017. Excavations in the Namayingo District were conducted at Namaboni B, Lugala A1, and Lugala A2 from mid-May up to the end of June 2016. Excavation at all the sites was carried out using trowels, shovels, picks, pangas, chisels, buckets, and sieves. Both normal and forked hoes, pangas, picks, and chisels were used in a few areas that had extremely hard sediments. All excavations stopped when sterile levels were hit, these occurring at varying depths.

The soil from the excavations were sieved using 5 mm wire meshes so as to recover artefacts and faunal material of different sizes (including small micro remains) to inform the research study on interactions and subsistence economies. All cultural materials and sediment samples were collected in plastic bags. Charcoal samples were taken from each level/layer wherever possible.

A 10-litre bucket of sediment was floated for each spit, and 30 litres from each layer, to recover botanical remains, but where the layers were thin, all the sediment was collected for flotation. Sediments were processed manually by bucket flotation using 10-litre buckets filled with lake water (see Figure 5.1). Lake water was sieved first to remove contaminants prior to bucket flotation. Sediment was stirred by hand, and particles were left to suspend for 10 minutes and then poured into 0.3 mm mesh flotation bags. Floats were air dried and, once dry, were transferred to clean plastic sample bags for storage awaiting further analysis. The remaining sediment was wet-sieved in the lake using a 1 mm mesh and allowed to air dry. Heavy residue was manually sorted in the field to retrieve other organics and cultural remains.

All excavated sites were mapped and the location of excavation units noted. Maps were drawn using the baseline off-setting method and/or using the dumpy level, and GPS coordinates were used to record temporary benchmarks to anchor the maps. Recording photographs were taken for every level/layer in each trench and when special features were recovered. Plans were drawn when reaching the end of each level/layer and on the appearance of features. All excavation information was recorded on an excavation form (see Appendix 2). At the end of each excavation, profiles with scales ranging between 1:5cm and 1:10cm were drawn to show stratigraphy.

In the following section, excavation results are discussed site by site. The focus is on sites where deposits were intact and not disturbed as these hold the greatest interpretive potential. The section starts by describing each site, after which detailed information of each excavation unit is given and discussed.

Figure 5. 1: Bucket flotation in progress

5.2 Excavation Results

5.2.1 Namundiri A site

Namundiri A was an open-air Kansyore LSA single-component site characterised by dense shell middens and containing large amounts of Kansyore ceramics and bones. The site was found in the Namundiri A village located at 0^{0}16’04.5”N and 33^{0}58’51.0”E and was situated at an elevation of 1 145 m above sea level. The site was approximately 1 km from the Majanji trading centre and could be accessed by a footpath—a vehicle could only stop approximately 200 m away. The site was about 70x40 m in size and roughly 50 m from the shoreline of Lake Victoria Nyanza in the Majanji Parish, Samia-Bugwe South County, Busia District. The site was under cultivation—specifically cassava, maize, sorghum, and beans—and was also disturbed by shell harvesters. A less disturbed area to set a trench was identified (see Figure 5.2). Two trenches (2x2 m and 2x1 m) were excavated (see Figure 5.2) in 2016 and 2017 respectively.

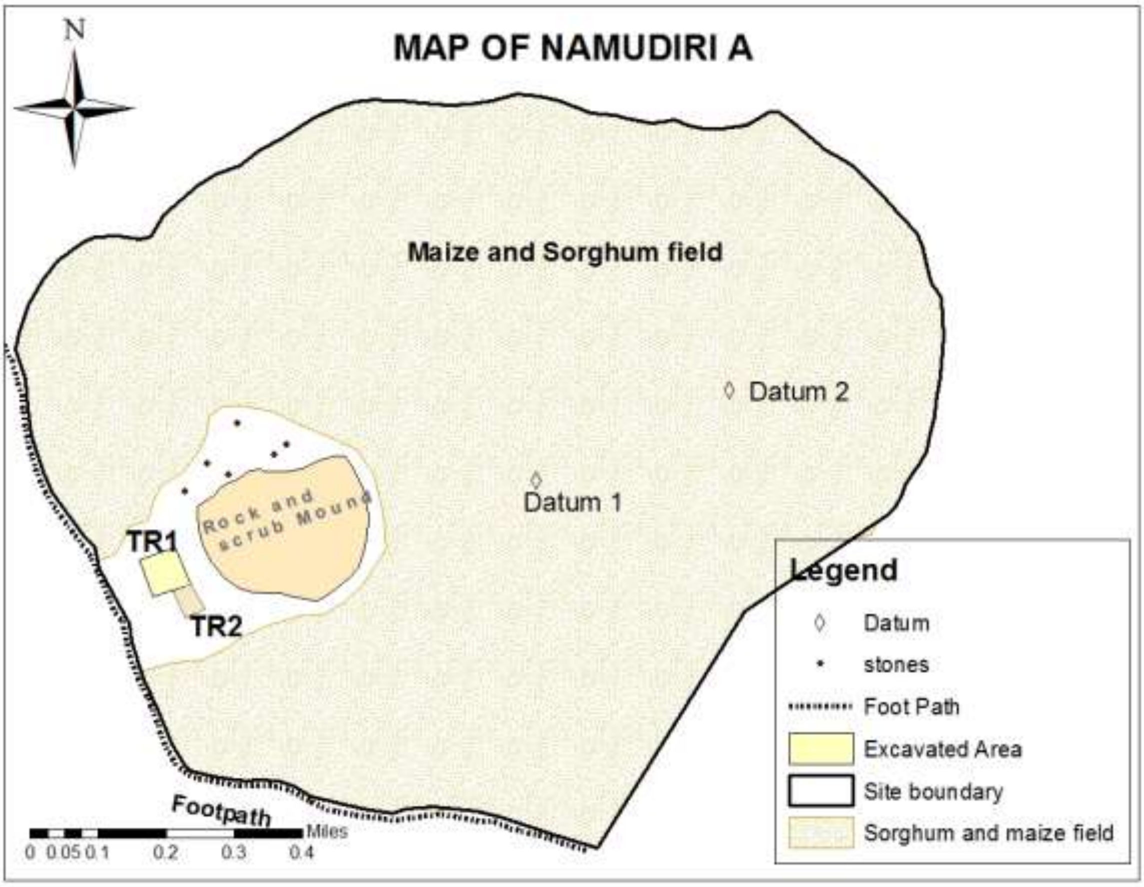


Figure 5. 2: Namundiri A map showing excavated area

5.2.1.1 Trench 1

Trench 1 measured 2x2 m and was excavated to a depth of 116 cm below the surface (see Figure 5.3). The trench sloped towards the west, and a few disturbances were observed in the southwestern corner of level 6 (49–60 cm) and level 9 (84–97 cm). The excavation used arbitrary spits of 5 to 19 cm because the soil colours were hard to define. As the sediment in some spits was too hard to break, chisels, forked hoes and picks were used, which made it hard to control the spit thickness (hence the range of depth of the spits).

Figure 5. 3: Namundiri A, trench 1, end of excavation

The sediment composition in trench 1 ranged from loam-to-loam sand in the upper levels (49 cm) to heavy loams and light clay in the lower levels (from 49 to 116 cm). Sediment descriptions are provided in Table 5.1. There was root disturbance in the upper four levels. Termite disturbance was observed in level 6, whereas levels 7 to 10 were dominated by boulders that increased in size with the depth of the trench (see Table 5.1). A termite burrow appeared in level 9 in the southwestern corner. The trench produced a range of artefacts (i.e., pottery, bones, lithics, shells, charcoal, bone points, daub, ochre, and metals (including coins) (see Table 5.1), and these were midden deposits. In addition, 10 litres of sediment per level were floated for archaeobotanical samples, and phytolith samples of 50 g of sediment were also collected from the middle of the trench (to avoid contamination) in each level. Very few (n = 4) roulette pottery sherds appeared in the first two levels, and thereafter only Kansyore pottery was found. Kansyore was found in association with burnt bones, burnt clay, lithics, and shells. Fish bones were predominant in the faunal assemblage regardless of level, but the quantity found was particularly high in levels overlaying level 8. Most of the materials were recovered in situ although some materials (e.g., lithics, fish bones, and pottery) were recovered by sieving the sediment. Based on the artefacts recovered from this site during survey and excavation, the site was associated with LSA hunter-gatherers who used Kansyore pottery. The disturbances observed during excavation and also the sloping nature of the site made dating the site as well as examining the variation within LSA somewhat problematic. Five stratigraphic layers were identified (see Figure 5.4).

Table 5. 1: Namundiri A, trench 1: Summary

Level/Depth (cm)	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Bone points (no.)	Others
1 (0–34 cm)	Loose, dark-reddish grey (5YR4/2) loam	76	9	1	36	0	0	3 metal items + a coin
2 (34–38 cm)	Loose, compact, reddish brown (5YR4/3) loam	56	8	4	80	0	0	
3 (38–40 cm)	Compact, weak red (10YR4/2) loam sand; A layer of shells was observed.	99	98	7	338	0	1	
4 (40–45 cm)	Compact, dark-reddish grey (5YR4/2) loam sand	32	28	4	183	2	0	
5 (45–49 cm)	Compact, reddish brown (5YR/4/4) loam	29	380	20	1482	1	1	Ochre
6 (49–60 cm)	Compact, reddish brown (2.5YR4/4) heavy loam sand	193	218	207	1996		4	Daub + ochre
7 (60–75 cm)	Compact, reddish brown (5YR4/3) light clay; Burnt soil and bones were observed in the southwestern corner.	232	236	419	1779	5	0	Ochre + burnt sediment
8 (75–84 cm)	Compact, light reddish brown (5YR6/3) heavy loam	277	95	631	2006	6	1	Seed + ochre
9 (84–97 cm)	Compact, yellowish brown (10YR5/4) light clay	216	97	384	1197	2	0	Metal blade
10 (97–116 cm)	Compact, brown (7.5YR5/4) light clay; Boulders dominated the trench and excavation ended due to lack of space to dig.	72	32	107	319	2	0	
TOTAL		**1 282**	**1 202**	**1 784**	**9 416**	**19**	**7**	

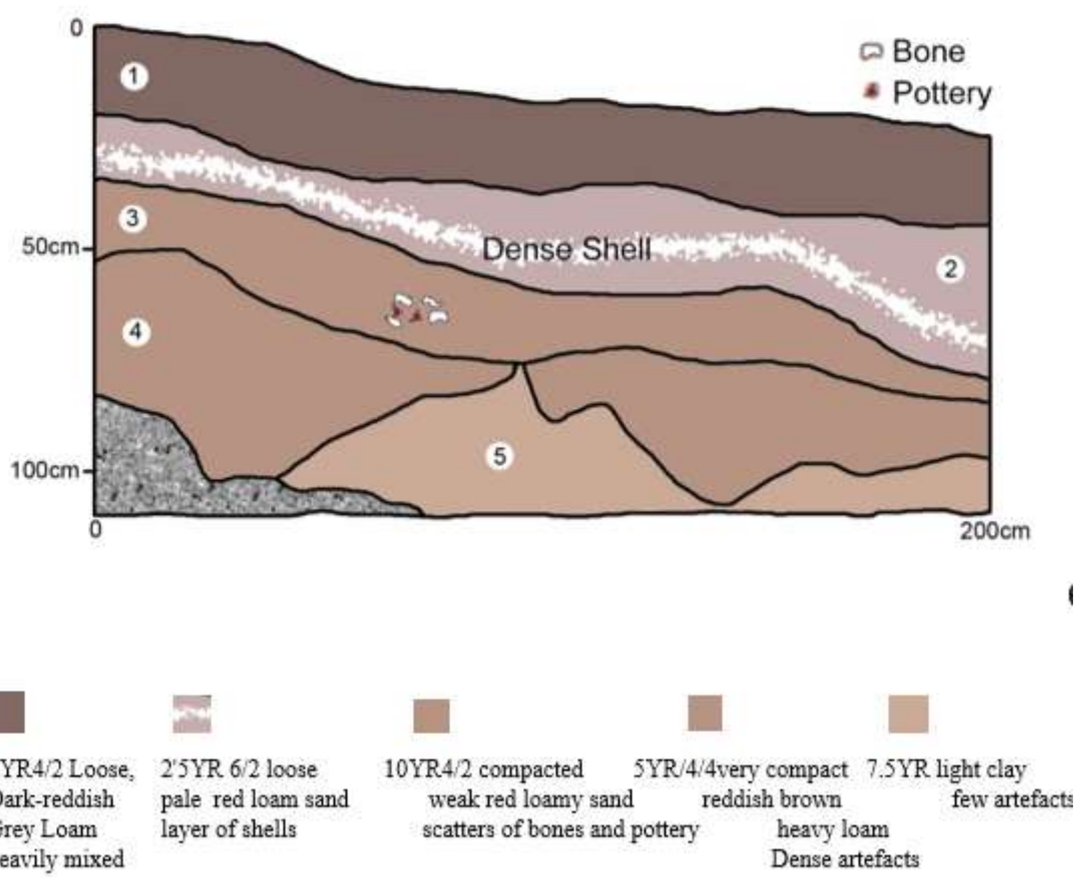


Figure 5. 4: Namundiri A, trench 1: North-facing profile at completion

A total of 13 700 items of archaeological material were recovered; bones (n = 9 416 (69%)), shells (n = 1 784 (13%)), pottery (n = 1 282 (9%)), lithics (n = 1 201 (9%)), bone points (n = 7 (0.1%)), metal (n = 4 (0.03%)) ochre (n = 4 (0.03%)), and daub (n = 2 (0.03%)) (see Table 5.1). Pottery, lithics, shells, and bones were found throughout all the layers in this trench (see Table 5.1). A high frequency of pottery was observed in layers 1 and 2 and this was attributed to agricultural activities in the area or previous disturbance by shell harvesters. The shell harvesters had a tendency of throwing away non-organic materials during the selection process, and this might have contributed to the high frequencies of such materials. A decrease in pottery was observed in layer 3, and this was attributed few disturbances. A drastic increase in pottery, lithics, shells, and bones was observed in layer 4 and a decrease in layer 5. Two bone points were recovered from layers 2 and 3, one from each, whereas five bone points were recovered from layer 4. Ochre was recovered from layer 3 and layer 4. Ochre is thought to have been used as paint/slip on ceramic as evidenced by some painted pot sherds at this site. Daub and/or burnt sediment (see Figure 5.5) was also observed in layer 4, suggesting the use of fire at the site. Metal was recovered in the southwestern corner of layer

5 which was quite surprising but could have been the result of disturbance from ant-hill burrows observed in the southwestern corner of this layer. Bones were the most dominant and abundant material recovered from all layers. Most of the datable materials from this trench were recovered from the sieve, making it impossible to plot the exact place they came from. Besides, trench 1 was disturbed by ant-hill burrows and therefore all charcoal samples collected from this trench were not considered for radiocarbon dating. The Namundiri A site, as noted earlier, sloped towards the west, suggesting site formation could have been influenced by processes such as runoff from the hilltop to the east. Although there was clear evidence of disturbance, it was noted that many more activities were taking place in layer 4 than in the other layers.

Figure 5. 5: Namundiri A, trench 1, layer 4: Daub and/or burnt sediment recovered

5.2.1.2 Trench 2

Namundiri A, trench 2 was an extension of trench 1 southwards that was excavated later in May 2017. The decision to excavate this trench was reached due to disturbances observed in trench 1 and the need to have secure charcoal for radiocarbon dating. It was a 2x1 m trench and was excavated following arbitrary spits of 10 cm to a depth of 110 cm below the surface. Charcoal samples were collected at different depths and, unlike in the first trench, very few artefacts were recovered. Perhaps this was due to the size of the trench or because the trench was at the extreme end of the site.

The trench was set using the northeastern corner of trench 1 as a datum point, aligning it 2 m southwards and 1 m westwards (see Figure 5.2). The surface elevation of the trench was 1 139 m above sea level and the trench sloped westwards from the eastern section towards the western section. With the exception of spit 1, which was excavated to 30 cm, the succeeding spits were excavated at an interval of 10 cm, and trowels were used throughout. Nine spits were excavated in this trench, and the sediment colour ranged from reddish black to dark reddish grey (see Table 5.2). Trench 2 ended at 110 cm below the surface, and sediment was more of a silty loam in the upper spits and gravelly in the lower spits. Cultivation and root disturbances from the current sorghum crops were observed in the upper three spits but no traces of disturbances were observed in other spits. Stone boulders began to appear at 40 cm in the northeastern corner, and at the end of spit 6 they had covered the eastern part of the trench, whereas at the end of spit 8 they had covered the whole trench leaving almost no space for excavation.

All the pottery collected from this trench belonged to the Kansyore tradition. Five charcoal samples were collected; two from spit 2 and one each from spits 3, 4 and 8. Only one charcoal sample (AMS 024209) (see Table 5.9 from level 3 (at a depth of 40 cm) towards the northeastern corner was considered for dating due to limited resources. The sample, when dated, indicated that the level was modern. The sample came from a level associated with Kansyore pottery, shells, lithics and bones. Given its proximity to the surface, the modern date was not unexpected. Our field observation indicated that hand-hoe cultivation and shell-harvesting in this level occurred up to 30 cm deep, an occurrence which could have resulted in mixed deposits and in the modern charcoal sample being buried as deep as 30 cm or 40 cm. However, the cultural materials recovered from this site in both trenches 1 and 2 did not support the modern date and this forced the team to revisit the site in 2018 to make another extension of 1x2 m on the southwestern corner of trench 1 (Jones 2020: 139–40; Tibesasa & Jones in prep.). Our hypothesis was proved right when the site turned out to be falling in the mid-Holocene period (see Table 5.4 in Jones 2020: 145; Jones & Tibesasa in prep.). The site was therefore set in the Middle Kansyore phase based on the existing Kansyore chronology of c. 6000–5000 cal. BC termed as the early phase and c. 1000 cal. BC–cal. AD 500 termed as the late/terminal phase respectively (Dale & Ashley 2010).

Table 5. 2: Namundiri A, trench 2: Summary

Level/Depth (cm)	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Ochre (no.)
1 (0–30 cm)	Loose, reddish black (2.5YR2.5/1) to dark reddish grey (2.5YR4/1) loam	40	22	1	48		
2 (30–40 cm)	Loose, dark greyish brown (10YR4/2) loam	20	16	7	41	2	
3 (40–50 cm)	Loose, weak red (10R4/3) loam in the eastern part of the trench and reddish grey (10R5/1) loam on the western side	41	0	22	38	1	1
4 (50–60 cm)	Compact, dark-brown (10YR3/3) loam sand with gravel throughout the trench	12	2	43	24	1	1
5 (60–70 cm)	Compact, greyish brown (10YR5/2) loam sand	1	5	4	7		1
6 (70–80 cm)	Compact, light-reddish brown (5YR6/3) loam sand	19	0	6	24		
7 (80–90 cm)	Compact, light-brown (7.5YR6/3) loam sand	2	0	4	2		
8 (90–100 cm)	Compact, yellowish brown (10YR5/4) loam sand	1	0	1	3	1	
9 (100–110 cm)	Light-brown (7.5YR6/4) loam sand	0	6	3	2		
TOTAL		**136**	**51**	**91**	**189**	**5**	**3**

A total of 470 artefacts, excluding charcoal samples, were recovered from trench 2. In this trench, as was the case with trench 1, bones (n = 189 (40%)) dominated, followed by pottery (n = 136 (29%)), shells (n = 91 (19%)), lithics (n = 51 (11%)) and finally ochre (n = 3 (1%)) (see Table 5. 2). High numbers of materials (e.g., pottery, bones, and lithics) were observed from layer 1 to layer 2, except that in layer 2 the number of lithics was less and the number of shells more, just as in the case of trench 1. A sharp decrease in all artefacts, except shells, was observed from layer 3 onwards. The decrease can be attributed to the undisturbed nature of layers but also to the presence of rock boulders that covered almost the whole trench or to the fact that this trench could have been the boundary of this site.

Archaeology at the Namundiri A site indicated continuous occupation/settlement by Kansyore-using communities. This finding was based on the distribution of material deposits in all spits excavated where there was no evidence of hiatus/sterile spits. A handful of roulette sherds (n = 4) was recovered in the upper layers of trench 2 mixed with Kansyore sherds, suggesting disturbances from modern activities.

5.2.2 Budecho A Site

Similar to Namundiri A, Budecho A was an open-air Kansyore LSA single-component site in the village of Budecho, Bwanikha Parish, Busia District. It was located at $0^0$14’02.3”N and $33^0$55’40.4”E at an elevation of 1 129 m above sea level. The site, which was found on Mr. Oduma’s land, measured approximately 44.8x153.5 m (see Figure 5.6). It was positioned roughly 100 m from the shore of Lake Victoria Nyanza, about 2 km from the Bwanikha trading centre and accessible by vehicle. At the time of the present study the site was under cultivation (specifically cassava, maize, bananas and beans). The site was under threat from shell and sand harvesters.

Three trenches (two measuring 2x2 m and one measuring 1x1 m), which were oriented cardinally using a compass, were dug (see Figure 5.6). The decision to excavate this site was taken due to the need to rescue it from ongoing destruction by sand harvesters but also to reach the overall project objectives. Trench 1 was set at 1 m north of the datum point that was set at the centre of the site; trench 2 was set at 31.8 m southeast of the datum point; and trench 3 at 9 m north of the datum point. Excavations followed arbitrary spits of 10 cm until lake sand with no artefacts was reached. Very few artefacts were recovered in all three trenches because the site had been highly disturbed by shell harvesters.

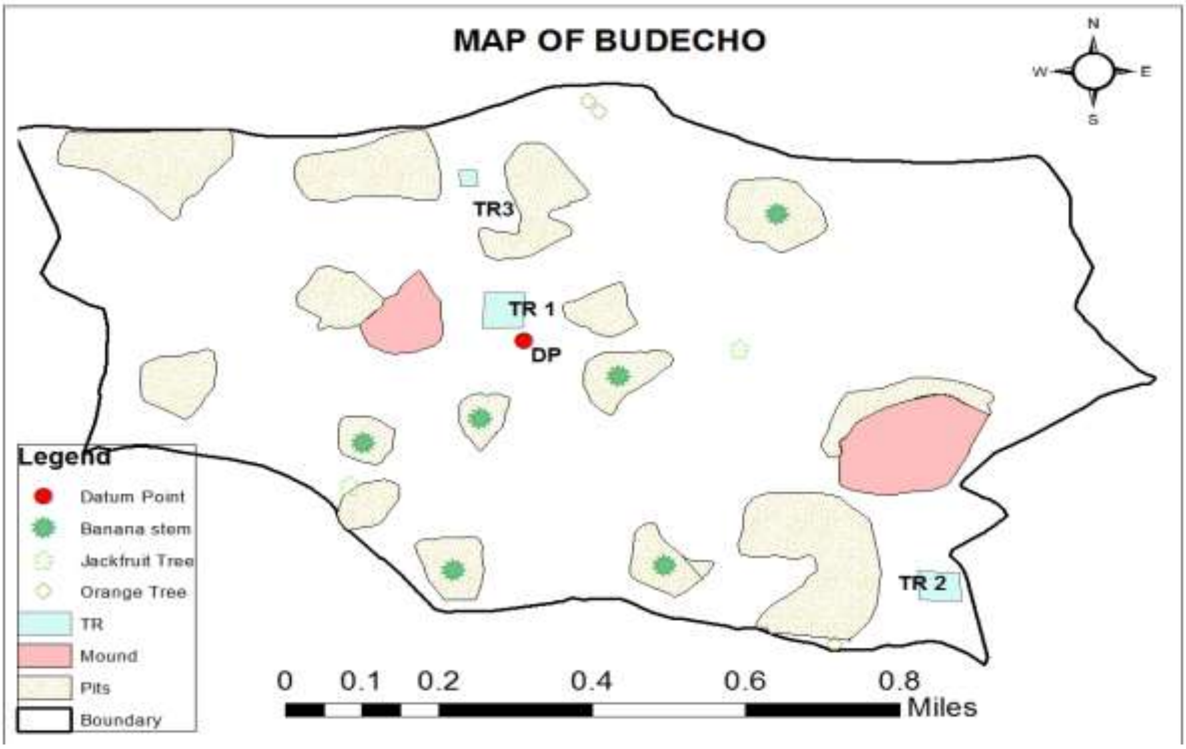


Figure 5. 6: Budecho A: Map indicating areas excavated, shell-mining pits and unexcavated mounds

5.2.2.1 Trench 1

Eight levels were excavated, and the sediments in the four upper levels (0–50 cm) were loose pale-red (2.5YR6/2) sand. The levels yielded a few pieces of pottery that were not decorated, lithics, and tiny broken pieces of shell and bone (see Table 5.3), suggesting that the sediments were backfill from shell harvesters. In addition, the levels were highly disturbed by cultivation activity.

The lower levels (5–8, 50–90 cm below the surface) had loose reddish brown (2.5YR5/3) to loose pale-red (2.5YR) sandy sediments that continued to yield similar materials as those in the upper levels. Polythene/nylon bags, maize stocks, cassava stems, and roots were recorded in almost all levels, suggesting the site was not in its primary state. This compelled the survey team to open another trench in order to get undisturbed content.

Table 5. 3: Budecho A, trench 1: Summary

Level (cm)	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Flot (10L) (no.)
1 (0–20 cm)	Loose, pale-red (2.5YR6/2) while dry and dark reddish grey (10R4/2) sand while wet; composed of tiny broken artefacts; highly disturbed by cultivation, roots	0	10	35	22	0	0
2 (20–30 cm)	Loose, pale-red (2.5YR6/2) while dry and dark reddish grey (10R4/2) sand while wet; highly disturbed by roots; only very tiny artefacts recovered	56	8	4	82	0	1
3 (30–40 cm)	Loose, pale-red (2.5YR6/2) while dry and dark reddish grey (10R4/2) sand while wet; reduced number of broken artefacts; root disturbance observed	0	0	13	0	1	1
4 (40–50 cm)	Loose, pale-red (2.5YR6/2) while dry and dark reddish grey (10R4/2) sand while wet; root, maize cobs, nylon sacks, and termite disturbance observed	2	10	12	20	0	1
5 (50–60 cm)	Loose, brown (5YR/4/3) while dry and dark reddish brown (2.5TR3/2) sand while wet; polythene bags, maize stocks, cassava stems and root disturbance recorded	5	7	30	21	0	1
6 (60–70 cm)	Loose, reddish brown (2.5YR5/3) while dry and brown (7.5YR4/3) sandy while wet; nylon, plastics and root disturbance observed	3	5	54	35	1	1
7 (70–80 cm)	Loose, reddish grey (5YR5/2) while dry and reddish brown (2.5YR4/3) sand while wet; nylon, plastic and root disturbance observed	1	0	41	15	1	1
8 (80–90 cm)	Loose, pale-red (2.5YR) while dry and reddish brown (2.5YR4/4) sand while wet; maize cobs, root disturbance observed	4	11	52	47	1	1
TOTAL		**71**	**51**	**249**	**242**	**4**	**7**

5.2.2.2 Trench 2

Trench 2, measuring 2x2 m, was set 31.8 m southeast of trench 1 in an area that seemed intact. Three levels (l–3, 0–65 cm) were excavated in this trench which sloped southwards. The sediment in these levels was loose to compact, weak red (10YR5/2) loam to clay that yielded Kansyore pottery, lithics and bones (see Table 5. 4). The soil was highly disturbed by an anthill, which made it hard to proceed with excavations, and the trench work stopped at 65 cm below the surface. The presence of the anthill (see Figure 5.7) could have been the reason why shell harvesters had left the area intact despite their story of discovering many human skeletons in this part (Moses pers. com. 2016).

Table 5. 4: Budecho A, trench 2: Summary

Level	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Flot (10L) (no.)
1 (0–14 cm)	Loose, weak-red (10YR5/2) while dry and reddish brown (5YR5/3) loam while wet; highly disturbed by anthill	3	2	0	7	0	0
2 (14–35 cm)	Compact, weak-red (10YR5/2) while dry and reddish brown (5YR5/3) sandy loam while wet; too compact due to anthill disturbance	11	9	0	12	0	0
3 (55–65 cm)	Compact, weak-red (10YR5/2) while dry and reddish brown (5YR5/3) clay while wet; sediment was hard to break	9	5	0	37	0	0
TOTAL		**23**	**16**	**0**	**56**	**0**	**0**

Figure 5. 7: Field team members clearing the anthill at Budecho A

5.2.2.3 Trench 3

The trench was set at 9 m north of the datum point. The upper levels of the trench had been disturbed by cultivation and all other levels consisted of backfill from the shell harvesters (explained by the presence of nylon and plastic sacks in the lower levels). Trowels were mainly used in the excavation all through this trench, and a few pieces of pottery, lithics and bones were recovered. The trench stopped at level 5 (see Table 5.5). Given the disturbed nature of this site and limited time and resources, the drawing of profiles was thought to be meaningless. Therefore, the site was abandoned and not considered for further detailed analysis.

Table 5. 5: Budecho A, trench 3: Summary

Level	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Flot (10L) (no.)
1 (0–20 cm)	Loose, weak-red (2.5YR 4/2) while dry and dark-red (2.5YR3/3) sand while wet; disturbance from cultivation, roots and shell-harvest backfill observed	0	0	0	0	0	0
2 (20–30 cm)	Loose, dark-grey (5YR4/1) dry and dark reddish brown (5YR3/2) light loam while wet; root disturbance	1	0	0	0	1	0
3 (30–40 cm)	Loose, pale-red (2.5YR 6/2) light loam while dry and wet; root disturbance	5	0	0	0	0	0
4 (40–50 cm)	Loose, brown (7.5YR 5/4) while dry and dark greyish brown (10YR 4/2) clay while wet; roots, cassava stems and maize cobs disturbance	5	3	0	9	0	0
5 (50–60 cm)	Loose, light-grey (5YR/7/1) while dry and grey (5YR6/1) clay while wet; no artefacts	0	0	0	0	1	0
TOTAL		**11**	**3**	**0**	**9**	**2**	**0**

5.2.3 Namaboni B Site

Namaboni B site was an open-air Kansyore LSA single-component site characterised by dense shell middens. The site was in the village of Namaboni situated $0^0$13’35.5”N, $3^0$55’32.5”E and at an elevation of 1 143 m above sea level. It was on Mr Wandera Joachim’s land in Bukooli South, Banda Subcounty, Namayingo District. The site was approximately 67x40 m in size, situated roughly 50 m from the lake shore (see Figure 5.8), approximately 1.5 km from the Namaboni trading centre, and accessible by vehicle. The site was a large U-shaped uplift caused by buried shell middens, and it sloped off towards the swamp and Lake Victoria Nyanza to the north.

The site was under threat from shell harvesters but the shell harvesters indicated a site where a trench could be set. Based on team members' observations, this site appeared not to have been disturbed. This encouraged the team to follow a natural layering method at this site since the layers were very clear.

Two trenches of 2x2 m and 1.5x1 m (in the form of an L) and two datum points were set at this site (see Figure 5. 8). Datum point 1 ($0^0$13'34.9"N, $33^0$55'31.8"E) was set at an elevation of 1 143 m above sea level. Datum point 2 was set at 32.9 m due north from datum point 1 at an elevation of 1 155 cm. The trenches were oriented north–south, using a compass.

During excavation at this site, shell harvesters continued working alongside our archaeology team. Therefore, this section reports on materials found informally by shell harvesters in addition to the materials found during the controlled archaeological excavation of trenches. Accordingly, human skeletons were recovered at a level of 45.7 m northeast of datum point 1 by shell harvesters who called upon the excavation team to record and excavate them. Coordinates and heights of the skeletons were recorded and then carefully excavated. The intention of setting trenches at this site was to examine the settlement history and subsistence economies of LSA communities over time. The choice of where to excavate was, however, dictated by shell harvesters who had a contract with the landowner to harvest shells. Luckily, enough areas produced good results, and further results were obtained from the shell-harvesting work through collaboration with the shell harvesters.

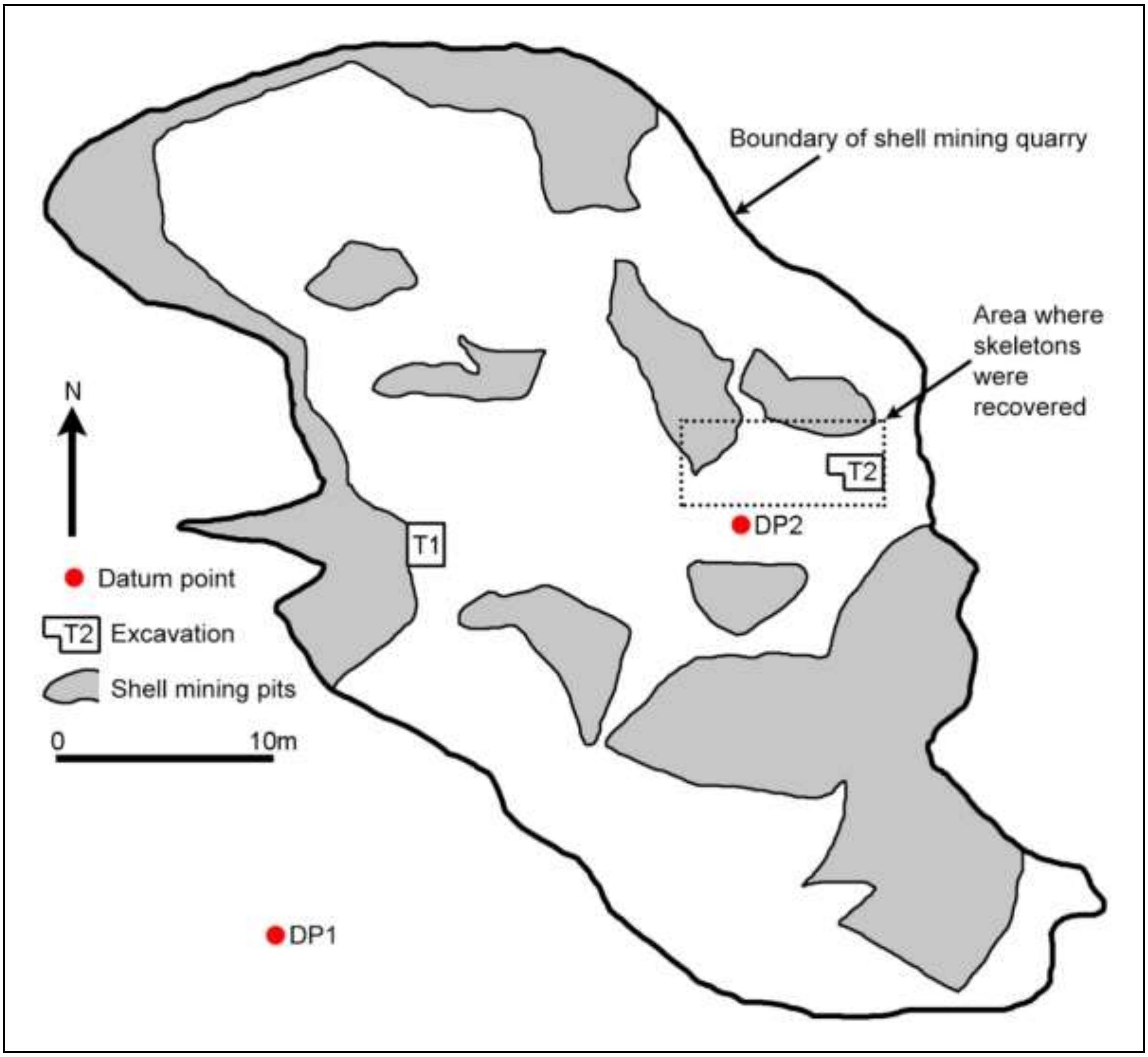


Figure 5. 8: Namaboni B: Site map

5.2.3.1 Trench 1

Trench 1 measured 2x2 m and was set at 27 m north of datum point 1. Excavations in this trench followed natural layering until a sterile layer (layer 10) was hit. The choice to follow natural layering was made because the shell harvesters' previous trenches on this site showed clear, natural layers. Their trenches revealed that, up to almost 172 cm below the surface, the deposit was sterile and nothing could be observed until a layer of bones, lithics, and Kansyore pottery (but no shells) was revealed at 183 cm below the surface. This was followed by another layer that had all the artefacts observed in the previous layer, including shells. The following layers contained lithics, bones, and shells (but no pottery). Therefore, the excavation team used tools such as hoes/jembes, pangas and picks to excavate through the compacted sediment, which was sterile as was observed in the shell harvesters' trenches.

However, trowels were employed in the layers that had cultural materials to avoid mixing artefacts from different layers. Ten layers (see Figure 5.9) were excavated in trench 1 up to a depth of 338 cm below the surface. Out of these, only six layers produced cultural materials relevant to the present study. Layer 1 consisted of 22 cm thick backfill left by shell harvesters, and it had loose, very dusty red (10R5/2) loamy sand sediment with no artefacts. Layer 2 was 14 cm thick, composed of compact, reddish brown (5YR4/3) loam sediment that contained no artefacts. Layer 3 was 84 cm thick, consisting of very compacted, weak-red (10R5/2) light loam sediment that also yielded no artefacts. At the end of this layer, the trench was divided into a southern part of 2x1 m and a northern part (also of 2x1 m) because of water that seeped from the southern wall (see Figure 5.9). This water was caused by rain that had fallen over the two or three preceding days and also by water that came from a rocky outcrop south of the trench. To prevent water from coming to the northern part where digging was in progress, the southern part was left unexcavated and sediment was piled there (see Figure 5.9).

Figure 5. 9: Namaboni B, trench 1: Bottom and unexcavated portion

Layer 4 was 35 cm thick and consisted of reddish brown (5YR4/3), compacted, light clay sediment that yielded Kansyore pottery, bones and lithics, but no shells (see Table 5.6), suggesting that Kansyore users had access to shellfish. Perhaps the harvesting of shellfish was because of environmental issues or because these hunter-gatherers chose to practise this activity. The artefacts were more concentrated in the north-eastern and western corners. Four charcoal samples were collected from this trench using a sieve. Layer 5 was 63 cm thick and consisted of compact, weak-red (2.5YR5/2), light clay sediment that yielded Kansyore pottery, bones, lithics and shells. Burnt clay, suggesting the use of fire, sediment and seeds were also recovered from this layer. Layer 6 was 37 cm thick and consisted of compact brown (7.5YR5/3) heavy loam that yielded bones, lithics, and shells. Shells in this layer were mostly big in size. A drop in lithic and bone frequency was observed. Ochre and seeds were also recovered from this layer.

Layer 7 was 25 cm thick and consisted of loose, dark reddish grey (5YR4/2), heavy loamy sediment that yielded a reduced number of big shells and an increased number of small shells, bones, and lithics. Both layers 6 and 7 produced no ceramics, suggesting the presence of hunter-fisher-gathering communities that had no knowledge of making pots at this time (i.e., aceramic). Two features, which were observed in layer 7, were excavated as two different layers, namely layers 8 and 9. The former was 11 cm thick, was located in the northeastern corner and had loose, weak-red (10R5/2) loam sediment that produced burnt sediment with no other cultural materials. Layer 9 was 19 cm thick below layer 8 and consisted of very loose, grey (7.5YR6/1) sandy loam sediment that produced no artefacts. Although no artefacts were recovered, these layers suggested that there had been some form of human activity. It was possible that most of the artefacts used in layers 8 and 9 had been organic and had rotted away. Layer 10 was 28 cm thick and consisted of reddish brown (5YR5/3) sand sediment that produced no artefacts (see Table 5.6 and Figure 5.10).

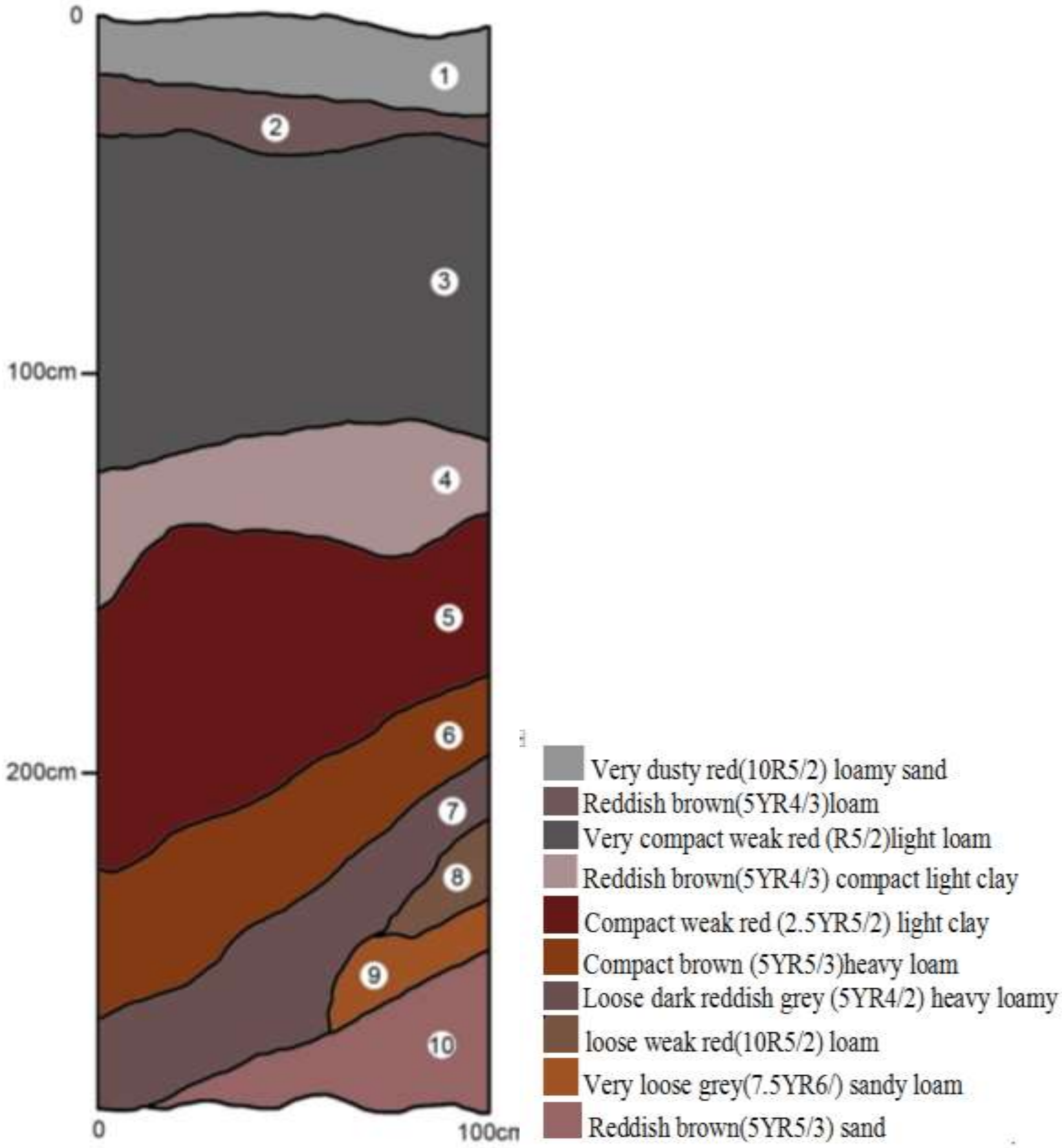


Figure 5. 10: Namaboni B, trench 1: West-facing wall profile at completion

Stratigraphically, three phases were observed at this site; a hiatus phase (layers 1–3), pottery phase (layers 4–5) and aceramic phase (layers 6–10). All charcoal samples from this trench were picked from the sieve and therefore were not considered for radiocarbon dating. Phytoliths and flotation samples were also collected from this trench with the intention of getting direct evidence of diet. All shells collected from this trench were given to the shell harvesters (see Figure 5.11) because the excavation at this site was carried out on condition that this was done since they had paid the land owners for the collection of shells. Therefore, the summary presented below does not reflect actual recoveries (see Figure 5.11 for details on shells recovered from this site).

Figure 5. 11: Namaboni B: Shells collected during excavation

A total of 3 034 artefacts (excluding shells, charcoal and flotation samples) were recovered from this trench. Out of these, 1 845 (61%) were bones, 875 (29%) pottery, 311 (10%) lithics, two seeds, and a piece of ochre (see Table 5.6). Bones, especially fish bones, were the most dominant (82.7%) in all the layers that had cultural materials (see Chapter 7; also Appendix 4). Second-most dominant were bones of mammals, especially of bovids that accounted for 53.6% (see Appendix 4). Pottery from this trench came from only two layers (see Table 5. 6). Interestingly, the two layers with Kansyore pottery seemed to indicate two different subsistence systems, evidenced by the absence of shells in layer 4 and their presence in layer 5. However, vessel technology (fabrics), forms, decoration techniques and motifs as well as lithic technology in this trench suggested some form of continuity (see chapters 6 and 7 for details). The absence of pottery in layers 10 to 6 revealed that the site had been occupied by a pre-ceramic group of hunter-gatherers before the arrival of ceramic-using hunter-gatherers. The ceramic-using hunter-gatherers did not seem to be different from the pre-ceramic hunter-gatherers judging from similarities in lithics and bones found at this site (see Chapter 7). It was likely that pre-ceramic hunter-gatherers gradually learnt to use or make ceramics (for reasons beyond the scope of the present study's investigation) and thus became ceramic-using hunter-gatherers. This argument was based on the recovery of a few ceramic items in the lower part of layer 5 and a gradual increase of such items in the overlying layer, showing no major changes in form, fabric and decoration (see Chapter 6). Although the presence of some ceramic items could be attributed to disturbances, this explanation did not apply to this site. The hiatus that was observed in the last three layers, on the other hand, suggested that the site was not occupied after the Kansyore-using hunter-gatherers had abandoned it.

Table 5. 6: Namaboni B, trench 1: Summary

Layers/ thickness (cm)	**Sediment description**	**Pottery (no.)**	**Lithics (no.)**	**Shells (no.)**	**Bones (no.)**	**Charcoal (no.)**	**Flot. (30L) (no.)**	**Others**
1 (22 cm)	Loose, very dusty, red (10R 5/2) loamy sand	0	0	0	0	0	0	0
2 (14 cm)	Compact, weak, red (2.5YR5/2) sandy loam	0	0	0	0	0	1	0
3 (84 cm)	Compact, very dusty, red (2.5YR5/2) light loam	0	0	0	0	0	1	0
4 (35 cm)	Compact, reddish brown (5YR4/3), compacted light clay	481	148	0	755	4	1	0
5 (63 cm)	Compact, weak, red (2.5YR5/2) light clay	394	121	98	322	1	1	One burnt seed + one burnt clay item
6 (37 cm)	Compact, brown (7.5YR5/3) heavy loam	0	4	189	273	1	1	Seed & ochre
7 (25 cm)	Loose, grey (7.5YR6/1) loamy sand	0	38	139	495	1	1	
8 (11 cm)	Loose, weak, red (10R5/2), reddish brown (5YR5/3) sand	0	0	0	0	1	0	Burnt clay
9 (19 cm)	Loose, grey (7.5YR6/1) sandy loam	0	0	0	0	0	1	
10 (28 cm)	Reddish brown (5YR5/3) sand	0	0	0	0	0	0	
	TOTAL	**875**	**311**	**426**	**1 845**	**7**	**7**	

5.2.3.2 Burials at Namaboni B

Almost all the burials at this site were investigated outside formal excavation. Most of these burials were identified by the shell harvesters who, as mentioned earlier, were digging the site looking for shells and bones to sell. They had dug pits/trenches across the site and only allowed the excavation team to concentrate on the southern part of the site which, according to them, had few shells compared to those in the northern part of the site towards Lake

Victoria Nyanza's swamp. The burials were largely found in ashy layers, were fragmented and survived in varying states of preservation. For instance, burials 1 and 3 were partially articulated while the rest were disarticulated. The individuals that were partly articulated were lying on their sides, and their skulls were not connected to the rest of their skeletons. It was not clear whether this was intentional or resulted from disturbance of some kind. Most of the skeleton parts were missing, suggesting they could have rotted away or disappeared during the process of shell-harvesting before the shell harvesters identified them as human skeletal parts and could alert the excavation team. In the case of some burials (e.g., burials 4 and 6) it seemed that more than one individual had been buried together. This was evidenced by the differences in size of femoral heads. At first it was thought that the burials consisting of more than two individuals were a result of scavenging animals, but the oval-like grave burial cut/pit in burial 6 disproved this idea and suggested that the burials at this site were intentional. These burials were associated with LSA artefacts such as Kansyore ceramics, lithics, bone tools, and shells; therefore they belonged to LSA Kansyore-using hunter-gatherers. Details of each burial are provided below.

a) Burial 1

Burial 1 (containing only one individual) was located 45.7 m northeast of datum point 1 and was recovered at a depth of 387 cm below the surface. The individual was buried in ashy midden-like level, different from that observed in trench 2 where individual 6 was recovered. The individual was associated with the presence of shells, most of which were taken by shell harvesters, but 15 of which were picked for sampling purposes. Other artefacts found with this skeleton included quartz (n = 6) and bones (n = 13) (see Table 5. 9). The head of individual 1 was found roughly 3 cm in front of the other body parts but was accidentally smashed by shell harvesters. The left lower jaw of this individual had an erupting molar 2 (M2), suggesting the individual was still young. Some parts of the skeleton were well-articulated, with the skeleton lying on its side in a flexed position (see Figure 5.12), suggesting intentional burial. The individual was recovered between two levels that contained many shells, lithics and bones; however, no evidence of a cut/pit was observed, making it hard to firmly argue that the burial was intentional despite the nature of the skeleton's articulation.

Figure 5. 12: Figure 10: Namaboni B: Burial 1

b) Burial 2

Burial 2 was found 48.8 m northeast of datum point 1 and was very close to burial 1. The individual was recovered at a depth of 424 cm below the surface in grey ashy midden deposits containing many shells. The individual was identified in the level below the level that produced Kansyore pottery. The skeleton was disarticulated and some bones looked as if they had been burnt (see Figure 5.13). Similar to individual 6, this individual was buried in an oval-like pit in trench 2. The skeleton was covered with concretions and was found in association with materials such as Kansyore pottery (n = 10), lithics of quartz material (n = 17), shells (n = unknown), bone points (n = 2) and a tooth thought to have belonged to a carnivore. It was possible that these materials were initially at the previous Kansyore level and therefore had not been intentionally placed as burial goods. This suggested that there was some form of disturbance during the recovery since most of these individuals were first identified by shell harvesters who had hit them accidentally and reported it to the excavation team. Individual 2 was found so close to individual 3 that they were first thought to be part of the same burial, but a thin layerof soil of about 10 cm between them led the team to conclude that these were different individuals.

Figure 5. 13: Namaboni B: Burial 2 with disarticulated and burnt-like bones in an oval-like pit

c) Burial 3

Burial 3 was found 50 cm south of burial 2 and was located at 48.2 m from datum point 1 at a depth of 434 cm. The individual in burial 3 was buried underneath a grey ashy level and individual 2 was recovered in dark-brown to red coarse sandy soil. Finding individual 3 underneath individual 2 was taken to suggest that the site had been used repeatedly. Skeleton 3 was partially articulated (see Figure 5.14) and its bones did not look burnt as did those of individual 2 but instead were lighter in colour than those of individual 2. Based on the available articulated part, this individual was lying on its side in a flexed position (similar to individual 1). The individual was found together with other bones that belonged to a different individual (see Chapter 7 for details). Animal and fish bones were also found with individual 3, but these were only identified as such while cleaning them in the Archaeology Laboratory at the University of Pretoria.

Figure 5. 14: Namaboni B: Semi-articulated skeleton 3

d) Burial 4

Burial 4 was located at 47.8 m from datum point 1 at a depth of 441 cm, and the skeleton was found together with a pointed pot base, shells, lithics, and fish bones (see Table 5.8). It was largely disarticulated (Figure 5.15). The individual was found in grey, ashy midden shell soils with lots of shells below a Kansyore pottery layer. It was found at the same level as burials 1 and 2. Different-sized femoral heads were recovered during excavation, therefore it was concluded that burial 4 contained more than one individual. The individuals were covered with concretions, similar to the individuals in burials 2 and 3. After the team had gone back to the camping site, shell harvesters recovered another individual beneath individual 4. This individual was labelled individual 4b because we were not sure about its position and relied on what the shell harvesters had told us. At the camp, Mica Jones, a PhD student from Washington University and a zooarchaeology specialist who was part of the team, identified non-human bones and separated them from the other materials (e.g., fish bones, shells, and lithics) that were packed with the human bones. It was possible that many burials had been excavated by shell harvesters in our absence and were not recorded since the work day of the shell harvesters and the excavation team ended at different times. The presence of this individual below individual 4 excavated by our team was, however, not unique to this site, considering that individual 3 was also identified below individual 2 as reported above. Thus it was concluded that the site had been used repeatedly for deliberate burial.

Figure 5. 15: Namaboni B: Burial 4 with skeleton and shells mixed in layer

e) Burial 5

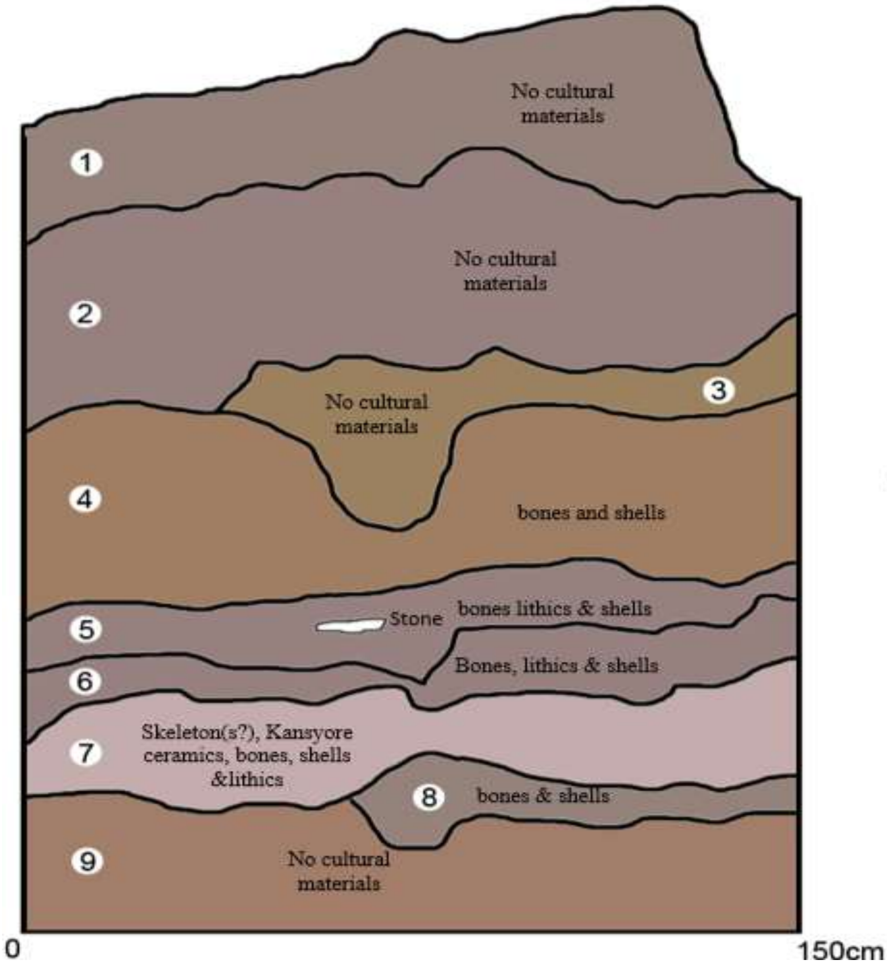
Burial 5 was located at 46.1 m from datum point 1 at a height of 385 cm, which was slightly higher than the level at which burial 1 was recovered. The level had thousands of shells, all of which were taken by the shell harvesters. Individual 5 was represented by cranium fragments, a mandible including teeth rows, and petrosal bone. It was possible that other parts of the individual had got mixed up with wild animal bones and shells during digging by shell harvesters and that they had left behind only the parts they had recognised easily as human parts for the excavation team to recover. No artefacts were collected by the excavation team because all of them had been collected by shell harvesters.

f) Burial 6

Burial 6 was also recovered by shell harvesters who worked alongside the excavation team and who called upon the team to rescue it (see Figure 5.16). As such, trench 2 was set up in an attempt to recover individual 6 (i.e., skeleton 6) with the intention of getting a clear picture of the burial systems. A 1x1 m trench was set over the unexcavated portion and was later extended by 50 cm to the south, making it a 1.5x1 m trench. For the excavation in this trench, both natural and arbitrary methods were used. Arbitrary spits of 10 cm were used up to level 4, followed by natural layers.

Figure 5. 16: Namaboni B, trench 2: Individual 6 in situ

On completion of excavation, the stratigraphic layers were equivalent to excavated layers, and the soil colours were similar (see Figure 5.17). The first level was 30 cm thick and was composed of loose, dark reddish grey (5YR4/2) heavy loam sediment, which was a backfill left by the shell harvesters. The level yielded no artefacts. Level 2 was very compacted dark-brown (7.5YR3/2) light loam that also yielded no artefacts. Level 3 was composed of loose, dark yellowish (10YR4/4) fine light loam that also yielded no artefacts. Level 4 was composed of compact, brown (7.5YR4/3) loamy sand that yielded shells and bones only. Thereafter, an undisturbed level (level 5) with shells and large bones, which seemed to be elephant tooth/tusk, was hit. At this stage, digging followed natural layers. The layer was composed of loose, weak, red (2.5YR4/2) sand sediment and, apart from bones, only one lithic came out of this layer. Layer 6 was composed of weak, red (2.5YR4/2) sandy loam that yielded lithics, bones, and shells before the skeleton was hit. Layer 7 was composed of loose, pinkish grey (2.5YR6/2) loamy sand sediment that covered the individual(s). Individual 6 was directly associated with pieces of pottery (n = 2), lithics (n = 15), shells (n = 35, all retained), bones (n = 13), burnt seed (considered for radiocarbon dating) and clay. The individual was buried in an oval-like grave (see Figure 5.18), suggesting that this was perhaps an intentional burial. The sediment underneath individual 6 (labelled here as layer 8) was composed of shells and bones found in loose, dark reddish grey (5YR4/2) loamy sand. This was followed by a reddish brown (5YR4/3) layer (9) of sand that yielded no artefacts (see Table 5.7). Despite the deal of giving the shell harvesters all the shells recovered, the trench produced insignificant numbers of shells and were all retained. While excavating individual 6, we discovered that the burial could have contained more than one individual because different clusters of body parts were recovered.



dark reddish grey (5YR4/2) heavy loam	*loose dark yellowish brown (10YR4/4) fine light loam*	*compact brown (7.5YR4/3) loamy sand,*	*loose weak red (2.5YR4/2) sandy*	*weak red (2.5YR4/2) sandy*	*loose pinkish grey (2.5YR6/2) loamy sand*	*dark reddish grey (5YR4/2) loamy sand*	*reddish brown (5YR4/3) loamy sand*

Figure 5. 17: Namaboni B, trench 2: West-facing wall at completion

The grave cuts and articulated nature of some individuals observed at this site (see Figure 5.18) suggested that this burial was a deliberate one. It was, however, not clear why the individuals recovered in this trench consisted of clusters of some body parts. One complete head/skull and a mandible plus some long bones (belonging to more than one individual) were, for instance, recovered from this trench. This scenario was also observed in the cases of two semi-articulated individuals buried at this site (their heads and other body parts were missing). If these body parts had not rotted or had not been disturbed/taken away by shell harvesters accidentally, it meant that this had been a burial practice of that time; however, this conclusion remains tentative.

Figure 5. 18: Namaboni B, trench 2: Individual(s) 6, burial pit

Other than the recovery of burial 6 in trench 2**,** a total of 721 artefacts (including shells) were collected. These consisted of 358 (50%) bones, 333 (46%) shells, 27 (4%) lithics, two ceramic items and one seed (see Table 5.7). From these results it was clear that trench 2 was dominated by bones and shells, suggesting the people depended on hunting, gathering and fishing for subsistence. The cultural materials in the lowest layer (8) of trench 2 were associated with bones and shells (but no pottery), suggesting the presence of aceramic hunter-gatherers. In trench 2, a similar pattern to that in the lowest layers of trench 1 was observed, except that the lower layers in trench 2 did not yield lithics. This suggested that the stratigraphic sequence cut across at this site, and it further suggested the presence of aceramic hunting communities at this site. These phases were overlain by levels associated with the presence of a ceramic-using hunting community in layer 7 (see Table 5.7 and Figure 5.17). The materials recovered from this layer included burnt seed, ceramics, burnt clay, lithics, bones, shells and human skeleton(s). A similar pattern was observed in layers 5 and 4 of trench 1, except that these two layers lacked human skeletons. It was possible that ceramic hunters buried their dead at the far end of this site. This conclusion was based on observations of the shell harvesters' trenches dug across the site which indicated that burials were only in the northern part of the site whereas only middens were identified in the southern part of the site.

It was also more than likely that the aceramic hunting communities who had occupied this site were the very communities who might have gradually started using ceramics. This suggestion was based on the recovery of a few ceramic items in the lower layers, the number of which increased over time in the next layers (see the section on trench 1 above). Important to note is the similarity in ceramic forms, fabric and decorations observed in the two layers of trench 1 (see Chapter 6) that seemed to suggest continuity of some sort.

A burnt seed sample (AMS 024208) (see Table 5.9) was obtained from Namaboni B in trench 2, layer 7 together with the human skeleton, Kansyore pottery, lithics, shells, and bones at 262 cm below the datum point. The sample was dated 6634–6479 cal. BC, which aligned with the date of Early-Kansyore-using communities (c. 6000–5000 cal. BC) in western Kenya (Dale 2007; Dale & Ashley 2010). This new evidence suggested the early settlement of ceramic-using communities on the northern shores of Lake Victoria Nyanza, Uganda. Given the fact that this was one sample, the excavation team was forced to return to the site in 2018 to recover more samples in order to confirm the evidence obtained in 2016. The results of the 2018 excavations are presented elsewhere (see Jones 2020; Jones & Tibesasa in prep.; Tibesasa, Krüger *et al.* in prep.). The dates of 7047–6775 cal. BC and 5208–4996 cal. BC for the Namaboni B respectively (Jones & Tibesasa in prep.) lined up with the original date of the Early Kansyore phase identified at this site, suggesting that the ceramic-using hunter-gatherers occupied the site in the early Kansyore phase. Based on three dated samples from two different laboratories, it was clear that the Namaboni B site was occupied in the early phase of Kansyore or the Early Holocene period (see Table 5.9; Jones & Tibesasa in prep.).

Table 5. 7: Namaboni B, trench 2: Summary

Level/cm	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Flots (10L) (no.)	Others
1 (0–30) cm	Loose, dark reddish grey (5YR4/2) while dry and dark-brown (7.5YR3/2) heavy loam while wet	0	0	0	0	0	0	0
2 (30–40) cm	Loose, weak, red (2.5YR4/2) while dry and dusky red (2.5YR3/2) light loam while wet	0	0	0	0	0	0	0
3 (40–50) cm	Loose, dark yellowish brown (10YR4/4) while dry and brown (7.5YR4/2), fine light loam	0	0	0	0	0	0	0
4 (50–60) cm	Compact, brown (7.5YR4/3) while dry and dark reddish grey (5YR4/2) loamy sand while wet	0	0	28	61	0	1	0
5 (5–16 cm thick)	Loose, weak, red (2.5YR4/2) sand while dry and wet	0	1	0	60	0	0	
6 (9–10 cm thick)	Weak, red (2.5YR4/2) while dry and dark reddish grey (5YR4/2) sand while wet	0	6	67	196	1	2	0
7 (10–19 cm thick	Loose pinkish grey (2.5YR6/2) while dry and weak-red (2.5YR4/2) loamy sand while wet.	2	15	35	13	0	2	Burnt seed, clay + skeleton
8 (6–16cm thick)	Dark reddish grey (5YR4/2) while dry and brown (7.5YR5/2) loamy sand while wet	0	0	204	28	0	0	0
9 (13–23 cm thick)	Reddish brown (5YR4/3) while dry and weak-red (2.5YR4/2) loamy sand while wet	0	0	0	0	0	0	0
TOTAL		**2**	**27**	**333**	**358**	**1**	**5**	

In the paragraphs below, a summary of Namaboni burials and possible interpretations is provided in line with previous studies in other parts of Lake Victoria Nyanza.

From the burial descriptions presented above, it was clear that all the burials were located in the northern part of the site towards Lake Victoria Nyanza. This conclusion was based on the shell harvesters' trenches that were dug across the site which clearly revealed that other parts of the site produced no burials. This, we believed, was not accidental but intentional. It was possible that the southern part of the site was used for settlement and specific activities whereas the northern part was considered a dumping ground for waste and/or burial ground for the dead. By implication, individuals at this site were intentionally buried. The presence of burials and trash dumps further suggested the site was occupied by different groups of hunter-gatherers, some of whom used the northern part as a dumping area for trash whereas others used it as a burial area. Interestingly, some individuals were found buried underneath others, separated by a thin sediment of about 10 cm, a finding that supported the idea that different groups occupied the site at different times or seasons. However, this might also have suggested that the site was repeatedly used by the same groups who actually returned to the same site at different times and buried their dead in the places they already knew, thus suggesting continuity in burial practices. This conclusion was exemplified by the findings that individual 5 lay below individual 1, individual 3 lay below individual 2, and individual 4b lay below individual 4.

No standardised burial pit or orientation was observed during the excavation of Namaboni B individuals; some appeared to be in oval-like burial pits (n = 3), whereas in other cases no burial pits or cuts could be observed. A few individuals (n = 2) lay on their side in a flexed position and had different body parts missing (e.g., individuals 1 and 6 had no crania), whereas others were too fragmented to determine orientation (e.g., individual 2). The burial of individuals on their sides and sometimes with their heads oriented to the north was observed at other Kansyore sites such as Gogo Falls in Kenya (Robertshaw 1991: 72) and Chole in Tanzania (Soper & Golden 1969: 37ff), suggesting it was a common burial practice among the Kansyore LSA hunter-gatherers. Sometimes individuals were comingled (see burials 4 and 6), which was evidenced by the presence of different bones and different sizes of femoral heads (e.g., burial 4). Some bones seemed to be burnt (e.g., those of individual 2), especially the bones of individuals who were comingled; however, it was not clear whether the appearance of these bones could be attributed to mineralisation.

The burial of more than two individuals together was not a common practice among sedentary groups because they waited for people to die and then buried them. Therefore this practice at this site seemed to suggest that the hunter-gatherers kept adding new individuals to the same grave every time they returned to it. It was also possible that some mixing had taken place during recovery; however, this was not supported by the evidence from burial 6 (trench 2) where the burial was intact in situ. It remained unclear why individuals would be buried together, but it was hoped that an analysis of human bones (see Chapter 7) would shed more light on the matter.

The presence of human skeletons has been a common finding at many sites where Kansyore pottery has been found (e.g., Kansyore Island, Gogo Falls, Siror, and most shell midden sites) (Chapman 1967; Mehlman 1989; Robertshaw 1991; Dale 2007; Lane *et al.* 2006; Lane *et al.* 2007). However, at most of these sites, parts of human skeletons have been found. At Gogo Falls, for instance, a poorly preserved human skeleton lying on its left side and facing north was recovered between levels M6 and M7 of trench 1 (Robertshaw 1991: 72). Despite the absence of a burial pit, the burial was taken to be intentional because of the arrangement of boulders on top of the skeleton. Also, a human right mandible (P_4-M_2) and a fragment of human acetabulum were collected from an exposed section and the surface respectively (Robertshaw 1991: 154). More human bones were recovered at Kanjera, Kanam and Luanda (Robertshaw *et al.* 1983: 18ff), and these were taken to represent chance inclusions rather than deliberate burials.

At the Chole site in Tanzania, three burials consisting of portions of poorly preserved bones of skeletons lying on their sides in a shallow hollow were recovered (Soper & Golden 1969: 37ff). The burials indicated that they were contracted burials as the heads of the skeletons faced north. However, because there were no traces of clear burial pits/graves (Soper & Golden 1969), it was hard to gather whether the burials were deliberate or not. At the Siror site in Kenya, more than 20% of fragmentary human long bones and teeth were recovered between 75 and 85 cm in trench 2 (Dale 2007: 218). Based on the degree of articulation and position of the bones, Dale concludes that the bones were collected and reburied. Further, Dale (2007: 218) is of the opinion that the finding of human remains together with other cultural materials (e.g., burnt bones, pieces of obsidian and a large piece of quartz) may be indicators of ritual activities surrounding burials at the Siror site. At the Ndali crater site in western Uganda, an intact human skeleton associated with large urns identified as Kansyore and Boudiné wares were recovered (Schmidt *et al*. 2016). Although these authors do not say much about burial practices/systems, they conducted an isotopic analysis of bone collagen and apatite in order to understand dietary patterns.

From the available evidence, it is clear that no detailed study has so far been conducted on the Kansyore LSA hunter-gatherers' burial practices/systems. The recovery of many human burials (associated with Kansyore ceramics) in varying states of preservation at the Namaboni B site, avails us the opportunity to conduct a detailed study on these individuals in order to understand them better and potentially obtain direct evidence on subsistence, health, burial systems and social structure. These aspects are discussed in greater detail in Chapter 7.

5.2.4 Lugala A1 Site

Lugala A1 was an open-air multi-component site that was occupied by both LSA hunter-gatherers who used Kansyore pottery and EIA farmers who used Urewe pottery. The site was found in the village of Busime at $0^0$11'46.3"N, $33^0$53'52.3"E and it was located at an elevation of 1 143 m on the land of Mr Wandera Stephen in Lugala Parish, Banda Subcounty, Namayingo District. The size of the site was approximately 180x200 m and it was positioned at the lakeshore, roughly 50 m from Lake Victoria Nyanza. It was approximately 800 m from the Lugala lake shore landing site and was accessible by vehicle. At the time of the study, the site was under threat from sand harvesters but a place to set a trench was identified based on the skeletons and pottery the sand harvesters had left in situ at the edge of their operations (see Figure 5.19). A 2x2 m trench was set on top of the location where the skeletons were observed in situ, with the intention of exposing them. Excavations at this site followed the arbitrary method of using 10 cm spits because the soil colour of the different levels was not discernible. Trowels were used for excavation throughout. At a cut made by the sand harvesters, it was observed that the skeletons, which were buried at a depth of 82 cm (see also Chapter 4), had eroded. It is important to note that there was no surface material.

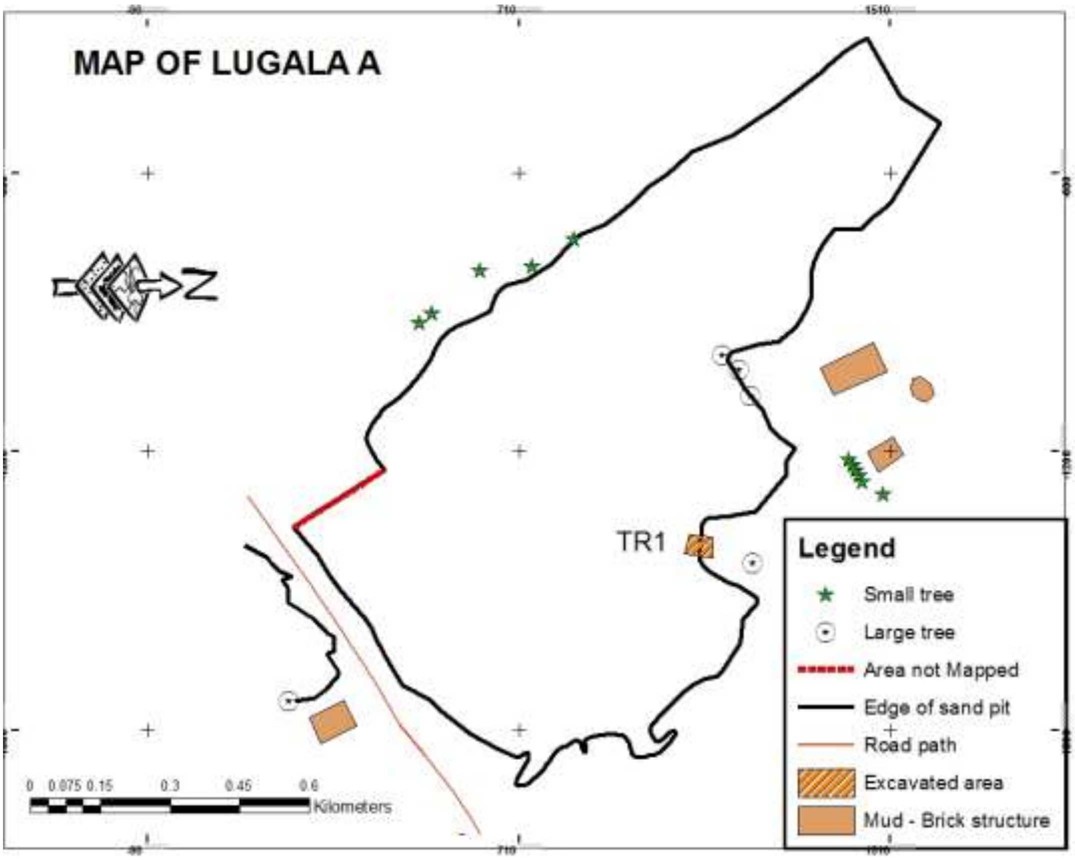


Figure 5. 19: Lugala A1: Map of excavated area

5.2.4.1 Summary of excavation at Lugala A1 and its cultural stratigraphic interpretation

Levels 1 to 6 (0–70 cm) consisted of sediment ranging from loose, reddish grey (10YR6/1) sand, compact grey (5YR6/1) sandy soil to light brown (7.5YR6/3) sand that yielded land-snail shells, but no other anthropogenic materials. Root and termite disturbances were observed. The former was dominant in levels 1 to 3 (0–40 cm) and the latter in levels 4 to 6 (40–70 cm), especially towards the northern wall and southeastern corner. Whether the land-snail shells in these levels were anthropogenic or not was unclear because there were no other artefacts associated with them. Given the lack of other material, this seemed unlikely.

Levels 7–8 (70–90 cm) had sediments ranging from pale brown (10YR6/3) sand to brown (7.5YR5/3) sand and yielded the remains of two human skeletons, land-snail shells, a charcoal sample and Urewe ceramics of varying sizes and forms. Individual 1 (only lower limbs and a pelvic fragment) was found in the southwestern corner of the trench, 160 cm from individual 2 (only an upper limb, shoulder and thorax fragments) that was located in the southeastern corner of the trench (see Figure 5.20). No burial goods were found with individual 1 (see Figure 5.21), but ceramics were found with individual 2. At the edge of the sand-harvesting pit, the individuals had been cut into. The remaining articulated partial bones of individual 1 suggested that this individual had been buried lying on its side and perhaps in a flexed position. In the case of individual 2, a left arm and hand were found underneath a partially complete globular ceramic jar, reinforcing the idea that the ceramics found were grave goods (see Figure 5.21). The ceramics, which included fragments of two globular jars and three bowls, belonged to the Urewe tradition, which is commonly associated with EIA farming communities. It was not clear whether the absence of grave goods at individual 1 could indicate that they had been lost during sand harvesting or not, but it was clear that the two individuals had been buried at the same level, tentatively suggesting they could have lived at the same time and belonged to the same community. Important to note that, although there were no clear grave cuts, the presence of grave goods and the partial articulation of individual 2 suggested that the burial was intentional. The absence of burial goods at burial 1 could perhaps suggest that these two individuals had had a different social status or position; however, the possibility of the practice of a burial ritual was not discounted.

A charcoal sample (AMS 024210) (see Table 5.9) was obtained from the sediment found inside the globular jar that was associated with the human hand. This sample was dated cal. AD 339-AD 437 (see Table 5.9), which fitted the dating of Urewe pottery found to the east (cal. AD 410–600) of a study area in Kenya and to the west (cal. 400 AD) of a study area in Rwanda (Ashley 2010; Giblin *et al.* 2010). All the sediment that was recovered from the globular jar was later floated to try and recover botanical remains that would shed light on the diet of the Urewe-using communities.

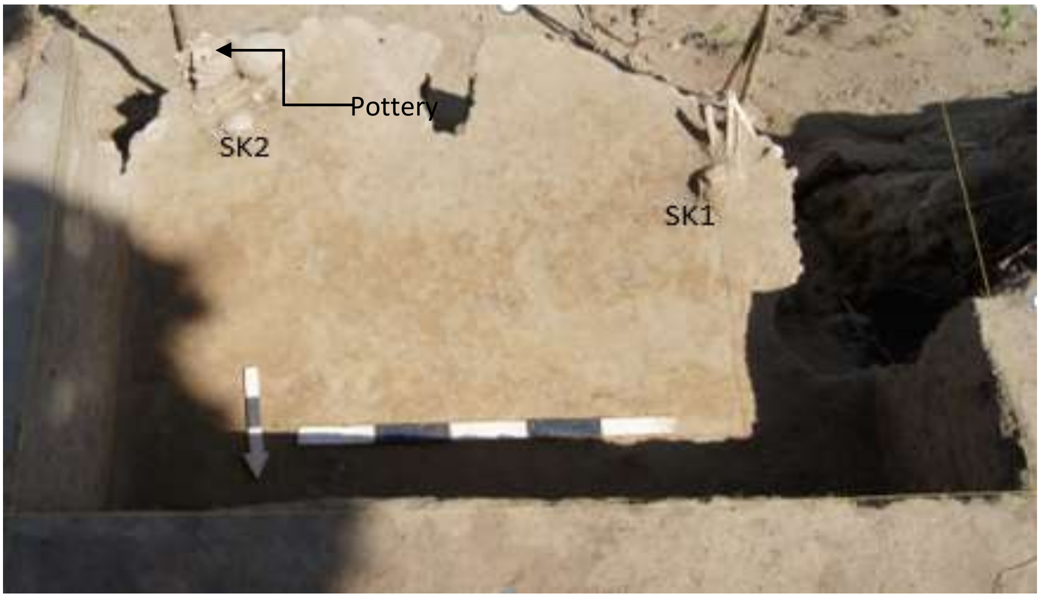


Figure 5. 20: Lugala A1, trench 1, skeletons (SK) 1&2

Figure 5. 21: Lugala A1, trench 1: Skeleton 2 with associated grave goods

A hiatus was observed in levels 9 to 11 (90–120 cm) below the surface (see Figure 5.22). The sediment in these levels ranged from pinkish grey (7.5YR6/2) to light brown (7.5YR6/3) sand. These levels lay between Urewe- and Kansyore-bearing levels which tentatively suggested an absence of interaction/connection between the two communities in this area. Flotation (n = 3) samples were collected from these levels but they yielded no information (see Chapter 7).

With the exception of level 13 (130–140 cm), which was composed of light-brown (7.5YR6/3) sand, and level 23 (230–240 cm), which was composed of the same colour sand, all other levels below the hiatus at level 12 (120–130 cm) and levels 14–22 (140–230 cm) yielded Kansyore pottery, lithics, bones, shells and charcoal (see Table 5.9). The sediments in these layers ranged from light-brown (7.5YR6/3) sand in levels 12–15 (120–160 cm), 17–21 (170–220 cm) and 23 (230–240 cm) and light yellowish grey (10YR6/2) sand in level 16 (160–170 cm) to pale-brown (10YR6/3) sand in level 22 (220–230 cm). These levels were indicated as the Kansyore levels (see Figure 5.22). A number of sherds with Kansyore decoration were found slightly higher in levels 15 and 22 (see Table 5.8), and the rest of the levels produced few sherds. The sherds appeared weathered and were medium to big in size with decorations covering all surfaces. Other artefacts recovered included lithics, bones, and shells, but these were generally few in number.

Four charcoal samples were collected from Kansyore levels (see Table 5.8). However, only one was dated due to financial constraints. Sample AMS 024211 (see Table 5.9) was obtained from level 15 at 157 cm below the surface and was associated with Kansyore ceramics and lithics. The level was dated to cal. 3465–3495 BC. In relation to the existing Kansyore chronology from western Kenya, this date fit in with the middle period, a period that has been missing between Early Kansyore (c. 6000–5000 cal. BC) and Late/Terminal Kansyore (c. 1000 cal. BC–cal. AD 500) (Dale 2007; Dale & Ashley 2010). However, more dates are needed to confirm this suggestion.

A total of 1 212 artefacts were recovered from this trench; 238 (20%) were pottery, 792 (65.3%) were lithics, 103 (8.5%) were shells and 79 (6.5%) were bones. Unlike as at other sites (e.g., Namundiri A and Namaboni B) where bones predominated in the Kansyore layers, lithics were the most dominant at this site, followed by pottery, shells, and bones, in that order. This might suggest a shift in diet, which might further suggest that Kansyore-using hunter-gatherers at this site lived in an environment that differed from that at Namundiri and Namaboni.

Table 5. 8: Lugala A1, trench 1: Summary

Level (cm)	Sediment description	Pottery (no.)	Lithics (no.)	Shells (no.)	Bones (no.)	Charcoal (no.)	Flot (10L) (no.)	Others
1 (0–20 cm)	Loose, reddish grey (10YR6/1) sand.	0	0	0	0	0	0	
2 (20–30 cm)	Compact, grey (5YR6/1) sand	0	0	6	0	0	1	
3 (30–40 cm)	Light-brown (7.5YR6/3) sand	0	0	10	0	0	1	
4 (40–50 cm)	Light-brown (7.5YR6/3) sand	0	0	16	0	0	1	
5 (50–60 cm)	Light-brown (7.5YR6/3) sand	0	0	22	0	0	1	
6 (60–70 cm)	Light-brown (7.5YR6/3) sand	0	0	9	0	0	1	
7 (70–80 cm)	Pale-brown (10YR6/3) sand	0	0	14	0	0	1	
8 (80–90 cm)	Brown (7.5YR5/3) sand	45	0	15	0	1	2	Human remains
9 (90–100 cm)	Pinkish grey (7.5YR6/2) sand	0	0	0	0	0	1	
10 (100–110 cm)	Light-brown (7.5YR6/3) sand	0	0	0	0	0	1	
11 (110–120 cm)	Light-brown(7.5YR6/3) sand	0	0	0	0		1	
12 (120–130 cm)	Light-brown (7.5YR6/3) sand	1	7	0	0	2	1	
13 (130–140 cm)	Light-brown(7.5YR6/3) sand	0	0	3	0		1	
14 (140–150 cm)	Light-brown(7.5YR6/3) sand	24	24	0	8	1	1	
15 (150–160 cm)	Light-brown(7.5YR6/3) sand	41	134	0	0	1	1	
16 (160–170 cm)	Light yellowish grey (10YR6/2) sand	17	84	2	2	0	1	
17 (170–180 cm)	Light-brown(7.5YR6/3) sand	16	24	0	16	0	1	
18 (180–190 cm)	Light-brown(7.5YR6/3) sand	21	171	0	37	0	1	
19 (190–200 cm)	Light-brown (7.5YR6/3) sand	11	99	1	13	0	1	
20 (200–210 cm)	Light-brown(7.5YR6/3) sand	13	92	5	3	0	1	
21 (210–220 cm)	Light-brown(7.5YR6/3) sand	11	72	0	0	0	1	

22 (220–230 cm)	Pale-brown (10YR 6/3) sand	38	85	0	0	0	1	
23 (230–240 cm)	Light-brown (7.5YR6/3) sand	0	0	0	0	0	1	
TOTAL		**238**	**792**	**103**	**79**	**5**	**2**	

Table 5. 9: Radiocarbon dates for Namundiri A, trench 2; Namaboni B, trench 2; Lugala A1, trench 1

Lab no.	**Sample code**	**Provenance**	**Dated material**	**Direct-AMS age BP**	**Cal. dates**
D-AMS 024209	NDRIA	40 cm	Wood charcoal	Modern	
D-AMS 024208	NAM B	262 cm associated with skeleton 6	Seed	7728±36	6634–6479 BC
D-AMS 024210	LUG A1	80-90 cm associated with skeleton 2	Wood charcoal	1637±30	AD 339–437
D-AMS 024211	LUG A2	157 cm associated with Kansyore ceramics	Wood charcoal	4718±35	3465–3495 BC

Note: All samples run in Beta AMS laboratory)

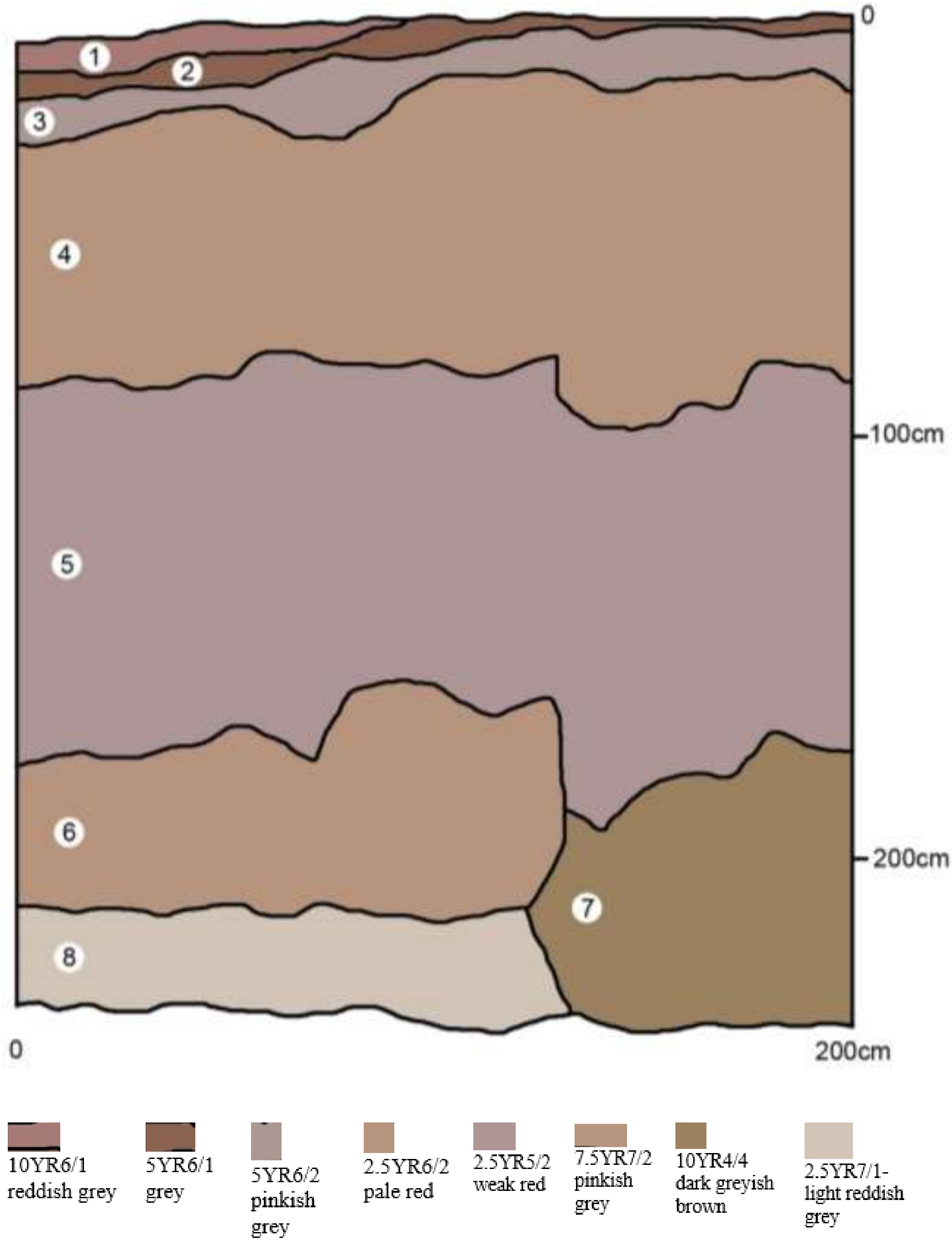


Figure 5. 22: Lugala A1: South-facing profile at completion

5.2.5 Lugala A2 Site

Lugala A2 site was located on the land of Mr Wabulya Francis at 0^{0}11’58.0”N, 33^{0}53’48.1”E. The site was composed of slag and pieces of Iron Age pottery scattered over the land and in the middle of the road (see Figure 5.23). At first, the site was thought to have been occupied by EIA smelters, and it was speculated that there might have been a relationship between these people and those buried at Lugala A1, given the proximity of these two sites and the lack of other EIA sites in the area (despite intensive survey). However, it was later discovered that the slag observed had recently been picked up from a smelting site to make modern house floors.

This observation was archaeologically demonstrated by a 1x1m that was abandoned at 13cm below the surface after discovering that the slag observed on the surface was not in situ. Based on information obtained from the locals and the discovery of the origin of the slag source 100 m northeast of this site, the team decided not to continue with excavations at this site. Therefore, this site (as was the case with the Budecho A site) was not considered for more detailed study.

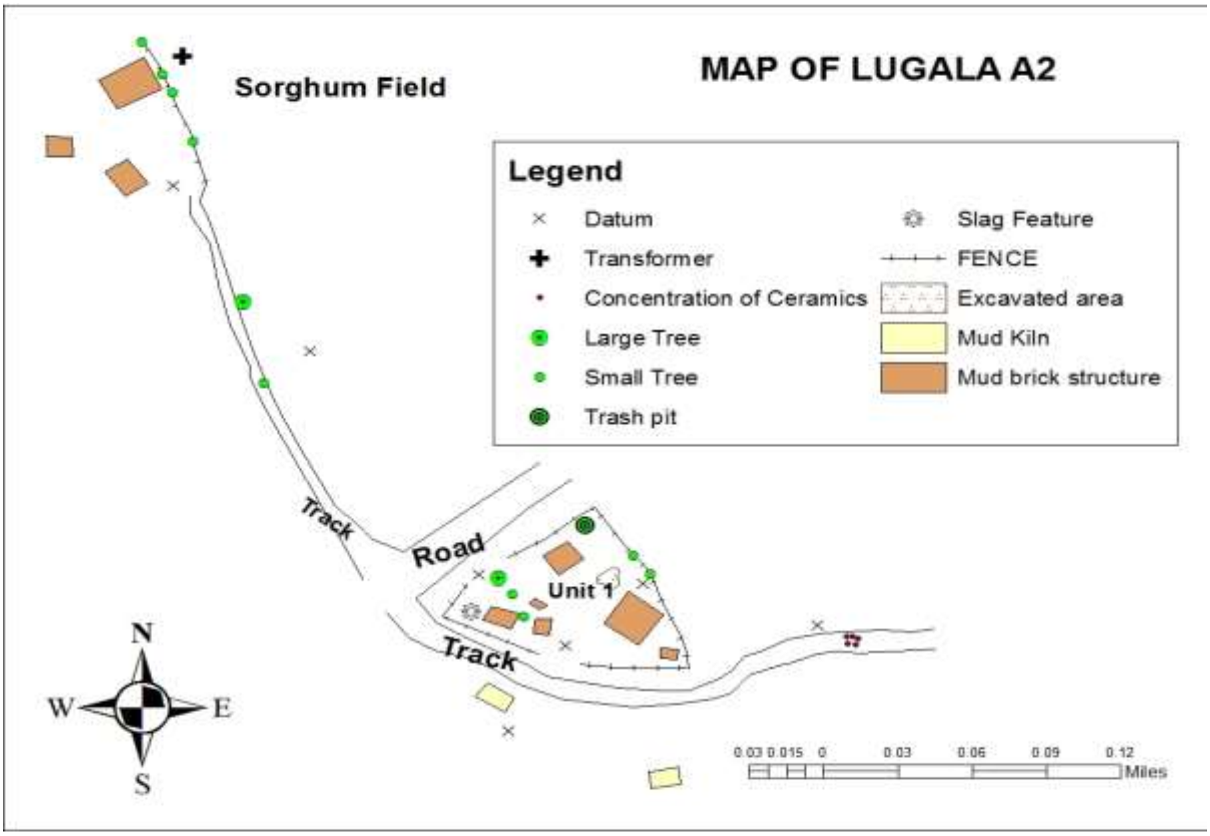


Figure 5. 23: Lugala A2: Excavated area

5.3 Chapter Summary

As indicated in this chapter, excavations were carried out on sites that were threatened and/or disturbed by the activities of shell and sand harvesters. All the shells, except for a few samples recovered by the excavation team, were handed over to the shell harvesters as per the agreement reached with them. Sometimes the shell harvesters gave the excavation team directions to areas that could be excavated. Further, the team gave special attention to excavating areas where cultural materials had been left exposed by sand harvesters.

It was clear that more Kansyore sites (n = 3) than Urewe EIA sites (n = 1) were excavated. Kansyore LSA sites, such as Namundiri A, were occupied continuously in the Middle Holocene period, as was evidenced by cultural materials recovered in all layers in 2018 (Jones 2020: 145; Jones & Tibesasa in prep.). On the other hand, the Namaboni B site was associated with occupation by aceramic hunter-gatherers and by ceramic-using hunter-gatherers. This suggested different types of settlement/activity across the period. Shell midden sites excavated for the present study confirmed the settlement pattern to be consistent with the bimodal settlement pattern suggested by scholars (Robertshaw 1991; Prendergast 2010: 83; Prendergast & Lane 2010).

The radiocarbon dates of 6634–6479 BC and 3465–3495 BC recovered from the Namaboni B and Lugala A sites respectively, and those recovered by Jones and Tibesasa (in prep.), suggested the presence of settlements from the Early Holocene/Kansyore phase to the Middle Holocene/Kansyore phase. This was an exciting finding because the indication of settlement in the Middle Holocene/Kansyore phase closed the chronological gap that had existed in the Kansyore settlement pattern in the region (as pointed out by Dale & Ashley 2010: 29). In addition, excavation findings at Namaboni B site indicated that existing understandings of burial traditions during the Kansyore period were poor or insubstantial. The excavations of burials shed new light on Kansyore burial practices and social and other general lifeways.

At Lugala A1 site, a hiatus between Kansyore and Urewe layers was observed, which was taken to indicate that there was no relationship between Kansyore LSA hunter-gatherers and EIA Urewe farming communities. This contradicted existing knowledge about Kansyore LSA and farming materials found in western Kenya (Robertshaw 1991; Lane *et al.* 2006; Lane *et al.* 2007).

Further, two Urewe burials were excavated at Lugala A1. This was an interesting find because very few Urewe burials have been known to exist in the Great Lakes region and eastern Africa. The present researcher knows about only one site (Giblin *et al.* 2010; Watts *et al.* 2020) that has been studied in detail, making the present study's findings on Urewe burials the second known detailed study of Urewe burials. Importantly, therefore, the present study added to the existing body of knowledge on the burial practices of Urewe-using communities. The date of the Urewe burials detailed in the present study was AD 339–437, which lined up with the existing Urewe ceramics in Kenya and Rwanda respectively. The next chapter, Chapter 6, presents discussions of methods, typology, and results relating to ceramic analysis.

CHAPTER 6

CERAMIC ANALYSIS: METHODS, TYPOLOGY AND RESULTS

6.0 Introduction

This chapter discusses the methods, typology and ceramic analysis results relating to the four case studies dealt with in the present study. The first three case studies, namely, the Namaboni B, Namundiri A and Lugala A1 sites, were associated with Kansyore LSA ceramics. Case study 4, namely, Lugala A1, was associated with EIA Urewe ceramics. The chapter starts by looking at Kansyore typologies in the Great Lakes region, moves on to Kansyore typologies developed for the present study as well as the methods, used in the present study and concludes with the results of the analysis of ceramics.

6.1 Kansyore Typology

Before presenting a detailed discussion of typology history, the researcher regards it as worth noting that most of the early pottery assemblages from Uganda that have been reported are derived from the area west of the Nile River, especially from Kagera (Chapman 1967; Kyazike 2016), Albert (Robertshaw 1994), Sesse Islands, Ngogwe (Reid 2002; Ashley 2005; Kessy *et al.* 2011), Kikubamutwe (Kiyaga-Mulindwa 2004), and Bussi Island (Tibesasa 2010). Therefore, the assemblages from the area east of the Nile River, Uganda provided an opportunity to understand not only the archaeology of traditionally known sites west of the Nile River but also that of the sites in Uganda east of the Nile River. The paragraphs below focus on Kansyore typology.

Kansyore pottery was first identified at Kansyore Island where it was associated with two other pottery types—Urewe and Roulette (Chapman 1967: 172). Although there was no clear procedure on how to distinguish between the three types of pottery, Chapman (1967: 174) went ahead to identify the following characteristics of Kansyore pottery: overall decoration of small impressions, internal decoration, rough gritty surface, poorly fired, breaks along the original coil rings, and so forth. Chapman has classified Kansyore pottery into six types based on decoration tools used, type of decoration, rim types, and base distinctions. Further, Kansyore sherds have been described as having a natural grey colour, although some sherds are tinged with red slip. Kansyore vessels are hemispherical or globular medium-sized bowls with tapered rims and rounded or slightly pointed thickened bases. The decorations are made with implements such as sticks, bones, and shells. Internal decoration has also been observed on some sherds, but then limited to the inner side of the rim and sometimes covering the whole inner side.

Kansyore ceramics have been recovered at various sites in Kenya, Tanzania, and southeastern Sudan in varying environmental contexts (see Chapter 2); nevertheless it is interesting that the ceramic typology has remained consistent over time and space. Kansyore studies (Collett & Robertshaw 1980, 1983; Soper 1987; Robertshaw 1991; Mosley & Davison 1992; Dale 2007; Dale & Ashley 2010) indicate that Kansyore forms/vessels are generally bowls with tapered, squared and rounded rims (Thorp 1992). Form/vessel variations do exist in the Kansyore tradition; many items are medium-sized bowls that are either ‘open mouthed’ or ‘closed mouthed’ (Collett & Robertshaw 1980; Robertshaw 1991; Ashley 2005; Dale 2007), whereas a few are large hemispherical bowls (Soper & Golden 1969). A very small thumb pot roughly 5 cm high was also recovered from Wadh Lang’o (Ashley 2005: 406). Polygonal vessels first identified at Gogo Falls and later at Haa, Wadh Lang’o, and Siror have also been recorded as being in the Kansyore tradition (Robertshaw 1991; Ashley 2005; Dale 2007; Ashley & Grillo 2015). Kansyore ceramics are also associated with rounded or slightly pointed and thickened bases (Dale 2007). The average rim diameter ranges between 24 cm and 26 cm, with an overall range of 18–35 cm recorded at Haa, Wadh Lang’o, and Siror in western Kenya (Ashley 2005; Dale 2007). According to Kansyore material recovered from the Siror site in western Kenya and the Nyang’oma site in Tanzania (Soper & Golden 1969; Dale 2007: 246), the body thickness of vessels ranges between 8 to 13 mm. However, two sherds, one with a thickness of 21.8 mm and another with a thickness of 5 mm were recovered from the Siror and the Nyang’oma sites respectively (Soper & Golden 1969; Dale 2007), but these appeared to be unique.

Kansyore ceramics from Nyang’oma have been described as hard and gritty with a crumbly texture (Soper & Golden 1969: 25–26) The ceramics have broken along the weak bonds between the coils and, according to Soper and Golden (1969), the ceramics have quartz inclusions up to 3 mm in diameter. However, this is not uniform in the case of all sites; for instance, quartz inclusions found at Gogo Falls ranged from .05 to 1.0 mm (Collett & Robertshaw 1980). At some other sites (e.g., in trench 2 at Siror), fine sand inclusions have been identified as the primary inclusion for Kansyore ceramics (Dale 2007: 232). However, heavily tempered sherds that looked the same as Kansyore pottery in general were also observed in trench 1 at this site. Other than quartz, different inclusions, such as mica, have also been identified in Kansyore ceramics found at Mumba-Höhle in Tanzania (Mehlman 1989) and at midden sites. Kansyore ceramics have been described as thick, poorly made and fired (Thorp 1992); however, some (but not many) well-fired, thin-walled and smooth-textured sherds have been recovered (Mehlman 1989; Dale 2007: 229). Kansyore sherds have colours ranging from grey and buff brown to reddish brown (Soper & Golden 1969; Robertshaw 1991; Dale 2007).

In some cases, Kansyore sherds have been described as heavily decorated, with elaborate decorations that cover much of the exterior surface and extend to the rim (Soper & Golden 1969; Robertshaw 1991). However, Dale (2007) observed a great number of plain sherds at Siror in western Kenya. Tools and implements such as sticks, bones, and shells are believed to have been used to create horizontal, vertical and circular bands of rocker stamp and punctate impressions (Chapman 1967). Dale (2007) and Dale and Ashley (2010) have categorised decoration techniques into rocker, incised, impression and applique techniques. Decorative motifs include close-set lines of impressions, serrated-edge zigzag, and circular punctates (Soper & Golden 1969; Robertshaw 1991; Dale 2007; Dale & Ashley 2010). Variability in the density of Kansyore ceramics has also been observed at various sites; for instance, high densities have been observed at sites near the rapids (e.g., Gogo Falls, Siror, Wadh Lang'o), moderate densities have been observed at Mumba, and low densities have been observed at Nasera Seronera, Luanda, Kanjera West, and White Rock Point (Dale *et al*. 2004; Prendergast 2008).

Kansyore ceramics are associated with 'non-descript' and heterogeneous lithics that are predominantly of quartz raw materials (Robertshaw *et al.* 1983; Robertshaw 1991: 34; Seitsonen 2004, 2010) and dominated by crescents and bipolar cores. However, other raw materials, such as obsidian, have been recovered at midden sites and multi-component sites such as Wadh Lang'o (Seitsonen 2004, 2010). Other than lithics, Kansyore ceramics are also associated with bone points, shell beads, ochre, ostrich eggshell, bones (of fish and terrestrial animals), and human remains (in most cases, isolated bones) (Chapman 1967; Dale 2007; Lane *et al.* 2007; Prendergast 2008; Prendergast & Lane 2010). Based on dates and decorations, Kansyore ceramics have been divided into Early Kansyore (dating 6000–5000 cal. BC) and Late Kansyore (dating 1000 cal. BC–cal. AD 500 (Dale 2007; Dale & Ashley 2010). Dale (2007: 251) suggests that punctate motifs of varying kinds (e.g., pairs of horizontal rows of punctate impressions in panels) are key to the identification of Early Kansyore pottery, and that plain-edge, serrated-edge, zigzag and serrated-edge motifs are distinct to Late Kansyore pottery. Unlike Early Kansyore pottery, which is associated with the bones of fish and wild animals, Late Kansyore pottery is associated also with the bones of domestic animals. The presence of these characteristics has been used to prove that there was contact between neighbouring communities (Dale & Ashley 2010).

It is interesting to note that ceramic studies prior to 2000 did not focus on the function and use of ceramics; ceramics were always considered as inactive or static. Some ceramic analysists (e.g., Collett & Robertshaw 1980; Robertshaw 1991) focused on creating types in accordance with South African methodologies, yet these were not widely applied to East Africa. However, from 2000 onwards an alternative classification of Kansyore ceramics was used following the '*chaîne opératoire'* approach proposed in Caneva's (1988) ceramic typology developed for El Geili in Sudan. According to Dale (2007), this approach emphasises the use of tools and techniques of decoration; therefore it can cater for even broken pieces of pottery. The approach is significant for describing the actions that organise the progressive changes of the clay into a finished product as well as the implementation of each action (Roux 2019: 15). The approach enables an understanding of the relationship between elements and the logic of decorative patterns (Caneva 1988; Dale 2007). It also enables the collection of data on the geographical and chronological variations between ceramics of different regions or different sites (Gatto 2002), suggesting that it allows comparison (Roux 2019: 15). The approach is not limited to a specific ceramic group or to time and space (Gatto 2002: 66), and it emphasises the use of decorative techniques instead of decoration motifs as has been done in many ceramic studies in East Africa. Dale's (2007) approach to Kansyore is comprehensive and helps to classify the degree of variation within the assemblages. It also stresses techniques, which include all phases of a potter's contribution in terms of labour, time, care, and style (see also Caneva 1987: 231). For these reasons, the present study adopted Dale's typology that emphasises the '*chaîne opératoire'* approach.

6.1.1 Kansyore Typologies Developed for the Present Study

The present study's Kansyore typology was developed based on Dale's (2007) typology, with reference to Caneva's (1988) typology in some special cases. Dale's classification scheme for Kansyore ceramics from the Siror site is presented in Table 6.1. The present study attempted to identify the technique, implement, element and motif in respect of each sherd included in its analysis. Unlike Dale (2007: 156), who lumped together the rocker stamp technique and alternating pivot techniques because of their similarity, the present study separated the two techniques based on the implements used. For instance, for the former, both a plain-edge and serrated-edge comb was used, whereas for the latter, a bi-fid comb was used which produced dots, triangles, dashes, and rectangles in pairs of lines when pivoted across the clay body. For the former, a single-edge comb and often a multi-toothed comb was used to produce rows of impressions in grid-like panels or bands. A simple impression technique was to use a pronged instrument or hollow sticks to produce dots, vees, and empty circles in single-row lined and/or random impressions that created deep and sometimes shallow impressions. A stab-drag technique using a stylus/serrated-edge implement produced individual lines or pairs of vees, rectangles, and dots that were dragged continuously across the clay body. The classification of the ceramic assemblages found at the sites of Namundiri A, Namaboni B, and Lugala A1 is indicated in Table 6.2. However, this classification is preliminary and supplements Dale's (2007) classification (see Table 6.1), but it provides details on the classification of Kansyore ceramics. Where possible, comparisons were made with pottery from sites in western Kenya.

Table 6. 1: Siror: Classification scheme of ceramic assemblage

Table 7.2: Classification Scheme for the Siror Ceramic Assemblage (adapted from Caneva 1988).

Technique	Implement	Element(s)	Motif	Structure
Impression – **Rocker**	comb – plain edge	lines	straight or curved zigzags	horizontal bands or panels of horizontal and vertical bands of variously spaced zigzags
Impression – **Rocker**	comb – serrated edge	dots, triangles, vees, rectangles, dashes	packed or spaced zigzags	horizontal or vertical bands/panels of packed or spaced zigzags
Impression – **Rocker**	bi-fid comb	dots, triangles	pairs of dots or triangles	horizontal rows of pairs of dots or triangles
Impression – **Simple**	pronged instrument	dots, dashes, triangles		horizontal bands of dots, dashes, or triangles
Incision	stylus/comb	v or u shaped grooves	horizontal or vertical lines	bands of horizontal, vertical or a combination of horizontal and vertical lines
Appliqué	fingers	round or oblong pieces	pieces of clay added to clay body	

Source: Dale (2007: 158)

Table 6. 2: Namundiri A, Namaboni B and Lugala A1: Classification scheme of assemblages

Technique	Implement	Elements	Motif	Structure
Rocker Impression	Comb Plain edge	Lines	Curved, zigzag	Horizontal bands of zigzag lines
	Serrated edge	Dots, vees, rectangles, triangles, dashes, ovals	Spaced and packed zigzag	Horizontal or vertical bands/panels, sometimes continuous or discontinuous
Alternating pivot	Bi-fid comb	Dots dashes, triangles, rectangles	Pairs of each of these elements	Horizontal or vertical parallel paired rows, circular bands in pairs
Simple impression	Pronged instrument/stick	Dots, empty circles, vees		Horizontal or vertical, sometimes in pairs or single lines; others random
Stab drag	Stylus/bi-fid comb / serrated edge	Rectangles, dashes, triangles, dots, vees	Individual lines or paired lines	Horizontal or vertical continuous rows
Incision	Stylus /comb	U- or v-shaped and circular grooved/incised lines	Paired grooved lines, individual circular grooves	Panels of horizontal, vertical or circular lines; sometimes a combination of vertical and horizontal lines
Applique	Fingers /bi-fid comb	Round moulded piece of clay		Combination of circular punctate and moulded piece of clay

Detailed analyses were done only of sherds larger than 3 cm (including rims and bases) because smaller sherds provided less detailed information. Each sherd was assigned an identification number based on site, trench and level/layer. The sherds were conjoined prior to detailed analysis, which affected the counting done previously. In analysing the sherds, the focus was on their technology/fabric, form, and surface treatment/decoration, and the guidelines of the Prehistoric Ceramics Research Group (PCRG) (2010), Dale (2007), Ashley (2005), and Collett and Robertshaw (1980) were followed. Information was recorded on a data sheet created for ceramic analysis (see Appendix 3). Rim sherds, decorated body sherds, and bases included in the analysis were illustrated and photographed according to the site and the level/layer where they were found.

6.1.2 Technological/Fabric Information

The fabric analysis involved the study and classification of the pottery based on the characteristics of the clay body of the pottery item (see Appendix 3). The analysis of fabric deals with a range of attributes such as inclusions, clay matrix, colour of the clay, and firing.

Fabric analysis became central in the 1960s in an effort to break away from traditional chronological studies by concentrating more on technological, trade and exchange issues (Orton *et al.* 1993: 132). Such an analysis provides information on the natural composition of the raw materials, actions taken by the potter in creating the clay matrix, the firing atmosphere and temperature, as well as the use and post-depositional environment of the vessel (Orton *et al.* 1993). Orton add that most stages of manufacture and the technological properties of finished products largely depend on the original clay matrix as well as the frequency, size, shape and identification of non-plastic inclusions. Therefore, fabric data can help in understanding changes in technology and in providing a clue about different clay sources which, in the long run, may cast light on mobility and contacts.

Technological/fabric analyses in the present study were done where possible by observing the matrix from a fresh break and often by macroscopically examining very well-cleaned old break matrices. A hand lens was also employed to verify what had been observed through the naked eye. Ceramics of the same fabric were grouped together and assigned a fabric group. Petrological analysis was not possible in this study due to limited time and resources. To determine the types of fabric inclusions, the geology of the area investigated was studied. Rocks and soil types in the area were identified using very recent atlases and geological research work (e.g., NEMA 2009; Nyende *et al.* 2014). Having no background in geology, the researcher had difficulty in identifying fabric inclusion, but, through consultations with the University of Pretoria doctoral student, Jean Tshisekedi, who specialises in minerals, different inclusions in the assemblages were identified. Inclusion frequency, degree of sorting and size, and scale of roundness were recorded. Inclusions or the addition of temper improves the mechanical reaction of very plastic clay materials to fashioning because it creates the effect of flexibility (Roux 2019). Inclusions not only help in homogeneous drying by moderating the degree of plasticity and shrinkage but they also help in increasing resistance to thermal and mechanical shocks (Roux 2019: 36). The colour of each sherd was also checked as a matter of consistency, and colours were found to vary.

Under inclusion frequency, the density of each inclusion identified in the fabric and not the surface was recorded. Visual percentage estimation charts, though always preferred while identifying inclusion frequency, were not used in this study, but, instead, a computer-generated chart (Mathew cited in Orton *et al.* 1993) was employed. Such a chart covers a wide range of inclusion sizes and percentage values. In the present study, the degree of sorting and the size of inclusion were determined according to a range of size estimates (e.g., 0.1–0.25 mm (see Table 6.3). Determining sorting and size provides information on different aspects of fabric technology. Terms (e.g., fine) were used to denote range size (see Table 6.3). Simple classifications, such as angular, sub-angular, sub-rounded and rounded, were used to denote different shapes of inclusions in the paste. This was helpful in differentiating temper and natural inclusion.

Table 6. 3: Inclusion Estimation

Very fine	up to 0.1 mm
Fine	0.1–0.25 mm
Medium	0.25–1.00 mm
Coarse	1.00–3.00 mm
Very coarse	3.00 mm+

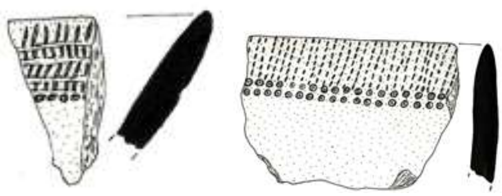
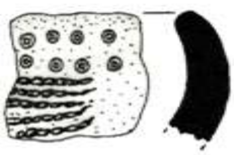
Source: PCRG (2020)

The firing of each sherd was also studied through visually examining and recording colour, hardness, and fracture. Colour was described in terms of core, inner and outer surfaces as this evidence could provide information on firing conditions and inclusions (Orton *et al.* 1993: 68-69). In addition, fracture acts as an indicator of firing temperature and the amount and size range of inclusions. High-fired fabrics with few inclusions have conchoidal fractures whereas lower-fired fabrics with lots of inclusions have hackly fractures. Also, some pots break following layers and this kind of fracture is commonly known as laminated (Orton *et al.* 1993: 70). All these variables provided information about firing atmosphere, clay matrices/pastes and inclusions. Technological or fabric data, if carefully studied, can help understand who the potters were and can also give a hint about how their skills were acquired (PCRG 2010).

6.1.3 Information about Form

Pottery containers come in different shapes and sizes depending on vessel function (Rice 1987: 210; Ashley 2010: 139). Vessels have three essential components—orifice/mouth, body/belly and base/foot (Rice 1987: 212–213). Most archaeological ceramics are broken and incomplete, which means that pots rarely survive in their original form. In such cases, vessel parts (e.g., rims, bases, spouts, handles, and some parts of the body) provide information on the form of the vessel. The Kansyore assemblages found at Namundiri A, Namaboni B, and Lugala A1 were composed of fragmentary pot sherds, some of which were small in size whereas others were weathered; therefore it was difficult to get a clear picture of vessel shape/form. An estimation of vessel shape was therefore largely based on the few rims preserved. However, a few pieces were conjoined, giving a clear picture of what the form could have been. Previous typologies indicate that all Kansyore ceramics are basically bowls with small variations (see typology section6.1.1). All rims recovered during the present study were consistent with previous studies on vessel shape (Collett & Robertshaw 1980; Robertshaw *et al.* 1983; Dale 2007). Some of the bowls recovered from excavations carried out for the present study were closed whereas others were open. The open bowls were subdivided into incurved bowls and open bowls, and these were coded as 1a and 1b (see Table 6.4). The present study used Rice's (1987: 216) and Dale's (2007) definitions of bowls, according to which a bowl has a restricted or unrestricted mouth and a height that varies from being one-third of the maximum diameter of the vessel to being equal to its diameter.

Table 6. 4: Namundiri A, Namaboni B and Lugala A1: Vessel forms recovered

Vessel forms	Description
1a. 	Incurved bowls: These slightly curved inwardsbent towards the interior but had no observed angle at which the curve started. They had a deeper surface.
1b. 	Open bowls: These spread towards the exterior but had no corner point. Some of these had a shallow surface whereas others were straight rims
2. 	Closed bowls

The rim diameters of vessels found at all three the sites (see Table 6.4) were recorded so as to estimate the size/volume of each vessel because such information could, in the long run, enable interpretations in relation to function. Some rims provided no information on vessel shape/morphology and therefore they were categorised as of indeterminate form. Rims that had a diameter of between 9 and 14 cm were recorded as belonging to small vessels, rims with a diameter of between 15 and 24 cm were considered as belonging to medium vessels, whereas rims with a diameter of 25 mm and above were considered as belonging to large vessels. The size intervals were based on the researcher’s empirical data as well as the descriptions of Dale (2007) and Ashley and Grillo (2015) of the Siror assemblage. Rim types were described based on the works of Collett and Robertshaw (1980), Robertshaw (1991), Ashley (2005), and Dale (2007), as well as rim types created based on evidence found at the different sites where excavations for the present study were carried out. The rim types that applied to the present study included rounded, tapered, and flattened rims, and these were coded as 1, 2, and 3 (see Figure 6.1). With the exception of tapered rims (which were slightly thin at the lip/rim), the other two types of rim found seemed to be symmetrically thickened. Some rims were both tapered and flat (see Figure 6.2). It is important to identify rim shapes; they serve both a decorative and functional purpose and are useful for determining spatial-temporal variation (Rice 1987; Braun 2010). All rims, irrespective of size, were analysed, but only those that were roughly 4 cm or more in size were illustrated because larger sherds could provide relevant information.

Figure 6. 1: Figure 22: Rim types

Figure 6. 2: Tapered/flattened rim

Body sherds and bases were described based on provenience (trench and level), and measurements were taken using manual calipers. Wall thickness was emphasised in the present study because, in many cases, they indicate the function and use of a vessel. Moreover, any change in vessel wall thickness from one level to another may indicate a change in activity (Joukowsky 1980: 338; Rice 1987).

6.1.4 Surface Treatment/Decoration

The surface condition and decoration of each sherd (whether smoothed, burnished, or painted) were considered. The description of decoration followed Dale's (2007) approach, and reference was made to Caneva (1988) where applicable. As discussed earlier in the typology section 6.1.1, Dale's approach emphasises techniques, elements, implements, and motifs. Therefore, when analysing a sherd, the decorative technique used was identified first.

The technique could be that of impression (e.g., rocker-stamp, alternating pivot or simple impression), stab drag, incision or applique (see Table 6.5). Thereafter, the implement used (e.g., a pronged implement or a serrated-edge comb) was identified as well as the design elements used (e.g., plain lines, u- or v-shaped or circular-grooved/incised lines, dots, vees, rectangles, triangles, dashes, oval or round moulded piece of clay). The final stage was to identify the motif of the design (e.g., curved, zigzag (packed or spaced), paired or individual lines). Motifs observed are discussed at the results of each case study because they varied in number from one case study to the next. Decoration location of all sherds analysed was recorded.

Table 6. 5: Description of decoration techniques used for ceramics recovered

Example	Technique	Description
 	1. Applique	The clay pieces are added and moulded using fingers, creating roundish shapes. This technique is combined with other decoration techniques.
 	2. Incision	The implement used is dragged into the clay, creating horizontal or vertical, dotted or plain lines, circular, v- or u-shaped grooves or lines depending on the state of clay paste, the choice of the potter as well as the implement used.
 	3. Stab drag	An implement is stabbed into the clay and dragged continuously without leaving the clay surface, creating a combination of horizontal rows of dots and dashes.
 	4. Impression a. Rocker	An implement is placed on the clay and moved back and forth without leaving the surface. Different implements are used (e.g., plain-edge and serrated-edge combs). Depending on the angle the implement is held

		and at which distance, many decoration motifs can be created.
 	b. Alternate pivot	The implement is pressed into the clay surface and then lifted. A double-pronged (bi-fid) stylus/comb can be used to create paired lines/a punctate motif. This is sometimes called walked punctuates.
 	c. Simple	This technique is almost the same as alternate pivot but the implement is not double-pronged, and even if it were, one edge is applied to create uneven and spaced punctuates. Otherwise a hollow stick is impressed into the clay, leaving a circular motif.

6.2 Results relating to Kansyore LSA Ceramics

A total of 1 934 sherds were recovered from the excavation of six trenches: Budecho A, trenches 1–3 (2 m², 2 m² and 1 m²); Namundiri A, trench 1 (2 m²); Namaboni B, trench 1 (2 m²); and Lugala A1, trench 1 (2 m²). The number of sherds indicated excluded surface-collected sherds as well as sherds associated with LSA skeletons collected outside formal excavation (see chapters 4 and 5) and sherds from the 2017 Namundiri A excavation. Of the total number recovered, the Budecho A trenches yielded 44 sherds, seven of which were decorated and 37 undecorated (see Figure 6.3). Namundiri A, trench 1 yielded 1 220 sherds, of which 638 were decorated and 582 undecorated (see Figure 6.3). Namaboni B, trench 1 yielded 468 sherds, of which 127 were decorated and 341 undecorated (see Figure 6.3). Lugala A1, trench 1 yielded 202 sherds, of which 87 were decorated and 115 undecorated (see Figure 6.3). With the exception of sherds that were put aside for residue analysis, all sherds were washed, dried and bagged in the field for further analysis.

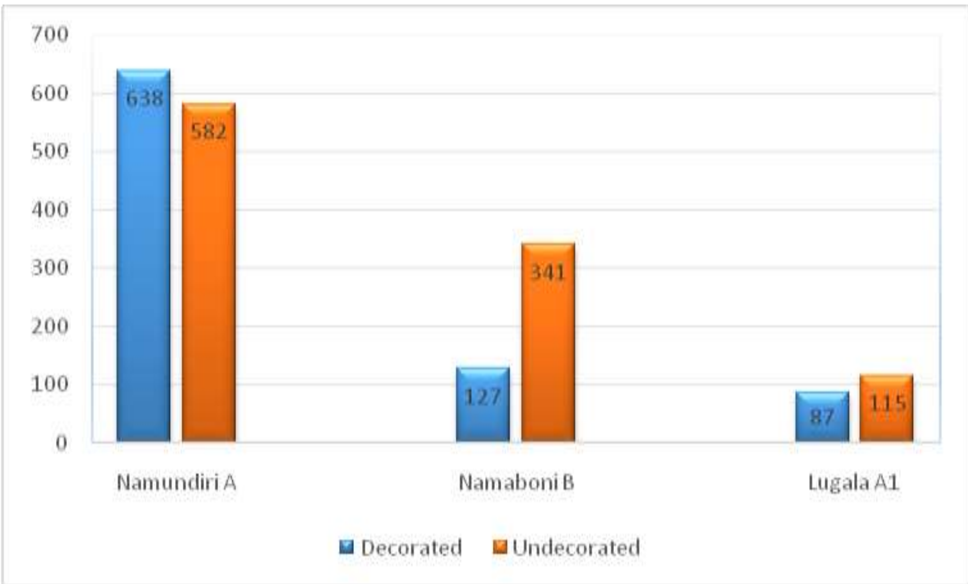


Figure 6. 3: Namundiri A, Namaboni B and Lugala A sites: Decorated and undecorated ceramics recovered

A preliminary analysis was conducted in the field which entailed counting and weighing decorated vs. undecorated sherds from each level in each trench. Weighing of ceramics is important for intra- and inter-site density comparisons (Ashley 2005). All decorated sherds and featured sherds, such as bases and rims, were bagged separately according to the site, trench number, and level/layer, ready for further analysis. However, Budecho A ceramics were not considered for further analysis because of the high degree of disturbance of the site by shell harvesters as observed during excavation as well as personally communicated by one of the shell harvesters (see Chapter 5). That aside, the number of featured and decorated sherds in all trenches was low and most of them were very fragmentary and therefore provided little information. Given the scope of the study, only Kansyore LSA and Urewe EIA decorated and featured sherds were transported to the Archaeology Laboratory of the University of Pretoria for detailed analysis. All the non-Urewe and non-Kansyore ceramics were stored at the Uganda National Museum for future reference.

As indicated earlier, the results of the analysis of ceramics relating to the three case studies (Namaboni B, Namundiri A, and Lugala A1) are discussed separately.

6.2.1 Case study 1: Early Holocene Ceramics from the Namaboni B Site

The Namaboni B site was an Early Kansyore site dated to 6634–6479 cal. BC based on a burnt seed that was recovered from trench 2, layer 7. Two trenches of 2x2 m and 1.5x1 m (in the form of an L) were set at this site. Trench 1 (2x2 m) produced 10 stratigraphic layers and was excavated up to a depth of 338 cm below the surface. Out of these layers only six (layers 9, 8, 7, 6, 5 and 4) produced cultural materials relevant to the present. Of the six layers, only two (5 and 4) produced ceramics, and the rest of the layers were aceramic. In addition to ceramics, layer 4 produced bones (fish and animal), lithics, burnt clay, and seeds (but no shells) whereas layer 5 produced all the materials observed in layer 4 as well as shells, suggesting the two layers were occupied at different times.

As far as stratigraphic layers were concerned, trench 2 produced nine layers and it was excavated up to 270 cm below the surface. Of the nine layers, only layer 7 produced ceramics (n = 2) associated with a human skeleton, fish and animal bones, lithics, shells, burnt seeds, and clay. Some layers (i.e., 6, 5 and 4) on top of layer 7 and others (i.e., 9 and 8) below layer 7 in trench 2 were aceramic. More discrete excavations were carried out in the area northeast of trench 1 where there were a number of human skeletons including skeleton 6recovered from trench 2. Excavations in the northeast of trench produced a few pieces of ceramics that were highly fragmented and others that were highly weathered. Therefore, ceramic analysis at this site only considered materials from trench 1, which was systematically excavated. Importantly, trench 1 produced many featured sherds that were big enough for detailed analysis. The paragraph below provides details about the ceramic analysis relating to trench 1.

A total of 468 sherds were recovered from trench 1. Out of these, 127 were decorated whereas 341 were undecorated. The decorated sherds weighed 1 709.6 g and the undecorated ones 2 860.8 g. Out of the 127 decorated sherds, 69 were subjected to detailed analysis. These included rims (n = 60) and body sherds (n = 10). The detailed analysis followed the methodology outlined above, and the results reported below are grouped according to technological/fabric, form, and surface treatment/decoration.

6.2.1.1 Results relating to technology/fabrics

Four fabric types were identified, namely, NAMB 1, NAMB 2, NAMB 3 and NAMB 4. The term NAMB denotes ‘Namaboni B’. The fabric properties are described in the table below

Table 6. 6: Namaboni B, trench 1: Description of fabric group

Fabric group	Description
NAMB 1	Dark to orange-brown fabric, hard, smooth to sandy texture and hackly fractured; poorly sorted, subrounded, sparse (3–9%), medium (0.25–1.00 mm) quartz and moderate subrounded, very common (30–39%) fine (0.1–0.25 mm) sand inclusions
NAMB 2	Dark to light orange-brown fabric, hard, sandy texture and hackly fractured; poorly sorted, subangular, moderate (10–19%) coarse (1.00–3.00 mm) quartz and well-sorted subrounded, common (20–29%) fine (0.1–0.25 mm) sand inclusions
NAMB 3	Dark, pale-grey to light-orange brown fabric, hard, sandy texture and hackly fractured; poorly to moderately sorted, subangular, moderate (10–19%) coarse (1.00–3.00 mm) dolomite, subrounded, moderate (10–19%), medium (0.25-1.00 mm) quartz and rounded rare (< 3%), fine (0.1–0.25 mm) sand inclusions
NAMB 4	Orange-brown fabric, hard, sandy, hackly fractured; poorly sorted, rounded, rare (< 3%), medium (0.25–1.0 mm) quartz and very common (30–39%) fine (0.1–0.25 mm) sand inclusions

NAMB 1 was the most abundant (n = 31; 45%) fabric in both layers 5 and 4 in this trench, followed by NAMB 2 (n = 20; 29%), NAMB 3 (n = 12; 17%) and lastly NAMB 4 (n = 6; 9%) (See Figure 6.4). The fabric colours of the sherds varied, but all fabrics were fired by bonfire. NAMB 1 and NAMB 2 had similar inclusions (i.e., of quartz and sand) but the texture, frequency, sorting, roundness, and size of the inclusions differed (see Table 6.6). NAMB 1 and NAMB 2 might have had the same clay source or the clay from the same source might have been processed differently. The similarity and quantity of these two fabrics suggested that the clay source was within the local area and could have been easily accessible to almost all potters. The poorly sorted/arranged, subangular, moderate and coarse quartz observed in NAMB 2 was likely to have been deliberately added, and the poorly sorted, subrounded sparse, medium quartz and the moderate, subrounded, very common, fine sand inclusions could have been natural inclusions in the clay. Interestingly, the NAMB 1 fabric had a smooth to sandy texture, which may suggest that the hunter-gatherers put in much effort, time and skill to achieve such smoothness.

NAMB 3 was the third most popular fabric type in this trench, and its major inclusion was dolomite. Dolomite minerals/rocks are located in a wetland close to the Uganda–Kenya border towards the Tororo District, roughly 27 km from the Namaboni B site. Finding sherds with this inclusion suggested that either potters travelled long distances to obtain this inclusion/clay or they had contacts with potters from this area. The paste in this fabric was composed of poor to moderately sorted, subangular, moderate coarse dolomite mixed with subrounded, moderate, medium quartz plus rounded, rare, fine sand inclusions. Dolomite inclusions seemed to have been deliberately added whereas quartz and sand were naturally included. The texture was sandy, suggesting that less effort, time, care and/or skill was put in as the surface was not smoothed but left coarse. However, leaving the surface coarse could have been intentional since coarse-textured pottery was good for cooking purposes (Rice 1987).

The NAMB 4 fabric was rarely found in this trench but it was slightly more common in layer 4 than in layer 5. This fabric could have been regarded as exotic at this site or it was sourced from a distant area not easily accessible to everyone. The slightly higher numbers found in layer 4 could suggest increased contacts or continuity of some kind. NAMB 4 fabrics were composed of poorly sorted, rounded, rare, fine sand inclusions.

Observations relating to fabric frequencies over time seemed to suggest some form of continuity in fabric use between layers 5 and 4, although some variations were noted in the number of fabrics used per layer. It should be noted, however, that the samples were fairly small and, therefore, that significant conclusions relating to such variations could not be drawn at that stage.

The frequency of these fabrics within the same layer (e.g., in layer 5) indicated that NAMB 1 (n = 13) was the fabric preferred most, followed by NAMB 3 (n = 8), NAMB 2 (n = 6) and lastly NAMB 4 (n = 1). On the other hand, the preferences in layer 4 seemed to be different, and the sequence of preference was NAMB 1(n=18, NAMB 2 (n = 14), NAMB 4 (n = 5), and NAMB 3 (n = 4). The preference of fabrics might perhaps be associated with the functions of the vessels or the choices of the potters. Pottery makers'/users' fabric of choice in layers 5 and 4 was NAMB 1, but the second choice differed, namely, NAMB 3 in the case of layer 5, and NAMB 2 in the case of layer 4. NAMB 3 inclusion was located about 27 km from this site, suggesting potters/users were in contact of some kind. Different fabrics recovered from this site indicated some kind of variation within the Kansyore tradition, which could be the result of regional contacts between or innovations by Kansyore potters at this site.

The composition of most of the fabrics of the ceramics found at Namaboni B was fairly typical of Kansyore ceramics. Generally, they were poorly sorted, and had a sandy surface and coarse (1.00–3.00 mm) quartz and sand inclusions. However, a few sherds had poor to moderately sorted, smooth surfaces and medium (0.25–1.00 mm) to fine (0.25–1.00 mm) sand and quartz inclusions (see Table 6.6). These differences might suggest differences in clay sourcing/contacts/processing skills (technology) and also that ceramics were used for different functions/purposes or that different potters were involved in pottery-making at this site and exercised their individual choices. Evidence at Namaboni B also suggested that a good number of fabrics were locally available, thus supporting the idea that people stayed long at the site since resources were readily available. Further, fabric frequency over time revealed some form of continuity, which was consistent with the presence of faunal and lithic materials recovered from this trench. Some fabrics, however, seemed to have been exotic to this site, suggesting there had been contact of some kind (i.e., individuals took pots or raw materials with when they moved).

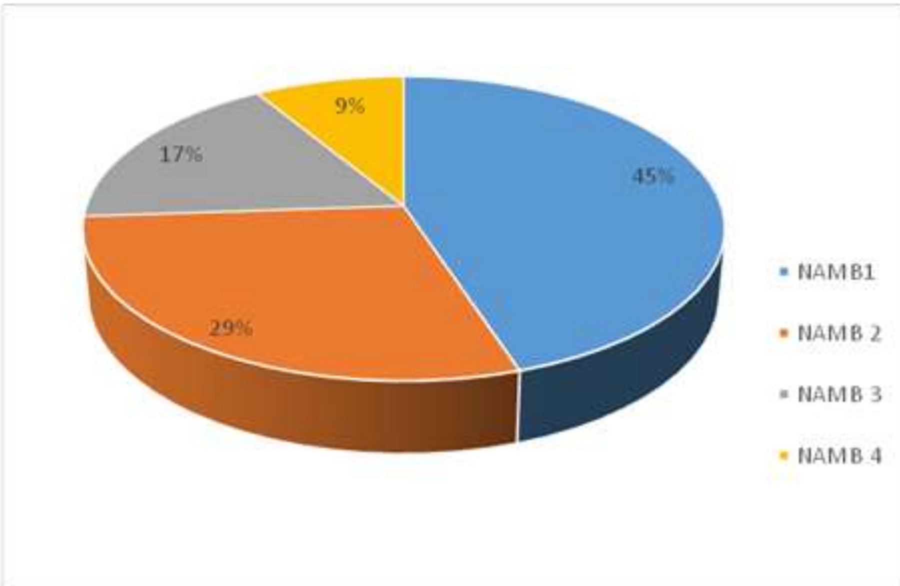


Figure 6. 4: Namaboni B, trench 1: Fabric percentages

6.2.1.2 Results relating to form

The wall thickness of ceramics found in trench 1 at Namaboni B depended on the fabric type that was used. The mean average thickness of NAMB 1 sherds was 10.5 mm, of NAMB 2 it was 13.5 mm, of NAMB 3 it was 8.7 mm and of NAMB 4 it was 9 mm. The differences in the mean average thicknesses of the fabrics could indicate that the ceramics might have been used for different purposes (e.g., food processing and cooking), but this could not be confirmed due to insufficient data and potential variability among vessels. Vessel forms from this trench varied from small, medium and large open and closed bowls. Of the 59 rims analysed, 37 rims were too small to provide information on vessel form. Judging from rim diameters, four rims belonged to small-sized bowls and were made using NAMB 1 (n = 2) and NAMB 2 (n = 2), 11 were from medium-sized bowls and were made from both NAMB 1 and 2 fabrics. Only 7 belonged to large-sized bowls (see Table 6.7) and all were made using NAMB 3 fabric. Medium- and small-diameter open vessels were popular in layer 4, whereas large-diameter open vessels were common in layer 5 (see Table 6.7).

Table 6. 7: Namaboni B, trench 1: Vessel sizes based on rim diameters, per layer

Layer	**Too small for analysis**	**Small (11–14 cm)**	**Medium (15–24 cm)**	**Large (25+ cm)**
4	24	3	7	1
5	13	1	4	6
Total	37	4	11	7

Three types of rims were identified; tapered 39 (66%), rounded 14 (24%) and flattened 6 (10%) (see Figure 6.5). The numbers of types 1 and 3 were low in layer 4. The same numbers of flattened rims were recovered in both layers. Tapered rims were the most abundant in this trench, with 26 sherds in layer 4 and 13 in layer 5. Two types of rims (tapered and rounded) made up the largest portion of the rims at Namaboni B.

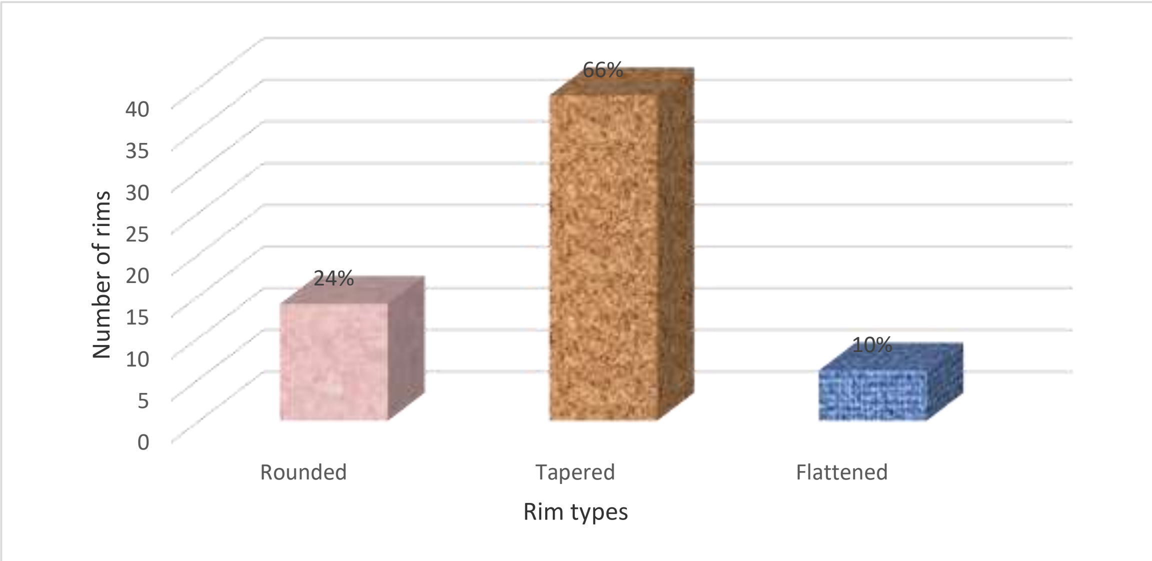


Figure 6. 5: Namaboni B, trench 1: Rim type frequencies and percentages

Eight bases were recovered, and these were rounded (n = 4), slightly pointed (n = 2), and flat (n = 1). The bottom of one was worn away, making it difficult to classify the base. The bases were all undecorated, and although their wall thicknesses were not measured, drawings were made to show what they looked like (see Figure 6.6).

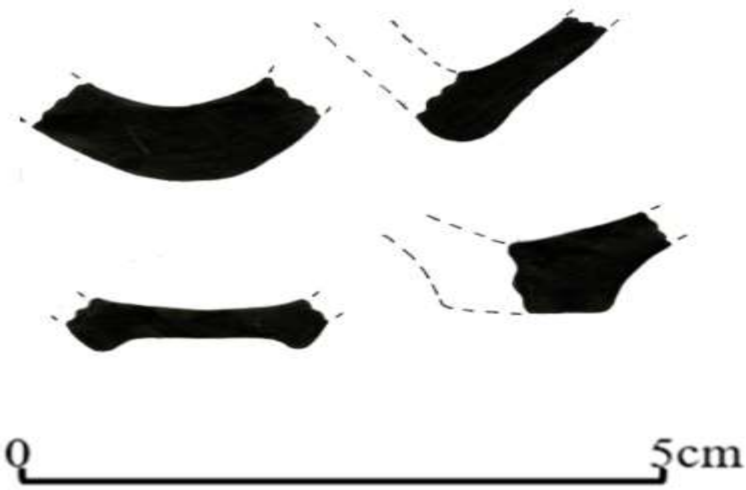


Figure 6. 6: Namaboni B, trench 1: Bases

6.2.1.3 Results relating to surface treatment and decoration

Red paint/slip was observed on five rims recovered from layers 5 and 4 (see Table 6.8 and Figure 6.7) of this trench. Red paint was used on all types of rims (i.e., rounded, tapered, and flattened). At rounded rims, red paint was applied to the exterior and was associated with simple impression decorated sherds (n = 1) recovered from layer 4. At both tapered and flattened rims, red paint was applied to the exterior and interior parts. The former treatment (n = 2) was associated with rocker and simple impression decoration recovered from layers 4 and 5, whereas the latter treatment (n = 1) was associated with rocker decoration recovered from layer 4.

Table 6. 8: Namaboni B, trench 1: Rims with red paint/slip

Rim type	Exterior	Interior	Both	Total
Rounded	1	0	0	1
Tapered	1	0	2	3
Flattened	0	0	1	1

Figure 6. 7: Namaboni B, trench 1: Sherds with red paint

Of the 59 rims recovered from trench 1, four were plain/undecorated and 55 were decorated. Decorations associated with analysed tapered rims included incision (n = 4), rocker (n = 12), alternating pivot (n = 8), simple impression (n = 13) and miscellaneous (n = 1) (see Table 6.9). Decorations associated with flattened rims were incision (n = 1), alternating pivot (n = 1), and rocker (n = 3). The decorations associated with rounded rims included incision (n = 1), rocker (n = 6), alternating pivot (n = 2), and simple impression (n = 3). The decoration associated with rim types in all layers was uniform, suggesting continuity in the rim types and decoration techniques. The spatial decoration of rims found in this trench showed two patterns; right at the lip/rim, or a few centimetres below the lip/rim (up to 0.7 cm) (see Figure 6.8). Only a few decorated ceramic sherds were recovered at this site. Moreover, the decorations were limited to a few centimetres below the lip/rim, perhaps because the vessels were functional and not decorative. The decorative patterns found on ceramics at this site differed slightly from the known patterns identified at other Kansyore sites where decorations varied extensively and sometimes covered a big part of the vessel (Ashley 2005; Dale & Ashley 2010; Ashley & Grillo 2015). Red slip, which was known to be used in Late Kansyore assemblages (Dale & Ashley 2010), was identified as part of the Early Kansyore assemblage at this site. In addition, more than one decoration (see Figure 6.9) was observed on sherds recovered from this trench, suggesting complex decorations were used on ceramics. Such combinations included rocker and simple impression, and incision and alternating pivot. Sherds (n = 5) with more than one decoration were recovered from layers 5 (n = 3) and 4 (n = 2).

Table 6. 9: Namaboni B, trench 1: Decorations per rim type

Rim type	Incision	Stab drag	Rocker	Alternating pivot	Simple impression	Plain	Miscellaneous
Rounded	1	0	6	2	3	2	0
Tapered	4	0	12	8	13	1	1
Flattened	1	0	3	1	0	1	0
Total	**6**	**0**	**21**	**11**	**16**	**4**	**1**

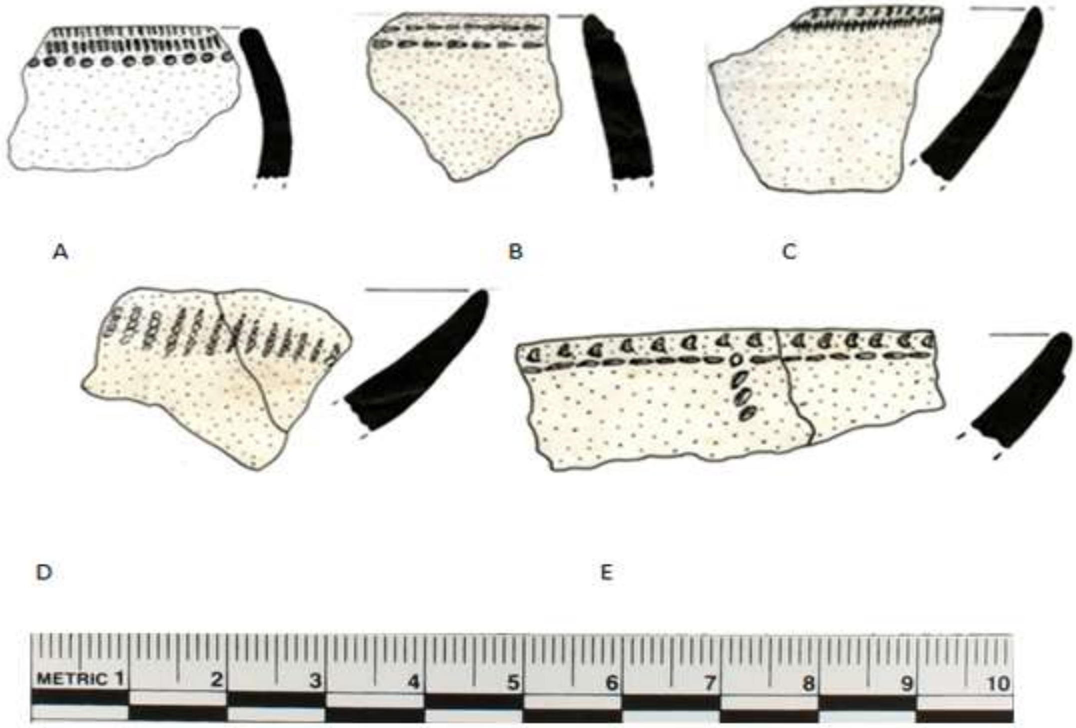


Figure 6. 8: Namaboni B, trench 1: Rim sherds showing decoration coverage; A shows a rounded lip/rim bowl with comb impressions and punctuate, B shows a slightly incurved bowl with paired punctuates, C shows a tapered lip/rim with punctuate and a line of

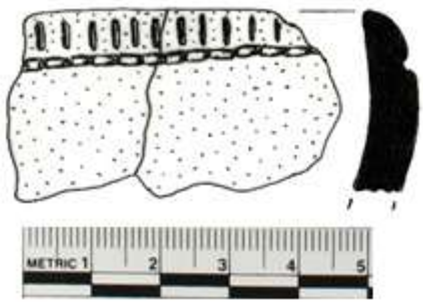


Figure 6. 9: Namaboni B, trench 1: Ceramics with combination of decorations

Below, results relating to decoration techniques and motifs found at Namaboni B, trench 1 are discussed.

6.2.1.4 Results relating to decoration techniques

Five decoration techniques were identified; incision, stab drag, rocker, alternating pivot, and simple impression (see Figure 6.10). Plain sherds were also identified as well as sherds that had a combination of techniques such as incision and simple impression, rocker and simple impression, and alternating pivot and simple impression.

Of the 69 sherds that were analysed, 65 were decorated, and these were the ones whose decorations were considered for the identification of decoration techniques. The most common technique was rocker (n = 24), accounting for 36.9% of the 65 decorated sherds analysed. Ceramics decorated using the rocker technique were found throughout the two ceramic layers in equal numbers (n = 12 per layer) (see Table 6.10). Examples of the simple impression technique (n = 20; 30.8%) were recovered, with the largest number being in layer 4 (n = 16). The alternating pivot technique (n = 13; 20%) was identified on seven sherds in layer 4 and on six sherds in layer 5. Examples of incision were also present in this trench but in low numbers (n = 7; 10.8%). The incision technique was slightly more common in the lower ceramic layer (layer 5) (n = 5) than in the upper layer (layer 4) (n = 2). The rarest decoration technique found was stab drag (n = 1; < 1.5%). Plain rim sherds (n = 4) were also recovered. Some of the decoration techniques (e.g., applique) were not present at this site. With the exception of the stab drag technique, which appeared only in layer 4, all the other techniques, except for the incision technique, were traced from the lower layer to the upper layer and in increasing numbers as the numbers of sherds increased. This finding suggested continuity, with some minor changes, between layers 5 and 4. It is worth noting that the layers above layers 5 and 4 produced no ceramics, suggesting the site was abandoned at one stage and occupied again only later.

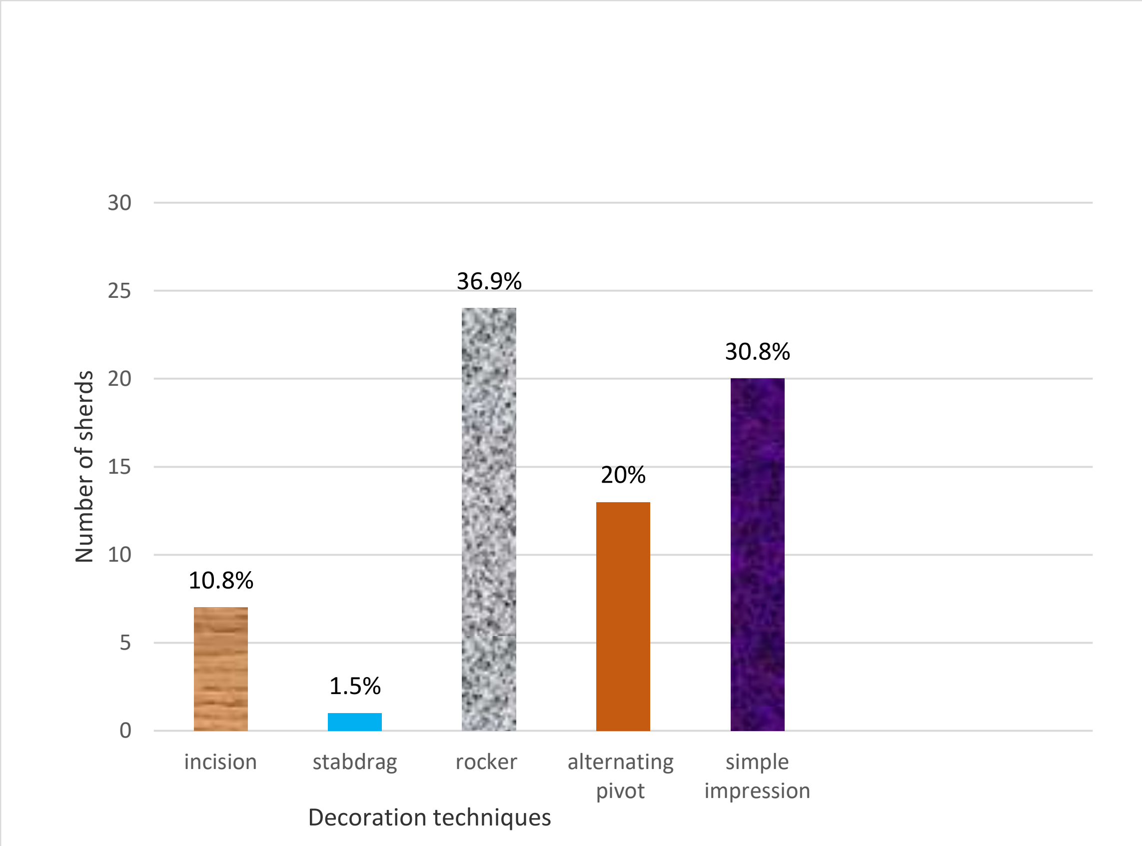


Figure 6. 10: Namaboni B, trench1: Chart showing decoration techniques

Table 6. 10: Namaboni B, trench 1: Decoration techniques per layer

Layer	Incision	Stab drag	Rocker	Alternating pivot	Simple impression	Plain	Total
4	2	1	12	7	16	3	41
5	5	0	12	6	4	1	29
Total	7	1	24	13	20	4	69

6.2.1.5 Results relating to decoration motifs

Decoration motifs by layer are presented in Table 6.11. The serrated edge motif (n = 24) was the most commonly identified motif in the trench 1 assemblage, followed by simple impression (n = 18), punctate (n = 9), incised/grooved lines (n = 4) and mixed motifs (n = 9). These nine mixed-motif sherds, recovered largely from layer 5, had, for instance, incised lines and simple impression, punctates and simple impression, and serrated edge and incision motifs (see Table 6.11). With the exception of the incision motif, almost all decoration motifs were present in higher numbers in layer 4 compared to layer 5. This might have been due to the fact that more items were recovered from layer 4.

The serrated-edge motif was created using an evenly serrated-edge comb to apply rocker, stab and drag, and simple impression techniques. A combination of both vertical and horizontal rows was observed too. Plain-edge zigzag motifs were not recovered from this trench. Simple-impression sherds had a few decorations that were randomly distributed or in pairs, although these were not many in number. Some of these sherds had roundish impressions placed horizontally or vertically. Sherds with the simple-impression motif were found in both layers 5 and 4, but the numbers increased from five in layer 5 to 14 in layer 4, suggesting the continued preference for this motif over others. This preference might be attributed to the greater ease and speed with which this motif, compared to other motifs, could be applied. The serrated-edge motif, for instance, required much more time to create a neat grid-like pattern.

Punctate motif sherds were recovered from both layers 4 and 5, but the numbers were slightly higher in layer 4 than in layer 5. However, this might be due to the limited data collected. Punctate motifs were made by pressing and lifting a double-pronged (bi-fid) stylus/comb implement to create straight lines or pairs of lines. Different forms of incised lines were also observed, some of which were thin, shallow, fine, multiple, or oblique, and had individual parallel grooves. Some incised lines were horizontal and continuous whereas others were broken panels. Sherds with the incised motif were found in both layers 4 and 5. Well-executed incised motifs as well as serrated-edge motifs were also observed on a few sherds in this trench, suggesting that care and time were invested in creating motifs.

Table 6. 11: Namaboni B, trench 1: Decoration motifs per layer

Layer	**Incised**	**Serrated edge**	**Punctate**	**Simple impression**	**Mixed motifs**
4	2	13	6	14	2
5	2	11	3	4	7
Examples					
Total	**4**	**24**	**9**	**18**	**9**

Sherds from Namaboni B, trench 1 showed the consistent use of quartz and sand inclusions, suggesting a unified production system. It was likely that pottery makers/users at this site had access to the same clay source or raw materials but had different ways of processing the clay. Judging from the fabrics of the ceramic pieces, it was possible that clay was sourced locally and that potters stayed long at a site and became familiar with resources available locally.

Smooth to sandy textures were observed despite the poorly sorted subangular, moderate to coarse inclusions observed in some sherds, suggesting that some skill and time were invested to create smooth surfaces. Some sherds with exotic inclusions (e.g., dolomites) were also identified, suggesting that there was some form of contact between people or that people took pots and/or raw materials with them when they moved. Varied decorations limited to vessels' lips/rims and up to 0.70 cm below lips/rims were identified at this site. The large numbers of undecorated body sherds (341 out of 468 sherds collected from this site) indicated the possibility that most vessel body parts were not decorated, a finding that differed from the evidence presented by Prendergast *et al.* (2007: 238 in Figure 12 a-e; see also Prendergast *et al.* 2014) in studies on northern Tanzania. The presence of red paint was also observed on some of the Early Kansyore ceramics recovered at this site, a finding that differed from known patterns, according to which red paint has been associated with the Late Kansyore phase (e.g., at Usenge 3) (Dale & Ashley 2010; Ashley&Grillo 2015). Judging from rim diameters, small, medium and large open bowls were present at this site. This finding was consistent with the evidence found at the Siror site (Dale 2007) and the Usenge 3 site (Lane *et al.* 2007; Dale & Ashley 2010) and supported Ashley's (2010) and Ashley and Grillo's (2015) idea that ceramics were used at a familial level.

6.2.2 Case Study 2: Middle Holocene Ceramics from the Namundiri A site

The Namundiri A site was a Middle Kansyore site dating between 4520–4368 cal. BC and 3938-3710 cal. BC. The dating was based on a charcoal samples recovered from the extension to trench 1 in 2018 (Jones 2020; Jones & Tibesasa in prep Although the charcoal samples were recovered from the trenches excavated in 2018 and not from those excavated in 2016, it is important to note that the stratigraphic layers of the two groups of trenches were the same.Two trenches of 2x2 m and 1x2 m were set at this site in 2016 and materials from all the trenches were similar. Only ceramics from trench 1 (2x2 m) were considered for detailed analysis because the cultural materials from the two trenches were similar and because time and resources were limited. Five layers (5, 4, 3, 2 and 1) were identified in trench 1 after excavations, and the trench was excavated up to a depth of 116 cm below the surface. All five stratigraphic layers produced cultural materials (e.g., ceramics), which suggested that the site was occupied continuously. Of all five layers, layer 4 produced the highest numbers of all cultural deposits, suggesting dense site occupation during the relevant period. A total of 1 220 sherds were collected from trench1. Out of these, 638 (weighing 10 929.8 g) were decorated, and 582 (weighing 6 855.5 g) were undecorated. After combining the sherds, 178 sherds, each with a size of 3 cm or larger, were considered for detailed analysis. These included decorated body parts (n = 103), rims (n = 73) and bases (n = 2). One of the two bases was decorated with a simple-impression technique and the other undecorated. Following the methodology outlined above, the results of the analysis are presented according to fabric, form, and surface treatment/decoration.

6.2.2.1 Results relating to technology/fabrics

Five fabric types were created for the assemblage from this site, namely, NDRIA 1, NDRIA 2, NDRIA 3, NDRIA 4, and NDRIA 5 (see Table 6.12). The term NDRIA denotes 'Namundiri A'. The properties of each type are described in Table 6.12.

Table 6. 12: Table 25: Namundiri A, trench 1: Fabric type and description

Fabric types	Description
NDRIA 1	Orange brown to dark-grey, oxidised and unoxidised core, exterior, interior and irregularly fired fabrics, hard, sandy, and hackly fractured; poorly sorted, subangular, sparse (3–9%), coarse (1.00–3.00 mm) quartz and moderately sorted subrounded, common (20–29%), medium (0.25–1.00 mm) sand inclusions
NDRIA 2	Black to pale-grey unoxidised core, exterior and interior fabric with hard, smooth to sandy texture; hackly fractured with poorly sorted subrounded, rare (< 3%), medium (0.25–1.00 mm) quartz and well-sorted subrounded, very common (30–39%), fine (0.1–0.25 mm) sand inclusions
NDRIA 3	Orange-brown to dark- and pale-grey oxidised and unoxidised and irregularly fired fabric; hard, smooth to sandy texture; hackly fractured, with combination of poor to moderately sorted, subangular, moderate (10–19%), coarse (1.00-3.00 mm) dolomite, subrounded, moderate (10–19%), medium (0.25-1.00 mm) quartz and rounded, rare (< 3%), fine (0.1–0.25 mm) sand inclusions
NDR1A 4	Black, pale-grey to light-orange and brown unoxidised and irregularly fired fabric; hard, smooth to sandy texture, and hackly fractured. Poorly sorted subangular, very common (30–39%), coarse (1.00–3.00 mm) quartz and well-sorted, rounded, common (20–29%), very fine (up to 0.1 mm) sand and mica inclusions
NDRIA 5	Dark-brown to orange-brown fabric, hard, smooth-textured and hackly fractured; poorly sorted subangular, sparse (3–9%), coarse (1.00–3.00 mm) quartz inclusion

NDRIA 2 was the most abundant fabric in almost all the layers, followed by NDRIA 1, NDRIA 3, NDRIA 4, and NDRIA 5 (see Table 6.13). NDRIA 1 and NDRIA 2 had similar inclusions (i.e., sand and quartz), but the texture, frequency, sorting, roundness and size of the inclusions differed. It was likely that the two fabrics were created using clay from the same source and that the differences between them could have been the result of different ways of processing, as was the case at Namaboni B. Also as was the case with Namaboni B, the similarity of the fabrics suggested that the clay source was in the local area and could be accessed easily. Whether the subangular, coarse quartz inclusion in NDRIA 1 ceramics was deliberately added or not, was uncertain, but it was certain that the subrounded, medium quartz and sand were natural inclusions in the clay. Therefore, it was possible that the two fabrics came from clay extracted from the same source, and that differences in the composition of the clay could be ascribed to the fact that one area of extraction was located at the extreme end of the other and that river and weather systems also played a role.

NDRIA 3 represented the third most popular fabric type in this trench. As this fabric was completely different from the first two, it suggested that a different clay source was used. Dolomite mineral/rock, which was the major inclusion in this paste, is located in a wetland close to the Uganda–Kenya border towards the Tororo District, roughly 19 to 20 km from the site. The fabric texture was smooth to sandy, suggesting that it took effort, time, care and some skill to create wares with a smooth surface, given the coarse nature of this inclusion.

NDRIA 4 and NDRIA 5 (see Table 6.13) were rarely found in this trench. Stratigraphically, the ceramics made from these two fabrics fell in two layers; NDRIA 4 in layers 4 and 2, and NDRIA 5 in layers 5 and 4. The two fabrics had different inclusions (i.e., quartz and mica) and varied in texture as well as method of firing. Regarding the subangular quartz inclusion in NDRIA 4, it was tempting to suggest that the quartz had been added as a temper. As far as the mica inclusion was concerned, it was difficult to determine whether it had been added purposely or whether it was a primary ingredient. NDRIA 5 was very rare in trench 1 (n = 3), and because the appearance of this fabric type was completely different from that of the other fabrics in this trench, it could have been brought to the site from elsewhere.

The composition of some of these fabrics is fairly typical of Kansyore ceramics, being generally poorly sorted, having a sandy surface and coarse (1.00–3.00 mm) quartz and sand inclusions. However, some of the sherds had a well- to moderate-sorted, smooth surface and medium-sized (0.25–1.00 mm) inclusions such as mica, sand, quartz and dolomite. This might be taken to suggest different clay sourcing or contacts or processing skills (technology), which might further suggest that the ceramics were used for different purposes or were made within differing technological systems or by different potters.

Slightly low numbers of all fabrics were observed in layer 5 (see Table 6.13), suggesting that site occupation was limited or that ceramic use was in its initial stages. Even then, NDRIA 2 was the most commonly used fabric, followed by NDRIA 1 and lastly NDRIA 3. As noted earlier, NDRIA 2 and NDRIA 1 had similar inclusions, but the size and frequency of use of these suggested that they were easily accessed and perhaps locally available. A sharp increase in ceramics was observed in layers over time, suggesting that this could have been the reason for the increase in the use of these fabrics. This increase in ceramics was consistent with an increase in all the other cultural materials in layer 4, suggesting that site occupation was long, which perhaps resulted in the intensification of materials and activity (see Chapter 5). A sharp decrease of all ceramics was observed in layer 3, and this was consistent with the decline in the presence of all fabrics—some fabrics, such as NDRIA 4 and 5 were completely absent (see Table 6.13). This suggested that the site was not as intensively occupied as was the case with layer 5. The low numbers observed in layer 3 could also be attributed to fewer disturbances in this layer. A slight increase in NDRIA 2 and 3 was observed in layer 2 and layer 1. NDRIA 4 appeared only in layer 2 and was absent in layer 1. NDRIA 1 increased in layer 1, whereas NDRIA 4 and 5 were absent in this layer. The slight increase in fabric types observed in both layers 2 and 1 was attributed to disturbances caused by shell harvesting and hand-hoe cultivation observed at this site. Evidence was found of the presence of mixed materials such as recent pottery, recent hooks used for fishing, and Kansyore pottery. It is important to note that cultivation at this site went to a depth of up to 30 cm and that this could have brought early materials to the surface. Furthermore, evidence of shell harvesting was found up to a depth of 2 m.

Fabric percentages per layer are presented in Figure 6.11. Both vertical and horizontal fabric frequencies suggested that NDRIA 2 and NDRIA 1 were the dominant fabrics used at this site (see Figure 6.11 and Table 6.13), indicating they were locally available and could be accessed by every potter in the area. Although most of the fabrics were made locally within the same *chaîne opératoire*, some fabrics (e.g., NDRIA 3, 4 and 5) were quite different, suggesting that objects were made elsewhere and/or according to different production values. High percentages of NDRIA 3 in layers 2 and 1 were the result of disturbances observed at this site. Ceramic fabric frequencies in these layers were consistent with the frequency over time of other cultural materials such as fauna and lithics. Continuity was observed in respect of ceramic fabrics, and faunal and lithic materials.

Table 6. 13: Namundiri A, trench 1: Fabric types of ceramics (3 cm+ in size) per layer

Layer	NDRIA 1 (no.)	NDRIA 2 (no.)	NDRIA 3 (no.)	NDRIA 4 (no.)	NDRIA 5 (no.)
1	9	6	10	0	0
2	1	7	4	1	0
3	3	1	1	0	0
4	25	43	18	6	1
5	11	24	5	0	2
Total no. / (%)	**49 / (27.5%)**	**81 / (45%)**	**38 / (21.3%)**	**7 / (3.9%)**	**3 / (1.7%)**

Note. NDRIA = Namundiri

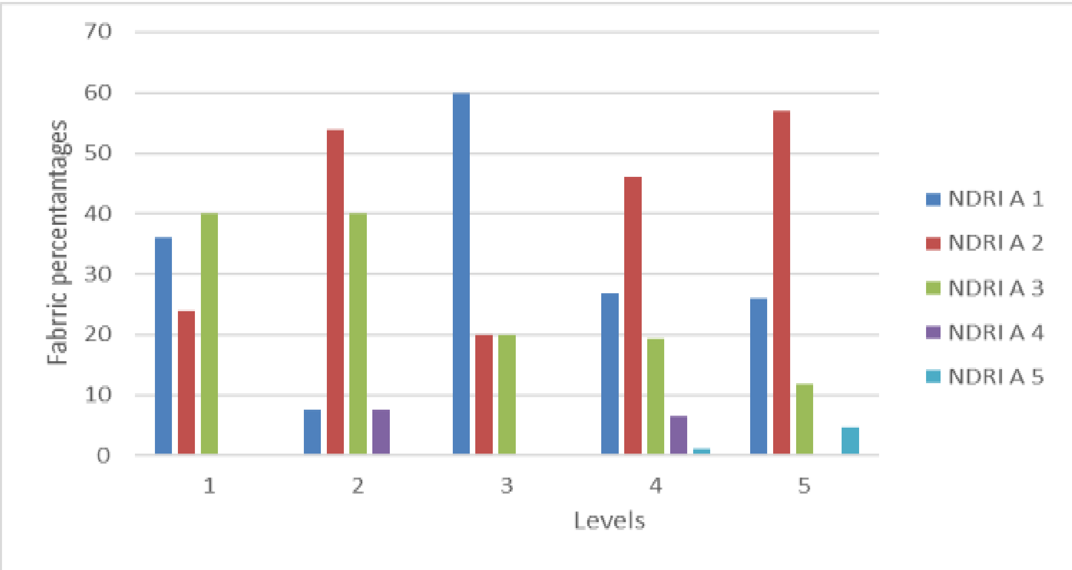


Figure 6. 11: Namundiri A, trench 1: Fabric percentages per layer

6.2.2.2 Results relating to form

The mean wall thickness of sherds in the different fabrics was as follows: NDRIA 1, 12 mm; NDRIA 2, 10.7 mm; NDRIA 3, 11.3 mm; NDRIA 4, 11.3 mm; and NDRIA 5, 10.5 mm. Therefore, all sherds had thick walls, but ceramics made with NDRIA 1 had slightly thicker walls. The variations being small, it suggested that the fabrics were intended for almost similar purposes. Vessel forms from this trench ranged from small, medium to large closed and open bowls, and this was consistent with the findings at the Soror site in western Kenya (Dale 2007). Of the 73 rims analysed, 24 (33%) were too small to provide any information on vessel form, 18 (25%) belonged to small-sized bowls that were made from all fabrics, except NDRIA 4, at this site. Twenty-four (33%) rims were from medium-sized bowls that were made from NDRIA 1, NDRIA 2, NDRIA 3, and NDRIA 4 fabrics (see Figure 6.12). Seven rims (9%) belonged to large-sized bowls and were made from NDRIA 1 and NDRIA 3 fabrics (see Figure 6.12). A comparison of bowl sizes in the layers (except for layer 3 which did not contain rims) indicated that most bowls were medium-sized, followed by small-sized bowls, and then by large-sized bowls. It was possible that the small-sized bowls were used by individuals for specific purposes, medium-sized ones by family, and large-sized ones by more than one family or for specific functions. The findings from this site were in line with those from Namaboni A (the Early Kansyore site explored in the present study) as well as the proposals of Ashley and Grillo (2015: 14) regarding the size ranges of Kansyore vessels, and their suggestion that these vessels were primarily used at a family or extended family level and not on a large-scale level.

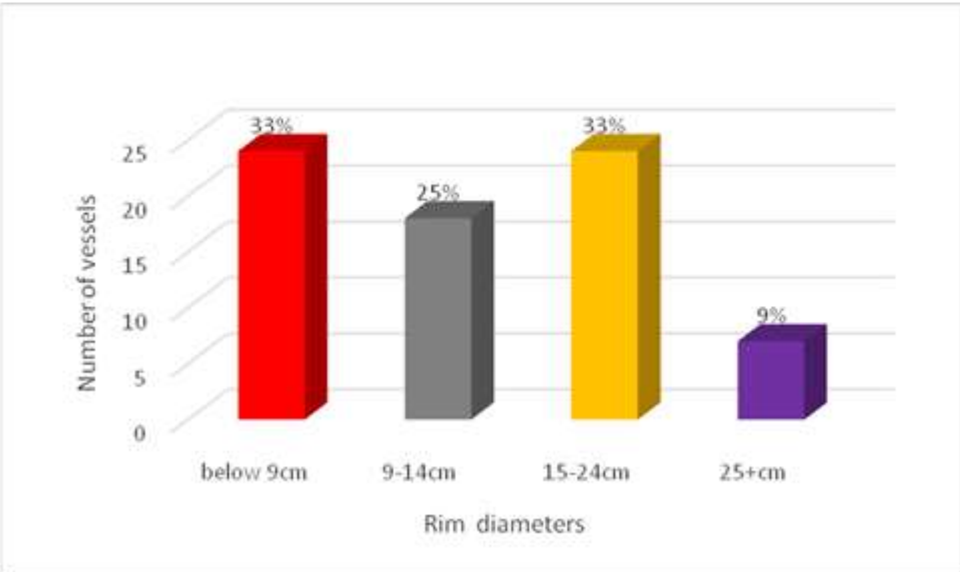


Figure 6. 12: Namundiri B, trench 1: Rim diameters and percentages

As in the case of the Namaboni B Early Kansyore site, three types of rims were identified at Namundiri A; tapered 34 (46.7%), rounded 29 (39.7%), and flattened rims 10 (13.7%) (See Table 6.14). Consistent with the numbers of other cultural materials recovered in layer 5, only a few rim types were observed in this layer at this site. A drastic increase in rim types was observed in layer 4, which was consistent with the increase in all other cultural materials recovered from this layer (see Table 5.1, Chapter 5). No rims (only body sherds) were recovered in layer 3. The numbers of rounded and tapered rims were very low in the first two upper layers. Generally, two types of rims, namely, tapered rims (n = 34) and rounded rims (n = 29), made up the largest portion of the rims in this trench (see Table 6.14).

Table 6. 14: Table 27: Namundiri A, trench 1: Rim types per layer

Layer	Rounded	Tapered	Flattened
1	2	6	0
2	2	2	0
3	0	0	0
4	19	17	7
5	6	9	3
Total	29	34	10

Two rounded bases were identified in trench 1. One base was decorated using a simple-impression technique whereas the other base was plain. The rounded tip of the decorated base was worn out (see Figure 6.13) whereas the undecorated base was intact. Based on an observation of the decorated base, it was likely that, in some cases, decorations covered the whole body of a ceramic piece.

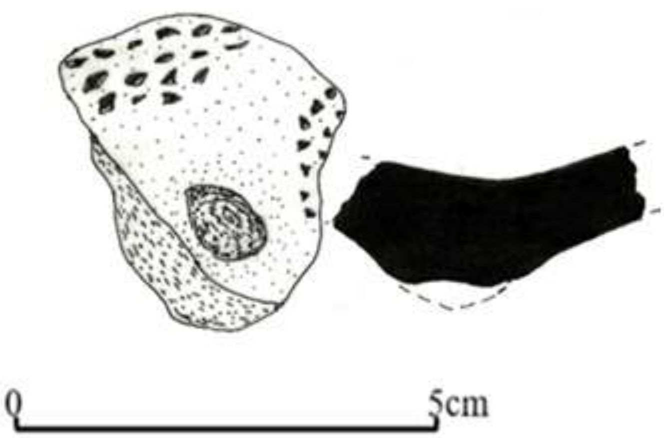


Figure 6. 13: Namundiri A, trench 1: Decorated rounded base

6.2.2.3 Results relating to surface treatment and decoration

Twenty-five sherds (rims n = 11; body parts n = 14) out of 178 sherds recovered from this trench had red slip/paint on them. Most, if not all, sherds with red paint had been smoothed, some seemed to have been burnished, and the surfaces of others seemed to have been wiped. Red paint had been applied to all types of rims (see Table 6.15) and was associated with different decorations. For instance, seven out of 14 body sherds had rocker decoration, six had stab drag decoration and one had incision decoration. The slip on the rims of some sherds (n = 3) was applied on the exterior surface only, at one sherd (n = 1) it was applied to the interior surface only, whereas at others (n = 7) it was applied to both surfaces.

Table 6. 15: Namundiri A, trench 1: Rims and body sherds with red paint/slip

Rim type/body parts	**Exterior surface**	**Interior surface**	**Both surfaces**	**Total**
Rounded rim	1	0	2	3
Tapered rim	1	1	5	7
Flattened rim	1	0	0	1
Body sherds	12	1	1	14
Total	15	2	8	25

Of the 73 rims recovered from this trench, nine were plain/undecorated sherds and 64 were decorated. Decorations associated with tapered rims included incision (n = 2), rocker (n = 4), alternating pivot (n = 6), simple impression (n = 3), stab drag (n = 8) and mixed (impression/stab drag) (n = 1). On the other hand, decorations associated with flattened rims included incision (n = 1), alternating pivot (n = 1) rocker (n = 2), stab drag (n = 3) and simple impression (n = 2). On the rounded rims, the decorations were associated with, for example, incision (n = 10), rocker (n = 2), alternating pivot (n = 7), stab drag (n = 6), applique (n = 1), mixed (stab drag/alternating pivot) (n = 1), and simple impression (n = 3) (see Table 6.16) With the exception of rims that had both applique and mixed decorations, the decorations applied to all rim types were the same, suggesting that the ceramics in this trench were made by a group of people linked to each other in some way. The spatial decoration of rims in this trench followed two patterns; right at the lip/rim and a few centimetres below the lip/rim (in other words, similar to the spatial decoration of rims found at the Early Holocene site of Namaboni B). Some of the decorated sherds recovered from this trench had decorations covering most parts of the vessel (see Figure 6.14), which was consistent with Kansyore ceramics recovered from Haa and WadhLang'o in western Kenya (Ashley 2010; Ashley & Grillo 2015: 268).

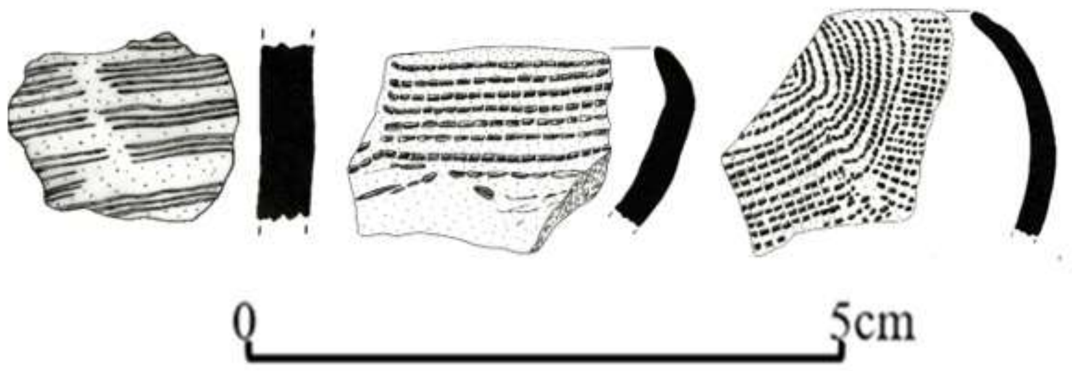


Figure 6. 14: Namundiri A, trench1: Sherds showing decoration coverage

Table 6. 16: Namundiri A, trench 1: Decorations per rim type

Rim type	**Incision**	**Stab drag**	**Rocker**	**Alternating pivot**	**Simple impression**	**Plain**	**Applique**	**Mixed decoration**
Rounded	10	6	2	7	3	3	1	1
Tapered	2	8	4	6	3	6	0	1
Flattened	1	3	2	1	2	0	0	0
Total	13	18	8	14	8	9	1	2

6.2.2.4 Results relating to decoration techniques

Six decoration techniques were identified in this trench; applique, incision, stab drag, rocker, alternating pivot and simple impression (Table 6.17). Undecorated sherds (n = 9) were also identified in layer 4 (see Figure 6.15) as well as sherds that had a combination of techniques such as stab drag and alternate pivoting (n = 1, 1%) and simple impression and stab drag (n = 1, 1%). Ceramics decorated using the applique technique was the least common—only one was recovered from layer 2. However, this was not a unique scenario—only a few sherds with an applique technique were recovered from other sites such as Luanda (see Figure 5, sherd 8 in Robertshaw *et al.* 1983: 11) and Siror (see Figure 7.7 l-n in Dale 2007: 170) in western Kenya. Interesting to note is that all decoration techniques, except for applique, were found from the lowermost layer to the upper-most layer, suggesting continuous occupation of the site over time. This was consistent with the finding of other cultural materials (lithics and fauna) which indicated some form of continuity in technology and subsistence strategies followed at this site (see Chapter 7).

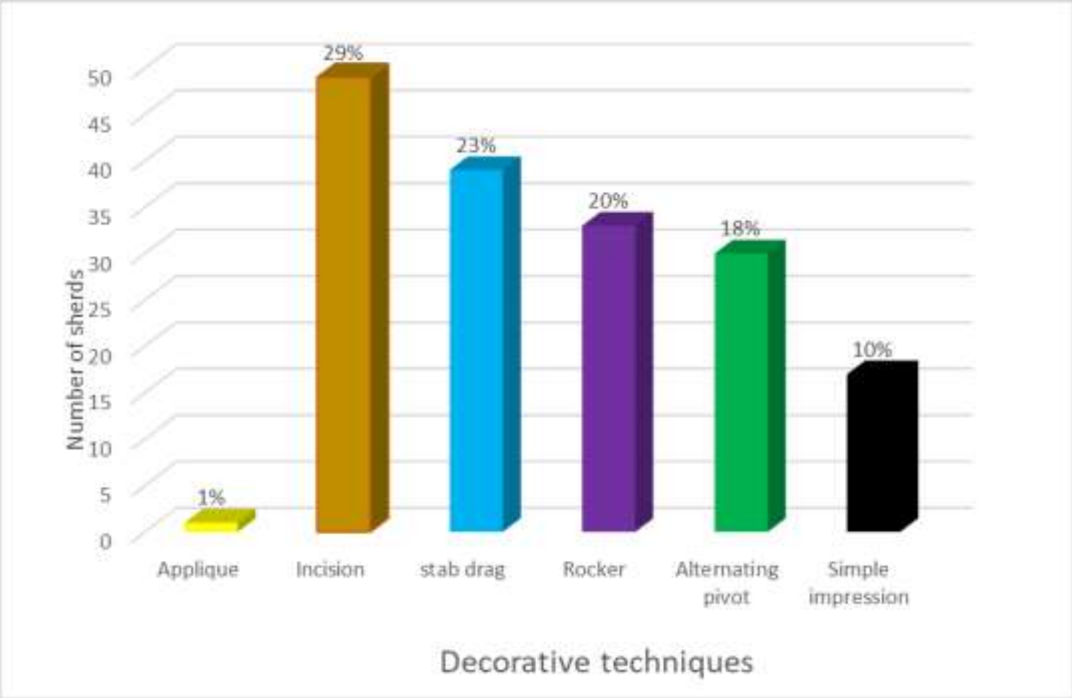


Figure 6. 15: Namundiri A, trench 1: Chart showing percentage of decorative techniques used on all ceramics (over 3 cm in size) analysed

Table 6. 17: Namundiri A, trench 1: Decoration techniques used on analysed ceramics, per layer

Layer	Applique	Incision	Stab drag	Rocker (no.)	Alternating pivot	Simple impression	Plain
1	0	7	8	4	5	1	0
2	1	5	3	0	3	0	1
3	0	4	0	1	0	0	0
4	0	24	22	17	15	11	3
5	0	9	6	11	7	5	5
Total	1	49	39	33	30	17	9

6.2.2.5 Results relating to decoration motifs

Seven decoration motifs were identified on all the ceramics that were analysed from this trench; plain-edge zigzag, serrated edge, serrated-edge zigzag (packed and spaced), applique, incised/grooved lines (including circular), punctate (including punctate circular), and simple impression (see Table 6.18).

Table 6. 18: Namundiri A, trench 1: Major ceramic decorative motifs per layer

Layer	Applique	Incised	Serrated-edge	Serrated-edge zigzag	Plain-edge zigzag	Punctate	Simple. impression
1	0	7	9	4	0	5	1
2	1	5	03	0	0	3	0
3	0	4	1	1	0	0	0
4	0	25	26	15	0	12	10
5	0	8	12	4	1	5	4
Examples							
Total	**1**	**49**	**51**	**24**	**1**	**25**	**15**

The frequency of motifs per layer showed that low numbers of almost all motifs were found in layer 5 but that the numbers increased over time in layer 4 (with the exception of the plain-edge zigzag motif and applique motif that were rare in this trench). A sharp decrease in the numbers of all motifs was observed in layer 3, perhaps because few sherds were recovered from this layer. The situation in layer 2 was similar; however, a slight increase was observed in layer 1. As mentioned previously, this increase could have been due to disturbances that were observed at this site. The major decoration motif by layer at Namundiri A, trench 1 is indicated in Figure 6.16.

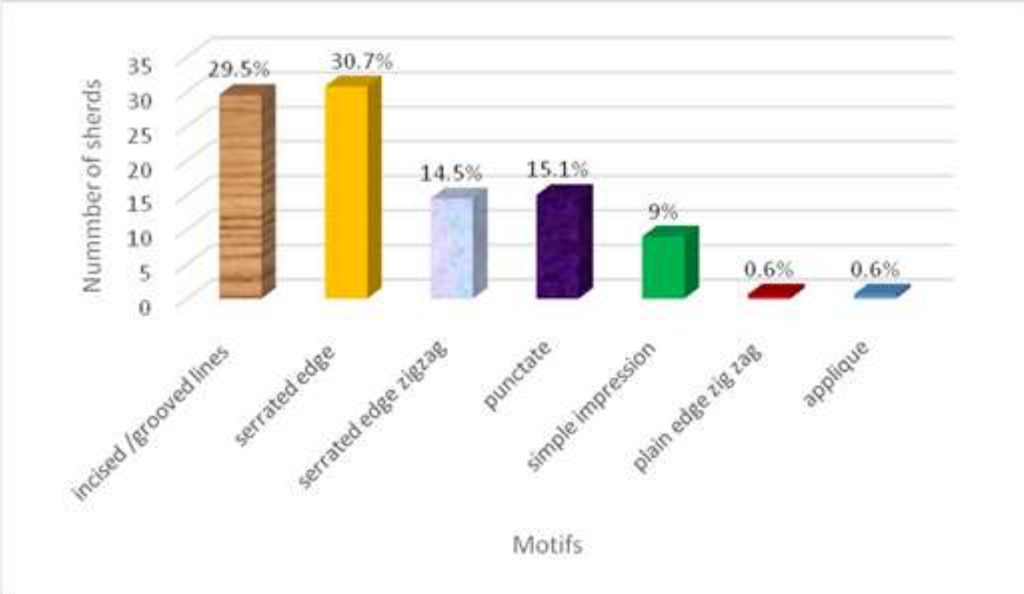


Figure 6. 16: Namundiri A, trench 1: Major decoration motif by layer

Different forms of incised lines were observed and these included thin, fine parallel lines applied on leather dry paste, u-shaped and v-shaped grooves largely executed on wet clay, creating raised clay and deep incisions. Sherds with the incised motif were found throughout all layers (see Table 6.18). A similar pattern has also been identified at the Siror site in Kenya (Dale 2007: 188). The serrated-edge motif at this site was created using an evenly or unevenly serrated edge comb to create rocker and stab drag techniques. These implements created closely spaced and packed dashes, rectangles, dots and vees placed in horizontal and vertical panels/combinations, and the bands were sometimes continuous and sometimes broken. The serrated-edge zigzag motif, on the other hand, was created using alternating techniques that produced packed dots, rectangles, dashes, and vees. The serrated-edge and the serrated-edge zigzag motif, if not keenly observed, seemed to belong to the same motif; however these two were slightly different. The latter seemed to have been executed in a rush, whereas the former seemed to have been done carefully and slowly in order to create a motif that was neat and attractive. The serrated-edge zigzag motif seemed to have been less frequently used in layer 5, and the number decreased even more in layer 4. Moreover, it was observed that there was a sharp decrease in the use of this motif in layer 3, that it was not used at all in layer 2, and that it was used again in layer 1. The frequency of use of the serrated-edge remained the same in both layers 5 (n = 10) and 4 (n = 10), suggesting some form of continuity.

The punctate motif was in the form of circular, rectangular, triangular, vee and dot shapes that were sometimes in pairs of horizontal or vertical lines, bands or panels. In some cases, sherds in this category also had a combination of vertical and horizontal lines of punctates. Although Dale (2007) distinguished between the punctate circular motif and the punctate motif based on their departure from the trend of using straight lines, the present study combined the two because the same technique was used to produce similar elements, although with different structures. Sherds with the punctate circular motif were recovered in almost all layers (i.e., except in layer 3) but it was most commonly found in layer 4.

The simple-impression motif found in this trench looked like the punctate motif, the only difference being that different implements were used to create them. In the case of the former the implement was not double pronged/bi-fid and in the latter case the reverse was true. When a double-pronged implement was used, only one edge was applied, resulting in unevenly spaced deep punctuates. Also, it seemed that hollow sticks/bird bones could have been impressed into the clay, leaving circular motifs in horizontal individual lines (see Figure 6.17) or double lines (here referred to as simple impression). Although Robertshaw (1991) referred to simple impressions as miscellaneous, Dale (2007) classified them as simple impressions. A large number of the sherds found in this trench were not wholly decorated with the simple-impression motif—applique and plain-edge zigzag motifs were also found. The applique motif was combined with other decoration motifs such as punctate (circular).

As indicated earlier, five fabrics (i.e., NDRIA 1 to 5) were identified at the Namundiri A site. Some of the fabrics (e.g., NDRIA 1 and 2) had similar inclusions but they differed in size and frequency of use, suggesting that the ceramics could have been produced using clay sourced from the same area but from different spots or that the the clay was processed differently, creating the angulated nature of the inclusions. Based on fabric frequency over time, there seemed to have been continuity of practice. Further, there seemed to have been some form of contact between potters as some fabrics (e.g., NDRIA 3) had inclusions that were sourced outside the area. Vessel forms (small, medium and large closed and open bowls) were identified at this site, but medium bowls were in the majority, which suggested that—contrary to the suggestions of Ashley and Grillo (2015)—the communities at this site used their ceramics for family purposes.

It was clear that the surfaces of some of the ceramics at this site had been smoothed or wiped, suggesting that time was invested in making them. Nevertheless, the majority of the ceramics had rough surfaces, which suggested that they were finished in a rush. Other ceramics were painted with a red substance or had red slip applied to either their interior or exterior or both surfaces, suggesting that special tasks/functions were performed when making the items. Unlike the Early Holocene ceramics recovered at Namaboni B that were decorated only at the rim or a few centimetres below the rim, a large number of ceramics at Namundiri A were covered fully of partially with decorations, a feature typical of Kansyore pottery. Six decoration techniques were identified at this site, suggesting variations within Kansyore-using communities which could be ascribed to personal innovations, contacts of some kind or differences in the functions these ceramics were used for. Seven decoration motifs were identified; interestingly, the dates recovered in 2018 (Jones 2020) seemed to indicate that the motifs changed over time, suggesting that changes took place gradually as time went by.

Figure 6. 17: Namundiri A, trench 1: Sherd showing simple-impression circular motif

6.2.3 Case Study 3: Lugala A1 Site

Lugala A1 was an open-air, multi-component site that was settled by both LSA hunter-gatherers who used Kansyore pottery and EIA farmers who used Urewe pottery dating between 3465 and 3495 cal. BC and between cal. AD 339 and 437 respectively. One trench of 2x2 m was set at this site and was excavated up to 240 cm below the surface. Eight stratigraphic layers (8, 7, 6, 5, 4, 3, 2, and 1) were identified after excavations. The lowermost layer produced no artefacts and the layers from layer 7 to the lower half of layer 5 produced LSA Kansyore cultural materials. The upper part of layer 5 was 30 cm thick and presented a hiatus. This was followed by layer 4 that was divided into a lower and an upper part—the lower part produced two burials associated with Urewe ceramics and land snails (see Figure

5.22) and the upper part produced land snails but no other cultural materials. The materials in layers 3 and 2 were similar to those in the upper part of layer 4.

A total of 202 sherds were collected from this trench. Out of these, 87 (weighing 2 337.8 g) were decorated and 115 (weighing 1 249.9 g) were undecorated. Of the decorated sherds, 77 belonged to LSA Kansyore ceramics and 10 to Urewe ceramics. As noted above, the former were recovered from lower layers separated from the higher layers by a 30 m hiatus. The focus here was on the Kansyore sherds. It should be noted that a large number of these sherds belonged to one pot which was refitted, resulting in one partially complete bowl (see Figure 6.18). After joining the sherds, 22 sherds were left (i.e., decorated body sherds (n = 18) and rims (n = 4).

Figure 6. 18: Lugala A1, trench 1, layer 5: Partially refitted LUGA 3 bowl

6.2.3.1 Results relating to technology/fabrics

Four fabric types were identified from this trench's pottery assemblage; LUGA 1, LUGA 2, LUGA 3, and LUGA 4 (see Table 6.19). The properties of each type are provided in
Table 6.19

Table 6. 19: Lugala A1, trench 1: Description of fabric groups

Fabric group	Description
LUGA 1	Black to pale-grey fabric, hard, smooth to sandy texture, and hackly fractured; poorly sorted, subrounded, sparse (3–9%), medium (0.25–1.00 mm) quartz and subrounded, common (20–29%), fine (0.1–0.25 mm) sand inclusions
LUGA 2	Black to dark-brown fabric, hard, sandy texture, hackly fractured; poorly sorted, subangular, sparse (3–9%), coarse (1.00–3.00 mm) quartz and moderately sorted, subrounded, common (20–29%), medium (1.00–3.00 mm) sand inclusions.
LUGA 3	Dark-brown to orange-brown fabric, hard, sandy texture and hackly fractured with a combination of moderate to poorly sorted, subangular, very common (30-39%), coarse (1.00-3.00 mm) dolomite, sparse (3–9%). coarse (1.00–3.00 mm) quartz and moderate, subrounded, common (20–29%), fine (0.1–0.25 mm) sand inclusions
LUGA 4	Dark- to pale-grey fabric, hard, smooth to sandy texture and hackly fractured; well-sorted round, common (20–29%), fine (0.1–0.25 mm) sand and sparse (3–9%), very fine (up to 0.1 mm) mica inclusions

LUGA 3 was the most popular fabric recovered from this trench (n = 11, 50%) as it was found in layers 6 and 5. Ceramics with similar inclusions were identified at Namaboni B and Namundiri A sites. It is important to note that the Namaboni B site was dated as belonging to the Early Kansyore phase and both the Namundiri A and Lugala A1 sites as belonging to the Middle Kansyore phase. This dating suggested continuity in the use of the fabric from the Early to the Middle Kansyore phases. However, the fabric was more rare (n = 8) in the Early Kansyore phase than in the Middle Kansyore phase, with 38 and 11 sherds recovered at Namundiri A and Lugala A1 respectively. The dolomite that was included in this fabric was common to a swamp located about 27 km away at the Tororo–Busia border east of Lugala A1. It was likely that LUGA 3 was collected from a distant common source, and/or that pots in this fabric were moved by the same group of people who occupied different sites during different seasons right from the Early Kansyore to the Middle Kansyore phases. It was possible that the LSA pottery makers/users from the three sites mentioned above extracted clay from the same source or a local source geologically similar. Besides LUGA 3, LUGA 1 (n = 4, 18%) and LUGA 4 (n = 4, 18%) were the most preferred fabrics in this assemblage, with LUGA 2 having been used the least (n = 3, 14%) (See Table 6.20). LUGA 1 and 2 had similar inclusions (differing only in respect of frequency of use and size of inclusion), suggesting that the clay was sourced locally from areas that were geologically similar. LUGA 1, 2 and 4 were the least recovered fabrics in this assemblage, suggesting that they were not commonly used and that the ceramics might have been made elsewhere. While the Kansyore sherds recovered from this trench were few in number, it was nevertheless clear that the potters used a range of clay/geological sources, suggesting mobility and interaction between communities as previously suggested (e.g., Prendergast & Lane 2010).

Table 6. 20: Lugala A1, trench 1: Fabric frequencies per layer

Layer	**LUGA 1**	**LUGA 2**	**LUGA 3**	**LUGA4**
5	1	1	9	3
6	1	0	1	1
7	2	2	1	0
Total	4	3	11	4

6.2.3.2 Results relating to form

The mean average wall thickness of LUGA 1 was 13.85 mm, of LUGA 2 was 10 mm, of LUGA 3 was 10.5 mm, and of LUGA 4 was 10.1 mm, suggesting all the vessels at this site were thick and fit for different activities ranging from food processing and cooking to storage. Of the four rims analysed in detail, one was too small to provide any information on vessel form, two belonged to medium-sized bowls, and one to a large bowl (see Table 6.21). This finding was consistent with findings at other Kansyore sites analysed in the present study as well as at sites in western Kenya (Dale 2007; Dale & Ashley 2010) where medium-sized bowls dominated. Two vessel forms were identified; incurved and open bowls. An incurved bowl made from LUGA 3 fabric was refitted using sherds collected from layer 5. Three rim types were identified from this trench; two rounded, one tapered and one flattened.

Table 6. 21: Lugala A1, trench 1: Vessel size per layer

Layer	**Too small**	**Medium (15-24cm)**	**Large (25+cm)**
5	1	1	0
7	0	1	1
Total	1	2	1

6.2.3.3 Results relating to surface treatment and decoration

A few Kansyore sherds from this trench seemed to have been burnished whereas others were smoothed, suggesting that the potters at this site invested significant time in their work. Red slip/paint was observed on two rims recovered from layers 7 and 5. One rim sherd had red slip/paint on the exterior surface and the other had red slip/paint on both the interior and exterior surfaces. In addition, six body sherds with red slip/paint were recovered from layer 7. Of these, four had red paint on the exterior surface and two had red slip on both the interior and exterior surfaces. Five of the slipped sherds had rocker decorations and one had a stab drag decoration.

The rocker decoration of two of the rims recovered from this trench was placed right on the lip/rim, which was made from LUGA 3 fabric. The decoration of the other rims identified in this trench was placed 0.25 cm below the lip/rim. Almost 90% of the sherds that were analysed in detail had decorations covering the whole vessel. This was consistent with findings at the Namundiri A Middle Kansyore site, which was excavated during the present study, as well as with descriptions of Kansyore pottery (Chapman 1967: 173; Ashley & Grillo 2015). On the other hand, a different finding was reached at the Namaboni B Early Kansyore site where decorations were limited to the upper part of a sherd's rim (the rest of the sherd was plain). As was the case with the Namaboni B site, rim milling was identified at the Lugala A1 site (see Figure 6.19).

Figure 6. 19: Lugala A1, trench 1: Example of rim milling

6.2.3.4 Results relating to decoration techniques

Four decoration techniques were observed; incision, stab drag, rocker and alternating pivot (see Table 6.22). The most common technique in this trench was rocker (n = 14), accounting for 64% of the total sherds decorated. Rocker-decorated sherds were recovered from all the layers with LSA ceramics. The highest number of decorations appeared in layer 5 (n = 9) and in layer 7 (n = 4) (see Table 6.22). The second-highest number of decorations was done in the stab drag technique (n = 4, 18%) and these were found in layers 5 and 6. Alternating pivot (n = 2, 9%) was the third most popular technique, followed by incision (n = 1, 5%). It was found that the rocker technique was not used as often in layer 6 as it was in layers 7 and 5, which could be ascribed to the low numbers of pottery items found in layer 6.

Table 6. 22: Lugala A1 LSA: Decoration techniques per layer

Layer	Incision	Stab drag	Rocker	Alternating pivot	Plain
5	1	2	9	2	0
6	0	2	1	0	0
7	0	0	4	0	1
Total	1	4	14	2	1

6.2.3.5 Results relating to decoration motifs

Four decoration motifs were identified in this trench; plain edge zigzag, serrated edge, punctate and incised lines (see Table 6.23). Decoration motifs per layer are presented in Table 6.23.

Table 6. 23: Lugala A1 LSA: Decoration motifs

Layer	Simple zigzag (no.)	Serrated edge (no.)	Punctate (no.)	Incised lines (no.)
5	1	11	2	1
6	0	3	0	0
7	0	4	0	0
Examples				
Total	**1**	**18**	**2**	**1**

The serrated-edge motif (n = 18) was the most popular, making up 81.8% of the trench assemblage, followed by punctate (n = 2, 9.1%), incised lines (n = 1, 4.5%), and plain edge zigzag (n = 1, 4.5%). At other sites, such as Namundiri A and Namaboni B, sherds with more than one motif were found, but such sherds were not identified from this assemblage, perhaps because the sherds recovered at this site were few in number. The serrated-edge motif in this trench was created using rocker and stab-drag techniques. They seemed to have been carefully and skilfully applied with an evenly serrated edge implement. This implement created closely spaced and packed dashes, rectangles, oval dots, and vee shapes in a grid-like structure. These were placed in continuous horizontal panels (Figure 6.20a). Only four serrated-edge motifs were recovered from layer 7, three were recovered from layer 6, and eleven were recovered from layer 5. No serrated-edge zigzag motifs were identified in this trench. One plain-edge zigzag motif was identified from layer 5 during analysis (see Figure 6.20b).

Figure 6. 20: Lugala A1, trench 1: Sherds showing decoration motifs recovered; a) serrated edge, b) plain edge zigzag, c) punctate, and d) incised lines

In this trench, the punctate motif was identified in layer 5. It was made using the alternating pivot technique, walking a double-pronged or bi-fid implement across the clay, producing dash shapes in pairs of horizontal lines, and a combination of horizontal and vertical lines/rows (see Figure 6.20c). The incised-lines motif accounted for only 4.5% of the motifs recovered from this trench, making it one of the least identified motifs. Compared with the incised sherds identified at the Namaboni B and Namundiri A sites, the incised sherd from Lugala A1 looked completely different (see Figure 6.20d). It looked almost the same as the Elmenteitan decoration found at Gogo Falls (Robertshaw 1991: 220), tempting one to speculate that there was contact of some kind or that, perhaps, Kansyore-using people imitated the Elmenteitan pottery-using people. However, given the earlier dates (3465–3495 BC) for Kansyore ceramics at this site, the possibility of contact was rather unlikely. More likely was that this was an innovation by ceramic users of that time, as the design was not particularly complex or original.

The analysis indicated that Kansyore ceramics from Lugala A1 were made from four fabrics; LUGA 1, 2, 3 and 4. The use of LUGA 3 was popular but the others were rarely used, suggesting they could have been brought to the site. Similarities were observed between LUGA 1 and 2 but so were differences in terms of frequency of use and size of inclusions, suggesting the use of similar clay sources or different clay processing methods. Despite the few sherds discovered at this site, it was clear that potters drew on a range of clay sources, suggesting mobility or contact of some kind. Two vessel forms were recorded; incurved and open bowls. The bowls were thick and largely medium-sized (based on rim diameter) and might have been used for food processing, cooking, and perhaps storage (for short periods). A few sherds were burnished or smoothed, and others had grid-like, well-executed decorations, suggesting significant time investment, whereas still others seemed to have been finished in a rush. Decorations at this site were extensive, and some sherds were decorated with red paint. Rim milling was also observed in this assemblage. Four decoration techniques were observed; incision, stab drag, rocker, and alternating pivot. Further, four decoration motifs were observed; plain edge zigzag, serrated edge, punctate, and incised lines. It is worth noting that the sherds recovered at this site were too few to suggest meaningful patterns. Nevertheless, despite the small sample of ceramics recovered, a diversity of decorations was observed at Middle Kansyore sites. This was in contrast to findings at Early Kansyore sites, suggesting increasingly intensified settlement and social structures in the Middle Holocene period.

6.3 Cross-Site Comparison

In an attempt to examine the spatial patterns at the three sites explored for the present study, the uses/functions of the ceramics recovered, and the existence of the possible contacts of the communities who occupied these sites, the researcher considered and compared the data obtained from the sites, with particular reference to the technology (fabric), form and surface treatment/decoration of the ceramics recovered. Important to note is that the number of ceramics produced at these sites differed; therefore, the amount of data that could be collected differed from site to site. The Namundiri A site produced the highest number of ceramics, the Lugala A1 site produced the lowest number, whereas the number of ceramics at the Namaboni B1site fell somewhere in between. A comparison of the technology (fabrics) of the ceramics found at the three sites is depicted in Figure 6.21 and is discussed below.

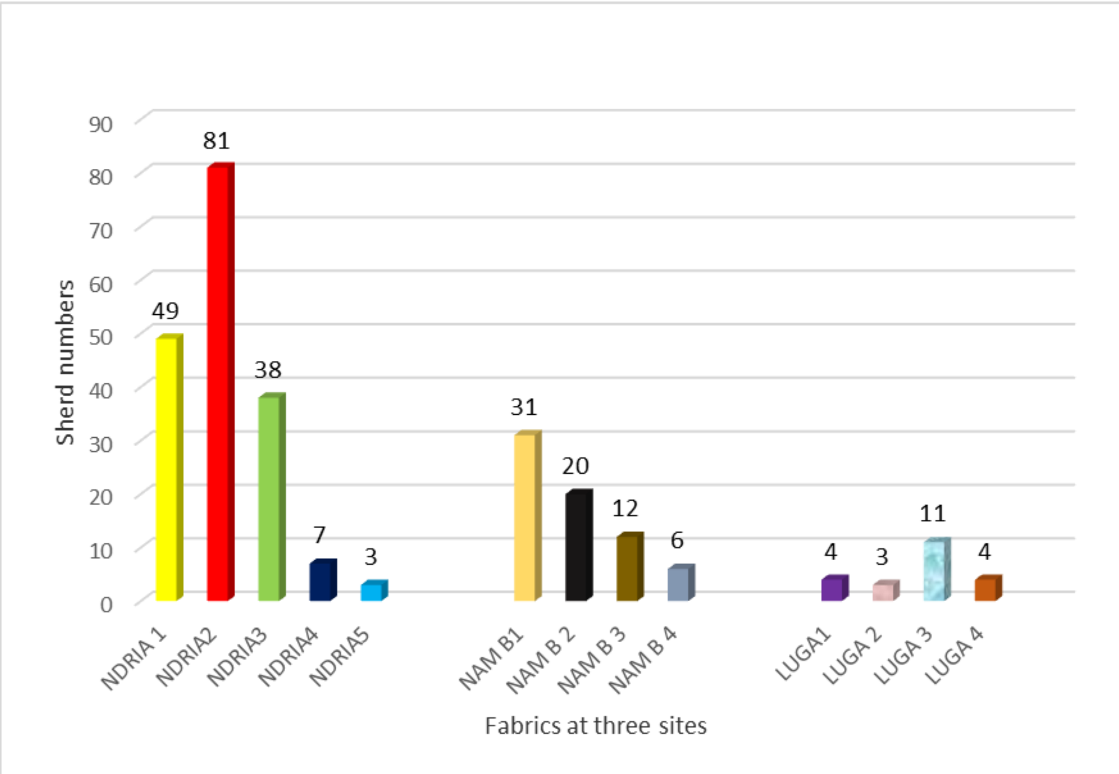


Figure 6. 21: Size of fabric samples across the sites

6.3.1 Comparison of Fabrics

The fabrics recovered at the three sites, namely, NDRIA 1, NAMB 1, and LUGA 1 (see Figure 6. 21), had almost similar properties and differed only in minor ways in terms of inclusion frequencies and perhaps colour. These differences could be attributed to potters' use of different sources to extract clay and their use of different firing or processing procedures. NDRIA 2, NAMB 2 and LUGA 3 fabric groups also cut across different sites. The same observations applied to NDRIA 3 (the fabric used at the Namundiri A site), NAMB 3 (the fabric used at the Namaboni B site), and LUGA 3 (the fabric used at the Lugala A1 site). On the other hand, the clay sources could have been the same, but some of the potters could have extracted their clay from different end points at the same source, which could explain variations observed (see Ashley 2005 for details on clay source end points). Processing procedures also seemed to have played a role in variations observed. Although coarse (1.00-3.00 mm) dolomite inclusions were identified at all three sites, Namundiri A potters created ceramics that had a smooth texture whereas Namaboni B and Lugala A1 potters created wares with a sandy texture, suggesting that processing played a significant role. As noted earlier, the Namaboni B site was classified as belonging to the Early Kansyore phase whereas the Namundiri A and Lugala A1 sites were classified as Middle Kansyore sites; therefore the presence of cross-cutting fabrics at such sites might indicate continuity from the Early to the Middle Kansyore phase. NDRIA 4 and LUGA 4 fabrics seemed to have been extracted from an area rich in mica whereas NAMB 4 was extracted from an area containing no mica. NDRIA 5 and NAMB 4 were unique to their specific sites and, therefore, could have been brought to the sites through contacts or, as Prendergast and Lane (2010) suggest, the ceramic users may have moved sites seasonally and taken their ceramic wares with them. The seasonality argument however does not seem possible for the sites discussed above because the three sites do not belong to the same period despite the sizes and thicknesses of the bowls which normally suggest easytransferability from one site to another.

The present study indicated that there were variations in fabrics in terms of type and number at the three sites. Namaboni B and Lugala A1 pottery users, for example, had access to four fabric types, whereas Namundiri A pottery users had access to five fabric types. The pattern observed clearly showed that the Kansyore ceramics were quite unique from one site to another and perhaps from one region to another. However, it is worth noting that the three sites were occupied at different periods of time, which could explain the differences (although not the similarities) observed. The similarities between the three sites could perhaps have been the result of the similarities between the living environments of the potters at different times or of the movement of the potters (and the ceramics) from site to site as the seasons changed. However, the occupation dates of the sites (Namaboni B between 6634 and 6479 cal. BC [see Chapter 5, Table 5.9], Namundiri A between 4520 and 3710 cal. BC [Jones 2020; Jones & Tibesasa in prep.], and Lugala A1 between 3465 and 3495 cal. BC [see Table 5.9]) indicated no contacts between hunter-gatherers at the three sites. Interestingly, however, both the Namundiri A and Lugala A1 sites were occupied during the Middle Kansyore phase. The similarities observed at the three sites that were classified as falling within different periods could indicate continuity from the Early Kansyore phase through to the Middle Kansyore phase on the northern shores of Lake Victoria Nyanza, Uganda.

6.3.2 Comparison of Form

Although ceramic forms consist of many elements, rim diameters and rim types were considered in the present study since they afforded information on vessel size, shape and volume, from which conclusions about the use/function of the vessels could be drawn, which, in turn, could provide insight into the social structure of the ceramic users. High numbers of medium-sized vessels (15–24 cm) were observed at all the sites, suggesting at least that the sites were occupied by families (as proposed by Ashley (2005), Ashley (2010), and Ashley and Grillo 2015)). Large bowls, though in small numbers, were also observed at all three the sites (see Figure 6.22), suggesting they were used for specific functions.

A high number of large vessels were identified in layer 5 (lowest layer) at Namaboni B, whereas a high number (n = 5) of large vessels were identified in layer 4 at Namundiri A, but only two large vessels were recovered from layer 5. Interestingly, a different pattern was observed at Lugala A1 in that small vessels were absent. This might be attributed to the very small sample size or the disturbance by sand harvesters.

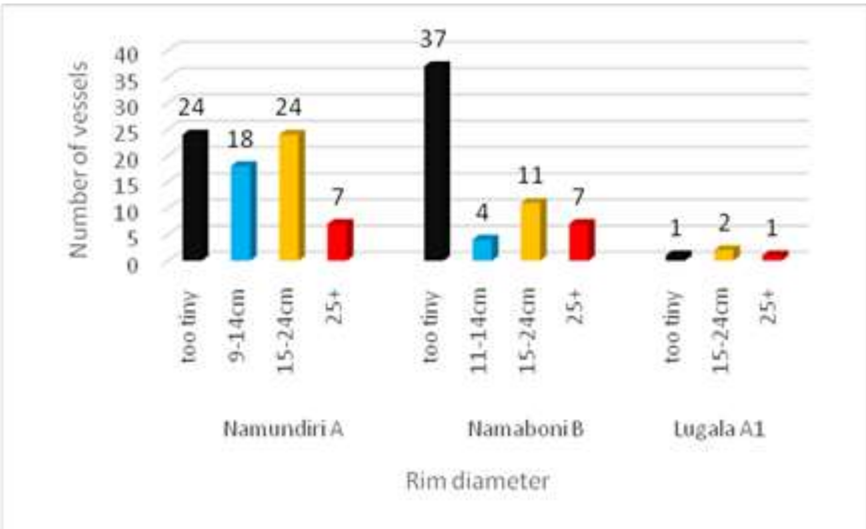


Figure 6. 22: Namundiri A, Namaboni B and Lugala A1: Comparison of vessel forms based on rim diameters

Comparison of rim types was done with the aim of predicting what the vessels at the three sites could have been used for. The rim types at all three the sites did not change a lot. Tapered rims occurred the most at both Namundiri A and Namaboni B. The vessels with such rims were vertical, curved slightly inwards or flared. At these two sites, rounded rims were the second-most frequent to occur and were also the most abundant at Lugala A1. The rim shapes remained stable irrespective of rim type. Flattened rims were also recovered at all sites but in low numbers. This study's results of the analysis of rim types and the shape/form and size of vessels did not support the proposals of Dale *et al.* (2004), Dale (2007), and Prendergast (2008) that Kansyore LSA ceramics are suitable for long-term storage. However, indications were that short-term storage could have been possible as suggested by Ashley and Grillo (2015).

Vessel wall thicknesses observed at the three sites (with the exception of Namaboni B where some vessels made from NAMB 3 and NAMB 4 fabrics had thin walls measuring 8.7 mm and 9 mm respectively) were substantial, ranging between 10.1 mm and 13.8 mm. This suggested that vessels at all three sites could have served similar purposes (e.g., they could have been used for food processing, cooking, serving, and storage, among others things) since the wall thicknesses made the vessels stable and transferable. If the walls were thick and the vessels large, it meant that the vessels probably had to remain in one place. Given the large number of broken vessels/sherds at the three sites, large vessels with thick walls seemed not to deter potters from carrying the vessels around for daily activities such as cooking and serving. Thin-walled vessels observed at the Namaboni B site perhaps indicated that the potters at this site possessed some form of technological skill or that the vessels in question served a specific function or represented a local preference. Thin-walled vessels are known to lessen thermal stress and be better conductors of heat than thick-walled vessels. On the other hand, thick-walled vessels are better for transfer purposes since they stay cool on the outside when they are filled with a hot substance (Rice 1987).

6.3.3 Comparison of Surface Treatment and Decoration

The results of a comparison of the surface treatment and decoration of ceramics found at the three sites indicated that red paint was used in the case of all three sites. The paint was applied to the exterior and interior surfaces of the bodies and rim sherds, and was also part of different decoration techniques. However, sherds with red paint were very few in number at all sites, and the reason for applying the paint was not clear.

Despite the fact that fabrics were poorly sorted, a few ceramics from each site were well-made and showed the skills of the potters. These ceramics had smoothed surfaces and well-executed decorations (often in a grid-like pattern), which suggested good planning and visual grammar. About 1% of the sherds from both Namundiri A and Lugala A1 that were analysed in detail had wiped and burnished surfaces. All these characteristics put together suggest that, although the majority of the analysed sherds from all the sites appeared to have been finished in a rush—which was consistent with the general characteristics of Kansyore pottery (Chapman 1967; Robertshaw 1991)—the present study showed that at least some Kansyore ceramic makers invested time, skill and labour in their production. This finding supported the argument put forward by Dale (2007) that the people attached value to the ceramics (see also Dale *et al*. 2004; Dale & Ashley 2010; Ashley & Grillo 2015).

Decoration techniques and motifs varied at these three sites. For instance, Namundiri A yielded six decoration techniques—applique, incision, stab drag, rocker, alternating pivot and simple impression. Namaboni B yielded five decoration techniques that included all the techniques at Namundiri A except for applique, whereas Lugala A1 yielded only four techniques—incision, stab drag, rocker and alternating pivot. Interestingly, the number of decoration techniques used reduced in number as one moved further west towards the Nile River from Busia on the Uganda–Kenya border. The same pattern was observed in respect of decoration motifs; Namundiri A yielded seven, Namaboni B yielded five, and Lugala A1 yeilded four. However, it should be noted that fewer ceramics were recovered from Lugala A1 and that this comparison should be regarded with caution. Based on the radiocarbon dates of the three sites, Namaboni B fell in the Early Holocene period whereas Lugala A1 and Namundiri A fell in the mid-Holocene period (see Chapter 5). Based on the status of Lugala A1 and of Namundiri A (which was a middle Holocene site) as regards the number of ceramics and motifs recovered, it could be said that the use of decoration motifs was more common in the Middle Kansyore phase than in the Early Kansyore phase. It seemed that more diverse decoration techniques and motifs were used in the Middle Kansyore period. Interestingly, although different decoration techniques and motifs were observed at these sites, continuity in the use of techniques and motifs from the Early Kansyore to the Middle Kansyore phases was observed. For instance, the use of incision, stab drag, rocker, and alternating pivot techniques was observed to continue from the Early Kansyore to the Middle Kansyore phase. A similar finding was reached in respect of the other materials (e.g., lithics, fauna) recovered from these sites. The comparison showed that few decorative techniques and motifs were employed during the Early Kansyore phase and that more diverse decorative techniques were used during the Middle Kansyore phase.

6.4 Case Study 4: Lugala A1: Early Iron Age Site

Case study 4 was in the same location as case study 3, which was about 6 to 7 km west of the Namaboni B site. It was a multi-component site because its lower levels produced LSA ceramics of the Kansyore type whereas its middle levels produced EIA working pottery of the Urewe type. It is important to note that the two ceramic types were not in close association because they were separated by a 30 cm-thick hiatus. The analysis of EIA Urewe ceramics showed they were slightly different than Kansyore ceramics in that the former did not include motifs and techniques (which were analysed in case studies 1 to 3). Urewe ceramics were mostly incised, therefore the analysis of the sherds focused on the layout and position of the decoration. These aspects are discussed below.

6.4.1 Technological Information

A total of 10 sherds were collected and refitted, resulting in five reconstructable vessels (see Table 6.24). All were partially complete on recovery and in association with burials in layer 4 between 70 and 90 cm. The nature of pottery recovered from this layer dictated the analysis method used, although it was not very much different from that used in the first three case studies. Pottery fabrics were distinguished based on the character of the clay and inclusions. Firing atmosphere was also recorded as well as macro fabric descriptions based on the PCRG (2010: 22–29) standard format. All reconstructables corresponded to two fabrics (see Table 6.24).

Table 6. 24: Lugala A1: Fabric characteristics of EIA pottery

Fabric	Description
LUGA x	Black to pale-grey unoxidised fabric, hard, sandy to smooth texture, and hackly fractured; poorly sorted, subrounded, sparse (3-9%), medium (0.25–1.00 mm) quartz inclusion; associated with rounded rims with well-executed incised lines attributed to Urewe
LUGA y	Black to dark brown unoxidised fabric, hard and sandy in texture; hackly fractured, poorly sorted, subangular, sparse (3–9%), coarse (1.00–3.00 mm) quartz and moderately sorted subrounded, common (20–29%), medium (1.00–3.00 mm) sand inclusions; associated with everted, rounded rims decorated with cross-hatching, punctate, incised lines, incised lines with ‘w’ partner as well as horizontal lines all well executed

6.4.2 Technological Results

The sherds indicated that two fabric types were used to make the ceramics; LUGA x and LUGA y (see Table 6.24). Although typical Urewe fabrics are said to be well-sorted (Ashley 2005: 224; Giblin *et al.* 2010), fabrics from this assemblage were poorly to moderately sorted. Nevertheless, fabrics from this assemblage were capable of being processed to produce smooth surfaces if a lot of time, care and skill were applied. The LUGA 1 and 2 fabrics used for two Kansyore LSA sherds resembled the fabrics used for EIA Urewe sherds. However, the significant time gap between the two activity levels ruled out the idea that these were contemporaneous traditions. Perhaps the similarity suggested that the potters of these ceramics occupied the same area and used similar clay sources. LUGA x was used more often (n = 3) than LUGA y (n = 2), but the overall low numbers suggested that this difference was negligible. All the LUGA x vessels were bowls and the LUGA y items were jars. The former was associated with an incision decoration that was either vertical or horizontal or a combination of the two. The latter was associated with cross-hatch, horizontal incised lines filled with punctate.

6.4.3 Information on Vessel Form

Vessels were categorised as either jars or bowls (see Table 6.25) and coded as 1 and 2. Vessels in the second group were further subdivided into 2a for open bowls and 2b for closed bowls (see Table 6.25). Form elements, such as rim and base, were also recorded where possible. In an attempt to explore the question of standardisation, body thickness and rim diameter measurements were considered. Horizontal and vertical incision decorations were recorded for the bowls (n = 3), whereas cross-hatched incisions and filled punctates were recorded for the jars (n = 2).

Table 1: Vessel forms and description

Vessel form 1 was composed of globular outflared, everted, necked jars.  
Vessel form 2a was composed of open bowls. Some were slightly incurved and others were vertical/straight with a deeper or shallower surface.  
Vessel 2b was composed of closed bowls. 

6.4.4 Results Relating to Vessel Form

Bowls were slightly more common (n = 3, 60%) than jars (n = 2, 40%). The results obtained from analysing this burial revealed a more restricted range of vessel forms than was the case at other sites where a range of vessel forms was recovered (see Leakey *et al*. 1948; Posnansky 1961a; Ashley 2005; Giblin *et al*. 2010). A 3:2 ratio of bowls to jars was recorded. This ratio differed from the ratio at other sites, for example, at the Kabsusanze burial site in Rwanda where the ratio of jars to bowls was higher (i.e., 60:40) (Giblin *et al*. 2010: 279). However, the pottery recovered at Kabusanze was largely associated with male individuals (indicated by the overall size and robusticity of the human mandible) (Giblin *et al*. 2010: 281), whereas the pottery at Lugala A1 was associated mostly with female individuals (see Chapter 7). The jar-to-bowl ratio at Kabusanze and the bowl-to-jar ratio at Lugala A1 might, therefore, suggest a gender-based difference which was possibly related to the function of the vessels, implying that men were more often associated with jars and women with bowls. However, this sample was too small to substantiate this suggestion, and it remains tentative until more similar data is discovered in other studies.

No dimple bases were recovered from this assemblage; the available base portions indicated rounded and flat bases. All jars (n = 2) identified were made from the LUGA y fabric, whereas all bowls (n = 3) were made from the LUGA x fabric, which suggested that they served specific functions. Although these vessel forms seemed to have served specific functions based on their shapes, some of them might have served many other (unobservable) functions such as social, religious or ritual functions

The body thickness of all sherds recovered ranged between 8 mm and 9.5 mm, with a mean average of 8.8 mm, suggesting they had thin walls, making the vessels better for conducting heat if used for cooking purposes. The bowls (n = 3) were smoothed both on the outside and the inside, and one of them had red paint applied in the external vertical incisions. This has never before been identified in Urewe ceramics. Some burnishing—often seen as a hallmark of Urewe pottery—was also observed on two bowls and on all jars (n = 2). Unlike in other areas where Urewe assemblages were always dominated by diagnostic bevelled, squared and rounded rims (Ashley 2005; Giblin *et al*. 2010), Urewe sherds from this assemblage were dominated by rounded rims (see Appendix 8) which Ashley (2005: 173) calls simple rims. The rim diameters of jars (n = 2) recovered at this site were 14 cm and 17 cm respectively, suggesting the jars were of a small and a medium size respectively. The rim diameters of the three bowls were 18 cm, 13 cm and 11 cm respectively, suggesting that the vessels they belonged to were small (n = 2) and medium (n = 1). Vessels of these sizes would not have been difficult to lift up even if they had content in them.

6.4.5 Results Relating to Surface Treatment and Decoration

All the bowls (n = 3) were smoothed on both the outside and the inside, and the jars (n = 2) were smoothed only on the outside before they were decorated and fired. Red paint was noted within the vertical incisions of one of the bowls (Figure 6.23 c). All the vessels except the one to which red paint had been applied, were black and burnished. Decorations seemed to have been applied on leather-dry clay, apart from one jar, the decorations of which seemed to have been applied on wet clay. No decoration was placed on the lip/rim. All the jars had decoration motifs placed on the neck and shoulder. One of the jars had a well-executed cross-hatch incision on the neck and below it a band of horizontal incised lines filled with punctate, forming a sort of semi-circular pattern bound by 'W' incised lines (see also Figure 6.23 d). The other jar had cross-hatch incisions on the neck and a pair of parallel incised lines on the shoulder (Appendix 8). The bowls had well-executed decorations in parallel horizontal incisions, and one bowl had a combination of vertical and horizontal incisions placed a few centimetres below the rim on the body (Figure 6.23 c). The decorations in this assemblage were laid out well and visually impressive, indicating that a lot of time, skill and effort were applied to execute them. Further, although a coarse temper was used for the jars, these jars were well-smoothed.

Figure 6. 23: Lugala A1: Decoration motifs of EIA assemblage

6.4.6 Discussion of Urewe Evidence

The Urewe ceramics recovered from the Lugala A1 site dated to cal. AD 339–437. This date fit in with the recognised Urewe ceramics sequence in the Great Lakes region, which is between 500 BC and AD 800 (Clist 1987). Although the fabrics from this site were not well-sorted and fine-grained as most Urewe fabrics in the Great Lakes region (Ashley 2005; Giblin *et al*. 2010; Posnansky *et al.* 2005), they had smooth surfaces, suggesting that the Urewe users invested time in order to get a quality end product. This indicated that ceramics were of great significance/value in the society. Despite the coarse nature of the fabric inclusion, the potters produced Urewe wares of a high standard, thus showing that they, and society at large, put a high value on these ceramics. The use of different fabrics observed at the Lugala A site was perhaps planned so that vessels could be used for different activities.

Evidence relating to vessel form indicated the presence of jars (n = 2) and bowls (n = 3, two open and one closed). Unlike at other Urewe sites where the overall ratio of jars to bowls was higher (e.g., 60:40) (Van Grunderbeek 1988: 46; Giblin *et al*. 2010: 279), the number of jars recovered at this site was few compared to bowls. This could perhaps be due to deliberate deposits that had no relation to daily household activities; however, given the small sample size the difference was probably not statistically significant. The vessels recovered at this site might have been used for liquid storage, cooking and serving, although other functions could not be ruled out. Vessel sizes based on rim diameters ranging between 11 and 18 cm for both jars and bowls suggested these vessels were intended to be used by family groups only. These findings aligned with the findings of studies conducted by Ashley (2005; 2010: 145) at Luka, Namusenyu, Sanzi, Haa Wadh Lang'o and Usenge.

As noted in Chapter 5, the Urewe ceramics from this site were recovered from the burial that was excavated. This context was unusual and the first of its kind in Uganda. It was the third of its kind in the Great Lakes region, the other two having been at Kabusanze in Rwanda and Togo in the Democratic Republic of the Congo (Misago & Shumbusho 1992; Giblin 2008; Giblin *et al.* 2010; Watts *et al*. 2020). The detailed study of Lugala A1 (see Chapter 7) revealed that Urewe ceramics were associated with adult females whereas the Urewe ceramics at Kabusanze were associated with adult males (Giblin *et al.* 2010). In comparing the vessel forms from the two sites, it was clear that the individual user at Lugala A1 was associated primarily with bowls whereas the individual user at Kabusanze was associated primarily with jars. This finding seemed to confirm a correlation between vessel forms and gender-related roles. However, this was just an observation made based on little data and as such could not indicate a meaningful pattern. Future studies may shed light on this issue. The recovery of Urewe ceramics from non-domestic contexts was not unique to this site; previous studies have indicated that complete Urewe vessels have also been recovered at the base of smelting furnaces in some areas such as Buhaya, Tanzania, and southern Rwanda (Schmidt 1978; Van Noten in Giblin *et al*. 2010), at rock shelters in Uganda (Posnansky *et al*. 2005), and at sealed pit shafts in Kenya (Leakey *et al*. 1948). All in all, the above findings seemed to suggest that Urewe ceramics could have been used for many activities beyond domestic/daily household activities and that Urewe ceramics could have played both a functional and symbolic role in society (Ashley 2010).

With the exception of one bowl that was painted with red paint in vertical incisions (which was the first incidence of this kind recorded in the whole of the Great Lakes region), all other vessels had surfaces that were burnished with black slip, something that is typical of Urewe ceramics. A number of well-executed decorative motifs, similar to those observed at the Siaya site in Kenya (Leakey *et al.* 1948), the Lolui, Luka, and Namusenyu sites in Uganda (Ashley 2005; Posnansky *et al.* 2005), and the Kabusanze site in Rwanda (Giblin *et al*. 2010), were also present at the Lugala A1 site. These included hatching, horizontal lines/channelling, vertical lines, and incised lines filled with punctates/dashes. Hatching was limited to the neck of a jar, and no bevels and dimples were present in this collection; however, the surface treatment and decoration indicated intensive investment of time and care, which could only be possible in a society that was well-structured and consisted of members that specialised in different activities.

6.5 Chapter Summary

Generally, case studies 1, 2 and 3 were concerned with LSA hunter-gatherers who used or made Kansyore ceramics in the Early to Middle Kansyore phases (Holocene period), whereas case study 4 was concerned with EIA farming communities who used Urewe ceramics in the later Holocene period. Judging from similarities in the fabric, form and decoration of the ceramics recovered at the sites of the first three case studies, it was concluded that there was continuity from the Early Kansyore to the Middle Kansyore phases. Alternatively, the three sites were occupied by the groups of people who used the same clay sources and/or raw materials. It seems some clay sources were locally accessed, implying that the communities had to stay long in an area in order to get to know resources available locally. The presence of small, medium and large open bowls in the Kansyore assemblages at the Namundiri A, Namaboni A and Lugala A1 sites, suggested occupation of these sites by families, confirming a similar proposal by Ashley (2005). This further suggested that Kansyore users on the northern shores of Lake Victoria Nyanza lived a semi-sedentary life. Further, based on the sizes of the bowls recovered, it seemed that the families were small, that the society of Kansyore users in this area was not very complex, and that these groups could mobilise themselves easily to move to other sites when the seasons changed. This argument seemed to be in agreement with the proposal put forward by Ashley (2010) and Ashley and Grillo (2015) that the production and use of ceramics can shed light on the social organisation of a group.

The analysis of the forms/shapes and sizes of vessels indicated that Kansyore ceramics were used for different purposes such as food processing, cooking, serving, and storage. However, the shapes and sizes of the vessels recovered from the three sites suggested they were suitable for short storage periods only, which confirmed the finding of Ingold (cited in Ashley & Grillo 2015: 473). The present study also identified the presence of a few wiped and burnished Kansyore sherds from both the Early and Middle Kansyore phases, suggesting that the production of these ceramics involved an investment of time, skills and labour. Interestingly, wiped and burnished sherds were more common to the middle phase than the early phase, suggesting the societies in the middle phase were more complex than those in the early phase. Moreover, decorations were more distinctive and extensive in the Middle Kansyore phase than in the Early Kansyore phase. The decoration of ceramics from the Early Kansyore phase was limited to a small part of the rim/lip of a vessel whereas decorations during the Middle Kansyore phase showed variety. Also, in the latter case, decorations were arranged in neat grid-like forms covering a large part of the body of a vessel, which emphasised that societies of this period were more complex than societies of the Early Holocene period. The few variations observed at the three sites were taken to suggest that the potters exercised personal choices and that different communities occupied the sites during different periods.

All Urewe ceramics analysed in the present study were recovered from the burial at the Lugala A1 multioccupational site. This recovery was the first of its kind in Uganda, although it was the third of its kind in the Great Lakes region. The first two recoveries were in Rwanda and the Democratic Republic of the Congo (Misago & Shumbusho 1992; Giblin *et al*. 2010; Watts *et al*. 2020). The sizes of the bowls and jars that were present at Lugala A1 were determined based on the diameters (ranging between 11 and 18 cm) of the rims that were recovered. Based on the sizes of the vessels it was suggested that these vessels were used by families, as suggested by Ashley (2010). More bowls were observed at this site than at other known burial sites, a finding that led to a suggestion that kinds of vessels were role-related. However, because of the small sample recovered, it was thought that future research could perhaps shed light on this issue. Also, because the ceramic fabrics were not well-sorted but that the potters nevertheless created smooth and burnished surfaces, it was suggested that these potters invested time and labour in their work. The dating of Urewe ceramics (cal. AD 339–437) at this site suggested that the settlement of EIA farming communities on the northern shores of Lake Victoria Nyanza fit in with the recognised sequence relating to Urewe ceramics (i.e., 500 BC–AD 800) recovered in the Great Lakes region (Clist 1987).

CHAPTER 7

LITHICS, FAUNA AND OTHER FINDS

7.0 Introduction

Although the focus of the present study was on the recovery and analysis of ceramics (which was reported on in Chapter 6), it also recovered non-ceramic materials from the three major sites of Namundiri A, Namaboni B, and Lugala A1. Chapter 7 reports on these materials, which are lithics, faunal remains (including worked bones (bone points), and human remains, as well as on the stable carbon and nitrogen isotope analyses of the human remains. The chapter discusses materials, analytical methods used, results obtained, and the different categories of materials.

7.1 Lithics Material and Methods

A total of 1 582 lithics were recovered through excavation and sieving at Namundiri A, Namaboni B and Lugala A1. The lithic artefacts came from layers at Namaboni B (see Chapter 5) that yielded ceramics (such as layers 4 and 5) and those that did not (such as layers 6 and 7). At Namundiri A lithics were recovered from all the layers. At Lugala A1 lithics were recovered only from layer 7,6, and 5. The main interest in analysing the lithic materials at these three sites was to compare the spatial and temporal relationships between the sites and between the layers in the trenches in an effort to shed light on the lifeways and behaviours of hunter-gatherers. First, a review of lithics analysis is provided to better understand what has been done previously, and thereafter the approach used in the present study is discussed.

LSA artefacts associated with Kansyore and Urewe ceramics in the Great Lakes region were first defined by Leakey (cited in Kessy 2005) who originally placed the lithics under a label called 'Wilton C'. The retouched tool types recovered from Kansyore assemblages lacked morphological standardisation and therefore their value as culturally meaningful tool types was considered questionable (Robertshaw 1991: 159–161). Detailed studies from the late 1960s through to the 1990s indicated that the lithic artefacts from Kansyore assemblages were largely of quartz raw material (Gabel 1969; Soper & Golden 1969; Nelson & Posnansky 1970), and were 'non-descript' (Robertshaw *et al.* 1983: 84) due to poor flaking qualities (Robertshaw 1991).

Recently, analyses of lithics recovered from the four sites of Usenge 1, Usenge 3 Haa, and Wadh Lang'o (Onjala *et al.* 1999; Seitsonen 2004; Ashley 2005; Lane *et al.* 2007;

Prendergast 2008) situated on the eastern shore of Lake Victoria, Nyanza Province, Kenya, indicated that quartz was the most dominant raw material in the Kansyore levels (Seitsonen 2010: 54). The colour of this quartz ranged from milky or translucent white to translucent grey variants (Mosley & Davison 1992). At some of these Kansyore sites, lithics were found in association with ceramics, whereas at others the reverse was true. At Usenge 1, for instance, lower levels produced lithics and no ceramics (Lane *et al.* 2006; Lane *et al.* 2007). The general lithic techno-typology in aceramic levels, especially in unit 4 at Usenge 1, showed that the raw material used was predominantly grey chert, which differed completely from that found in the case of Kansyore materials in later levels—these materials relied on quartz (Seitsonen 2010: 51). Analyses of lithic raw materials are well-known for shedding light on mobility patterns of hunting communities, and the technical characteristics of these raw materials can govern lithic reduction sequences (Binford 1979; Mehlman 1989; Barut 1994: 48; Kusimba 2002. For example, relatively sedentary hunter-gatherers are believed to have procured locally available raw materials and use them in an expedient manner with little investment in tool retouch (Bamforth 1991; Nelson; Parry & Kelly cited in Barut 1994: 48). Quartz raw material was largely used in Kansyore levels at all the sites that Seitsonen (2010) analysed. Seitsonen (2010: 70) points out that quartz is readily available in the immediate environs of the sites, suggesting that they could easily have been used in daily activities. This suggests that quartz users were relatively sedentary (Bamforth 1991; Nelson; Parry & Kelly cited in Barut 1994: 48). Based on these arguments, it was likely that the quartz users on the northern shores of Lake Victoria Nyanza lived a semi-sedentary life.

Apart from lithic raw materials, artefact type, size and debitage are known for providing evidence of relationships between technology and social strategies relating to land-use patterns and mobility (Kooyman 2000: 94; Mackay 2008). Sites with high densities and/or thick cultural layers of tool types/artefacts have been used to measure site functionality and intensity of site use whereas sites with low densities and/or thin cultural layers have been taken to represent sites where there was specialised limited activity that was short-lived (Barut 1994; Kooyman 2000: 141). Lithic density patterns through time are believed to shed light on intensity of occupation over time (Speth & Johnson 1976; Villa & Courtin cited in Barut 1994). For instance, high presence of lithics and tools in the late Kansyore phase at Usenge 1(Seitsonen 2010: 72) led to a delayed-return settlement suggestion (Dale *et al.* 2004). The following paragraphs describe the methods used in the present study to analyse lithic materials recovered from the northern shores of Lake Victoria Nyanza, Uganda. The results of the analyses are also presented.

7.1.1 Methods of Analysis

All lithic materials from Namundiri A, Namaboni B and Lugala A1 were washed, dried and transported to the National Museum of Kenya in Nairobi where a detailed analysis was conducted by Dr. Emmanuel Ndiema with the assistance of the researcher and two museum volunteers. Analysis started by discarding some lithic materials that were regarded as non-anthropogenic. Thereafter, lithic artefacts were analysed using typological and technological methods (Ambrose 1984; Siiriäinen 1984). These methods entailed categorising lithic artefacts according to raw material, technological characteristics, and distribution over landscape, and stipulated coherence.

Lithic materials were examined visually to identify raw materials based on colour. All lithic materials were sorted by raw material, site, trench, and layer. Where possible, lithic materials were divided into groups based on typological and technological tool types; core, crescent, and retouched pieces. The rest of the material was categorised as debitage (e.g., broken flakes and angular fragmented pieces) and could not be classified as any established tool types. Lithic artefacts with cortex were counted per site and per layer at each site as indicators of technological actions. The lithics in each layer were counted and weighed to provide information on frequencies of lithics over time, which was hoped to cast light on technological behavioursof hunter-gatherers and any changes within and between sites.

7.1.2 Results Relating to lithic analysis

Information on raw materials, the tool type and lithic count per site is presented in tables 7.1, 7.2 and 7.3 (see also Figure 7.1). Quartz was the raw material used most at all three sites (accounting for 99.9%), whereas the use of other raw materials (e.g., chert and chalcedony) accounted for less than 1% (see Figure 7.1). Two artefacts out of a total of 1 582 exhibited modifications, and the rest of the materials were categorised as debitage (i.e., whole blades/flakes, broken flakes and angular fragments). The tools recognised included a utilised flake from Namundiri A and a crescent from Namaboni B that showed clear signs of a retouch. Of the total of 1 582 artefacts recovered from the three sites, 92 (6%) indicated evidence of the cortex.

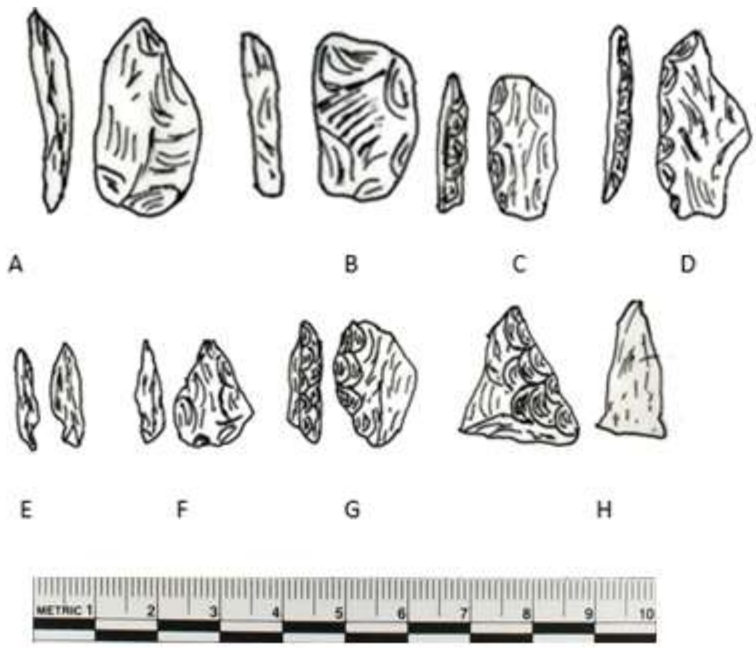


Figure 7. 1: Lithic artefacts from the three sites investigated; A–D at Lugala A1, E–F at Namundiri A, G–H at Namaboni B

Table 7. 1: Raw material type per site

Site name	**Quartz**	**Chert**	**Chalcedony**	**Total**
Namundiri A	692	1	1	694
Namaboni B	255	0	0	255
Lugala A1	633	0	0	633
Total	**1 580**	**1**	**1**	**1 582**

Table 7. 2: Tool type per site

	Tool type					
Site Name	**Angular fragments**	**Blades**	**Flakes**	**Crescents**	**Cores**	**Total**
Namundiri A	693	0	1	0	0	694
Namaboni B	253	0	0	1	1	255
Lugala A1	632	1	0	0	0	633
Total	**1 578**	**1**	**1**	**1**	**1**	**1 582**

Table 7. 3: Lithics count and weight per site

Site name	Number	Weight (grams)
Namundiri A	694	1077
Namaboni B	255	1061
Lugala A1	633	771
Total	**1 582**	**2 909**

7.1.3 Lithics Frequencies and Interpretations

The count and weight of lithic materials recovered from the three sites are presented in Table 7.3 above. As indicated in Table 7.3, the frequency of lithics use was the highest (n = 694) at Namundiri A, followed by Lugala A (n = 633), and then Namaboni B (n = 255). Interestingly, both Namundiri A and Lugala A1 fell in the Middle Kansyore phase whereas Namaboni B fell in the Early Kansyore phase (Dale 2007; Dale & Ashley 2010). Low lithic numbers can loosely be taken to suggest low intensity of occupation (e.g., at Namaboni B in the early Kansyore phase), and higher lithic numbers to suggest higher intensity of occupation (e.g., at Namundiri A and Lugala A in the Middle Kansyore phase). However, the findings at some layers (especially layers 5 and 4 at Namaboni B) did not support this assumption because high numbers of other cultural materials were recovered there, suggesting intensive occupation of the site.

The frequency, weight and cortex of lithics per layer at each site are presented in Table 7.4. At Namundiri A, for instance, the lithics frequency was low in layer 5 but spiked in layers 4 and 3, and decreased slightly in layers 2 and 1. This suggested that the site was not intensively occupied in the lower layer (layer 5), that it was intensively occupied in layers 4 and 3, and that the intensity reduced again as time passed by (i.e., in layers 2 and 1). The lithics evidence at Namundiri A was consistent with other pieces of evidence recovered from this site relating to, for instance, bone points, fauna, ochre, shells, and pottery (see Chapter 5).

At Namaboni B, the lithic numbers in trench 1 were low in the lower layers (7 and 6) but increased in the upper layers (5 and 4) (see Table 7.4). As was the case with Namundiri A, this was taken to suggest that the site was not intensively occupied in the lower layers but intensively occupied in the upper layers. The increase of lithics in layer 4 was consistent with the increase in other cultural materials (see Chapter 5). Other layers (3, 2 and 1) that overlay layers 5 and 4 did not have cultural materials, suggesting they were not occupied. Low cortex numbers were observed in layers 7 and 6, but numbers increased in layer 5, a finding that was consistent with the general lithics pattern in this trench. Based on cortex frequency (see Table 7.4), cortex removal was probably not done at this site.

At Lugala A1, the frequency of lithics in all the layers was generally high—in layer 7 it was the lowest, in layer 6 it was slightly higher, and in layer 5 it decreased again (see Table 7.4). The associated cultural materials (e.g., ceramics, shells and bones) were generally low in number in all the layers (see Chapter 5), suggesting lithics were more commonly used at this site than were other artefacts.

Table 7. 4: Lithics frequency, weight and cortex at each site per layer

Site name	Layer	Count	Weight (g)	Cortex
Namundiri A	1	15	53	0
	2	66	131	1
	3	264	380	8
	4	278	379	14
	5	70	134	5
Namaboni B				
	4	126	339	10
	5	68	217	6
	6	18	115	4
	7	13	223	1
Lugala A				
	5	208	325	15
	6	222	177	13
	7	203	269	13

7.1.4 Raw Material and Tool Type per Layer Recovered from the Namundiri A site

Information on raw material and tool type of the lithic artefacts per layer recovered from the Namundiri A site is shown in Table 7.5. Of the raw material recovered in each layer from this trench, 99.9% was quartz and < 1% was other raw materials such as chalcedony (n = 1) in layer 2, and chert (n = 1) in layer 5. The characteristics of the lithic assemblage from this trench belonged to the LSA period. One tool type (utilisedflake) was recovered from layer 5 of this trench and was found together with bones, shells, pottery, seeds and ochre (see Chapter 5). The rest of the lithic material was debitage (angular fragments) whose length ranged between 14.8 and 45 mm and its width was from 14.8 to 35 mm. Lithic use in this trench was higher in layers 4 and 3 than in the other layers, suggesting the two layers were perhaps intensively occupied. The radiocarbon dates recovered from this trench suggested that site fell in the Middle Kansyore period (Jones & Tibesasa in prep.).

Table 7. 5: Namundiri A: Raw material and tool type analysis per layer

	Raw materials			Tool type	
Layer	**Quartz/ Raw materials**	**Percentage (%)**	**Other raw materials**	**Flakes**	**Angular fragments**
1	15	2.16		0	15
2	65	9.41	1	0	66
3	264	38.10		0	264
4	278	40.12		0	278
5	69	10.10	1	1	69
Total	**691**	**100%**	**2**	**1**	**692**

7.1.5 Raw Material and Tool Type per Layer Recovered from the Namaboni B site

Table 7.6 shows the raw material and tool type of stone artefact assemblages recovered from the Namaboni B site per layer. The presence of raw material in all the layers indicated that only quartz was used. As discussed in the previous section, low quartz frequencies were observed in the lower layers (7 and 6) and higher frequencies were observed in the upper layers (5 and 4); however, layer 4 had the highest quartz usage of all the layers (see Table 7.6). This might suggest intensive occupation of the layer. Only one date (6634–6479 cal. BC) was recovered during the present study and this date was recovered from deposits associated with the skeleton in trench 2 in layer 7, making it difficult to understand the exact time of intensive occupation.

The presence of lithics in the lower layers was associated with the presence of other cultural materials such as bones and shells, whereas ceramics were also present in the upper layers. It was clear that the first occupants of this site were aceramic lithic tool users—Kansyore ceramics were found only in layers 4 and 5. However, the raw material, whether in aceramic or ceramic settlements, remained the same, namely that of milky quartz. In contrast, at other Kansyore sites with both aceramic and ceramic settlements, grey chert was the raw material that was used most in the aceramic period (Seitsonen 2010: 51). However, only one other well-analysed example (Usenge 1) was available for making this comparison. It is interesting to note that only two tool types were recovered from layer 7 (bipolar core) and layer 4 (crescent) suggesting specialised, limited lithic activity at this site.

Table 7. 6: Namaboni B: Raw material and tool type per layer

	Raw material		Tool type		
Layer	**Quartz**	**Percentage (%)**	**Crescents**	**Cores**	**Angular fragments**
4	126	55.75	1	0	125
5	68	30.09	0	0	68
6	18	7.96	0	0	18
7	13	6.19	0	1	12
Total	**225**	**100%**	**1**	**1**	**223**

7.1.6 Raw Material and Tool Type per Layer Recovered from the Lugala A1 Site

All the lithics recovered from the Lugala A1 site belonged to quartz raw material. Only one tool (a blade) was identified in layer 7, suggesting limited activity at this site. Limited activity was also evidenced by the presence of only a few cortexes at this site (see Table 7.7), which further suggested that the initial cortex removal was done at a location away from the excavated area. Some lithic artefacts were also illustrated in this study (Figure 7.1).

Table 7. 7: Lugala A1: Raw material and tool type per layer

	Raw material		Tool type	
Layer	**Quartz**	**Percentage (%)**	**Blades**	**Angular fragments**
5	208	32.86	0	208
6	222	35.07	0	222
7	203	32.06	1	202
Total	**633**	**100%**	**1**	**632**

7.1.7 Lithics Found with Skeletons at the Namaboni B Site

Thirty lithic artefacts were found in the same contexts with human skeletons at the Namaboni B site (see Table 7.8). All artefacts were made out of quartz raw material and all were debitage (angular fragments). The lithic artefacts were associated not only with human skeletons but also with burnt seeds, fish bones, shells, and Kansyore ceramics.

Table 7. 8: Namaboni B: Skeleton (SK) lithic artefact analysis

	Raw material type			
Site Name Namaboni B	**Quartz**	**Percentage (%)**	**Weight (g)**	**Cortex**
Skeleton 1	6	20.00	24	0
Skeleton 2	17	57.00	98	2
Skeleton 3	3	10.00	36	0
Skeleton 6	4	13.00	9	0
Total	**30**	**100%**	**167**	**2**

7.1.8 Grinding Stones

Other than microlithics recovered from the three sites, some grinding stones were identified. A grinding stone was, for instance, recovered by shell harvesters who were working alongside the excavation team (see Chapter 5 for details on shell harvesters). The presence of grinding stones was clear evidence that the diet of the community at this site contained processed food. This evidence was further supported by the presence of ceramics.

7.1.9 Discussion of Lithic Materials

Lithic material analysis per site and per layer indicated that the raw material used at the three sites and in all three trenches was almost exclusively milky quartz, and that other raw materials (e.g., chert and chalcedony) made up less than 1%. Quartz raw material was found in the area in small cobbles and big chunks. Chert, quartzite, shale, grey wackes, sandstones and mudstones were also locally available in the study area (Westerhof *et al.* 2014). Nevertheless, it was evident they were not preferred as raw materials by either the aceramic- or ceramic-using hunter-gatherers in the study area. However, Seitsonen (2010) notes that other raw materials, such as chert and obsidian, were commonly used by aceramic- and ceramic-using hunter-gatherers in western Kenya. Nevertheless, despite the use of other raw materials, quartz is still known to dominate most of the Kansyore-using hunter-gatherer sites at Lake Victoria Nyanza (on-shore and off-shore), even the sites in western Kenya (Chapman 1967; Mehlman 1989; Seitsonen 2004; Lane *et al*. 2007; Dale 2007).

The preferred use of quartz as a raw material can probably be attributed to its local availability and easy accessibility. This pattern can be understood given the fact that the raw material used at these sites was known for its poor quality and fracture properties (Siiriäinen 1981; Seitsonen 2010). Artefacts made out of this raw material have in most instances been described as non-descript and have sometimes not been analysed because of the difficulty in identifying the tools used (Robertshaw *et al.* 1983: 34; Robertshaw 1991; Dale 2007; Seitsonen 2010). The use of locally available raw materials at other sites has been associated with relatively sedentary hunter-gatherers (Bamforth 1991; Parry & Kelly cited in Barut 1994: 48). The scenario at the three sites investigated in the present study was probably similar.

Very few formal stone tool types were identified at the Namundiri A, Namaboni B and Lugala A1 sites. These included a crescent and a utilised flake, accounting for less than 1% of the total lithic artefacts collected. Only one of these tools showed clear signs of retouch. This pattern was not unique to these sites; the same pattern has been found at other Kansyore sites, especially midden sites (Seitsonen 2010). Shell midden sites, compared to riverine sites where there are Kansyore ceramics, have been identified as having very few tools. Also, the number of expediently produced and used tools seems to be high at shell midden sites (Seitsonen 2010). This scenario applied also to the three sites under study, even though the Lugala A1 site was not a shell midden site. In addition, the lack of retouched tools has also been associated with hunter-gatherers who have a sedentary lifestyle (Bamforth 1991; Parry & Kelly cited in Barut 1994: 48). At all the studied sites, thick archaeological deposits were found with the burials, some containing well-articulated skeletons placed in a flexed position (see Chapter 5) (e.g., at the Namaboni B site), thus suggesting that the Kansyore hunter-gatherers might have lived a sedentary lifestyle.

It is known that a detailed study of debitage may shed light on the relationships between technological strategies and social strategies of land use and mobility (Morrison 1994: 93; Mackay 2008: 41). However, because of time limits and research focus, debitage in the present study was not analysed in detail; an analysis of only counts and weights in respect of debitage between sites and within trench layers was conducted, limiting the amount of information that could be extracted from this category of artefacts. Nevertheless, a comparison of the numbers and weights showed some level of lithic activity through space and time at the studied sites. Although it is not easy to compare numbers and weights without taking into account the volume of material excavated, the available evidence from Namundiri A, Namaboni B and Lugala A1 indicated that there was more lithic activity at Namundiri A, followed by Lugala A, and finally by Namaboni B (see Table 7.4). Further, if lithic numbers were to be equated with thick archaeological deposits, the Namundiri A site was probably the most intensively occupied site, followed by Lugala A1, and finally by Namaboni B. It is important to note that some grinding stones were recovered at the Namaboni B site. The presence of grinding stones together with ceramics at the Namaboni B site was important because it cast light on the existence of a subsistence economy at this site (and also at other sites where applicable). For instance, it was possible that some kind of food processing, such as grinding of wild cereals and cooking, took place at the Namaboni B site. However, grinding stones can sometimes be used for activities other than processing food (e.g., grinding of ochre), which may account for the red slip found on ceramics.

Radiocarbon dates from the three sites suggested that the Namundiri A and Lugala A1 sites fell in the Middle Kansyore period and Namaboni B in the Early Kansyore period (Dale 2007; Dale & Ashley 2010). Based on these dates, it was possible that sites of the Middle Holocene period were more intensively occupied than those of the Early Holocene period; however, a change in occupation intensity was a gradual process from the early period to the middle period, suggesting continuity of some kind. This is not unusual; at other sites of this nature, especially at the lake shore shell midden sites, more intensive and long-term occupation has been observed during the Early Kansyore period than during later periods. This observance has been based on lithic evidence (Seitsonen 2010: 71). The suggestion is that an intensive and long-term occupational lifestyle was practised that extended from the Early Kansyore phase to the Middle Kansyore phase. This is a very interesting finding since documentation on the Middle Kansyore phase has been missing in Kansyore studies up to now (Dale & Ashley 2010). However, this finding remains tentative until further studies are conducted in the area. In the section that follows, information on the faunal materials recovered from Namundiri A (trench 1), Namaboni B, and Lugala A is presented.

7.2 Faunal Materials

As in the case of lithics, faunal materials were recovered through excavation and sieving at all three major sites; Namundiri A, Namaboni B, and Lugala A1. Only the faunal materials from Namundiri A and Namaboni B were considered for analysis in this study due to limited time and resources. Namundiri A and Namaboni B were each located about 50 m from the shoreline of Lake Victoria Nyanza and were characterised by dense shell middens that contained large amounts of Kansyore ceramics, lithics and fish bones (see Chapter 4). The two sites, though different in period of occupation, produced some materials that indicated some similarity. For instance, both sites yielded quartz raw materials and ceramics whose fabrics and forms were quite similar (see Chapter 6). These hunting communities lived in different periods, so perhaps they lived in similar environments and in close proximity. The aim of faunal analyses at the two sites was to compare the sites, their layers and their trenches in order to determine if there were any relationships between the faunal materials recovered. This was hoped to cast light on the subsistence economies/strategies of the hunter-gatherers in this area as well as their general lifeways, especially their settlement patterns.

All faunal materials recovered from Namundiri A and Namaboni B were cleaned, sorted, identified, quantified, and recorded in the field immediately after excavations. All faunal materials were analysed by Mica Jones, a doctoral student from Washington University who was part of the excavation team, and who used part of the data obtained in the present study for his PhD. The faunal analyses at these sites represented the first systematic zooarchaeological study of the Kansyore period in this part of Uganda. As such, the findings from this study were compared with faunal patterns identified at other previously analysed Kansyore sites in western Kenya. The results presented here come from a report prepared by Mica Jones (see Appendix 4), and further faunal analysis work on this material is presented in Jones's PhD (Jones 2020).

For the faunal analyses, established analytical methods used in similar studies in northern and eastern Africa (Gifford *et al.* 1980; Brain 1981; Marshall & Stewart 1994; Prendergast 2008; see also Appendix 4 for details) were followed. To examine change through time, two broad categories of identification were used, namely, maximally identifiable (ID) and non-identifiable (NID) (Gifford & Crader 1977; see also Appendix 4). All analysed faunal materials were put in storage at the Uganda National Museums.

7.2.1 Results Relating to Faunal Materials

Faunal analysis results indicated that fish bones dominated the identifiable specimens at both Namundiri A and Namaboni B (see Appendix 4, Tables 3 and 7). At Namundiri A, for instance, 6 563 out of 7 325 specimens were fish bones (accounting for 89.6%), and at Namaboni B, 254 bones out of 307 were fish bones (accounting for 82.7%). The common fish taxonomies (henceforth referred to as taxa) identified at both sites were *Clarias* (catfish) and *Protopterus aethiopicus* (lungfish) (see Appendix 4, Tables 5 and 7). This pattern, according to Jones (Appendix 4), could have been due to his lack of experience in identifying other species such as *Cichilidae* (tilapia) and *Cyprinidae* (carp or barbels). Despite Jones's concerns, the findings at the two sites aligned with what has been identified at other midden sites, for instance, at Pundo (Prendergast 2008), Luanda, and White Rock Point, Kanam east, and Kanjera (Robertshaw *et al.* 1983). This suggested that the communities on the shores of Lake Victoria Nyanza in both Uganda and Kenya utilised similar subsistence strategies and perhaps settled in similar environments between 6000 and 5000 BC.

Mammal bones were the second-most commonly identified taxa in the assemblages recovered from both Namundiri A and Namaboni B, comprising 726 out of 7 325 specimens (accounting for 9.9%), and 28 out of 307 specimens (accounting for 9.1%) respectively (see Appendix 4). Bovid species such as *Syncerus caffer* (African buffalo), *Kobus ellipsiprymnus* (waterbuck), and *Tragelaphus scriptus* (bushbuck) were identified at Namundiri A (see Appendix 4, Table 5). Bovid species at Namaboni B, on the other hand, included *Syncerus caffer* (African buffalo), *Tragelaphini* (spiral-horned antelope), and *Cephalophini* (duikers) (see Appendix 4, Table 7). Non-bovid mammal species were also identified at both sites and these included *Hippopotamus amphibius* (hippopotamus), *Potamochoerus larvatus* (bushpig), *Cercopithecus* (guenon monkeys), *Felis* (cats), *Phacochoeru* (warthog), *Equus burchelli* (common zebra) and *Carnivora* (carnivores) (see Appendix 4, Tables 5 and 7). Reptiles, namely, *Testudines* (turtles and tortoises), *Serpentes* (snakes), *Python* (python) (see Appendix 4, Tables 5 and 7), and birds were also recovered during this study. A comparison between fish, wild fauna, reptiles and birds from the two sites seemed to indicate some continuity in the subsistence patterns of the communities at the two sites. The differences observed in fish taxa, wild animals and reptiles could be tied to either the hunters' choices or to the fact that the two sites belonged to different phases—the Early Kansyore phase (Namaboni B) and the Middle Kansyore phase (Namundiri A). The similarity suggested that the environments of these hunter-gatherers were not that different despite the differences in period.

A comparison between fish, wild animals, reptiles and birds per layer was done to establish the relationships between fish, mammal, reptile, and bird bones per layer at the Namundiri A site. Compared to all the other taxa identified at Namundiri A, the presence of fish taxa was relatively high in each layer/level (see Table 7.10). This suggested that fish was the main source of food, although other animals were consumed too. Layer 4 at this site showed the highest numbers of fish, mammal/wild animal, reptile and bird bones, suggesting intensified fishing and hunting during this period. However, a decrease in the number of fish, mammal/wild animal, reptile and bird bones was observed in layer 3 at Namundiri A. This decrease continued to layers 2 and 1 (see Table 7.10), which aligned with the general decrease in the presence of other artefacts, suggesting that the site was less occupied in these layers. Similarly, compared to other identifiable assemblages, relatively high numbers of fish taxa in each layer/level were also observed at Namaboni B (see Table 7. 11; Appendix 4, Table 8). Mica Jones (Appendix 4) further reveals that the fish bones, relative to the bones of all other identified fauna, increased in layers 5 and 4 and that this coincided with a slight decrease in the frequency of mammal bones in layers/levels 6 through to 5. This seemed to suggest that the fishing activity was the most preferred form of hunting and that this could perhaps be associated with the availability of resources. Based on faunal findings, the environment during the Early Kansyore phase seemed not to have differed much from that during the Middle Kansyore phase.

Table 7. 9: Total fauna identified at Namundiri A: Relative taxonomic frequencies of fish, mammal, reptile, and bird bones

	Layer 5 (NISP)	**Layer4 (NISP)**	**Layer3 (NISP)**	**Layer 2 (NISP)**	**Layer 1 (NISP)**
Fish	833	4 208	1163	329	30
Mammals	154	402	130	38	2
Reptiles and birds	4	11	2	3	1

Note: NISP = Number of Identified specimens.

Source: Adapted from Jones (2016 Appendix 4, Table 5)

Table 7. 10: Maximally identifiable fauna at Namaboni B: Relative taxonomic frequencies of fish, mammal, reptile, and bird bones

-	Layer 7 (NISP)	Layer 6 (NISP)	Layer 5 (NISP)	Layer4 (NISP)
Fish	74	32	60	103
Mammals	7	5	5	9
Reptiles and birds	3	1	2	2

Note: NISP = Number of Indentified Specimens

Source: Adapted from Jones (2016 Appendix 4, Table 8)

Although mollusc shells found at the Namaboni B and Namundiri A sites were not analysed, the relative taxonomic weight and frequencies of mollusc shells and total non-mollusc fauna excavated per layer at the two sites were considered for the purpose of establishing the complexities of societies based on subsistence economies. Because shells at Namaboni B were taken by shell harvesters, the relative taxonomic frequencies at this site Namaboni B not considered. The results of the analysis of shells at Namundiri A suggested a gradual and consistent trend toward less mollusc shells relative to non-mollusc fauna through all layers (see Appendix 4, Table 6). At Namundiri A, a significant decrease in mollusc shell numbers in layers 3 and 2 and a complete absence of mollusc shells in layer 1 were observed. This suggested reduced reliance on shellfish and increased reliance on other types of fish and terrestrial wild animals over time. It was clear that shellfish were more abundant in the lower layers (layers 5 and 4) than in the upper layers, which Jones (Appendix 4) ascribed to an environmentally related issue or to human choice relating to the use of resources. These possibilities further suggested a move towards specialisation.

7.2.2 Inclusion of Faunal Materials

The faunal analysis revealed that faunal materials recovered from the Namaboni B site (Early Kansyore phase) and the Namundiri A site (Middle Kansyore phase) were similar to the assemblages reported at the midden sites of Pundo, Luanda, Kanjera West, and White Rock Point in western Kenya. Similar to all the other known sites mentioned earlier, *Protopterus aethiopicus* (lungfish) and *Clarias* (catfish) were dominant at both the Namaboni B and

Namundiri A sites. Second-most dominant were a diverse array of terrestrial/amphibious animals, including hippopotamus, African buffalo, wild pig, small carnivores, primates, and reptiles (see Appendix 4). This indicated that almost all Kansyore groups who occupied the shores of Lake Victoria Nyanza in both Uganda and Kenya between 6000 and 5000 BC utilised similar subsistence strategies and perhaps settled in similar environments. However, based on the faunal materials recovered, the Early Kansyore phase seemed to have been wetter than the Middle Kansyore phase.

A comparison between the faunal materials at Namaboni B and Namundiri A indicated minor differences, particularly among the non-fish assemblages. For instance, Namundiri A contained a high proportion of large mammals such as African buffalo (*Syncerus caffer*) and hippopotamus (*Hippopotamus amphibious*) whereas Namaboni B had a slightly higher proportion of medium-sized mammals in the bovid 2-size class such as wild pig and antelope (see Appendix 4). As far as reptiles are concerned, Namaboni B had a number of large python vertebrae spread throughout its stratigraphy whereas Namundiri A had smaller reptiles such as turtles and tortoises (*Testudines*) (see Appendix 4, Tables 3, 5 and 7). Despite the closeness of the two sites, the faunal composition reflected slight differences which, according to Mica Jones (see Appendix 4), could have resulted from either human choice or level of preservation or different environments.

Available evidence on subsistence change through time showed that fish dominated throughout the archaeological sequence at Namundiri A and that an increase in fish exploitation coincided with a decrease in the exploitation of mammals and shellfish (see Appendix 4, Table 6). The finding was similar at Namaboni B in that fish dominated the faunal assemblage in all layers. It differed, however, in that the lowest layers did not contain ceramics (see Chapter 5). These layers indicated that communities seemed to have subsisted on fish, mammals, reptiles, and birds. The layer overlaying the pre-ceramic layers at the Namaboni B site produced the first evidence of Kansyore ceramics. The shift from pre-ceramic to ceramics levels coincided with a shift toward greater dependence on the consumption of mammals and a decrease in the consumption of fish, reptiles, and birds (see Appendix4), suggesting a change in subsistence strategies.

From the analysis it was clear that there was specialised exploitation of aquatic resources (e.g., of fish and shellfish), which, according to Dale *et al*. (2004), might have led to complex social organisation among the Kansyore hunter-gatherers. Dale *et al*. (2004) further argue that this resulted most likely in a delayed-return hunter-gatherer subsistence system (see also Prendergast 2008). This argument was supported by evidence such as thick deposits of material culture, including ceramics (see Chapter 6) and burials, at the Namaboni B site. In the sections below, information on bone points, botanical materials, osteological, stable carbon and nitrogen isotopes, provide more insight into the social organisation and subsistence economies of the Kansyore LSA and EIA communities living in the area.

7.3 Analysis of Pointed bones

Out of the 10 pointed bones recovered in the present study, three came from Namaboni B and seven from Namundiri A (see figures 7.2 and 7.3). Two of the Namaboni B pointed bones were recovered from burial 2 deposits, and the third one was recovered from the shell samples the excavation team got from the shell harvesters. At Namundiri A, most pointed bones (n = 5) were recovered from layer 4, and no pointed bone were recovered from the lowest layer (layer 5). From layers 3 and 2, which overlay layer 4, only one pointed bone each was recovered. No pointed bone was recovered from layer 1. The recovery of pointed bones coincided with a high frequency of bone artefacts, shells, pottery, seeds and ochre at this site. An intensity of artefacts has always been associated with a delayed-return hunter-gatherer subsistence system (Dale *et al.* 2004; Dale 2007; Prendergast 2009).

Figure 7. 2: Namundiri A, trench 1: pointed bones

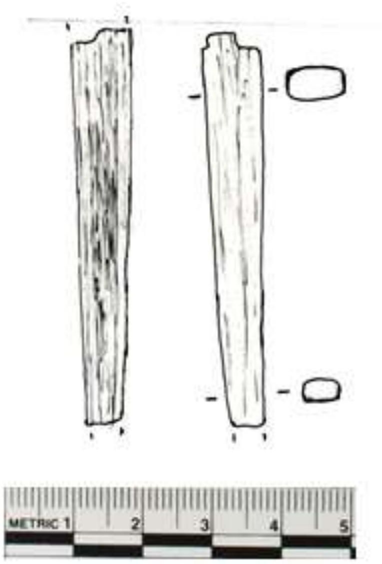


Figure 7. 3: Namaboni B: pointed bones recovered on the surface

The analysis of pointed bones recovered from the study area was carried out by a specialist, Dr Justin Bradfield, from the Evolutionary Studies Institute, University of the Witwatersrand. This analysis was mainly concerned with the manufacturing technology and use-trace evidence on bone artefacts. Dr Bradfield's analysis followed his own analytic protocols as well as those of Newcomer (see Appendix 5 for details). An Olympus BX 51 reflected-light microscope was employed for each bone tool analysis, and images were recorded using a mounted SC 30 camera. Bradfield also compared bone tools from the present study with 13 bone tools recovered from sites in southern and eastern Africa (see Appendix 5).

The pointed bone analysis results revealed that seven out of ten pointed bone tools analysed were made from long bones of large mammals (Appendix 5). Most of Namundiri A's and Namaboni B's bone artefacts were not modified except for bone artefact F (Appendix 5, Figure 11) that was modified into a cylindrical form. Although some bone tools displayed poor surface preservation, others displayed use-wear evidence. For instance, some cut marks were observed on one bone tool from Namaboni B (Appendix 5, figures 12 and 13), which, according to Bradfield, could have been the result of hafting. Ancient residues of plant tissue, whose taxonomies were hard to identify, were observed on one of the bone tools from the Namundiri A site (Appendix 5, Figure 14.). Some of these residues had ochre inclusions but it was not clear whether these were intentional applications or incidental contamination.

Pointed bones/bone points have been recovered from many sites such as White Rock Point, Luanda, Kanjera West, Kanam East, Gogo Falls, and Pundo (Robertshaw *et al.* 1983; Prendergast 2010; Robertshaw 1991). Analyses of such ponted bones have revealed various morphologies that have been described as awls and spear heads. Unlike in the case of the previous bone tool analyses, Bradfield's study traced use- and wear-evidence, which made it the first of its kind in this region. This study made information available not only on morphology/technology but also on functional interpretations and the general lifeways of the hunter-gatherers in the present study area. It is interesting to note that pointed bones recovered at Namundiri A and Namaboni B were similar morphologically, suggesting that the lifestyle of hunter-gatherers in the Early Kansyore phase and in the Middle Kansyore phase was the same (see Dale 2007 for details on Kansyore phases). Similarities at these sites were observed not only in respect of pointed bones/ bone points but also in respect of pottery forms and decorations (see Chapter 6), lithics, and faunal materials.

Although bone tool artefacts are known to have had many purposes, such as knitting and basketry (Apendix 5), they might have been used for fishing/hunting at the sites under study. Prendergast and Lane (2010: 105) point out that lung fish and catfish can easily be speared or harpooned in shallow water, and given the fact that lungfish and catfish were dominant at these two sites, it was possible that pointed bones/bone points were used for fishing (although using them for hunting game could not be ruled out completely). The general faunal analysis revealed the presence of large mammals, such as African buffalo (*Syncerus caffer*) and hippopotamus (*Hippopotamus amphibious*), and medium mammals such as wild pigs and antelope (see section 7.2.1 in the present study). It was likely that bone points at Namundiri A and Namaboni B were made from such faunal materials. This was not unique because large ungulates, such as hartebeest, giraffe and ostrich, have been used elsewhere for bone points (Bradfield & Choyke 2016).

7.4 Botanical Remains

In an effort to obtain direct evidence that would lead to an understanding of the subsistence economy of hunting communities on the northern shores of Lake Victoria Nyanza, flots from the studied sites were sent to Dr Alison Crowther, an archaeobotanical specialist and a research fellow based at the University of Queensland in Australia. Dr Crowther's analysis is ongoing but tentative results from the sites of Namundiri A and Namaboni B showed that the flots were not very rich. Further, no crop seeds could be identified with confidence.

A single possible pearl millet grain (Crowther pers. com., see Appendix 6) from layer 4 at Namundiri A was observed in one of the flots (see Chapter 5). The identification was based on the morphological traits of a similar pearl millet, but some diagnostic features (e.g., the embryo) were not clear enough so that a specialist could identify it confidently. Based on dates when this site was occupied (see Jones & Tibesasa in prep. for Namundiri A dates), it was possible that this grain was wild. Some pieces of shell of wild nut that had features consistent with *Canarium* were also identified from this layer, suggesting that gathering of some sort was practised. A legume with features consistent with *Lablab purpureus* (hyacinth bean) was also identified in the flots from layer 3 (Crowther pers. com.2017, see Appendix 6; also see Chapter 5), but this still needs confirmation.

At the Namaboni B site, a few charred legumes, including one cotyledon with features consistent with those of *Vigna unguiculata* (cowpea), were identified in layer 2 (Crowther pers. com.2017; also see Appendix 6). Crowther noted that the legume was much smaller than the domesticated type and that it was probably an immature or wild specimen. This legume was tentatively identified as *Vigna* cf. *unguiculata.* The layer from where it was recovered did not contain any cultural materials, suggesting it could indeed have been wild. Many nutshells were identified from the flots, and these were associated with skeletal materials at this site. The nutshells (as already mentioned in the case of Namundiri A) had features consistent with *Canarium*, confirming that some kind of gathering activity was practised at this site too.

7.5 Human Skeletal Materials and Methods of Analysis

In the present study (see Chapter 5), human skeletal remains were recovered from the Namaboni B and Lugala A sites. These skeletons belonged to humans of the LSA and EIA periods based on artefacts associated with them. The human skeletons at Namaboni B, for instance, were associated with lithic artefacts, Kansyore ceramics, shells, fish and wild animal bones, bone points and wild seeds. The skeletons from Lugala A1, on the other hand, were associated with Urewe ceramics (see Chapter 5).

With the permission of the Uganda National Museum and the Uganda National Council for Science and Technology, all human remains were taken to the archaeology laboratory at the University of Pretoria where detailed analyses were conducted by Ms Gabriele Krüger from the Department of Anatomy, with my assistance. The first step of the analyses involved the separation of the skeletal materials to ascertain the minimum number of individuals present (see figures 7.4 and 7.5). Gross morphological techniques were used involving the assessment of the number of skeletal elements present, visual pair-matching, articulation, process of elimination and taphonomy (L’Abbé 2005).

Further assessment included estimating the sex and age of each of the individuals (see Appendix 7). Because no standards exist for estimating the sex and age of LSA or EIA individuals, all estimates were based on modern South African standards. The age ranges used in the present study were limited to sub-adult, young adult and older adult, and estimates were based on visual assessments of dental eruption, dental wear, epiphyseal fusion and the presence of vertebral osteophytes (Ortner, 1998; Rösing & Kvaal 1998; Scheuer & Black 2004; AlQahtani 2008; also see Appendix 7). Most of the other age-related features were badly preserved. Where possible, sex was measured following the guidelines of L'Abbé *et al*. (2013) (see also Bowman 2016; Shakoane 2016; Krüger *et al*. 2017; Appendix 7).

7.5.1 Results of Analysis

The analysis revealed a minimum number of 12 LSA and two EIA skeletons (see figures 7.4 and 7.5). Some individuals were only represented by single bones, making estimation of sex and age less reliable. Of the LSA individuals, 25% were sub-adults who presented with unfused epiphyses and mixed dentition, 16.7% were most probably older adults based on extensive dental wear or vertebral osteophytes, 16.7% were most probably younger adults based on limited dental wear or non-fusion of the first and second sacral vertebrae, 41.7% were estimated to be adults because they presented with fused epiphyses (but with no further specific age indicators to limit the age range (see Appendix 7). Both EIA individuals were most probably adults, although no age indicators were available to limit the age range.

Figure 7. 4: Namaboni B: Some LSA skeletons; Skeleton 1 (most likely a 7–12-year-old sub-adult), skeleton 3 (older adult male), skeleton 4 (younger adult male), and skeleton 12 (adult female)

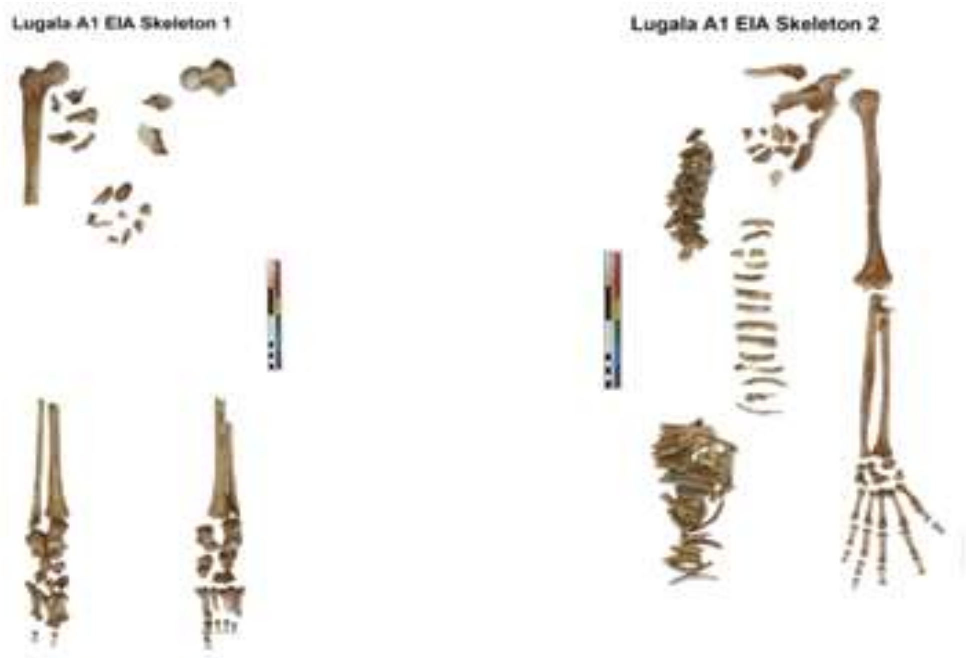


Figure 7. 5: Lugala A1: EIA skeleton 1 (adult female—lower limbs and pelvic girdle fragments), and skeleton 2 (adult female—upper limb, shoulder girdle and thorax fragments)

No attempt was made to estimate the sex of the sub-adult remains since sexually dimorphic features only appear after puberty (see Appendix 7). Of the nine remaining LSA individuals, one was represented by a partial mandible only, making sex estimation very unreliable. According to modern standards, 37.5% (three of the eight) individuals were most probably female and the remaining 62.5% (five of the eight) were most probably males (see Appendix 7).

Sex estimation based on the EIA skeletal remains indicated that both individuals were most probably females. The analysis also revealed that no skeletons (both EIA and LSA) exhibited peri-mortem modifications, which was taken to suggest that all broken bones observed could have been caused by heavy deposits/earth on top of them (Krüger pers. comm 2017.) and/or excavation by sand harvesters.

7.5.2 Discussion of Results

The articulated and partially articulated (see Chapter 5) LSA skeletons at Namaboni B were some of the first instances in the region to show some form of deliberate burial, reinforcing the idea of increasing sedentism and a sense of ownership displayed at the sites (Dale *et al.* 2004; Dale 2007; Dale & Ashley 2010; Prendergast & Lane 2010). Kansyore communities, in burying their dead in specific locations to which they might have returned season after season, might have been taking material ownership of places in the sense that they remembered the presence of their buried ancestors in specific locations. This suggestion could be traced clearly through the recovery of skeletons buried underneath each other and the identification of intensity of site occupation in terms of large quantities of artefacts (see Chapter 5). Both adults (female and male) and children were buried together (no special places were reserved for particular individuals), suggesting that, although these communities were moving towards increasingly complex settlement patterns, they still maintained an egalitarian social structure in which all individuals had equal burial rights.

Extensive dental wear was common in older adults at Namaboni B, suggesting it could be the result of age. However, extensive dental wear is sometimes associated with diet and the way food is processed (Eshed et al. 2006; White *et al*. 2011: 482). The use of mortars and grinding stones were thought to introduce large stone particles into the food, causing teeth to become worn away. Eshed *et al*. (2006), using a Natufian example from Levant, argue that using the teeth as a ‘third hand’ can also cause teeth wear. It has been found that the teeth of prehistoric inhabitants of the Santa Barbara Channel in California were worn because their food, which they obtained from the littoral zone, contained sand and grit (Walker 1978). This finding also points to food processing. At Namaboni B, the teeth of young adult, adult and old adult individuals (but not sub-adult individuals) were found to be worn, and this could, therefore, be attributed to diet and processed food (e.g., grinding food using a grinding stone, and stirring in the pot), although age as a reason could not be totally discounted.

It was thought that the Namaboni B individuals might have processed their food by grinding it using grinding stones, or the pots they used could have had particles that had an impact on their teeth. Alternatively, they could have eaten fish from shallow waters that were not processed well enough to remove sand, which, over time, resulted in tooth wear. Teeth could also have been used to crush nuts and seeds (of which there were plenty at this site), thus causing their teeth to become worn away. Despite the tooth wear, their teeth did not seem to show signs of tooth decay, suggesting that these communities did not eat a lot of starchy foods (carbohydrates) and perhaps relied a lot on foods rich in proteins, which promoted good health. All the evidence put together suggested that the hunter-gatherers lived a life of reduced mobility but one that was relatively healthy.

As noted in section 7.5.1 of the present study, the Namaboni B skeletons were highly fragmented and comingled. Careful observation of these bones did not reveal any cut marks or indicators of violence, suggesting that the hunter-gatherers of the Early Kansyore phase lived a peaceful life. A similar observation was made by Yirka (2016) in a study of the Jomon hunter-gatherers of Japan, although Mirazón Lahr *et al.* (2016: 394) observed violent tendencies among the hunter-gatherers of the Early to the mid-Holocene period at Nataruk, Turkana, Kenya in East Africa.

Two adult female individuals who were radiocarbon-dated to 339–437 cal. AD were identified at Lugala A1 (see Chapter 5, Table 5.9). Their burials were clearly intentional, and their graves were probably isolated because no other cultural material was found in association with them. These burials were in contrast to the Namaboni B Kansyore burials which were located within refuse middens. One of the Lugala individuals was found buried with very well-made Urewe pottery, whereas another one was found with no accompanying materials, suggesting that the former held a higher status in society than did the latter. This could be evidence of varying social and economic statuses among individuals in communities. The same scenario was observed at the Kabusanze site in Rwanda (Giblin *et al.* 2010). However, at this site the one individual was adult whereas the other one was a neonate.

It is also worth noting that no similarities were observed between Namaboni B and Lugala A1 burial practices, reinforcing the argument that there was little/no evidence of connection between these two groups under study in this area (in contrast to the results of studies in western Kenya, for example). Further, the burial evidence indicated subtly different social structures; Namaboni B communities did not seem to have had socio-economic inequalities whereas Lugala A1 communities may have enjoyed differences in status and were certainly being treated as individuals compared to the joint burials at Namaboni B. No sign of violence was observed in either case, suggesting the communities lived peaceful lives. Finally, no sign of pathological/bone disease was observed on either site, tentatively suggesting both communities lived healthy lives and perhaps ate foods that were rich in proteins and calcium needed for bone growth and strength. At Namaboni B, one older adult male was identified with lumbar vertebral osteophytes, which might have been caused by age or activity stress. Age was the likely reason since this condition was not observed in young adult and adult individuals at this site, which further suggested they lived a quality of life that allowed them to live to a relatively advanced age. In the following sections, evidence of subsistence economies obtained through stable carbon and nitrogen isotope analyses are presented.

7.6 Stable Isotope Material and Methods of Analysis

Stable carbon isotope value ($\delta^{13}C$) and stable nitrogen isotope value ($\delta^{15}N$) measurements were performed on bone collagen from skeletal elements representing 12 individuals—10 from the Namaboni B LSA site and two from the Lugala A1 EIA site (see Table 7.11). Three sets of skeletal remains were recovered through systematic excavation (e.g., EIA skeletons 1 and 2, and LSA skeleton 6) at both sites and shell harvesters who worked alongside the excavation team exposed the remainder of the skeletons (see also Chapter 5). All specimens at Namaboni B were buried in shell midden sediments whereas those at Lugala A1 were buried in pale to brown sand sediment that yielded no artefacts (see Chapter 5). The condition of the burials and the state of preservation of the remains varied significantly at these two sites even though all were located on the shores of Lake Victoria Nyanza. For instance, the Lugala A1 site individuals did not have concretions on their bones whereas the Namaboni B site individuals had concretions. Other bones at Namaboni B looked as if they had been burnt (see Chapter 5). These findings could be attributed to the age differences between the two sites. For instance, Lugala A1 dated cal. AD 339–437 whereas Namaboni B dated 6634–6479 cal. BC (see Chapter 5, Table 5.9). The skeleton remains were selected for analysis based on their degree of preservation (see Table 7.11); only skeletal elements that were not highly concretised or mineralised were considered for analysis.

The preparation procedures developed and used by Sealy *et al.* (1987) and Zhu (2016) were followed in the present study. Sections of cortical bone were cut from the selected femurs and mandibles using a small fine-toothed saw. Working in the Stable Isotope Laboratory, Mammal Research Institute, University of Pretoria, Dr Grant Hall and I used ethanol and a dental burr to manually clean all the skeletal materials prior to and in between handling them. This was necessary as all of the skeletal material was covered with a dense calcareous crust which had to be removed prior to any further pre-treatment. Once the samples were sufficiently cleaned, they were broken up into smaller fragments of 1 g. Each sample was placed in a labelled beaker and covered with a 0.1–0.5 m hydrochloric acid (HCl) solution to begin demineralisation. The samples were checked on a daily basis and the HCl solution regularly replaced for approximately two weeks

As the samples became more gelatinous, each sample was first centrifuged for five minutes at 4000 rpm, after which the acid was removed by means of a syringe. Once all the samples were reduced to collagen, they were repeatedly washed with distilled water until the pH was neutral. A sodium hydroxide solution of 0.125 M was then added to the samples to remove other organics and humics, and the samples were left to stand for 24 hours. Thereafter, the samples were washed repeatedly with distilled water until the pH was neutral. After having dried the collagen samples overnight in a drying oven at 70°C, they were homogenised to a fine powder and stored in labelled micro-centrifuge tubes prior to isotopic analysis.

Aliquots of approximately 0.6 to 0.65 mg of collagen were weighed using a Mettler Toldeo MX5 micro-balance and placed in tin capsules that were pre-cleaned in toluene. Where samples had yielded sufficient collagen, duplicate subsamples were also weighed for analysis. Isotopic analysis was done on a Flash EA 1112 Series coupled to a Delta V Plus stable light isotope ratio mass spectrometer via a ConFlo IV system (all equipment supplied by Thermo Fischer, Bremen, Germany), housed at the University of Pretoria's Stable Isotope Laboratory. Two laboratory running standards (Merck Gel: $\delta^{13}C$ = -20.26‰, $\delta^{15}N$ = 7.89‰, C% = 41.28, N% = 15.29, and DL-Valine: $\delta^{13}C$ = -10.57‰, $\delta^{15}N$ = -6.15‰, C% = 55.50, N% = 11.86) and a blank sample were run after every 11 unknown samples. Data corrections were done using the values obtained for the Merck Gel during each run. The values of the DL-Valine standard provided the ± error for each run. These running standards are regularly calibrated against the following international standards: National Institute of Standards and Technology (NIST) 1557b (bovine liver), NIST 2976 (muscle tissue), and NIST 1547 (peach leaves). All results were reported relative to Vienna Pee-Dee Belemnite for carbon isotope values and to AIR for nitrogen isotope values. Results were expressed in delta notation using a per mill scale and the following standard equation:

$\delta X (‰) = [(R_{sample}-R_{standard})/R_{standard}-1]x1000$

Where X = ^{15}N or ^{13}C and R represent $^{15}N/^{14}N$ or $^{13}C/^{12}C$ respectively

Table 7. 11: Skeletal elements considered for isotope analysis

Site	Period	Skeleton number	Age group	Sex	Skeletal element
Lugala A1	EIA	1	Adult	Female	Femur and phalanx
Lugala A1	EIA	2	Adult	Female	Two ribs +phalanx
Namaboni B	LSA	1	Sub-adult	-	Mandible + two rib fragments
Namaboni B	LSA	2	Adult	Female	A rib fragment + femur
Namaboni B	LSA	3	Older adult	Male	Femur +two rib fragments
Namaboni B	LSA	4	Younger adult	Male	Femur + two rib fragments
Namaboni B	LSA	5	Adult	Male	Left humerus
Namaboni B	LSA	6	Older adult	Male	Two rib fragments + femur
Namaboni B	LSA	7	Adult	Female	Right femur
Namaboni B	LSA	8	Sub-adult	-	Right humerus
Namaboni B	LSA	9	Younger adult	Female	Mandible
Namaboni B	LSA	12	Adult	Female	Two ribs, femur +mandible

Note: EIA = Early Iron Age; LSA = Late Stone Age

7.6.1 Results of Analysis

Table 7.12 and Figure 7.6 present the δ^{13}C and δ^{15}N results of the analysis of the human skeletons sampled from the Namaboni B LSA site and the Lugala A1 EIA site. Out of 12 samples considered for this analysis (see Table 7.11), only four samples (i.e., n = 2 LSA samples and n = 2 EIA samples) produced C: N ratios ranging between 3:22 and 3:54 whereas the rest produced C: N ratios ranging between 4:51 and 70:93, suggesting poor bone collagen preservation. All these samples were from the Namaboni B site.

One individual from the Namaboni B site had a carbon-to-nitrogen ratio of 3:5, which exceeded the usually accepted upper limit of 3:4 (Zhu 2016: 51; Zhu & Sealy 2019) (see Table 7.12). The results indicated that the δ^{13}C of Namaboni B individual Sk4 was -16.31 (see Table 7.12) which was indicative of the consumption of more freshwater resources and mixed C_3 and C_4 resources such as. The δ^{13}C of Namaboni B individual Sk7 was -13.33 (see Table 7.12 and Figure 7.6), which was indicative of the consumption of more C_4 resources. The δ^{15}N of both individuals were elevated, although the δ^{15}N count of 11.74 of individual Sk4 was slightly lower than that of individual Sk7 at 13.28, suggesting that the latter may have consumed resources with higher trophic levels than the former had. The two LSA individuals at Namaboni B seemed to have had access to different diets; Sk4 had consumed mostly freshwater or mixed C_3 and C_4 resources whereas Sk7 had consumed more C_4 resources. All in all, the evidence pointed to the consumption of a mixture of aquatic, C_3, and C_4 resources.

On the other hand, all individuals (skeletons 1 and 2) at the Lugala A1 site had elevated $\delta^{13}C$ (i.e. collagen) values (-9.03 and -9.78 respectively), which were higher than the values of the Namaboni B individuals. This suggested that Lugala A1 individuals consumed more C_4 plants directly or ate animals that ate plants. It was also possible that these individuals supplemented their diet with food resources with high trophic levels (e.g., aquatic resources), given their proximity to Lake Victoria Nyanza (see Chapter 4). No organic materials were recovered in association with the EIA individuals during the excavations; therefore there was no additional information as to what exactly they subsisted on. All the individuals at this site were well preserved, and their carbon-to-nitrogen ratios fell within the accepted range (e.g., 3:26 and 3:22 respectively) (see Table 7.12).

Further, all the EIA individuals had elevated $\delta^{15}N$ collagen values (14.45 and 13.23) (see Table 7.12 and Figure 7.6), suggesting they had access to resources with high trophic levels (e.g., freshwater resources), given the site's proximity to the lake. A clear difference was identified between the diet consumed by the Kansyore LSA and the EIA communities living on the northern shores of Lake Victoria Nyanza. The former relied on proteins from mixed aquatic, C_3 and C_4 resources, whereas the latter relied more on proteins from C_4 food resources (e.g., millet), which might have been wildly harvested or domesticated.

Table 7. 12: δ13C collagen and δ15N collagen values of individuals from Lugala A1 and Namaboni B after calculating average of replicates

LC	wt (Mg)	Pr'd	A. grp	Sex	$\delta^{13}C$	%C	$\delta^{15}N$	%N	C:N
LA Sk1	0.71	EIA	Adult	F	-9.03	40.23%	14.45	14.46%	3.26
LA Sk2	0.81	EIA	Adult	F	-9.78	39.83%	13.23	14.50%	3.22
NB Sk 4	0.83	LSA	Young Adult	M	-16.31	28.42%	11.74	9.35%	3.54
NB Sk 7	0.82	LSA	Adult	F	-13.33	41.51%	13.28	14.64%	3.31

Note: LC = Laboratory code; wt = Sample weight; Mg = Millgrams; Pr'd = Period; A. grp = Age group; $\delta^{13}C$ = Delta carbon collagen value; %C = Percentage carbon; $\delta^{15}N$ = Delta nitrogen collagen value; C:N= Carbon-to-nitrogen ratio; LA = Lugula A1 site; NB = Namaboni B site; Sk = Skeleton; EIA = Early Iron Age; LSA = Late Stone Age

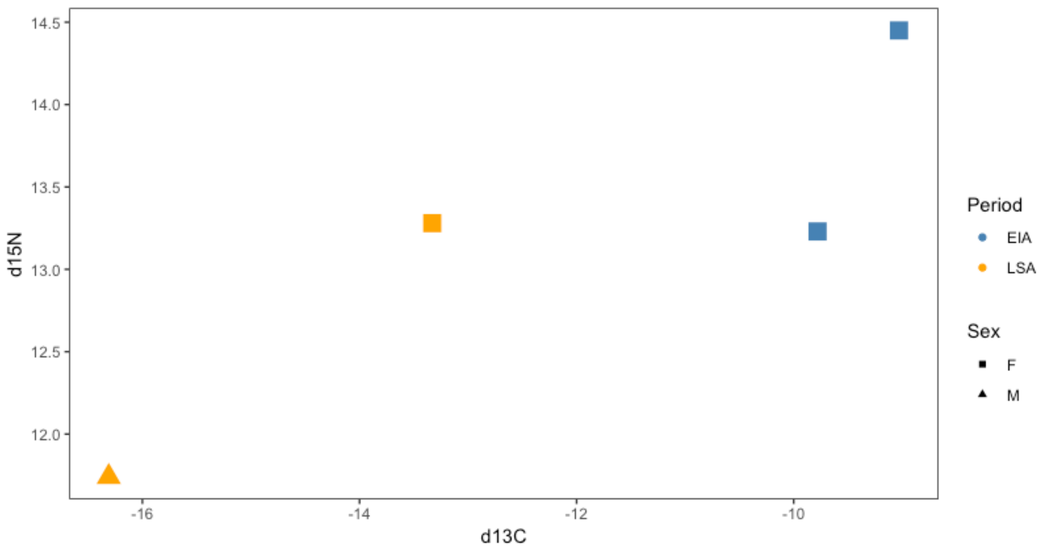


Figure 7. 6: Lugala A1 and Namaboni B: Plot of δ15N and δ13C bone collagen

Note: EIA= Early Iron Age; LSA=Late Stone; F=Female; M= Male; ; $\delta^{15}N$ = Delta nitrogen collagen value; $\delta^{13}C$ = Delta carbon collagen value

7.6.2 Discussion of Analysis

Unfortunately, the isotopic analysis of four individuals did not produce much conclusive evidence. However, it was clear that the two individuals at Namaboni B who were analysed had had access to different proportions of C_3, C_4, and aquatic resources (Katzenberg 1999; Katzenberg 2008: 426). Individual 7 appeared to have had access to more C_4 plant/animal resources or more freshwater resources that contained higher $\delta^{13}C$. Elevated $\delta^{15}N$ in this individual also implied that these resources had a higher trophic level, perhaps indicating that the consumption of freshwater resources was quite likely. Prendergast and Lane (2010) point out that lungfish and catfish can easily be speared or harpooned in shallow water or mudflats, thus possibly confirming the consumption of freshwater resources. Studies on pollen and leaf wax suggest an abundance of C_4 grasses in and around Lake Victoria (Kendal 1969; Chritz *et al*. 2015; Tryon *et al*. 2016), suggesting that the possible consumption of higher trophic level C_4 foods in these areas. However, these assumptions remain tentative as no isotopic studies on these species of fish (i.e., lungfish and catfish), animals or plants in this area have so far been conducted.

Animal remains recovered from the Namaboni B site suggested that occupants of this area subsisted on a variety of terrestrial and aquatic animals. Some of these animals (e.g., buffalo, warthog and zebra) were C_4 plant eaters, whereas other browsers or animals (e.g., duikers) fed on C_3 plants, whereas still others (e.g., spiral-honed antelope) were C_3 and C_4 mixed feeders (see section 7.2 in the present study). The presence of C_3 and C_4 animal resources seemed to support the idea of Prendergast and Lane (2010) that hunter-gatherer communities used different parts of the landscape in different seasons as food resources. Furthermore, Lake Victoria Nyanza is believed to have desiccated at different intervals as a result of increased aridity, which repeatedly facilitated the dispersal of different ecosystems across the basin (Tryon *et al.* 2016). These environmental changes in the Lake Victoria basin are believed to have facilitated the movement of occupants in the lake area (Tryon *et al.* 2016). It was possible that the consumption of C_3 and C_4 resources observed at Namaboni B was the result of such movements. Caution must, however, be exercised when considering these assumptions, as the samples in the present study were too small to provide conclusive evidence. Furthermore, if the presence of fish bone and terrestrial wild bone are to be equated with resources consumed, it needs to be mentioned that the animal bone samples recovered at this site were few compared to fish bone samples.

The nitrogen isotope data on Namaboni B individuals suggested that both individual 7 and individual 4 had higher levels of δ15N, perhaps because they consumed foodstuffs with a higher trophic level (most likely water resources). It should, however, be noted that $\delta^{15}N$ values depend on the types of species and the places they inhabit; therefore some plant, animal, and fish species could have low $\delta^{15}N$ levels. For example, arid environments are known to have higher $\delta^{15}N$ content (Heaton *et al.* 1986; Ambrose 1991; Katzenberg 2008; Zhu 2016).

On the other hand, it was found that Lugala A1 EIA individuals had higher levels of $\delta^{13}C$ and $\delta^{15}N$ than LSA individuals, suggesting the consumption of C_4 resources, most probably millets. Lugala A1 individuals were dated to cal. AD 339–437 (Chapter 5, Table 5.9), a period that has been associated with pollen, leaf wax biomarker and palaeoenvironmental data, suggesting an abundance of C_4 grasses on which domestic and wild herbivores in the Lake Victoria basin could graze (Kendall 1969; Berke *et al.* 2012; Lejju 2012; Chritz *et al*. 2015). Around AD 400, Giblin and Fuller (2011) recovered sorghum and pearl millet associated with Urewe burials in Rwanda, suggesting that Lugala A1 individuals too might have consumed such cereals that could have been wildly or domestically collected. However, as in the case of Namaboni B, the samples collected were too small to reach a conclusion of this kind; therefore further studies are needed to uncover knowledge about the diets and related technologies of these communities.

Stable isotopes have been used to differentiate the diets of high- and low-status burials. For example, Ambrose *et al.* (2003) used stable carbon and nitrogen ratios from both carbonates and collagen to differentiate the diets of high- and low-status burials recovered from Cahokia in Illinois. However, the use of stable carbon and nitrogen isotopes in analysing individuals at Lugala A1 revealed little obvious difference in the $\delta^{13}C$ and $\delta^{15}N$ values of skeleton 1 and skeleton 2 (see Table 7.12 and Figure7. 6). On the other hand, the presence of sophisticated Urewe ceramics at skeleton 2 and the absence of any materials at skeleton 1, led to a conclusion that skeleton 2 had a higher socio-economic status than skeleton 1. It was possible that these people measured inequality based on materialistic or other goods (which were in use but not preserved) and not on diet. However, this assumption remains tentative until larger samples are recovered and further isotopic studies are carried out on EIA communities.

Generally, a comparison of the LSA and EIA communities indicated that the two had different diets. The protein component of the diet of the former showed that they consumed a mixture of aquatic resources, C_3 and C_4 resources, whereas the latter clearly subsisted more heavily on C_4 resources, most likely in the form of millet, the production of which increased with the emergence of agriculture in the region. The consumption of C_4 resources coincided with the introduction of cereals in the period that the Lugala A1 site was occupied and it also coincided with the emergence of the occupation of open environments (Lejju 2012). It may therefore be that we are witnessing a significant dietary shift that occurred with the arrival of new populations, technologies, plants and animals in this part of Africa during the Iron Age (MacLean 1994; Schoenbrun 1998; Lejju 2012; Grollemund *et al.* 2015).

7.7 Chapter Summary

As indicated in this chapter, the Kansyore LSA hunter-gatherers of the northern shores of Lake Victoria Nyanza, Uganda were less mobile than earlier aceramic LSA groups. This conclusion was based on the presence of deliberate burials that consisted of individuals of all ages, large quantities of cultural materials and the specialised exploitation of aquatic resources. This pattern, according to Woodburn (1982) and Dale *et al.* (2004), indicates that the communities' socio-economic organisation became increasingly complex in order to manage and maintain resource availability within a given environment.

The chapter also indicated a clear difference between Kansyore LSA and EIA communities, particularly relating to burial practices and diet. Although burials during both periods were intentional, nascent inequality was suggested by individual burials and the different distribution of grave goods. For example, two adult female individuals of the EIA community were buried in close proximity but discretely apart, and only one was buried with grave goods. On the other hand, a greater sense of equality was observed among the LSA communities where all individuals (men, women and children) were buried together in the middens without an indication that special places were reserved for some individuals. Although some individuals were found in association with lithics, bones and ceramics, the scenario observed could have been caused by recovery methods, and there was no compelling evidence that the materials recovered were grave goods.

In addition, although the two communities settled on the same shores of Lake Victoria Nyanza, they seemed to have followed different diets. The LSA communities largely consumed aquatic and C_3 and/or C_4 resources which may have included shellfish, fish, wild terrestrial animals (based on evidence of faunal materials) and wild plants (based on botanical evidence). On the other hand, the EIA communities, based on elevated nitrogen values, consumed mostly C_4 resources and perhaps aquatic resources. The C_4 resources could have included wild or domesticated millets and sorghum, which could have been available by the time the Lugala A1 site was occupied (cal. AD 339–437). Given the similarities observed during the analysis of lithics, fauna and bone points, the settlement patterns or lifeways of Early Holocene and Middle Holocene hunter-gatherers at these sites seemed to have been the same. This suggested continuity in terms of technology and general lifeways among the Kansyore hunter-gatherers, which could perhaps be ascribed to their living in similar environments.

Generally, it was clear that both LSA and EIA communities on the northern shores of Lake Victoria Nyanza, Uganda lived a semi-sedentary lifestyle. Based on observations of the condition of their teeth and bones in general, they seemed to have enjoyed good health; based on the nature of broken bones observed, they did not die from any form of violence; based on the results of stable isotope and faunal analyses, they consumed different diets; based on evidence found (and contrary to evidence found further to the east at sites such as Usenge 3, Wadh Lang'o or Gogo Falls), they had different burial practices and lived during significantly different periods.

CHAPTER 8

DISCUSSION OF RESULTS

8.0 Introduction

This chapter discusses the results of the present study in relation to existing knowledge about the archaeology of the eastern and western shores of Lake Victoria Nyanza. The first part of the discussion focuses on survey results and their implications in respect of the settlement history of this area and East Africa at large. This is followed by discussions of the archaeological records of LSA and EIA communities on the northern shores of Lake Victoria Nyanza, of LSA and EIA subsistence structures, of the relationship between LSA and EIA communities, and of the transition from LSA hunting and gathering to EIA farming in this area. The chapter ends by looking at this study's evidence from regional and large-scale perspectives.

8.1 Survey Results

In an attempt to understand the archaeology of the northern shores of Lake Victoria Nyanza—an area that has not been explored archaeologically prior to this study—the researcher conducted an archaeological survey of the study area and identified 24 sites. The sites contained materials ranging from the Kansyore LSA, EIA, MIA and LIA periods (see Chapter 4). Of the 24 sites, 13 were of interest to this study; Majanji A, Namundiri A, Lukaba 1, Budecho A, Budecho B, Budecho D, Buloosi A2, Buloosi B, Namaboni A, Namaboni B, Namaboni C, Lugala A1, and Lukaba 2. The materials recovered at these sites belonged to the Kansyore LSA and EIA periods, which were the focus of this research. Prior to this study, only four Kansyore LSA sites (see Chapter 2, Table 2.1) and 11 EIA sites (see Chapter 2, Table 2.2) were known in the whole of Uganda. Owing to new knowledge added by this study, Kansyore LSA sites increased from four to 16 and EIA sites from 11 to 12. Thus, the study's identification of Kansyore LSA and EIA sites on the northern shores of Lake Victoria Nyanza increased the known geographical distribution of these sites in this part of Uganda for the very first time.

No systematic survey was conducted on the northern shores of Lake Victoria Nyanza due to poor visibility and lack of time and resources; only open areas, such as road cuts, cultivated land, and shell- and sand-harvesting trenches were examined. The survey strategy (i.e., examining open ground) employed in this study has been used in previous studies, especially in areas with poor visibility, and has produced good results (Robertshaw 1994; Reid 2002; Giblin 2008; Iles 2009). Some of the archaeological materials at some of the studied sites (e.g., Lugala A1, Namaboni B, Budecho A, B and D) were identified at a depth of 80 cm below the surface, suggesting that had it not been for these site destructions, no sites would have been identified. However, this observation is not meant to justify the resultant destruction but to show that it was hard to identify sites in an area that was vegetated. The survey findings of this study were consistent with those of Reid (2002) in Buganda where 99% of the sites were recovered from such settings. Despite productive survey results, it was hard to use survey data currently available to build rigorous models around land use, site preferences and changing settlement strategies over time. Nevertheless, some broad patterns could be established and observations could be made.

Twelve Kansyore LSA sites were identified during the survey. All the sites were concentrated on the shores of Lake Victoria Nyanza and were shell midden sites, confirming Kansyore settlement typology (Robertshaw 1991; Prendergast 2008: 192). Previously, two types of Kansyore sites had been identified round Lake Victoria Nyanza and its tributaries, namely, shell middens on the lake shore, and riverside sites. According to Prendergast, these sites were occupied on a seasonal basis—shell midden sites during the dry season and riverside sites during the rainy season (Prendergast 2008; Prendergast & Lane 2010). The present study did not find evidence of riverside sites; however, data obtained was based on limited surveys that concentrated on the lake shore and up 10 km inland. Although these survey results were too limited to indicate river patterns, the finding that multiple lake-shore shell midden sites existed was consistent with seasonal patterns.

The relatively high numbers of Kansyore LSA sites identified in this study suggested that this area was a core Kansyore area in Uganda. This is based on the fact that, to date, very few scattered Kansyore sites (i.e., Hippo Bay, Nsongezi Ndali and the type site Kansyore Island) have been identified in Uganda despite intensive surveys and excavations conducted on the northwestern banks of the Nile River and the shores and islands of Lake Victoria Nyanza (Reid 2002; Kiyaga-Mulindwa 2004; Ashley 2005; Tibesasa 2010). The presence of Kansyore sites east of the Nile River and around the Uganda–Kenya border suggested that sites in this area are a continuation of the distribution in western Kenya, although this remains a tentative suggestion until confirmed by further investigations. The suggestion is based on the fact that no Kansyore LSA sites have been found west of the Nile River in the areas of Luagazi, Mukono, Kampala, Kalangala, and Masaka (Reid 2002; Kiyaga-Mulindwa 2004; Ashley 2005; Chami & Tibesasa 2010; Tibesasa 2010; Kessy *et al.* 2011). The virtual absence of Kansyore LSA sites in these areas but their presence on the eastern part of the river might also be a reflection of environmental differences. The eastern part is, for instance, drier than the western part, and drier/savanna environments are believed to be home to large mammals and diverse ungulates (Arsenault & Owen-Smith 2002; Hopcraft *et al*. 2010; Sinclair *et al.* cited in Marchant *et al*. 2018: 19). These environments might have attracted hunting and gathering communities because they provided readily available food resources (e.g., animals and plants).

One Urewe EIA site (i.e., Lukaba 2) was added to the 11 existing Urewe EIA sites in Uganda. The site was located about 200 m from Lake Victoria Nyanza. As Urewe EIA sites have been previously identified in wetter riverine settings and in the margins of sub-mountain forests, its identification in this area was in accordance with existing patterns (Posnansky 1961a: 185; Reid 1994: 311).

Archaeological survey coverage has not been comprehensive in Uganda, but more investigations have been done in regions west of the Nile River (e.g., Kansyore Island) (Kyazike 2019). This study's survey and recovery of Kansyore LSA and EIA sites east of the Nile River have therefore shed new light on the history of LSA and EIA settlements. The research also showed that both LSA and EIA communities settled in similar environments, suggesting that the two communities might have had opportunities to interact at a certain point. If this suggestion is true, then MacLean's (1994) conclusions about LSA and EIA sites need to be revised to take account of the possibility that both Kansyore LSA and EIA farming communities might have settled in the same area and might have had access to the same diets since they occupied similar environments. This point was illustrated in Chapter 7 where it was observed that both LSA and EIA communities occupied similar environments and subsisted on aquatic, hunted and gathered resources that were easily accessible. This observation was based on isotopic evidence found in the present study.

The LSA and EIA sites identified to the west of the Nile River have been dated to around the first millennium AD (Nelson & Posnansky 1970; Ashley 2005; Schmidt *et al*. 2016; Tibesasa, Shipton *et al*. in prep.). This period is associated with a decline in the forest cover due to anthropogenic (e.g., bush clearing, burning) and natural factors (reduced precipitation) (Taylor 1990; Marchant & Taylor 1998). Based on available dates relating to the present study (see Chapter 5; Tibesasa and Jones 2021.) and those relating to western Kenya (Dale 2007), it is possible that Kansyore LSA communities first settled east of the Nile River area before they moved westwards. The settlement of Kansyore LSA communities to the east coincided with the occupation of environments that were more open and arid, which Lejju (2012) attributes to both anthropogenic and natural factors around the first millennium AD. Based on the survey evidence of the present study, it was not clear whether the Kansyore LSA communities east of the Nile River were the very ones who moved to the west or if they belonged to a different group. The present study's recovery of sites on the northern shores of Lake Victoria Nyanza therefore contributed to the existing understanding of spatial settlement patterns on the shores of Lake Victoria Nyanza. The survey results helped to close the geographical and knowledge gap that existed between the western and eastern shores of Lake Victoria Nyanza. In the section below, different patterns identified during excavations of different sites are discussed.

8.2 Archaeological Record of the Northern Shores of Lake Victoria Nyanza

Archaeological excavations on the northern shores of Lake Victoria Nyanza revealed that these shores were occupied by pre-ceramic LSA hunter-gatherers, ceramic (Kansyore) LSA hunter-gatherers as well as EIA farming communities. The pre-ceramic LSA materials at the Namaboni B site were recovered only from the lower layers (e.g., layers 7 and 6) of trench 1 and from layer 8, 6, 5 and 4 of trench 2. The only ceramic layer in trench 2 was layer 7. The ceramics in this layer were found in association with human skeleton 6. It was not clear whether the ceramics associated with individual 6 were intentional or not, but it was clear that layers without ceramics were located above and below the layer where skeleton 6 was found. Such findings reflected a complex sequence at this site. The pre-ceramic levels in trench 2 were stratigraphically equivalent to the layers in trench 1 that overlay the ceramic layers and that did not produce artefacts (see Chapter 5). This suggested that ceramic-using communities returned to pre-ceramic technologies at a certain point before they abandoned the site. A situation similar to the one observed in trench 2 was also observed in trench 3 that was excavated in 2018 (Tibesasa and Jones 2021). Although some disturbances caused by the shell harvesters' activities were observed in trench 2, trenches 1 and 3 at this site showed no evidence of disturbance; thus reinforcing the idea that the hunter-gatherers at this site returned to aceramic patterns before they abandoned the site.

No radiocarbon dates were recovered from the aceramic layers in either trench 1 or 2 during the 2016 field study. However, in 2018 four charcoal samples were recovered from trench 3 (Jones & Tibesasa in prep.). Two charcoal samples were the most significant to this study; the first one was recovered at 185 cm below the surface and dated 6775–7047 cal. BC, and the other was recovered at 145 cm below the surface and dated 5208–4996 cal. BC (Jones &

Tibesasa in prep.). The former charcoal sample was found in the same context as lithics and bones; however, as no ceramics were found, the sample was taken to be representative of an pre-ceramic group of hunter-gatherers. The latter charcoal sample was found in the same context as pottery, bones, shells and lithics, and this finding mirrored the stratigraphic results obtained from both trenches 1 and 2 in 2016. Similar findings have been recorded at Usenge 1 (Dale & Ashley 2010) and Siror in western Kenya, dating to 5468–5322 BC or even earlier (Dale 2007). Based on the dates recovered from Namaboni B, the dating of pre-ceramic LSA hunter-gatherers fit in with regional chronology (Dale 2007). Although more artefacts were observed in trench 1 than in trench 2, the material densities/numbers were generally small in aceramic layers in both these trenches (at least when compared to later ceramic layers), suggesting aceramic activity was limited or short-lived. This further suggested that pre-ceramic hunter-gatherers were mobile, which was the reason why they showed low material densities. Interestingly, excavations revealed no hiatus between pre-ceramic and ceramic layers, suggesting there was an inter-relationship between the pre-ceramic and ceramic phases. This was evidenced by the presence of faunal and lithic materials recovered from both pre-ceramic and ceramic layers (see Chapter 7). The lithics in both layers were made from milky quartz, which confirmed there was continuity between the two phases. While similarities in raw materials were observed at this site, pre-ceramic levels at other Kansyore sites (e.g., Usenge 1, unit 4) were characterised by the use of grey chert, whereas Kansyore levels were characterised by the use of quartz (Seitsonen 2010: 51), which suggested that different raw materials were used in these two phases.

8.2.1 Ceramic (Kansyore) LSA Hunter-Gatherers

Other than pre-ceramic hunter-gatherers, the northern shores of Lake Victoria Nyanza were settled by ceramic (Kansyore) LSA hunter-gatherers. The Kansyore ceramics recovered in the present study belonged both to the Early and the Middle Kansyore periods, a finding that was based on radiocarbon dates (Chapter 5; Tibesasa &Jones in prep.). Although sites belonging to the Early Kansyore phase have been recovered in other areas, for instance, at Siror in western Kenya (Dale 2007), the recovery of sites belonging to the Middle Kansyore phase has been lacking, resulting in a knowledge gap about Kansyore LSA hunter-gatherers (Dale & Ashley 2010). The discovery in the present study of sites of the Middle Kansyore phase therefore closed the existing knowledge gap and contributed to a better understanding of LSA settlement history in Uganda and East Africa at large.

Early Kansyore LSA materials recovered in this study came from layers 5 and 4 of trench 1 and layer 7 of trench 2 at the Namaboni B site. The layers (in trench 1 and 2) that overlay the aceramic layers, and the layers (in trench 2) that underlay the aceramic layers (see Figures 5.9 and 5.13) suggested the existence of a complex sequence at this site. As mentioned earlier, this finding suggested that ceramic hunter-gatherers returned to pre-ceramic practices. It was possible that the hunter-gatherers did not regard the transition to ceramic use as the ultimate solution and that they were flexible in their approach to the use of ceramics.

Middle Kansyore materials were recovered from two sites; Namundiri A (a shell midden site), and Lugala A1 (an open-air multi-component site that did not contain a shell component) located in the Busia and Namayingo districts respectively. Although excavations at Namundiri A in 2016 and 2017 did not yield secure charcoal samples that enabled dating the site (see Chapter 5, Table 5.9), the 2018 excavations (Jones & Tibesasa in prep.) did provide secure samples dated 4520-4368 cal. BC, 3984–3808 cal. BC, 3942–3711 cal. BC, and 3938–3710 cal. BC (see also Jones 2020). The dates placed the Namundiri A site in the Middle Kansyore period. Further, a charcoal sample recovered from the Kansyore layer at the Lugala A1 site produced a date of 3465–3495 cal. BC, suggesting it belonged to the Middle Kansyore phase. This was the first dating ever of this period in this region, thus filling the existing chronological gap between the Early Kansyore period (c. 6000–5000 cal. BC) and the Late/Terminal Kansyore period (c. 1000 cal. BC–cal. AD 500) as recognised by Dale (2007) and Dale and Ashley (2010: 24). Based on the available dates, it may be tentatively argued that the northern shores of Lake Victoria Nyanza were occupied not only by hunter-gatherers who had no knowledge of ceramics but also by hunter-gatherers who used ceramics in the Early and Middle Kansyore periods.

8.2.2 Evidence of Materials Used by Early Kansyore Hunter-Gatherers

Early Kansyore layers produced cultural materials in varying densities. These cultural materials included ceramics, faunal materials, lithics, bone points, and burials (see chapters 5, 6 and 7). Although the frequency of the presence of cultural materials recovered from the Early Kansyore phases suggested that hunter-gatherers at Namaboni A were less mobile, their social structure seemed not to have been that complex. This interpretation was based on low densities of cultural materials recovered at this site, limited decoration techniques and motifs, simple decorations made in a rush, and the burial of different genders and ages together (see chapters 4 and 5). The low density of material suggested that the Namaboni A Early Kansyore site was not occupied for a long period. Limited detailed/planned decorations on ceramics at this site further suggested that the hunter-gatherers devoted limited time to ceramic-making.

Despite the limited detailed/planned ceramic decorations in the Early Kansyore phases (as noted above), different ceramic fabrics recovered from this site suggested that not all clay was used as soon as it was extracted; instead, ceramic-makers invested in trying to get the best out of clay paste by tempering it with dolomite. Based on the different fabrics recovered from this site (and within the same layers), it is tempting to suggest that a wide range of potters were involved in making pots. It also seemed that Early Kansyore potters had access to local clay sources because some fabrics displayed similarities. Based on exotic fabrics recovered at Namaboni B site (see Chapter 5), it was also possible that Early Kansyore hunter-gatherers had contact with potters from elsewhere or were able to access raw materials from afar. Observations relating to some fabrics (i.e., NAMB 1 and NAMB 2) at this site suggested that these two fabrics fit previous descriptions of Kansyore ceramics (Chapman 1967; Soper & Golden 1969; Collett & Robertshaw 1980; Robertshaw *et al*. 1983; Robertshaw 1991) as being coarsely tempered and containing largely quartz inclusions ranging from .05 up to 3.0 mm in diameter. However, NAMB 3 and NAMB 4 fabrics did not fit the Kansyore profile. Although the former had the same size, the inclusion was dolomite and not quartz. A few sherds had thin walls whereas others, especially those made from NAMB 1 fabric, had a smooth texture; these features departed from previous descriptions of Kansyore ceramics as being poorly fired, thick and chunky with a gritty texture (Chapman 1967; Mehlman 1989; Robertshaw 1991: 113). As suggested in the above discussion, different clay processing skills (technology) were demonstrated at the site, possibly indicating the movement of ceramics and/or people, or of potters' experimentation with early ceramic production.

It is worth noting that no fully reconstructable vessels were recovered from the Early Kansyore site but that reconstructions of vessel forms/shapes/sizes were attempted based on rim diameter estimates and profiles. Irrespective of layers where vessels were recovered, these vessels were curved slightly inwards, were vertical/straight and were bowls that had flared or wide-open mouths. The vessels recovered at Namaboni B site were categorised as form 1, 111 and V vessels as identified by Robertshaw (1991: 114). However, one bowl recovered from Namaboni B (see Figure 8.1) seemed to fit the description of polygonal vessels identified at Gogo Falls, Siror, Haa, and Wadh Lang'o (Ashley 2005; Dale 2007; Robertshaw 1991). Based on rim diameters, bowls varied in size and ranged from small (11–

14 cm), medium (15–24 cm) to large (25+ cm). The rim diameters recovered from this site were consistent with those recovered from Siror (24 cm), Wadh Lang'o, (26 cm) and Haa (24 cm) (Ashley 2005; Dale 2007: 246). The fact that the vessels/bowls differed in size suggested that they were used for different purposes.

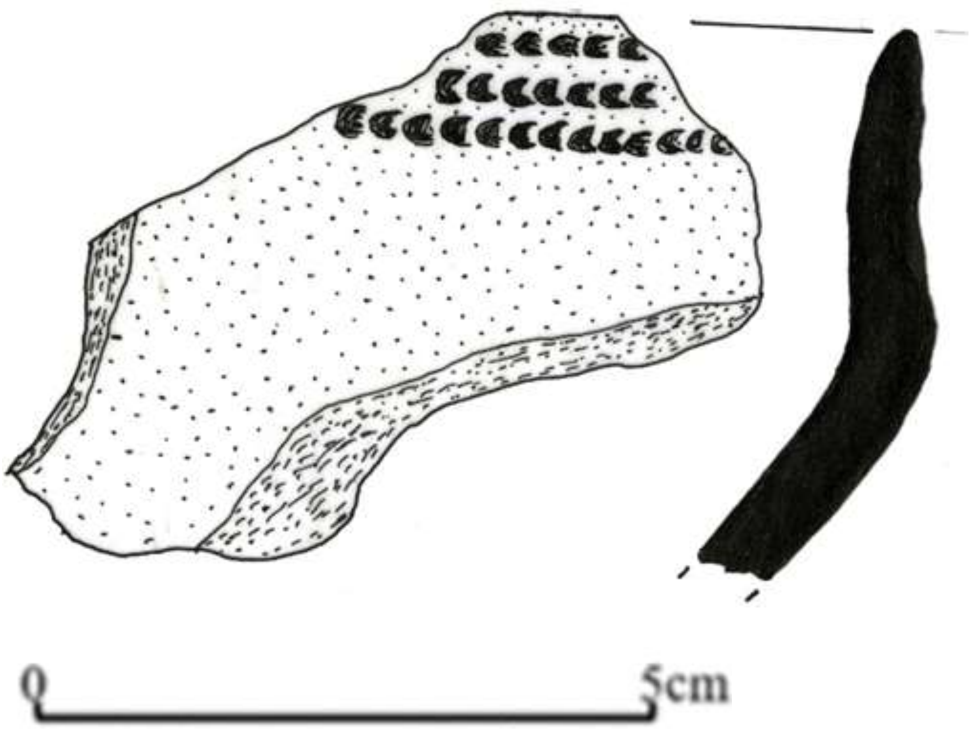


Figure 8: 1: Possible polygonal bowl recovered from Namaboni B, trench 1, layer 5

Three rim types—tapered, rounded, and flattened—were associated with the bowls recovered from this site. In addition, the rounded bases, slightly pointed bases and flat bases recovered were consistent with those recovered from Gogo Falls, Kansyore Island, and Siror (Chapman 1967; Dale 2007; Robertshaw 1991). According to Rice (1987: 242), rounded or pointed bases are more suitable for heating purposes; therefore, the vessels at this site were possibly used for cooking, especially if bowl sizes, rim diameters and base shapes were considered. It was also most likely that cooking and serving food were done primarily for family or extended family (Ashley & Grillo 2015: 14) and not for large gatherings.

Apart from ceramics, other materials worth mentioning at Early Kansyore sites are lithics. Quartz was used for all lithic materials probably because it was locally available in nearby areas that were easily accessible. The use of quartz is a pattern associated with hunter-gatherers who live a relatively sedentary life (Bamforth 1991; Nelson cited in Barut 1994:

48). However, very few stone tools (n = 1 crescent), accounting for less than 1%, were recovered from Early Kansyore layers and they showed clear signs of retouch. This signalled the availability of abundant resources that enabled easy access to the raw material and an expedient technology. The low numbers of utilised tools were consistent with the findings at pre-ceramic layers at this site and suggested continuity of some kind. The recovery of only a few stone tools at Namaboni B site was also consistent with the recovery of low numbers of stone tools from other Kansyore sites, especially shell midden sites in western Kenya (Seitsonen 2010). It is worth noting that most stone artefacts recovered were debitage, but, due to limited time, they were only numbered and weighed and not analysed in detail despite the fact that they are known to cast light on relationships between technological strategies and social strategies of land use and mobility (Morrison 1994: 93; Mackay 2008: 41; Clark & Barton 2017). A grinding stone was also recovered from this site, suggesting that food was processed in some way (e.g., grinding of wild plants), although other functions of grinding stones (e.g., grinding ochre or smoothing bone points) could not be discounted. The suggestion regarding food processing was based on finding other artefacts such as ceramics associated with cooking, storing, and serving food (Dale 2007).

8.2.3 Early Kansyore Burials

Of note is that the present study presented the first systematic analysis of Kansyore LSA skeletons and cast light on burial practices of this period. Six human burials in varying states of preservation were identified at Namaboni B. All six burials were clustered in the northern part of the site, suggesting the burial area was a deliberate choice. Burials 1 and 3 were of individuals who were partially articulated (see Figures 5.12 and 5.14), lying on their sides in a flexed position, strongly suggesting intentional burial. This scenario has also been observed at Gogo Falls in Kenya (Robertshaw 1991) and Chole in Tanzania (Soper & Golden 1969). The rest of the burials were disarticulated, and, based on the different sizes of long bones, more than one individual was buried together (especially in the case of burials 3, 4 and 6). Based on excavation context, the disarticulation was not the result of any disturbance but was, instead, an intentional practice. Burying more than one individual in one grave suggested that the same grave area was used more than once/was revisited, or that burying more than one individual in one grave was a matter of choice. These were the first incidences of deliberate burial in this region, reinforcing the idea of increasing sedentism and a sense of ownership among the communities that occupied the sites (Dale *et al.* 2004; Dale 2007; Dale & Ashley 2010). The above findings/observations suggested an increase in the social complexity among the Early Kansyore hunter-gatherer communities. Further, the fact that different genders and ages were buried together indicated that while these communities were moving towards increasing settlement complexity, they still maintained an egalitarian structure in which all individuals had equal burial rights.

Some individuals (e.g., individuals 3 and 5) were buried underneath each other, whereas others (e.g., individuals 2 and 4) were separated by a thin layer of sediment of about 10 cm or less. This suggested that the site was used repeatedly. Perhaps the site was returned to season after season, and, through the remembered presence of buried ancestors, new burials were made. In order to find out if there was any form of violence, which is one of the characteristics of delayed-return hunter-gatherers (Woodburn 1982), all 12 individuals were carefully examined. The results did not show any signs of peri-mortem modifications such as cut marks or any indicators of violence. This suggested that Namaboni B individuals did not die violently as did some Nataruk hunter-gatherers in Turkana, Kenya in eastern Africa (Mirazón Lahr *et al*. 2016). Early Kansyore hunter-gatherers may have been more peaceful as was the case with the Jomon of Japan (Yirka 2016).

Although vertebral osteophytes have been associated with too much manual labour (Novak & Šlaus 2011), vertebral osteophytes at Namaboni B site suggested it was caused by old age because it was present in older adults only (see Chapter 7; Tibesasa Krüger *et al*. in prep., Table 1). Extensive dental wear has been associated with food processing (e.g., Eshed *et al.* 2006; White *et al.* 2011: 482). This seemed to be the case here, as extensive and intermediate dental wear was only observed in adult individuals who were recovered at the site (see Chapter 7; Tibesasa, Krüger *et al*. in prep., Table 1, skeletons 11 and 12). In contrast, young adults (e.g., individual/skeleton 9) were found with limited dental wear, suggesting that dental wear could have resulted from long-term food processing. This evidence suggested that Early Kansyore hunter-gatherers at this site processed their food through either grinding or cooking it. Grinding of wild seeds on a stone, or cooking/stirring of food in a pot, is believed to leave some stone particles in food that gradually leads to teeth wear. At this site, extensive and intermediate dental wear was observed only in older adult individuals and not in young adults (Tibesasa Krüger *et al*. in prep.). It was possible that the investment of time in and the use of equipment for food processing could be associated with the semi-sedentary lifestyle of these Early Kansyore people.

8.2.4 Evidence Relating to Middle Kansyore Hunter-Gatherers

The material deposits associated with Middle Kansyore hunter-gatherers at the Namundiri A site were recovered from all five layers, suggesting the site was repeatedly occupied during this period. The materials at Lugala A1 were recovered from the lower layers of trench 1. Unlike the relatively low density of cultural materials in the Early Kansyore period, the density at Middle Kansyore sites, especially Namundiri A, was high (see tables 5.1 and 5.6). Material artefact frequencies at Middle Kansyore sites suggested that these hunter-gatherers were less mobile and that their social structure was complex, which was different from that of the Early Kansyore hunter-gatherers. This interpretation was based on high densities of cultural materials recovered, varied decoration techniques and motifs, as well as detailed decorations made in a grid-like pattern, suggesting high levels of investment (time and effort) in the production of these materials. Five fabric groups were identified at Namundiri A, whereas only four were identified at Lugala A1. Close observation of all fabrics (except NDRIA 5) at both sites suggested that the potters had access to the same clay source or to local sources that were similar geologically. The differences observed might have resulted from the way clay was processed by different potters. It is important to note that the distance between the two sites was about 13 km; therefore, clay sources could have been local to both sites. However, the dolomite inclusions in NDRIA 3 and LUGA 3 were not necessarily locally sourced, and the dolomite could have been collected from areas about 20 km away from the Uganda–Kenya border. This indicated that potters either had direct access to the source or that there was some contact between potters and that non-locally made vessels were brought to the sites. Sherds in some fabrics (e.g., NDRIA 4, NDRIA 5 and LUGA 2) were rare, suggesting that they too might have been brought to the site or were made by potters from elsewhere. The evidence provided here suggested that most of the ceramics at this site were made locally within the same *chaîne opératoire*. Rim milling was observed on one sherd recovered from the Lugala A1 site (see Figure 6.19). However, rim milling is not unique to a Middle Kansyore site; it has also been reported at other Kansyore sites such as Siror (Dale 2007: 197) where one sherd was recovered. Although some fabric inclusions were rough, some sherds were well-finished and had smooth/wiped surfaces, and others were burnished, whereas still others had applications of red paint, suggesting the potters were skilled and willing to spend time on production. These characteristics were observed at both Namundiri A and Lugala A1. A unique incised motif was observed on a sherd recovered at Lugala A1 (see Figure 6.20d). The sherd resembled Elmenteitan ceramics that were recovered at Gogo Falls (Robertshaw 1991: 220, Figure 24). If this piece of pot sherd fell in the same period as Elmenteitan pottery, it could suggest there was some form of contact between people; perhaps wares were exchanged or this particular sherd was part of a piece that was brought to the site. However, this proved to be not the case; therefore, the presence of this sherd could support the idea of creativity among the Middle Kansyore hunter-gatherers because this phase predated the Elmenteitan phase.

The lithic materials recovered from the Middle Kansyore sites were not much different than those recovered from the Early Kansyore sites. Of the lithics recovered from the Namundiri A and Lugala A1 Middle Kansyore sites, 99.9% were made of quartz and less than 1% (recovered from Namundiri A only) was made of other raw materials such as chalcedony and chert. As in the case of Early Kansyore sites, the raw materials used were locally available in the areas around the sites and were easily accessible. The use of formal tools was rare at these sites; for instance, only one utilised flake was recovered from layer 5 at Namundiri A, and one blade was recovered from layer 7 at Lugala A. The majority of lithics were debitage. The lithic profile on the northern shores of Lake Victoria Nyanza was not unique to this area; similar artefact patterns associated with Kansyore were observed in the wider Great Lakes region (Gabel 1969; Seitsonen 2004, 2010). The lithic frequency at the Namundiri A site indicated low numbers in layer 5 and an increase in numbers in layers 4 and 3 (see Table 7.4), coinciding with an increase in other artefacts, suggesting a growing intensity of occupation in these later layers. However, the number of lithics decreased drastically in layers 2 and 1, as did the number of other artefacts, suggesting that the site was less occupied during these periods. On the other hand, lithic frequency at the Lugala A site was generally high in all layers, with slightly lower numbers observed in layers 7 and 5.

8.3 LSA Subsistence Structure

As regards the subsistence structure of pre-ceramic LSA communities, it was found out that fish bones dominated the identifiable assemblage in each layer at the Namaboni B site (see Table 7.9). However, it is important to note that due to limited time, only faunal material from trench 1 was analysed because this trench was the least disturbed. In addition, all organic materials other than human skeletons were handed over to the shell harvesters as per the agreement between the excavating team and the shell harvesters. This implied that, although general information could be generated, the available information was not enough to represent a whole site. Based on bones recovered, pre-ceramic subsistence was characterised by a relatively diverse subsistence base composed of fish, mammals, reptiles, and birds (see Appendix 4, tables 3 and 7).

Interestingly, the fish taxa that were the most common in both layers 7 and 6 as well as in the ceramic layers belonged to *Protopterus aethiopicus* (lungfish) and *Clarias* sp. (catfish), both of which are believed to be easily speared or harpooned from shallows and mudflats (Prendergast & Lane 2010). These fish taxa inhabit the lake shore swamps even during the dry season (Prendergast 2008; Prendergast & Lane 2010). Lungfish burrow in the mud and are said to stay there for up to seven or eight months, and the air bubbles from their nests help fishers detect and spear them (Prendergast 2008). Likewise, catfish breed close to the lake shore in the dry season (Greenwood, 1966; Witte & De Winter cited in Prendergast & Lane 2010: 105–106). It was probable that the bone points recovered from this site were used for fishing and hunting. However, it is important to note that no bone points were recovered from the excavated layers; therefore, little could be said about fishing specialication at this stage. It was possible that the site was seasonally occupied during the pre-ceramic period and that the fishing strategies observed based on evidence in the ceramic layers were a continuation of the strategies of the pre-ceramic period (as was the case with lithics at this site). Similar to the fluidity and connectivity observed in the boundary between the LSA and EIA periods (Lane *et al.* 2007), this perhaps applied to the boundary between the pre-ceramic and ceramic phases. Earlier in this study, reference was made to the fluidity between pre-ceramic and ceramic layers at Namaboni B.

During the ceramic period (especially in the Early Kansyore phase at Namaboni B), the frequency of fish bones relative to all other identified fauna increased in layers 5 and 4, pointing to the specialised exploitation of aquatic resources. When Early Kansyore ceramic layers were compared with pre-ceramic layers, the evidence pointed to a continued subsistence on the same fish species (i.e., lungfish and catfish) (see Table 7.12). Since these fish taxa are known to be dominant even during the dry season (Prendergast & Lane 2010), it is possible that both pre-ceramic and ceramic hunter-gatherers occupied the site during the dry season. Interestingly, these species were also dominant at Middle Kansyore sites, especially at Namundiri A (see Appendix 4, Table 3), suggesting that the Middle Kansyore sites too were occupied during the dry season. This supported Prendergast's (2008) bimodal hypothesis of the shell midden sites being occupied in dry seasons and riverside sites in the wetter seasons. Further supporting the proposal of occupation during the dry season was the recovery of bivalve shells at Namaboni B (Early Kansyore) and Namundiri A (Middle Kansyore) sites (see tables 5.1 and 5.6). Bivalve shells are believed to have been collected when waters were low or when it was the dry season (Prendergast & Lane 2010: 106).

Therefore, based on aquatic evidence it was quite likely that the northern shores of Lake Victoria Nyanza were occupied during the dry season right from the pre-ceramic to the ceramic LSA periods.

Other than evidence of the presence of fish and shellfish, evidence of terrestrial and amphibious animals (e.g., *Syncerus caffer* (African buffalo), *Kobus ellipsiprymnus* (waterbuck), *Tragelaphus scriptus* (bushbuck), *Hippopotamus amphibius* (hippopotamus), *Potamochoerus larvatus* (bushpig), *Cercopithecus* (guenon monkey), and *Felis* (cat) was also recovered in both pre-ceramic and ceramic phases (see tables 7.9 and 7.10). This evidence suggested that the hunter-gatherers at Namaboni B/Early Kansyore Phase site and Namindiri A/Middle Kansyore phase site subsisted on similar resources and probably lived in similar environments. However, the diversity of terrestrial and amphibious animals was greater in the Middle Kansyore phase than in the pre-ceramic or Early Kansyore phase (see Appendix 4), suggesting changing technology, skills and knowledge that enabled hunting a wider range of animals. This also suggested that such communities were more socially organised, which enabled them to plan, for example, the complex hunts of big mammals ranging in weight between 60 and 500 kg (see Appendix 4) which were dominant in the Middle Kansyore faunal assemblage. This indicated that the hunter-gatherers in this phase subsisted on such game for some days, unlike in the pre-ceramic period where small hunted game could be consumed on the same day**.**

In the present study, bone points recovered were analysed in detail for the very first time. These indicated that they were made from large mammal long bones (see Appendix 5) and that they were made by scraping with a sharp object (probably a lithic/stone) and grinding them against a fine-grained abrasive surface. This suggested that the hunter-gatherers developed a technology that enabled them to hunt big- and medium-sized animals from which they got the long bones to make tools. A finding from a use-and-wear analysis indicated some cut marks on bone point B (see Appendix 5, Figure 1b, Figure 3), suggesting the bone points were hafted into some object. Although use-trace analysis has not been used before, bone points associated with Kansyore hunter-gatherers have been described as awls and spear heads based on their morphology (Robertshaw 1991). The finding of the present study supported the above description (see Appendix 5). This economic specialisation of making bone points from large game parallelled the tradition in the Terminal Pleistocene and Early Holocene periods in northern Kenya and southern Sahara of making bone harpoons (Drake *et al.* 2011).

The faunal, botanical and stable isotope results relating to the hunter-gatherers indicated that ceramic-using hunter-gatherers on the northern shores of Lake Victoria Nyanza subsisted on hunted animals and gathered plants supplemented by aquatic resources such as shellfish and fish. Based on the stable isotope results obtained from two individuals (SK4 and SK7) dating to the Early Kansyore phase (see Table 5.9) indicated they had access to different proportions of C_3, C_4 and aquatic resources (see Chapter 7). The $\delta^{15}N$ values of both individuals were elevated, although individual SK4's value of 12 was slightly lower than that of individual SK7's level of 13, suggesting that the latter might have consumed resources with higher trophic levels than did the former. The results suggested that these hunter-gatherers consumed resources from mosaic environments. The finding supported Prendergast and Lane's (2010) proposal that hunter-gatherers occupied different landscapes in different seasons. Differences in diet could also have resulted from the possibility that animals from different environments were attracted to Lake Victoria Nyanza as a permanent water body. However, the results from this study remain tentative until more data is available.

8.4 EIA Archaeological Record of the Northern Shores of Lake Victoria Nyanza

Evidence of EIA materials was recovered from Lukaba 1 and Lugala A1. The former was not studied in detail due to limited time. At the Lugala A1 site, EIA materials were recovered from levels 7 to 8 (see Chapter 5). These levels were associated with human burials and Urewe pottery. A charcoal sample was collected from a jar covering the left hand of individual 2 in level 8 dated cal. AD 339–437. The EIA levels were above a 30 cm hiatus that separated these levels from the Middle Kansyore levels, suggesting Lugala A1 was occupied by Middle Kansyore hunter-gatherers who later abandoned the site, which was quite some time before Late Holocene EIA communities arrived.

The EIA material deposits at Lugala A1 included two burials associated with Urewe pottery. These burials were the first of their kind recovered in Uganda and were examples of only a handful of all the burials found in the Great Lakes region (Giblin *et al.* 2010; Watts *et al.* 2020). Burial 1 included lower limbs and pelvic fragments, whereas burial 2 included an upper limb and shoulder and thorax fragments (see Figure 7.5). Although these burials were cut into by the edge of the sand-harvesting pit, the remaining part of burial 2 indicated that the individual was lying on its side. Burial 2 was also found with Urewe ceramics whereas burial 1 was not. The left arm and hand of the individual in burial 2 were found underneath a partially complete globular jar, reinforcing the idea that the ceramics were grave goods and therefore that the burials were intentional. What, however, remained puzzling was why one individual would be buried with grave goods and another without. It was possible that the burial goods of individual 1 were lost during sand-harvesting or that the burial 2 individual had a different social status. However, the latter suggestion remains tentative since it was based on limited data. The systematic analysis of these two individuals revealed that both were adult females and had no peri-mortem modifications. Burial goods observed in this study were consistent with those identified at Kabusanze in Rwanda (Giblin *et al.* 2010) and which belonged to Urewe tradition. The only difference was that the individual who was found with artefacts at Kabusanze was an adult male, and the other one, who had no grave goods, was a neonate (which could explain the absence of grave goods).

8.4.1 Urewe Ceramics

Other than human skeletons, the evidence of EIA materials consisted of ceramics belonging to the Urewe tradition. Five reconstructable vessels were recovered, and these were made from two fabric types, namely LUGA x and LUGA y (see Table 6.24). The fabrics were poorly to moderately sorted but had smooth surfaces, suggesting that time had been invested in their production. The inclusions seemed to have been naturally found in clay paste and not added. The fabrics recovered from these layers shared a similar fabric composition with that of a few Middle Kansyore sherds (n = 2) (i.e., LUGA 1 and 2 respectively), suggesting that the potters could have occupied the same local area and used similar clay sources. Only bowls (n = 3) and jars (n = 2) were recovered from this burial deposit, and their size range was more restricted than that at other sites (Leakey *et al.* 1948; Posnansky 1961a; Ashley 2005; Giblin *et al.* 2010) where other vessel shapes have been recovered. However, these other forms (e.g., beakers) were rare, and bowls and globular jars dominated the Urewe typology across the Great Lakes region. Interestingly, Giblin *et al*. (2010: 279) found more jars than bowls in Rwanda, which suggested that jars were associated with the male gender of the buried individuals. The scenario of finding more bowls associated with females and more jars with males (as was the case at Kabusanze) could suggest a gender-based difference relating to the different functions for which these vessels were used; but, given the sample size, this remains a tentative suggestion.

No bevelled or squared rims were recovered in this study, only rounded rims, which Ashley (2005) refers to as simple rims. In addition, no dimple bases were recovered from this assemblage and, based on available base portions, only rounded and flat bases were present in this assemblage. The bowls recovered were smoothed on both their exterior and interior surfaces, and one had red paint in the external vertical incisions—something that has not been identified before in Urewe ceramics. Burnishing, a common feature of Urewe pottery, was also observed. Two jars were decorated with a combination of cross hatch, bands of horizontal incised lines, and incised lines filled with punctates (see Figure 8.2). Two of the three bowls were decorated with parallel horizontal incised lines and one had a combination of both vertical and horizontal incised lines (see Figure 6.23, Table 6.25). The decorations were executed and laid out well and also visually impressive, suggesting a lot of skill and effort had been applied. The presence of red paint only in the vertical incision seemed to suggest this bowl might have been used for a specific function.

Figure 8: 2: Lugala A1 EIA jar showing the decorations described in the text

8.4.2 EIA Subsistence Structure

No faunal materials were recovered from EIA levels; therefore, it could not be established if the communities used these as a source of subsistence. However, the values obtained from the **s**table carbon isotope ($\delta^{13}C$) and stable nitrogen isotope ($\delta^{15}N$) measurements performed on the bone collagen of EIA skeletons (which were performed in Uganda for the first time) indicated that Lugala A1 individuals consumed more C_4 plants or animals that fed on these plants and they also supplemented their diet with food resources that had high trophic levels (e.g., aquatic resources). As in the case of individuals at Kabusanze in Rwanda (Giblin & Fuller 2011), the C_4 plants that EIA individuals ate could have included millet and sorghum. However, attempts to recover botanical remains failed—the sediment samples produced only unidentifiable materials. Future studies could examine phytoliths to shed more light on the subsistence patterns of EIA communities since macrobotanical evidence is rare.

8.5 LSA–EIA Relationship and the Transition to Farming

Based on the chronology of the Lugala A1 site, Middle Kansyore LSA ceramic users were the first to settle on this site. They abandoned this site later, and it was subsequently occupied by EIA Urewe users. No evidence of contact between LSA hunter-gatherers and EIA farming communities was observed at this site, suggesting that the transition to farming in this area was not the result of interaction, as was the case at other Late Kansyore sites, for example, Wadh Lang'o and Usenge 3 (Lane *et al.* 2007).

Stable isotope analysis conducted on both Kansyore LSA and EIA individuals indicated that EIA individuals consumed largely C_4 resources (probably millet or sorghum) whereas Kansyore LSA individuals largely consumed freshwater resources as well as C_3 and C_4 resources. The C_4 values identified among the Kansyore LSA individuals were thought to have come from consuming wild animals that ate wild C_4 grasses or from consuming C_4 plants directly. It was clear from this study that the two communities had different diets, further implying there was no contact between the two. EIA stable isotope results coincided with stable isotope measurements in open environments (Lejju 2012); these environments around the Lake Victoria Nyanza basin are characterised by the presence of C_4 grasses, grazing domesticates and wild herbivores (Kendall 1969; Berke *et al.* 2012; Chritz *et al*. 2015; Marchant *et al*. 2018). The present study's finding relating to food resources aligned with evidence obtained from Rwanda (Giblin & Fuller 2011) where sorghum and pearl millet were recovered from Urewe burials dating around AD 400. These cereals could have been wildly or domestically collected, making it hard to establish whether EIA farmers were responsible for the introduction of domesticates in the Late Holocene period.

A comparison between the northern and other shores of Lake Victoria Nyanza indicated that the settlement history of LSA hunter-gatherers on the northern shores was distinct from that in western Kenya and southwestern Uganda. In the latter case, LSA hunter-gatherers seemed to have been abruptly replaced, whereas in the former case there was contact between occupants and continuity of occupation between the periods. This study showed that there was a hiatus between the Middle Kansyore LSA period and the EIA period on the northern shores. Three phases of hunter-gatherers occupied the area under study; pre-ceramic, Early Kansyore, and Middle Kansyore. Three groups of hunter-gatherers have also been observed in western Kenya; pre-ceramic, Early Kansyore and Late Kansyore (Lane *et al.* 2007; Dale & Ashley 2010). The difference lay in the fact that whereas the northern shores of Lake Victoria Nyanza were occupied by Middle Kansyore hunter-gatherers, western Kenya (on the northeastern shore) was occupied by Late Kansyore hunter-gatherers. The areas west of the Nile River in Uganda were occupied only by pre-ceramic and Late Kansyore hunter-gatherers (Tibesasa 2010; Kyazike 2016, 2019). It was clear from this comparison that the LSA settlement history of the northern shores of Lake Victoria Nyanza was closer to that of western Kenya, and that both groups that settled there practised a delayed-subsistence system. Although little is known about the hunter-gatherers west of the Nile River in Uganda, they seem to have practised an immediate subsistence system (based on low archaeological densities at these sites) (Tibesasa, Shipton *et al.* in prep.).

8.6 Chapter Summary

The present study revealed that the northern shores of Lake Victoria Nyanza were occupied first by pre-ceramic hunter-gatherers, then by ceramic Early and Middle Kansyore hunter-gatherers, and then by EIA communities. The study added a new phase to the Kansyore profile, namely that of the Middle Kansyore phase. Prior to this study, only two Kansyore phases were known, namely, the Early and Late Kansyore phases (Dale 2007; Dale & Ashley 2010). Therefore, the study bridged the existing chronological gap by providing material evidence from the Namundiri A and Lugala A1 sites. Not only that, but the study added radiocarbon dates (see Figure 5.9) to the existing dates, in that way clarifying the LSA archaeological record of the northern shores of Lake Victoria Nyanza and of East Africa at large. The archaeological record on the LSA on the northern shores of Lake Victoria Nyanza revealed that the majority of sites were distributed in the Majanji Parish in the Busia District and that their number decreased to the west towards the Banda Parish in the Namayingo District. This suggested that more LSA sites were distributed in the east than in the west of this study area, which was consistent with the results of general site distribution in western Kenya and areas west of the Nile River. This, however, remains a tentative assumption because some parishes that border Lake Victoria Nyanza were not surveyed. Those that were surveyed indicated the presence of many LIA sites in the west. It was quite likely that the western part of the surveyed area was forested and more wet than the dry eastern part due to higher rainfall. If this was the case, the east could have been more attractive for human settlement than the west but was only occupied after cultural and/or environmental changes had taken place. The east, including Kenya, is also well-known for big rivers which, according to Prendergast and Lane (2010), are important in the Kansyore LSA settlement patterns. It was therefore possible that Kansyore LSA communities concentrated in eastern Uganda and western Kenya because of the availability of accessible lake shores and big rivers that provided resources in different seasons.

The chronological evidence from this study indicated change over time. The northern shores of Lake Victoria Nyanza were occupied from pre-ceramic LSA times through to the Early Kansyore LSA period and the Middle Kansyore LSA period. Based on the available evidence, the shift from the pre-ceramic to the ceramic period was not dramatic; it was a continuum that also included a period of return to pre-ceramic LSA practices. Evidence of Late Kansyore LSA was not recovered in this study area, and this could have been due either to limited surveys and excavations conducted in the area or to a genuine absence of occupation during this period.

A close look at other aspects of Kansyore material culture and lifeways showed that Kansyore hunter-gatherers represented in this study practised a delayed-return system. This interpretation was based on the fact that all Kansyore sites recovered from this study were located near predictable resources, which included large quantities of detailed decorated ceramics, high densities of lithics and bones (fish and mammal), and intentional burials (articulated and semi-articulated). Similar patterns have been reported among the delayed-return hunter-gatherers of Europe (Zvelebil 1986), Japan (Akazawa 1983) and the Levant (Bar-Yosef 1991). The evidence from the present study (e.g., bone point, burnished and wiped ceramics) suggested specialisation among hunter-gatherers. However, burials recovered from the Namaboni B Early Kansyore site suggested that the hunter-gatherers at this site were not fully delayed-return hunter-gatherers but, instead, were moderate-delayed-return hunter-gatherers as Dale (2007) suggests. This conclusion was based on the fact that no designated areas were allocated for the burial of different sexes and that no female, male, adult or young person was buried with grave goods, an occurrence that could be ascribed to the possible practice of some form of equality rather than to the differential accumulation of stored resources (as was the case with full-delayed-return hunter-gatherers).

Based on the analysis of ceramic decorations, the ceramics of the Early Kansyore phase were less elaborate than those of the Middle Kansyore phase, suggesting that, in the case of the former, little labour was invested in technological elaboration. According to Dale (2007), the high degree of labour investment and technological elaboration observed in Middle Kansyore ceramics is a characteristic of items owned and not shared. The high densities of decorated ceramics, fauna and lithics as well as the burial of individuals one beneath the other at sites on the northern shores of Lake Victoria Nyanza were clear indications that these sites were used repeatedly. Evidence of highly decorated ceramics and of specific human burial practices suggested that the occupants claimed ownership of materials and places (e.g., they remembered the presence of their buried ancestors). Although human skeletal parts have been identified at various Kansyore ceramic-bearing sites such as Gogo Falls, Siror, Kanjera, Kanam, and Luanda in western Kenya (Robertshaw *et al.* 1983; Robertshaw 1991; Dale 2007), Chole in Tanzania (Soper & Golden 1969), Kansyore and Ndali in western Uganda (Chapman 1967; Schmidt *et al.* 2016), no detailed study has ever been conducted on them. The systematic analysis of Kansyore LSA skeletons conducted in the present study was the first of its kind in this region and it contributed much to the knowledge about the burial practices of Early Kansyore hunter-gatherers as well as the settlement history of these communities.

Although the Kansyore ceramics (both Early and Middle) recovered during this study were not distinct in terms of decoration and form from those recovered at Gogo Falls (Collett & Robertshaw 1980; Robertshaw 1991) and Siror (Dale 2007) in western Kenya, some uniqueness was observed in ceramic fabric inclusions. For the very first time, dolomite inclusions were identified in the Kansyore profile, and, based on the size, frequency and angular nature of the inclusions, this temper must have been deliberately added to the clay. The numbers of ceramics with such inclusions were, however, small. Also, based on rare fabrics that were found, it was concluded that there had been some form of contact between the people (e.g., perhaps they carried pots that they treasured highly from one site to another). As far as decoration was concerned, not all ceramics recovered from this study were covered extensively with decorations, especially at the Namaboni B site, and some sherds were not decorated at all. This has also been observed at Siror in western Kenya (Dale 2007).

Unlike at other sites, for example, Wadh Lang'o and Usenge 3 (Lane *et al.* 2007) where the transition to farming has been associated with long interaction, the sites in the present study provided evidence that the transition to farming was connected to the arrival of new populations. This interpretation was based on the observance of a 30 cm hiatus between the Middle Kansyore hunter-gatherers and the Late Holocene Urewe EIA users. Further support for this interpretation was provided by the absence of EIA materials from other sites excavated in this study as well as by the latest LSA and earliest EIA dates (i.e., 3465–3495 cal. BC and cal. AD 339–437 respectively) which clearly suggested a gap between the two communities. Interestingly, stable isotope analyses carried out on Kansyore LSA and Urewe EIA individuals indicated that the two accessed different resources; the former largely exploiting a mixture of aquatic and C_3 and C_4 resources, and the latter depending more heavily on C_4 resources. It may therefore be true that the arrival of new populations introduced a significant shift in diet, reinforcing earlier theories that attributed the transition to farming to the arrival of new populations in this part of Africa during the EIA (Posnansky 1961b, 1968; Huffman 1970; Clist 1987; MacLean 1994; Schoenbrun 1998; Eggert 2005: 303; Grollemund *et al*. 2015; Bostoen 2018). However, isotope results did not provide clarity about whether the C_4 resources observed in EIA communities were from domesticated animals or plants. Based on the available resources identified at Kabusaze (Giblin & Fuller 2011) it was highly possible that EIA farming communities in the present study consumed/subsisted on domesticated plants such as millet and sorghum. Thus, the present study shed light on the subsistence structures and settlement history of LSA and EIA communities on the northern shores of Lake Victoria Nyanza.

CHAPTER 9

CONTRIBUTIONS, CONCLUSIONS, AND RECOMMENDATIONS

9.1 Contributions and Conclusions

This study made major contributions to the Holocene archaeology of Uganda and the Great Lakes region in general. The survey and excavation of Kansyore LSA and Urewe EIA sites in the Busia and Namayingo districts in eastern Uganda were done for the very first time. The only available information previously known about this area was from historical linguistic studies. As indicated in Chapter 4, 24 new sites were identified in this part of Uganda, which included LSA, EIA, MIA and LIA sites. It is also interesting to note that only four Kansyore and 11 Urewe sites were known in Uganda prior to this study and that this study added 12 new Kansyore sites and one new Urewe site to the existing ones. As such, this study contributed to existing knowledge about the geographical distribution of Kansyore and EIA sites in Uganda and East Africa at large. Information obtained through a survey enabled this study to close the geographical gap which has, up to now, existed between the western shores of Lake Victoria Nyanza (in Uganda) and its eastern shores (in Kenya) (see Chapter 1).

Further, the excavation of Kansyore sites in this study contributed to the understanding of the Kansyore LSA chronology in Uganda and East Africa. Prior to this study only two Kansyore phases, namely, the Early Kansyore phase (c. 6000–5000 cal. BC) and the Late/Terminal Kansyore phase (c. 1000 cal. BC–cal. AD 500) identified by Dale (2007) and Dale and Ashley (2010) were known. The present study added the Middle Kansyore phase (3465–3495 BC). As indicated in this study, the Early Kansyore phase was characterised by ceramics that were less elaborate than the ceramics of the Middle Kansyore phase, which indicated an increasingly complex lifestyle in the Middle Kansyore phase. In addition, the study produced three archaeological dates (see Figure 5.9), contributing to the understanding of the chronology and dates of LSA and EIA sites in Uganda and East Africa at large.

The study also contributed to the existing knowledge about the burial practices of the LSA and EIA communities in East Africa, thus shedding light on their settlement patterns (which was one of the issues this study investigated). Although human remains have always been discovered at other Kansyore sites in East Africa, the present study excavated Kansyore LSA burials in Uganda systematically for the very first time. Moreover, it was the first study to conduct an osteoarchaeological analysis of Kansyore individuals in East Africa and the third study to do such an analysis of EIA individuals—the first two having been conducted on EIA individuals at the Kabusanze site in Rwanda (Giblin *et al*. 2010; Watts *et al*. 2020).

Another first for this study was to use multi-disciplinary approaches, including ceramic, lithic, osteoarchaeological, faunal, botanical, stable carbon and nitrogen isotope, and bone-point-use-trace analyses, to shed light on settlement and subsistence structures of both LSA communities and EIA farming communities. Unlike previous studies that have all used indirect evidence (Reid 2002; Ashley 2005; Kessy *et al.* 2011; Tibesasa 2010; Kyazike 2016, 2019) to shed light on these two issues, the present study employed both direct and indirect pieces of evidence to understand these two issues, in that way assisting in giving a detailed account of the settlement and subsistence structures of both LSA and EIA communities on the northern shores of Lake Victoria Nyanza. Thus, this study closed the existing methodological gap (as indicated in Chapter 1) regarding the study of both LSA and EIA communities by making a contribution relating to methodological approaches.

This study provided information on the lifestyle of Kansyore LSA and EIA hunter-gatherers. For instance, osteoarchaeological results revealed no sign of violence in both Kansyore LSA and EIA individuals, implying the communities lived a peaceful life. The bones of both groups showed no sign of pathology/bone disease, tentatively suggesting both communities lived healthy lives and perhaps ate foods rich in proteins and calcium that are needed for bone growth and strength. At the Namaboni B site, one older adult male was identified with lumbar vertebral osteophytes that suggested an advanced age or activity-related stress. Also, analyses of stable carbon and nitrogen isotopes revealed that Kansyore LSA and EIA communities subsisted on different food sources. However, the samples were too small to draw significant conclusions about the subsistence patterns of the communities.

Another discovery of the present study was that Kansyore hunter-gatherers, especially of the Early Kansyore phase, returned from a ceramic to an pre-ceramic lifestyle at some point, suggesting that boundaries between pre-ceramic and ceramic communities were fluid, perhaps as a result of ecological factors. Based on information about ceramic decorations, fabrics, and forms, it was clear that there was contact of some kind (in terms of space and time) between the communities. Furthermore, the study contributed to technological information on Kansyore ceramics; for example, the use of temper was observed in a few Kansyore ceramics. The burnishing and wiping of the Kansyore ceramics that were observed, indicated that Kansyore ceramic users on the northern shores of Lake Victoria took care and invested time and skills in making ceramics. This further suggested that the social structure of Kansyore LSA communities in this area was complex, possibly due to delayed subsistence systems (Woodburn 1982).

A comparison of the study area's settlement history with that of the western and eastern shores of Lake Victoria Nyanza (see Chapter 2) showed that the study area, similar to the eastern shores in western Kenya, was occupied from the pre-ceramic LSA period to the ceramic LSA period. In contrast, the western shores were occupied directly from the pre-ceramic period to the EIA period onwards. By implication, the transition to farming in the study area, though brought on by the movement of populations, was not abrupt as was the case in the west; instead, the transition was slow and gradual as in the case of the eastern shores (Lane *et al.* 2007). Generally, the study contributed to an understanding of the archaeology of the northern shores of Lake Victoria Nyanza.

9.2 Recommendations

Given the fact that the present study obtained evidence, especially isotopic and osteoarchaeological evidence, from small samples, researchers who conduct studies in the area in future should follow approaches and use multidisciplinary methods that would allow them to collect more data samples to confirm the tentative conclusions made in this study.

The sites in this study area that were identified for archaeological investigation were located largely in parts that had been exposed by human activities such as shell harvesting and sand mining. These activities posed a threat to many archaeological sites in the study area, and the excavation team was forced to abandon its original plans in some cases to try and rescue some of the sites. Therefore, there is an urgent need for government intervention to conserve and preserve such sites; bodies issuing sand-mining and similar licences need to impose a regulation that cultural impact assessments be carried out before such licences are issued to companies or people intending to conduct operations in culturally sensitive areas.

While excavating the sites under study, our team worked alongside a group of shell harvesters made up largely from local people. They revealed to us that they always mixed shells with human remains to use as chicken feed. Clearly, these people needed to be sensitised about their heritage rights. Although the researchers tried their level best to sensitise the public by way of village meetings, we concluded that pro-active community sensitisation would be absolutely necessary when a future archaeological study is conducted in this area.

This study conducted a purposive survey due to limited resources and time. As such, the survey was limited to the shores of the Lake Victoria Nyanza and a few kilometres inland. Future research should expand the inland survey area so as to determine the existence of riverine sites and Late Kansyore sites which were not discovered in this study. Such studies would, perhaps, provide information allowing the construction of a complete settlement and subsistence history of the northern shores of Lake Victoria Nyanza.

Further, more studies are needed to expand on the multidisciplinary approaches employed in the present study. For instance, the seasonal appearance of shells could be studied to cast further light on an archaeological study, an aspect that was not explored in the present study. Also, this study did limited work on bone point analysis, botanical analysis and did not analyse all the phytolith samples that had been collected, despite the potential significance of such analyses to the provision of information on subsistence. It is recommended that future researchers should conduct detailed analyses to allow the construction of a complete history of the northern shores of Lake Victoria Nyanza. For such studies to be successful, collaboration with specialists inside and outside Uganda is a must, because studies of this nature require laboratory work which cannot be done in Uganda at this time. The present researcher recommends that future researchers study the northern shores of Lake Victoria Nyanza archaeologically so as to rescue as much information as possible before it is destroyed through shell-harvesting and sand-mining activities. The best way would be to conduct field schools during different seasons so as to recover all archaeological information.

10. References

Aikens, M.C. & Akazawa, T. 1996. Pleistocene–Holocene tradition in Japan and adjacent northeast Asia. In: Strauss, L.G., Eriksen, B.V., Erlandson, J.M. & Yesner, D.R. (eds) *Humans at the End of the Ice Age: The Archaeology of the Pleistocene–Holocene Transition*: 215–227. New York: Plenum. https://doi.org/10.1007/978-1-4613-1145-4_11

Akazawa, T. 1983. Fishing adaptation of prehistoric hunter-gatherers at the Nittano Site, Japan. *Journal of Archaeological Science* 7: 325–344. https://doi.org/10.1016/S0305-4403(80)80039-2

Alexander, J. 1977. The 'frontier' concept in prehistory: the end of the moving frontier. In: Megaw J. V. S. (ed.) *Hunters, Gatherers and First Farmers beyond Europe: an Archaeological Survey*: 25–40. Leicester: Leicester University Press.

Alexander, J. 1978. Frontier studies and the earliest farmers in Europe. In: Green, D., Haselgrove, C. & Spriggs, M. (eds) *Social Organization and Settlement.* British Archaeological Reports International Series 47: 13–29. Oxford: Archaeopress.

AlQahtani, S.J. 2008. *Atlas of Tooth Development and Eruption*. London: Barts and the London School of Medicine and Dentistry, Queen Mary University of London.

Ambrose, S.H. 1982. Archaeology and linguistic reconstructions of history in East Africa. In: Ehret, C. & Posnansky, M. (eds) *The Archaeological and Linguistic Reconstruction of African History*: 104–57. Berkley: University of Los Angeles Press. https://doi.org/10.1525/9780520314757-009

Ambrose, S.H. 1984a. Holocene environments and human adaptations in the Central Rift Valley, Kenya. Unpublished PhD dissertation. Berkeley: University of California.

Ambrose, S.H. 1984b. The introduction of pastoral adaptations to the highlands of East Africa: from hunters to farmers. In: Clark, J.D. & Brandt, S.A. (eds) *The Causes and Consequences of Food Production in Africa*: 212–239. Berkeley: University of California Press.

Ambrose, S.H. 1986a. Hunter-gatherer adaptations to nonmarginal environments: an ecological and archaeological assessment of the Dorobo model. *Sprache und Geschichte in Afrika* 7(2): 11–42.

Ambrose, S.H. 1986b. Stable carbon and nitrogen isotope analysis of human and animal diet in Africa. *Journal of Human Evolution* 15: 707–731. https://doi.org/10.1016/S0047-2484(86)80006-9

Ambrose, S.H., Lorenz, K.G., 1990. Social and ecological models for the Middle Stone Agein southern Africa. In: Mellars, P. (Ed.), The Human Revolution: Behavioral andBiological Perspectives in the Origins of Modern Humans. Edinburgh UniversityPress:3–33

Ambrose, S.H. 1991. Effects of diet, climate and physiology on nitrogen isotope abundances in terrestrial foodwebs. *Journal of Archaeological Science* 18: 293–317. https://doi.org/10.1016/0305-4403(91)90067-Y

Ambrose, S.H. 1998. Chronology of the Later Stone Age and food production in East Africa. *Journal of Archaeological Science* 25: 377–392. https://doi.org/10.1006/jasc.1997.0277

Ambrose, S.H. 2001. East African Neolithic. In: Peregrine, N. & Ember, M. (eds) *Encyclopedia of Prehistory* 1: 97–109. New York: Kluwer Academic. https://doi.org/10.1007/978-1-4615-1193-9_8

Ambrose, S.H. 2002. Small things remembered. Origins of early microlithic industries in Sub-Saharan Africa. In: Elston, R.G. & Kuhn, S.L. (eds) *Thinking Small: Global Perspectives on Microlithization*: 9–29. Archaeological papers of the American Anthropological Association 12. Hoboken: Wiley-Blackwell. https://doi.org/10.1525/ap3a.2002.12.1.9

Ambrose, S.H., Buikstra, J. & Krueger, H. 2003. Status and gender difference in diet at Mound 72, Cahokia, revealed by isotopic analysis of bone. *Journal of Anthropological Archaeology* 22: 217–226. https://doi.org/10.1016/S0278-4165(03)00036-9

Arranz-Otaegui, M., Colledge, S., Zapata, L., Teira-Mayolini, L.C. & Ibáñez, J. 2016. Regional diversity on the timing for the initial appearance of cereal cultivation and domestication in southwest Asia. *Proceedings of the National Academy of Sciences* 113(49): 14001-14006. https://doi.org/10.1073/pnas.1612797113

Ashley, C.Z. 2005. Ceramic variability and change: a perspective from Great Lakes Africa. Unpublished PhD dissertation. London: University College London, Institute of Archaeology.

Ashley, C.Z. 2010. Towards a socialised archaeology of ceramics in Great Lakes Africa. *African Archaeological Review* 27: 135–163. https://doi.org/10.1007/s10437-010-9074-0

Ashley, C.Z. & Grillo, K.M. 2015. Archaeological ceramics from eastern Africa: past approaches and future directions. *Azania: Archaeological Research in Africa* 50: 460-480. https://doi.org/10.1080/0067270X.2015.1102939

Atlas for Social Studies, Uganda. 2015. Nairobi: Longhorn.

Barnard, A. 2004. Hunting-and-gathering society: an eighteenth-century Scottish invention. In: Barnard, A. (ed.) *Hunter-Gatherers in History, Archaeology and Anthropology*. New York: Routledge.

Barthelme, J. 1977. Holocene sites north-east of Lake Turkana: a preliminary report. *Azania: Archaeological Research in Africa* 12: 33–41. https://doi.org/10.1080/00672707709511246

Barthelme, J.W. 1985. *Fisher-Hunters and Neolithic Pastoralists in East Turkana, Kenya.* British Archaeological Reports International Series 254. Oxford: Archaeopress.

Barut, S. 1994. Middle and Later Stone Age lithic technology and land use patterns in East African savannas. *African Archaeological Review* 12: 4470. https://doi.org/10.1007/BF01953038

Bar-Yosef, O. 1991. From sedentary hunter-gatherers to territorial farmers in the Levant. In: Green, S.A. (ed.) *Between Bands and States*: 181–202. Occasional paper number 9. Carbondale: Center for Archaeological Investigations.

Barker, G. W. 1985. Prehistoric Farming in Europe, Cambridge University Press, Cambridge

Bender, B. 1978. Gatherer-hunter to farmer: a social perspective. *World Archaeology* 10: 204-222. https://doi.org/10.1080/00438243.1978.9979731

Berke, M.A., Johnson, T., Werne, J., Grice, K., Schouten, S. & Damste, J. 2012. Molecular records of climate variability and vegetation response since the Late Pleistocene in the Lake Victoria basin, East Africa. *Quaternary Science Reviews* 55: 59-74. https://doi.org/10.1016/j.quascirev.2012.08.014

Binford, L.R. 1968. Post-Pleistocene adaptations. In: Binford, S. & Binford, L. (eds) *New Perspectives in Archaeology*: 313–341. Chicago: Aldine. https://doi.org/10.4324/9781315082165-19

Binford, L.R. 1979. Organization and formation processes: looking at curated technologies. *Journal of Anthropological Research* 35: 255–73. https://doi.org/10.1086/jar.35.3.3629902

Binford, L. 1980. Willow smoke and dogs' tails: hunter-gatherer settlement systems and archaeological site formation. *American Antiquity* 45: 4–20. https://doi.org/10.2307/279653

Binford, L.R. 1983. *In Pursuit of the Past*. London: Thames and Hudson.

Binford, L. 2001. *Constructing Frames of Reference: Analytical Method for Archaeological Theory Building Using Ethnographic and Environmental Datasets*. Berkeley: University of California Press.

Bisson, M.S. 1992. A survey of Late Stone Age and Iron Age sites at Luano, Zambia. *World Archaeology* 24(2): 234–248. https://doi.org/10.1080/00438243.1992.9980205

Blackburn, R. 1982. In the land of milk and honey: Okiek adaptations to their forests and neighbours. In: Leacock, E.B. & Lee, R.B. (eds) *Politics and History in Band Societies*: 283–305. Cambridge: Cambridge University Press.

Bostoen, K. 2018. The Bantu expansion. African history (consulted … …). https://doi.org/10.1093/acrefore/9780190277734.013.191

Bower, J. 1973. Seronera: excavations at a stone bowl site in the Serengeti National Park, Tanzania. *Azania: Archaeological Research in Africa* 8: 71–104. https://doi.org/10.1080/00672707309511573

Bower, J. & Nelson, C.M. 1978. Early pottery and pastoral cultures of the central Rift Valley, Kenya. *Man New Series* 13(4): 554–566. https://doi.org/10.2307/2801248

Bower, J.R.F., Nelson, C.M., Waibel, A.F. & Wandibba, S., 1977. The University of Massachusetts' Later Stone Age/Pastoral 'Neolithic' comparative study in Central Kenya: an overview. *Azania: Archaeological Research in Africa* 12: 119–146. https://doi.org/10.1080/00672707709511251

Bowman, 2016. Sex discrimination and ancestry assessment from the carpal bones: discriminant function analysis in a modern South African population. Unpublished MA thesis. Bournemouth: Bournemouth University.

Brachi, R.M. 1960. Excavation of a rock-shelter at Hippo Bay, Entebbe. *Uganda Journal* 24: 62-70.

Bradfield, J. & Choyke, A.M. 2016. Bone technology in Africa. In: Selin, H. (ed.) *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures* (consulted 16 January 2020). Dordrecht: Springer. https://doi.org/10.1007/978-94-007-3934-5_8476-2

Brain, C.K. 1981. *The Hunters or the Hunted?* Chicago: University of Chicago Press.

Braun, G. 2010. Technological choices: ceramic manufacture and use at the Antrex site (AjGv-38). *Ontario Archaeology* 89/90: 69–96. https://doi.org/10.1016/j.aeae.2010.08.012

Caneva, I. 1987. Pottery decoration in prehistoric Sahara and Upper Nile: a new perspective. In: Barbara, E.B. (ed.) *Archaeology and Environment in the Libyan Sahara: Cambridge Monographs in African Archaeology 23*. British Archaeological Reports International Series 368. Oxford: Archaeopress.

Caneva, I. 1988. *El Geili: The History of a Middle Nile Environment 7000 B.C.–A.D. 1500*. British Archaeological Reports International Series 424. Oxford: Archaeopress. https://doi.org/10.30861/9780860545484

Carmody, R.N. & Wrangham, R.W. 2009. The energetic significance of cooking. *Journal of Human Evolution* 57: 379–391. https://doi.org/10.1016/j.jhevol.2009.02.011

Chami, F. & Tibesasa, R. 2010. The archaeology of Kinanisi—Senyi Uganda. *Studies in the African Past* 8: 110–124.

Chapman, S. 1967. Kansyore Island. *Azania: Archaeological Research in Africa* 2: 165–191. https://doi.org/10.1080/00672706709511446

Childe, G. 1952. *New Light on the Most Ancient East*. London: Routledge.

Chritz, K.L., Marshall, F.B., Zagal, M.E., Kirera, F. & Cerling, T.E. 2015. Environments and trypanosomiasis risks for early herders in the later Holocene of the Lake Victoria basin, Kenya. *Proceedings of the National Academy of Science* 112: 3674–3679. https://doi.org/10.1073/pnas.1423953112

Clark, D.L. 1976. The beaker network: social and economic models. In Van der Waals, J.N. (ed.) Glockenbecher Symposion, Oberried, 17–23 März 1974: 459–477. Haarlem: Fibula van Dishoeck. https://zenon.dainst.org/Record/000299725

Clark, J.D. 1962. The spread of food production in sub-Saharan Africa. *Journal of African History* 3(2): 211–228. https://doi.org/10.1017/S0021853700003042

Clark, J.D. 1965. Changing trends and developing values in African prehistory. In: *African Affairs* 64: 76–98. Special Issue: African Studies Association of the United Kingdom, Proceedings of the 1964 Conference.

Clark, J.D. 1980. Early human occupation of African savanna environments. In: Harris, D.R. (ed) *Human Ecology in Savanna Environments*: 41–72. New York: Academic Press.

Clark, G.A. & Barton, C.M. 2017. Lithics, landscapes & la Longue-durée—curation & expediency as expressions of forager mobility. *Quarternary Journal* 450: 137–149. https://doi.org/10.1016/j.quaint.2016.08.002

Clist, B. 1987. A critical reappraisal of the chronological framework of the early Urewe Iron Age industry. *Muntu* 6: 35–62.

Clist, B., Bostoen, K., De Maret, P., Eggert, M.K.H., Höhn, A., Mindzie, C.M., Neumann, K. & Seidensticker, D. 2018. Did human activity trigger the late Holocene rainforest crisis in Central Africa? *Proceedings of the National Academy of Sciences of the United States of America* 115(21): E4733–E4734. https://doi.org/10.1073/pnas.1805247115

Collett, D.P. & Robertshaw, P.T. 1980. Early Iron Age and Kansyore pottery. Finds from Gogo Falls, South Nyanza. *Azania: Archaeological Research in Africa* 15: 133–145. https://doi.org/10.1080/00672708009511280

Cohen, M. 1977. Population pressure and the origins of agriculture: an archaeological example from the coast of Peru. In: Reed, C.A. (ed.) *Origins of Agriculture*: 135–178. Chicago: Aldine. https://doi.org/10.1515/9783110813487.135

Cowan, C.W. & Watson, P.J. 1992. *The Origins of Agriculture: An International Perspective.* Washington DC: Smithsonian Institution Press.

Crowther, A., Prendergast, M.E., Fuller, D.Q. & Boivin, N. 2017. Subsistence mosaics, forager-farmer interactions, and the transition to food production in eastern Africa. *Quaternary International* 489: 101–120. https://doi.org/10.1016/j.quaint.2017.01.014

Cumming, V. 2014. Hunter-gatherer in the post-glacial world. In: Cummings, V., Jordan, J. & Zvelebil, M. (eds) *The Oxford Handbook of the Archaeology and Anthropology of Hunter-Gatherers*. Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199551224.013.027

Dale, D. 2000. Recent archaeological investigation of Kansyore sites in western Kenya. *Azania: Archaeological Research in Africa* 35: 204–207. https://doi.org/10.1080/00672700009511604

Dale, D. 2007. An archaeological investigation of the Kansyore, Later Stone Age hunter-gatherers in East Africa. Unpublished PhD dissertation. Washington: University of Saint Louis.

Dale, D., & Ashley, C. 2010. Kansyore hunter-fisher-gatherers: new research from western Kenya. *Azania: Archaeological Research in Africa* 45(1): 24–48. https://doi.org/10.1080/00672700903291716

Dale, D., Marshall, F. & Pilgram, T. 2004. Delayed-return hunter-gatherers in Africa? Historic perspectives from the Okiek and archaeological perspectives from the Kansyore. In: Crothers, G.M. (ed) *Hunters and Gatherers in Theory and Archaeology*: 340–375. Center for Archaeological Investigations, Occasional Paper 31. Carbondale: Southern Illinois University.

Dennell, R. W., 1983. European Economic Prehistory: A New Approach. London: Academic Press

Dennell, R.W. 1985. The hunter-gatherer/agricultural frontier in prehistoric Europe. In: Green, S. & Perlman, S. (ed.) *The Archaeology of Frontiers and Boundaries*: 113–40. NewYork: Academic Press. https://doi.org/10.1016/B978-0-12-298780-9.50012-6

Drake, N.A., Blench, R.M., Armitage, S.J., Bristow, C.S. & White, K.H. 2011. Ancient watercourses and biogeography of the Sahara explain the peopling of the desert. In: *Proceedings of the National Academy of Sciences* 108(2): 458–462. https://doi.org/10.1073/pnas.1012231108

Drewett, P.L. 1999. *Field Archaeology: An Introduction*. London: UCL Press.

Eggert, M.K.H. 2005. The Bantu problem and African archaeology. In: Stahl, A. (ed.) *African Archaeology: A Critical Introduction*: 301–326. Oxford: Blackwell.

Ehret, C. 1998. *An African Classical Age: Eastern and Southern Africa in World History 1,000 BC to AD 400.* Oxford: James Currey.

Ehret, C. 2001. Bantu expansions: re-envisioning a central problem of early African history. *International Journal of African Historical Studies* 34: 5–41. https://doi.org/10.2307/3097285

Ehret, C. 2002. *The Civilizations of Africa: A History to 1800.* Charlottesville: University of Virginia Press.

Eshed, V., Gopher, A. & Hershkhoritz, I. 2006. Tooth wear and dental pathology at the advent of agriculture: new evidence from the Levant. *American Journal of Physical Anthropology* 130(2): 145–159. https://doi.org/10.1002/ajpa.20362

Fagan, B. & Lofgren, L. 1966, Archaeological reconnaissance on the Sese Islands. *Uganda Journal* 30(1): 81–86.

Fagan, B. M. and Van Noten, F. 1963. A note on two channel-decorated pottery sites from Northern Rhodesia. Man, 64, article 8.

Frahm, F., Goldstein, S.T. & Tryon, C.A. 2017. Late Holocene forager-fisher and pastoralist interactions along the Lake Victoria shores, Kenya: Perspectives from XRF of obsidian artefacts. *Journal of Archaeological Science Reports* 11: 717–742. https://doi.org/10.1016/j.jasrep.2017.01.001

Fungo, B., Grunwald, S., Tenywa, M.M.B. & Nkedi-Kizza, P. 2011. Lunnyu soils in the Lake Victoria basin of Uganda: link to toposequence and soil type. *African Journal of*

Environmental Science and Technology 5(1): 15–24. http://www.academicjournals.org/AJEST

Gabel, C. 1969. Six rock shelters on the northern Kavirondo shore of Lake Victoria. *African Historical Studies* 2: 205–254. https://doi.org/10.2307/216356

Garcea, E.A.A. 2006. Semi-permanent foragers in semi-arid environments of North Africa. *World Archaeology* 38(2): 197–219. https://doi.org/10.1080/00438240600693968

Garcin Y, et al. 2018 . Garcina, Y, Deschamps, P, M´enot,G, de Saulieu,G, Schefuß,E, Sebag,D, Dupont, M. Oslisly,R, Brademann,B, Mbusnum, K.G, Onana, J.M, Ako, A.A,.Epp, L. S, Tjallingii,R, Strecker, M.R, Brauerj, A & Sachse, D.2018. Early anthropogenic impact on Western Central African rainforests 2,600 y ago. Proc Natl Acad Sci USA115:3261–3266

Gatto, M.C. 2002. Early Neolithic pottery of the Nabta-Kiseiba area: stylistic attributes and regional relationships. In: Nelson, K. & Associates (eds) *Holocene Settlement of the Egyptian Sahara Volume 2*: 65–78. New York: Kluwer Academic.

Gebauer, A.B. & Price, T.D. 1992. Foragers to farmers: an introduction. In: Gebauer, A.B. & Price, T.D. (eds) *Transition to Agriculture in Prehistory*: 1–10. Madison: Prehistory Press.

Giblin, J. 2008. New work on the later archaeology of Rwanda, 2006 to 2007: a preliminary fieldwork report. *Nyame Akuma* 69: 45–55.

Giblin, J., Clement, A. & Humphris, J. 2010. An Urewe burial in Rwanda: exchange, health, wealth and violence c. AD 400. *Azania: Archaeological Research in Africa* 45: 276–297. https://doi.org/10.1080/0067270X.2010.521677

Giblin, J.D. & Fuller, D.Q. 2011. First and second millennium AD agriculture in Rwanda: archaeobotanical finds and radiocarbon dates from seven sites. *Vegetation History and Archaeobotany* 20(4): 253–265. https://doi.org/10.1007/s00334-011-0288-0

Gifford, D.P. & Crader, D.C. 1977. A computer coding system for archaeological faunal remains. *American Antiquity* 42: 225–238. https://doi.org/10.2307/278983

Gifford, D.P., Glynn L.I. & Charles M.N. 1980. Evidence for predation and pastoralism at Prolonged Drift: a pastoral neolithic site in Kenya. *AZANIA: Journal of the British Institute in Eastern Africa* 15(1): 57–108. https://doi.org/10.1080/00672708009511277

Gifford-Gonzalez, D.P. 1985. Faunal assemblages from Masai Gorge rock shelter and Marula rock shelter. *Azania: Archaeological Research in Africa* 20: 69–90. https://doi.org/10.1080/00672708509511359

Gifford-Gonzalez, D. 1998. Gender and early pastoralists in East Africa. In: Kent, S. (ed.) *Gender in African Prehistory*: 115–37. London: Altamira.

Gifford-Gonzalez, D. 2000. Animal disease challenges to the emergence of Pastoralism in sub-Saharan Africa. *African Archaeological Review* 17: 95–139. https://doi.org/10.1023/A:1006601020217

Gowdy, J. 2004. Hunter-gatherers and the mythology of the market. In: Lee, R.B. & Daly, R.H. (eds) *The Cambridge Encyclopedia of hunters and gatherers*: 391–398. Cambridge: Cambridge University Press.

Gowlett, J.A.J., Hedges, R.E.M., Law, I.A. & Perry, C. 1987. Radiocarbon dates from the Oxford AMS system: archaeometry datelist 5. *Archaeometr*y 29: 125–155. https://doi.org/10.1111/j.1475-4754.1987.tb00404.x

Greenberg, J.H. 1955. *Studies in African Linguistic Classification*. New Haven: Compass.

Grollemund, R., Brandford, S., Bostoen, K., Meade, A., Venditti, C. & Pagel, M. 2015. Bantu expansion shows that habitat alters the route and pace of human dispersal. *Proceedings of the National Academy of Sciences* 112(43): 13296–13301. https://doi.org/10.1073/pnas.1503793112

Grilloa, K. M., McKeeby, Z & Hildebrand, E. A. 2020. “Nderit Ware” and the origins of pastoralist pottery in eastern Africa. Quaternary International journal https://doi.org/10.1016/j.quaint.2020.06.032

Guthrie, M. 1959. Problèmes de génétique linguistique: La question du Bantucommun. *Travaux de l’Institut de Linguistique* 4: 83–92.

Guyer, J. & Belinga, S.E. 1995. Wealth in people as wealth in knowledge. Accumulation and composition in equatorial Africa. *Journal of African History* 36: 91–120. https://doi.org/10.1017/S0021853700026992

Habu, J. 2004. *Ancient Jomon of Japan*. Cambridge: Cambridge University Press.

Hakansson, N.T. 2000. A review of an African classical age: eastern and southern Africa in world history, 1000 B.C. to A.D. 400. *American Anthropologist* 102(2). https://doi.org/10.1525/aa.2000.102.2.418

Hayden, B. 1990. Nimrods, piscators, pluckers, and planters: the emergence of food production. *Journal of Anthropological Archaeology* 9: 31–69. https://doi.org/10.1016/0278-4165(90)90005-X

Headland, T. & Reid, L.A. 1991. Holocene foragers and interethnic trade: a critique of the myth of isolated independent hunter-gatherers. In: Gregg, S.A. (ed.) *Between Bands and States*: 333–340. Carbondale: Southern Illinois University.

Heaton, T.E., Vogel, J.C., La Chevallerie,V. & Collett, G. 1986. Climate influence on the isotopic composition of bone nitrogen. *Nature* 322: 823–824. https://doi.org/10.1038/322822a0

Helm, R. 2000. *Conflicting Histories: The Archaeology of the Iron-Working, Farming Communities in the Central and Southern Coast Region of Kenya*. Bristol: University of Bristol.

Henshilwood, C.S. 2012. Late Pleistocene techno-traditions in southern Africa: a review of Still Bay and Howiesons Poort, c. 75–59 ka. *Journal of World Prehistory* 25: 205–237. https://doi.org/10.1007/s10963-012-9060-3

Hervella, M., Izagirre, N., Alonso, S., Fregel, R., Alonso, A. & Cabrera, V.M. 2012. Ancient DNA from hunter-gatherer and farmer groups from northern Spain supports a random dispersion model for the Neolithic expansion into Europe. *PLOS One* 7(4): e34417. https://doi.org/10.1371/journal.pone.0034417

Hiernaux, J. & Maquet, E. 1960. *Cultures prehistorique de Page des metaux au Ruanda–Urundi et au Kivu (Congo belge)*. Bruxelles: Academie royale des Sciences d'Outre-Mer.

Hildebrand, E.A., Grillo, K.M., Sawchuk, E.A., Pfeiffer, S.K., Conyers, L.B., Goldstein, S.T., Hill, A.C., Janzen, A., Klehm, C.E., Helper, M., Kiura, P., Ndiema, E., Ngugi, C., Shea, J. J. & Wang, H. 2018. A monumental cemetery built by eastern Africa's first herders near Lake Turkana, Kenya. *Proceedings of the National Academy of Sciences of the United States of America* 115: 8942–8947. https://doi.org/10.1073/pnas.1721975115

Horn, H.S. 1968. The adaptive significance of colonial nesting in the Brewer's blackbird (*Euphagus cyanocephalus*). *Ecology* 49: 682–694. https://doi.org/10.2307/1935532

Huffman, T.N. 1970. The Early Iron Age and the spread of the Bantu. *South African Archaeological Bulletin* 25: 3–21. https://doi.org/10.2307/3888762

Iles, L. 2009. Pre-colonial iron production in western Uganda: recent survey and excavation. *Nyame Akuma* 71: 35–45.

Jacobs, Z., Roberts, R.G., Galbraith, R.F., Deacon, H.J., Grün, R., MacKay, A., Mitchell, P., Vogelsang, R. & Wadley, L. 2008. Ages for the Middle Stone Age of southern Africa: implications for human behavior and dispersal. *Science* 322: 733–735. https://doi.org/10.1126/science.1162219

Jones, M.B. 2020. Variability among Later Stone Age hunter-gatherers in eastern Africa. Unpublished PhD dissertation. St. Louis: Washington University.

Jones, M.B. & Tibesasa, R. In prep. Kansyore hunter-gatherers abandoned the shores of Lake Victoria~5.6-4.4 thousand years ago.

Jordan, P. & Zvelebil, M. 2009. Ex oriente lux: the prehistory of hunter-gatherer ceramics dispersals. In: P. Jordan & M. Zvelebil (eds) *Ceramics before Farming: The Dispersal of Pottery among Prehistoric Eurasian Hunter-Gatherer*. Walnut Creek: Left Coast Press.

Joukowsky, M. 1980. *A Complete Manual of Field Archaeology*. Englewood Cliffs: Prentice-Hall.

Kahlheber, S., Eggert, M.K.H., Seidensticker, D. & Wotzka, H-P. 2014. Pearl millet and other plant remains from the Early Iron Age site of Boso-Njafo (Inner Congo Basin, Democratic Republic of the Congo). *African Archaeologial Review* 31(3): 479–512. https://doi.org/10.1007/s10437-014-9168-1

Kaner, S. 2009. Long-term innovation: the appearance and spread of pottery in the Japanese archipelago. In: Jordan, P. & Zvelebil, M. (eds) *Ceramics before Farming: The Dispersal of Pottery among Prehistoric Eurasian Hunter-Gatherer.* Walnut Creek: Left Coast Press.

Karega-Mũnene. 1996. The east African Neolithic: an alternative view. *African Archaeological Review* 13: 247–254. https://doi.org/10.30861/9781841714172

Karega-Mũnene. 2002. *Holocene Foragers, Fishers and Herders of Western Kenya*. British Archaeological Reports International Series 1037. Oxford: Archaeopress. https://doi.org/10.30861/9781841714172

Katzenberg, M.A. 1999. A re-examination of factors contributing to elevated stable nitrogen isotope values in infants and young children (Abstract). *American Journal of Physical Anthropology* 28(suppl.): 165.

Katzenberg, M.A. 2008. Stable isotope analysis: a tool for studying past diet, demography, and life history. In: Katzenberg, M.A. & Shelley R. (eds) *Biological Anthropology of the Human Skeleton* 2nd edition. Saunders: John Wiley.

Keding, B. 2017. Middle Holocene fisher-hunter-gatherers of Lake Turkana in Kenya and their cultural connections with the North: the pottery. *Journal of African Archaeology* 15: 42-76. https://doi.org/10.1163/21915784-12340003

Keeley, L. 1988. Hunter-gatherer economic complexity and ‘population pressure’: A cross-cultural analysis. *Journal of Anthropological Archaeology* 7: 373–411. https://doi.org/10.1016/0278-4165(88)90003-7

Kelly, R. 1983. Hunter-gatherer mobility strategies. *Journal of Anthropological Research* 39: 277–306. https://doi.org/10.1086/jar.39.3.3629672

Kelly R.L. 1992. Mobility/sedentism: concepts, archaeological measures, and effects. *Annual Review of Anthropology* 21: 43–66. https://doi.org/10.1146/annurev.an.21.100192.000355

Kelly, R.L. 1995. *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Washington DC: Smithsonian Institution Press.

Kelly, R.L. 2013. *The Lifeways of Hunter-Gatherers: The Foraging Spectrum*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139176132

Kendall, R.L. 1969. An ecological history of Lake Victoria basin. *Ecological Monographs* 39: 121–176. https://doi.org/10.2307/1950740

Kessy, E.T. 2005. The relation between the Later Stone Age and Iron Age cultures of central Tanzania. Unpublished PhD dissertation. Burnaby: Simon Fraser University.

Kessy, T., Tibesasa, R. & Muwonge, H. 2011. Excavation of Lwala site, Ssi-Mukona District Uganda. *Journal of African Archaeology Network* 9: 116–138.

Khalidi, L., Cauliez, J., Bonb, F., Bruxelles, F., Gratuzee, B., Lesurf, J., Ménardg, C., Gutherzh, X., Crassardi, R. & Keallj, E. 2018. Late prehistoric oasitic niches along the southern Red Sea (Yemen and Horn of Africa). In: Purdue, L., Charbonnier, J. & Khalidi, L. (eds) *From Refugia to Oases Living in Arid Environments from Prehistoric Times to the Present Day*: 1–99.

Kiage, L.M. & Liu, K.B. 2006. Late Quaternary paleoenvironmental changes in East Africa: a review of multiproxy evidence from palynology, lake sediments, and associated records. *Progress in Physical Geography* 30(5): 633–658. https://doi.org/10.1177/0309133306071146

Kiyaga-Mulindwa, D. 2004. The archaeology of the riverine environments of the upper Nile valley in Uganda. *Studies in the African Past* 4: 38–57.

Koch, P., Tuross, N. & Fogel, M. 1997. The effects of sample treatment and diagenesis on the isotopic integrity of carbonate in biogenic hydroxlapatite. *Journal of Archaeological Science* 24: 417–429. https://doi.org/10.1006/jasc.1996.0126

Kooyman, B.P. 2000. *Understanding Stone Tools and Archaeological Sites*. Calgary: University of Calgary Press. https://doi.org/10.2307/j.ctv6gqs13

Krüger, G.C., L'Abbé, E.N. & Stull, K.E. 2017. Sex estimation from the long bones of modern South Africans. *International Journal of Legal Medicine* 131(1): 275–285. https://doi.org/10.1007/s00414-016-1488-z

Kusimba, S.B. 1999. Hunter-gatherer land use patterns in Later Stone Age, East Africa. *Journal of Anthropological Archaeology* 18: 165–200. https://doi.org/10.1006/jaar.1998.0335

Kusimba,S. 2005.What is hunter-gatherer? Variation in the archaeological record of Eastern and Southern Africa. *Journal of Archaeological research* 13:337-66.

Kusimba, C.M. & Kusimba, S.B. 2005. Mosaics and interactions: East Africa, 2000 b.p. to the present. In: Stahl, A.B. (ed.) *African Archaeology: A Critical Introduction*: 392–419. Oxford: Blackwell. https://doi.org/10.9783/9781934536261

Kyazike, E. 2016. Later Stone Age and Iron Age cultures at Kansyore Island in Western Uganda. *Journal of the International Union for Quaternary Research* 404: 211. https://doi.org/10.1016/j.quaint.2015.08.210

Kyazike E. 2019. Re-excavation of Kansyore Island. *Studies in the African Past* 12: 160–183.

L'Abbé, E.N. 2005. A case of comingled remains from rural South Africa. *Forensic Science International* 151(2): 201–206. https://doi.org/10.1016/j.forsciint.2004.11.021

L'Abbé, E.N., Kenyhercz, M., Stull, K.E., Keough, N. & Nawrocki, S. 2013. Application of Fordisc 3.0 to explore differences among crania of North American and South African blacks and whites. *Journal of Forensic Sciences* 58(6): 1579–1583. https://doi.org/10.1111/1556-4029.12198

Lane, P.J. 2004. The 'moving frontier' and the transition to food production in Kenya. *Azania: Archaeological Research in Africa* 39: 243–64. https://doi.org/10.1080/00672700409480402

Lane, P., Ashley C. & Oteyo, G. 2006. New dates for Kansyore and Urewe wares from northern Nyanza, Kenya. *Azania: Archaeological Research in Africa* 41: 123–138. https://doi.org/10.1080/00672700609480438

Lane, P., Ashley, C., Seitsonen, O., Harvey, P., Mire, S. & Odede, F. 2007. The transition to farming in eastern Africa: new faunal and dating evidence from Wadh Lang'o and Usenge, Kenya. *Antiquity* 81(311): 62–81. https://doi.org/10.1017/S0003598X00094849

Layton, R.H. 2001. Hunter-gatherer, their neigbours and nation state. In: Panter-Brick, C., Layton, R.H. & Rowley-Conwy, P. (eds) *Hunter-Gatherers: An Interdisciplinary Perspective*: 292–315. Cambridge: Cambridge University Press.

Layton, R., Foley, R. & Williams, E. 1991. The transition between hunting and gathering and the specialized husbandry of resources: a sociological approach. *Current Anthropology* 32(3): 255–274. https://doi.org/10.1086/203953

Leakey, L.S.B. 1929. An outline of the Stone Age in Kenya. *South African Journal of Science* 26: 749–757.

Leakey, L.S.B. 1931. *The Stone Age Cultures of Kenya colony*. Cambridge: Cambridge University Press.

Leakey, L.S.B. 1935. *The Stone Age Races of Kenya*. London: Oxford University Press.

Leakey, L.S.B. 1936. *Stone Age Africa*. London: Oxford University Press.

Leakey, M.D., Owen, W.E. & Leakey, L.S.B. 1948. *Dimple-based pottery from central Kavirondo, Kenya Colony.* Nairobi: Coryndon Memorial Museum.

Lee, R.B. 1992. Art, science, or politics? The crisis in hunter-gatherer studies. *American Anthropologist* 94: 21–54. https://doi.org/10.1525/aa.1992.94.1.02a00030

Lee, R.B. & DeVore, I. (eds) 1968. *Man, the Hunter*. Chicago: Aldine.

Lejju, B.J. 2012. *The Influence of Climatic Change and Human-Induced Environmental Degradation on Lake Victoria.* Addis Ababa: Organisation for Social Science Research in Eastern and Southern Africa.

Lombard, M. & Parsons, I. 2011. What happened to the human mind after the Howiesons Poort? *Antiquity* 85: 1433–1443. https://doi.org/10.1017/S0003598X00062153

Lynch, M. & Robbins, L. 1977. Excavations at Lothagam, 1975: a comparison between a typology and computer study of stone artefacts. *Azania: Archaeological Research in Africa* 12: 43–52. https://doi.org/10.1080/00672707709511247

Mabulla, A.Z.P. 1996. Middle and Later Stone Age land use and lithic technology in the Eyasi Basin, Tanzania. Unpublished PhD thesis. Gainesville: University of Florida.

Mackay, G.R. 2008. *The Nìı̂'ìı̂' Hunting Stand Site: Understanding Technological Practice as Social Practice in Subarctic Prehistory.* Occasional Papers in Archaeology No. 15. Archaeology Programme, Government of Yukon.

MacLean, R. 1994. Late Stone Age and Early Iron Age settlement in the interlacustrine region: a district case study. *Azania: Archaeological Research in Africa* 29/30: 296–302. https://doi.org/10.1080/00672709409511685

MacDonald, K., Mapunda, B., Mitchell, P., & Robertshaw, P. 2011. Editorial.Azania: Archaeological Research in Africa, 46, 121–122.

Malmström, H., Gilbert, M.T. P., Thomas, M.G., Brandström, M., Stora, J., Petra Molnar, P., Andersen, P.K., Bendixen, C., Holmlund, G., Götherström, A. & Willerslev, E. 2009. Ancient DNA reveals lack of continuity between Neolithic hunter-gatherers and contemporary Scandinavians. *Current Biology* 19(20): 1758–1762. https://doi.org/10.1016/j.cub.2009.09.017

Marchant, R., Richer, S., Boles, O., Capitani, C., Courtney-Mustaphi, C., Lane, M., Prendergast, D., Stump, G., Cort, D., Kaplan, J. & Phelps, L.N. 2018. Drivers and trajectories of land cover change in East Africa: human and environmental interactions from 6000 years ago to present. *Earth Science Reviews* 178: 322–378. https://doi.org/10.1016/j.earscirev.2017.12.010

Marean, C. 1992. Hunter to herder: large mammal remains from the hunter-gatherer occupation at Enkapune ya Muto rockshelter. *African Archaeological Review* 10: 65–127. https://doi.org/10.1007/BF01117697

Marean, C., Mudida, N. & Reed, K.E. 1994. Holocene paleoenvironmental change in the Kenyan central rift as indicated by micromammals from Enkapune ya Muto rockshelter. *Quaternary Research* 41: 376–389. https://doi.org/10.1006/qres.1994.1042

Marshall, F., 1990. Origins of specialized pastoral production in East Africa. Am. Anthropol. 92, 873–894.

Marshall, F. 1991. Appendix II: Mammalian fauna from Gogo Falls. *Azania: Archaeological Research in Africa* 26: 175–79. https://doi.org/10.1080/00672709109511425

Marshall, F. 1994. Food sharing and body part representation in Okiek faunal assemblages. *Journal of Archaeological Science* 21: 65–77. https://doi.org/10.1006/jasc.1994.1008

Marshall, F. 2000. The origins and spread of domestic animals in East Africa. In: Blench, R.M. & McDonald, K.C. (eds) *The Origins and Development of African Livestock: Archaeology, Genetics, Linguistics and Ethnography*: 191–221. London: University College London Press.

Mehlman, M.J. 1989. Later Quaternary archaeological sequences in northern Tanzania. Unpublished PhD thesis. Urbana-Champaign: University of Illinois.

Mirazón Lahr, M., Rivera, F., Power, R.K., Mounier, A., Copsey, B., Crivellaro, F., Edung, J.E., Maillo Fernandez, J.M., Kiarie, C., Lawrence, J., Leakey, A., Mbua, E., Miller, H., Muigai, A., Mukhongo, D.M., Van Baelen, A., Wood, R., Schwenninger, J.L., Grün, R., Achyuthan, H., Wilshaw, A. & Foley, R.A. 2016. Inter-group violence among early Holocene hunter-gatherers of West Turkana, Kenya. *Nature* 529: 394–398. https://doi.org/10.1038/nature16477

Misago, K. & Shumbusho, G. 1992. Archaeological and ethnoarchaeological research in the zones of Rutshuru and Masisi in northern Kivu. *Nyame Akuma* 38: 6671.

Moore, A.M.T. 2014a. Post-glacial transformations among hunter-gatherer societies in the Mediterranean and western Asia. In: Cummings, V., Jordan, J. & Zvelebil, M. (eds)

The Oxford Handbook of the Archaeology and Anthropology of Hunter-Gatherers: 456–478. Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199551224.013.038

Moore, A.M.T. 2014b. The spread of farming to the Adriatic: new insights from Dalmatia. *Eurasian Prehistory* 11(1–2): 155–164.

Morgan, C. 2012. Modeling modes of hunter-gatherer food storage. *American Antiquity* 77(4): 714–736. https://doi.org/10.7183/0002-7316.77.4.714

Morrison, D.M. 1994. Validity in lithic debitage analysis: an experimental assessment comparing quartzite to obsidian. MA thesis. Burnaby: Simon Fraser University.

Mosley, P.N. & Davison, S. 1992. Ugunja: A new Kansyore (Oltome) site. *Azania: Archaeological Research in Africa* 27: 129–134. https://doi.org/10.1080/00672709209511433

Murdock, G.P. 1959. *Africa: Its Peoples and their Culture History*. New York: McGraw-Hill.

National Environment Management Authority (NEMA). 2009. … (consulted 17 September 2016). http://www.grida.no/files/publications/uganda-atlas-2009.pdf

Nelson, M.C. 1991. The study of technological organization. In: Schiffer M.B. (ed.) *Archaeological Method and Theory* 3: 57–100.

Nelson, C.M., & Posnansky, M. 1970. The stone tools from the re-excavation of Nsongezi rock shelter, Uganda. *Azania: Archaeological Research in Africa* 5: 119–72. https://doi.org/10.1080/00672707009511530

Nenquin, J. 1967. Notes on the protohistoric pottery cultures in the Congo–Rwanda–Burundi region. In: Bishop, W. & Clark, J.D. (eds) *Background to Evolution in Africa*: 651–658. Chicago: University of Chicago Press.

Nenquin, J. 1967a. *Contributions to the Study of Prehistoric Cultures of Rwanda and Burundi*. Tervuren: Musee Royal de L'Afrique Centrale.

Nenquin, J. 1971. Archaeological prospection in the islands of Buvuma and Bugaia, Lake Victoria Nyanza (Uganda). *Proceedings of the Prehistoric Society*: 381–418. https://doi.org/10.1017/S0079497X00012706

Novak, M. & Šlaus, M. 2011. Vertebral pathologies in two early modern period (16th–19th century) populations from Croatia. *American Journal of Physical Anthropology* 145(2): 270–281. https://doi.org/10.1002/ajpa.21491

Nuwagaba, A. & Namateefu, L.K. 2013. Climate change, land use and food security: survey of western Uganda. *Journal of Earth Sciences and Geotechical Engineerin*g 3(2): 6–72.

Nyende, J., Van Tonder, G. & Vermeulen, D. 2014. Geological evolution of low-lying areas in Uganda: impacts of climate variability on rock weathering and consequences on groundwater quality and availability—a review. *Environmental Science and Water Resources* 3(8): 163–183.

O'Brien, T. 1939. *The Prehistory of the Uganda Protectorate.* Cambridge: Cambridge University Press.

Okungu, J.O., Njoka, S., Abuodha, J.O.Z. & Hecky, R.E. 2021. An introduction to Lake Victoria catchment, water quality, physical limnology and ecosystem status (Kenyan sector). In: *Lake Victoria Environment Report, Water Quality and Ecosystem Status: Kenya National Water Quality Synthesis Report*. Entebbe: Ministry of Water, Lands and Environment, Lake Victoria Environmental Management Project. (consulted 10 July 2020) https://aquadocs.org/handle/1834/7140

Oliver, R. 1966. The problem of Bantu expansion. *Journal of African History* 7: 361–76. https://doi.org/10.1017/S0021853700006472

Oliver, R., & Fagan, B. 1975. *Africa in the Iron Age: 500 BC to 1400 AD*. Cambridge: Cambridge University Press.

Onjala, I., Kibunjia, M., Odede, F. & Oteyo, G. 1999. Recent archaeological investigation along the Sondu-Miriu River, Kenya. *Azania: Archaeological Research in Africa* 34: 116–122. https://doi.org/10.1080/00672709909511476

Onyango-Abuje, J.C. 1977. A contribution to the study of the Neolithic in East Africa with particular reference to Nakuru-Naivasha basins. Unpublished PhD thesis. Berkeley: University of California

Ortner, D.J. 1998. *Identification of Pathological Conditions in Human Skeletal Remains*. 2nd edition. Cambridge: Academic Press.

Orton, C., Tyres, P. & Vince, A. 1993. *Pottery in Archaeology*. Cambridge: Cambridge University Press.

Owen, W.E. 1941. The early Smithfield culture of Kavirondo (Kenya) and South Africa. *Man New Series* 41: 115.

Pearce, S. & Posnansky, M. 1963. The re-excavation of Nsongezi rock-shelter, Ankole. *Uganda Journal* 27(1): 85–94.

Piggot, S.1965. Ancient Europe. Edinburgh: Edinburgh University Press.

Phillipson, D.W. 1976. The Early Iron Age in eastern and southern Africa: a critical re-appraisal. *Azania: Archaeological Research in Africa* 11: 1–23. https://doi.org/10.1080/00672707609511229

Phillipson, D. 1977a. *The Later Prehistory of Eastern and Southern Africa*. London: Heinemann.

Phillipson 1977b. Lowesera. *Azania: Archaeological Research in Africa* 12: 1–32. https://doi.org/10.1080/00672707709511245

Phillipson, D.W. 1993. *African Archaeology*, 2nd ed. Cambridge: Cambridge University Press.

Phillipson, D.W. 2005. *African Archaeology*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511800313

Posnansky, M. 1961a. Pottery from archaeological sites in East Africa. *Journal of African History* 2(2): 177–198. https://doi.org/10.1017/S0021853700002401

Posnansky, M. 1961b. Bantu genesis. *Uganda Journal*: 86–93.

Posnansky, M. 1968. Bantu genesis—archaeological reflections. *Journal of African History* 9(1): 1–11. https://doi.org/10.1017/S002185370000832X

Posnansky, M., Reid, A. & Ashley, C. 2005. Archaeology on Lolui Island, Uganda 1964–5. *Azania: Archaeological Research in Africa* 40: 70–100. https://doi.org/10.1080/00672700509480414

Prehistoric Ceramics Research Group. 2010. *The Study of Prehistoric Pottery: General Policies and Guidelines for Analysis and Publication.* Occasional papers numbers 1 and 2 (3rd ed.), Norwich: Prehistoric Ceramics Research Group.

Prendergast, M.E. 2008. Forager variability and transitions to food production in secondary settings: Kansyore and pastoral neolithic economies in East Africa. PhD dissertation. Cambridge: Harvard University. https://doi.org/10.1080/00671990903052330

Prendergast, M.E. 2010. Kansyore fisher-foragers and transitions to food production in East Africa: the view from Wadh Lang'o, Nyanza Province, Western Kenya. *Azania: Archaeological Research in Africa* 45: 83–111. https://doi.org/10.1080/00672700903291765

Prendergast, M.E., Grillo, K.M., Mabulla, A.Z.P. & Wang, H. 2014. New dates for Kansyore and pastoral Neolithic ceramics in the Eyasi Basin, Tanzania. *Journal of African Archaeology* 12(1): 89–98. https://doi.org/10.3213/2191-5784-10245

Prendergast, M.E. & Lane, P.J. 2010. Middle Holocene fishing strategies in East Africa: zooarchaeological analysis of Pundo, a Kansyore shell midden in northern Nyanza

(Kenya). *International Journal of Osteoarchaeology* 20(1): 88–112. https://doi.org/10.1002/oa.1014

Prendergast, M.E., Luque, L., Dominguez-Rodrigo, M., Diez-Martin, F., Mabulla A.Z.P. & Barba, R. 2007. New excavations at Mumba rockshelter, Tanzania. *Journal of African Archaeology* 5: 217–244. https://doi.org/10.3213/1612-1651-10093

Prendergast, M.E., Mabulla, A.Z.P., Grillo, K.M., Broderick, L.G., Seitsonen, O., Gidno, A.O. & Gifford-Gonzalez, D. 2013. Pastoral Neolithic sites on the southern Mbulu Plateau, Tanzania. *Azania: Archaeological Research in Africa* 48(4): 498–520. https://doi.org/10.1080/0067270X.2013.841927

Price, T. D., and A. B. Gebauer (eds.), 1992. The final frontier: foragers to farmers in southern Scandinavia. In A. B. Gebauer and T. D. Price (eds.), Transitions to Agriculture in Prehistory:97–115.

Price, T.D. 1995. Social inequality at the origins of agriculture. In: Feinman, G.M. & Price, T.D. (eds) *Foundations of Social* Inequality: 129–151. London: Plenum. https://doi.org/10.1007/978-1-4899-1289-3_5

Price, D. 2000a. Europe's first farmers: an introduction. In: Price, D. (ed.) *Europe's First Farmers*: 1–18. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511607851.002

Price, D. 2000b. The introduction of farming in northern Europe. In: Price, D. (ed.) *Europe's First Farmers*: 260–300. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511607851.011

Price, D. 2000c. Lessons in the transition to agriculture. In: Price, D. (ed.) *Europe's First Farmers*: 301–318. Cambridge: Cambridge University Press https://doi.org/10.1017/CBO9780511607851.012

Price, T.D. & Brown, J.A. 1985. *Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity*. Orlando: Academic Press.

Reid, A. 2002. Recent archaeological discoveries in Buganda, their implications for heritage management policies. *Uganda Journal* 48: 87–102. https://doi.org/10.4314/uj.v48i1.23005

Reid, A. & Ashley, C.Z. 2014. Islands of intensive agriculture in Victoria Nyanza. In: Fuller, D. & Murray, M.A. (eds) *African Flora, Past Cultures and Archaeobotany*. Chicago: University of Chicago Press.

Reid, D.A.M. 1994. Early settlement and social organisation in the interlacustrine region. *Azania: Archaeological Research in Africa* 29–30: 303–313. https://doi.org/10.1080/00672709409511686

Reid, D.A.M. & Njau, J.E.K. 1994. Archaeological research in Karagwe District. *Nyame Akuma* 41: 68–73.

Rice, P. 1987. *Pottery Analysis: A Sourcebook*. Chicago: University of Chicago Press.

Rice, P.M. 1999. On the origins of pottery. *Journal of Archaeological Method and Theory* 6: 1-54. https://doi.org/10.1023/A:1022924709609

Richards, M.P., Schulting, R.J. & Hedges, R.E. 2003. Sharp shift in diet at onset of Neolithic. *Nature* 425: 366. https://doi.org/10.1038/425366a

Rindos, D. 1980. Symbiosis, instability and the origin and the spread of agriculture: a new model. *Current Anthropology* 21(6): 751–772. https://doi.org/10.1086/202569

Robb, J. 2013. Material culture, landscapes of action, and emergent causation: a new model for the origins of the European Neolithic. *Current Anthropology* 54(6): 657–683. https://doi.org/10.1086/673859

Robbins, L.H. 1984. Late prehistoric aquatic and pastoral adaptations west of Lake Turkana, Kenya. In: Clark, J.D. & Brandt, S.A (eds) *Hunters and Farmers*: 206–212. Berkeley: University of California Press.

Robbins, L.H., McFarlin, S.A., Brower, J.L. & Hoffman, A.E. 1977. Rangi: a Late Stone Age site in Karamoja District, Uganda. *Azania: Archaeological Research in Africa* 12: 209-233. https://doi.org/10.1080/00672707709511256

Robertshaw, R &Collett, D. 1983. A New Framework for the Study of Early Pastoral Communities in East Africa. The Journal of African History, 24: 289-301 doi:10.1017/S002185370002202

Robertshaw , P, Collett, D , Gifford , D &. Mbae, N,B. 1983).

Shell Middens on the Shores of Lake Victoria, Azania: Archaeological Research in Africa, 18:1, 1-43, DOI: 10.1080/00672708309511313

Robertshaw, P. 1984. Archaeology in eastern Africa: recent developments and more dates. *Journal of African History* 25: 369–393. https://doi.org/10.1017/S0021853700028449

Robertshaw, P. 1985. Preliminary report on excavations at Gogo Falls, South Nyanza. *Nyama Akuma* 26: 25–26.

Robertshaw, P.T. (ed.) 1990a. *A History of African Archaeology*. Oxford: James Currey.

Robertshaw, P.T. 1990b. The development of archaeology in East Africa. In: Robertshaw, P.T. (ed.) *A History of African Archaeology*: 78–94. Oxford: James Currey.

Robertshaw, P.T. 1991. Gogo Falls: a complex site east of Lake Victoria. *Azania: Archaeological Research in Africa* 26: 63–195. https://doi.org/10.1080/00672709109511425

Robertshaw, P. 1993. The beginning of food production in southwestern Kenya. In: Shaw, T., Sinclair, P., Andah, B. & Okpoko, A. (eds) *The Archaeology of Africa: Food, Metals and Towns*: 358–371. New York: Routledge.

Robertshaw, P. 1994. Archaeological survey, ceramic analysis, and state formation in western Uganda. *African Archaeological Review* 12: 105–131. https://doi.org/10.1007/BF01953040

Robertshaw, P.T., Collett, D., Gifford, D. & Mbae, N.B. 1983. Shell midden on the shores of Lake Victoria. *Azania: Archaeological Research in Africa* 18: 1–44. https://doi.org/10.1080/00672708309511313

Robertshaw, P.T. & Mawson, A. 1981. Excavations in eastern equatorial, southern Sudan, 1980. *Azania: Archaeological Research in Africa* 16: 55–95. https://doi.org/10.1080/00672708109511286

Robertson, J.H. & Bradley, R. 2000. A new paradigm: the African Early Iron Age without Bantu migration. *History in Africa* 27: 287–323. https://doi.org/10.2307/3172118

Rösing, F.W. & Kvaal, S.I. 1998. Dental age in adults—a review of estimation methods. In: Alt, K.W., Rösing, F.W. & Teschler-Nicola, M. (eds) *Dental Anthropology*: 443–468. Vienna: Springer. https://doi.org/10.1007/978-3-7091-7496-8_22

Roux, V. 2019. *Ceramics and Society: A Technological Approach to Archaeological Assemblage.* Cham: Springer. https://doi.org/10.1007/978-3-030-03973-8

Sadr, K. 2002. Encapsulated Bushmen in the archaeology of Thamaga. In: Kent, S. (ed.) *Ethicinity, Hunter-Gatherers, and the 'Other': Association and Assimilation in Africa*: 28–47. Washington DC: Smithsonian Institution Press.

Sahlins, M. 1974. *Stone Age Economics*. Chicago: Aldine.

Sealy, J. 2006. Diet, mobility, and settlement pattern among Holocene hunter-gatherers in southernmost Africa. *Current Anthropology* 47(4): 569–595. https://doi.org/10.1086/504163

Sealy, J.C. & Van der Merwe, N.J. 1986. Isotope assessment and the seasonal-mobility hypothesis in the Southwestern Cape of South Africa. *Current Anthropology* 27: 135-150. https://doi.org/10.1086/203404

Sealy, J.C., Van der Merwe, N., Lee-Thorp, J.A. & Lanham, J. 1987. Nitrogen isotopic ecology in southern Africa: implications for environmental and dietary tracing.

Geochimica et Cosmochimica Acta 51: 2707–2717. https://doi.org/10.1016/0016-7037(87)90151-7

Schmidt, P. 1978. *Historical Archaeology: A Structural Approach in an African Culture*. Westport: Greenwood Press.

Schmidt, P.R. 1997. *Iron Technology in East Africa: Symbolism, Science, and Archaeology*. Bloomington: Indiana University Press.

Schmidt, P., Lejju, J., Asiimwe, R. et al .2016 *Ancient Settlements and Tropical Forest Landscape Changes in Western Uganda*. Johannesburg: Center for African Studies.

Schoenbrun, D.L. 1993. We are what we eat: ancient agriculture between the Great Lakes. *Journal of African History* 34: 1–31. https://doi.org/10.1017/S0021853700032989

Schoenbrun, D.L. 1998. *A Green Place, a Good Place: Agrarian Change, Gender and Social Identity in the Great Lakes Region to the 15th century*. Portsmouth: Heinemann.

Scheuer, L. & Black, S. 2004. *The Juvenile Skeleton*. New York: Academic Press.

Seitsonen, O. 2004. Lithics after Stone Age in East Africa: Wadh Lang'o case study. Unpublished MA thesis. Helsinki: University of Helsinki.

Seitsonen, O. 2010. Lithics use at Kansyore sites in East Africa: technological organisation at four recently excavated sites in Nyanza Province, Kenya. *Azania: Archaeological Research in Africa* 45: 47–81. https://doi.org/10.1080/00672700903291740

Shakoane, G.P. 2016. Sex estimation using metric characteristics from the scapula. Honours Thesis. Pretoria: University of Pretoria.

Shipton, C., Roberts, P. & Boivin, N. 2018. 78,000-year-old record of Middle and Later Stone age innovation in an East African tropical forest. *Nature Communications* 9, article 1832.| https://doi.org/10.1038/s41467-018-04057-3

Siiriäinen, A. 1981. Problems of the East Fennoscandian Mesolithic. *Finskt Museum* 1977: 5–31.

Siiriäinen, A. 1984. *Excavation in Laikipia. An archaeological study of the recent prehistory in the Eastern Highlands of Kenya*. (Suomen muinaismuistoyhdistyksen aikakauskirja 86). Helsinki: Vammalan kirjapaino.

Skoglund, P., Malmström, H., Raghavan, M., Storå, J., Hall, P., Willerslev, E., Gilbert, M.T., Götherström, A. & Jakobsson, M. 2012. Origins and genetic legacy of Neolithic farmers and hunter- gatherers in Europe. *Science* 336: 466–469. https://doi.org/10.1126/science.1216304

Solomon, J.D. 1939. The Pleistocene succession in Uganda. In: O'Brien, T.P. (ed.) *The Prehistory of Uganda Protectorate:* 15–50. Cambridge: Cambridge University Press.

Soper, R. 1969. Radiocarbon dating of dimple-based ware in western Kenya. *Azania: Archaeological Research in Africa* 4: 148–153. https://doi.org/10.1080/00672706909511514

Soper, R. 1971a. A general review of the Early Iron Age of the southern half of Africa. *Azania: Archaeological Research in Africa* 6: 5–3. https://doi.org/10.1080/00672707109511545

Speth, J. and Johnson, G. 1976. Problems in the use of correlation for the investigation of tool kits and activity areas. In Griffin, J. G. (ed. C. Cleland) Cultural Change and Continuity: 35-76. New York: Academic Press

Soper, R. 1971b. Early iron pottery types from East Africa: comparative analysis. *Azania: Archaeological Research in Africa* 6: 39–52. https://doi.org/10.1080/00672707109511546

Soper, R. 1982. Bantu expansion into Eastern Africa. In: Ehret, C. & Posnansky, M. (eds) *The Archaeological and Linguistic Reconstruction of African History*: 223–238. Berkeley: University of California Press. https://doi.org/10.1525/9780520314757-013

Soper, R. 1985. Roulette decoration on African pottery: technical considerations, dating and distribution. *African Archaeology Review* 3: 29–51. https://doi.org/10.1007/BF01117454

Soper, R.C. & Golden, B. 1969. An archaeological survey of Mwanza region, Tanzania. *Azania: Archaeological Research in Africa* 4: 15–78.

Speth, J.D. 2015. When did humans learn to boil? *Paleoanthropology* 54–67. https://doi.org/10.4207/PA.2015.ART96

Stager, J.C., Cumming, B. & Meeker, L.D. 1997. An 11,400-year, high-resolution diatom record from Lake Victoria, East Africa. *Quaternary Research* 47: 81–89. https://doi.org/10.1006/qres.1996.1863

Stager, J.C., Cumming, B.F. & Meeker, L.D. 2003. A 10,000-year-high-resolution diatom record from Pilkington Bay, Lake Victoria, East Africa. *Quaternary Research* 59(2): 172–181. https://doi.org/10.1016/S0033-5894(03)00008-5

Stager, J.C. & Johnson, T.C. 2000. A 12,400 14c yr offshore diatom record from east central Lake Victoria, East Africa. *Journal of Paleolimnology* 23(4): 373–383. https://doi.org/10.1023/A:1008133727763

Stahl, A. B. 1984. A History and Critique of Investigations into Early African Agriculture. In Clark J. D. and Brandt, S. A. (eds.) From Hunters to Farmers:.9-21. Berkeley

Stephens, R. 2007. A history of motherhood, food procurement and politics in east-central Uganda to the nineteenth century. Unpublished PhD thesis. Evanston: Northwestern University.

Stewart, K. 1991. Appendix III: Fish remains from Gogo Falls. *Azania: Archaeological Research in Africa* 26: 179–180. https://doi.org/10.1080/00672709109511425

Stewart, K. 1993. Iron Age ceramic studies in Great Lakes, Eastern Africa. *African Archaeological Review* 11: 21. https://doi.org/10.1007/BF01118141

Stiles, D. 2001. Hunter-gatherer studies: the importance of context. *Africa Study Monographs* 26: 41–65.

Sutton, J.E.G. 1966. The archaeology and early peoples of the highlands of Kenya and northern Tanzania. *Azania: Archaeological Research in Africa* 1: 37–57. https://doi.org/10.1080/00672706609511340

Sutton, J.E. 1968. The settlement in east Africa. In: Ogot, B.A. (ed.) *Zamani: A Survey of East African History*. Dar es Salaam: Longman Tanzania.

Sutton, J.E.G. 1990. *A Thousand Years of East Africa*. Nairobi: British Institute in Eastern Africa.

Sutton, J.E.G. 1994. The interlacustrine region. *Azania: Archaeological Research in Africa* 29-30: 263–9. https://doi.org/10.1080/00672709409511683

Testart, A. 1982. The significance of storage among hunter-gatherers: residence patterns, population densities, and social inequalities. *Current Anthropology* 23: 523–537. https://doi.org/10.1086/202894

Tibesasa, R. 2010. The cultural sequence on Busi Island, Lake Victoria. *Journal of African Archaeology Network* 8: 89–109.

Tibesasa, R. & Jones, M. (2021). Shells, sand and Holocene archaeology in Lake Victoria Nyanza, eastern Uganda. *Nyame Akuma* 95:55-61

Tibesasa, R., Krüger, G.C., Jones, M., Hall, G. & Ashley, C. In prep. An osteoarchaeological and stable isotope investigation of Kansyore Late Stone Age and Early Iron Age skeletons from the northern shores of Lake Victoria Nyanza, Eastern Uganda

Tibesasa, R., Shipton, C., Crowther, A., & Jennings, C. In prep. The forager to farming transition in Uganda: excavation at Nkuba rockshelter, Bussi Island, Lake Victoria. *Azania: Archaeological Research in Africa* (forthcoming).

Thorp, C. 1992. Nguru Hills: Iron Age and earlier ceramics. *Azania: Archaeological Research in Africa* 27: 21–44. https://doi.org/10.1080/00672709209511429

Tryon, C.A., Faith, J.T., Peppe, D.J., Beverly, E.J., Blegen, N., Blumenthal, S.A., Chritz, K.L., Driese, S.G., Patterson, D. & Sharp, W.D. 2016. The Pleistocene prehistory of the Lake Victoria basin. *Quaternary International* 404: 100–114. https://doi.org/10.1016/j.quaint.2015.11.073

Uganda Bureau of Statistics. 2009/2010. *Higher Local Government Statistical Abstract. Busia District* (consulted 2 February 2017). http://www.ubos.org/onlinefiles/uploads/ubos/2009_HLG_%20Abstract_printed/Busia%20District.pdf

Van der Merwe, N.J. 1992. Light stable isotopes and the reconstruction of prehistoric diets. *Proceedings of the British Academy* 77: 247–264.

Van Grunderbeek, M-C. 1982. The Iron Age in Rwanda and Burundi. *Nyame Akuma* : 26–31.

Van Grunderbeek, M-C. 1988. Essai d'etude typologique de ceramique urewe dans la region des collines au Burundi et Rwanda. *Azania: Archaeological Research in Africa* 23: 11–55. https://doi.org/10.1080/00672708809511386

Van Grunderbeek, M-C., Roche, E. & Doutrelepont, H. 2001. Un Type de Foumeau de Fonte de Fer Associe a la Culture Urewe (Age du Fer Ancien) Au Rwanda et au Burundi. *Mediterranean Archaeology* 14: 271–297.

Van Noten, F.L. 1974. Excavations at the Gordon's Bay shell midden, south-western Cape. *South African Archaeological Bulletin* 29: 122–142. https://doi.org/10.2307/3888340

Vansina, J. 1994. A slow revolution: farming in sub-equatorial Africa. *Azania: Archaeological Research in Africa* 29–30: 15–26. https://doi.org/10.1080/00672709409511658

Wadley, L. 2015. Those marvellous millennia: the Middle Stone Age of southern Africa. *Azania*: *Archaeological Research in Africa* 50: 155–226. https://doi.org/10.1080/0067270X.2015.1039236

Walker, P.L. 1978. A quantitative analysis of dental attrition rates in the Santa Barbara Channel area. *American Journal of Physical Anthropology* 48: 101–106. https://doi.org/10.1002/ajpa.1330480115

Watts, R., Mugabowagahunde, M., Ntagwabira, A. & Giblin, J. 2020. Deposition of modified human remains as evidence for complex mortuary treatment in East Africa during the first millennium AD. *International Journal of Osteoarchaeology* 30: 824–834. https://doi.org/10.1002/oa.2912

Wayland, E.J. 1924. The Stone Age in Uganda. *Man New Series* 24: 124. https://doi.org/10.2307/2788505

Weisdorf, J.L. 2005. From foraging to farming: explaining the Neolithic revolution. *Journal of Economic Surveys* 19(4): 561–586. https://doi.org/10.1111/j.0950-0804.2005.00259.x

Westerhof, A.B., Harma, P., Isabirye, E., Katto, E., Koistinen, T., Kuosmanen, E., Lehto, T., *et al.* 2014. Geology and geodynamic development of Uganda with explanation of the 1:1,000,000 -scale geological map. *Geological Survey of Finland, Special Paper* 55.

Wetterstrom, W. 1991. Appendix IV: Plant remains from Gogo Falls. *Azania: Archaeological Research in Africa* 26: 179–191. https://doi.org/10.1080/00672709109511425

Whallon, R. 2006. Social networks and information: Non-‘utilitarian’ mobility among hunter-gatherers. *Journal of Anthropological Archaeology* 25: 259–270. https://doi.org/10.1016/j.jaa.2005.11.004

White, T.D., Black, M.T. & Folkens, P.A. 2011. *Human osteology*. London: Academic Press. https://books.google.co.za/books?isbn=0080920853 Retrieved on 7/02/2018

Widmer, R. 1988. *The Evolution of the Calusa: A Nonagricultural Chiefdom on the Southwest Florida Coast*. Tuscaloosa: University of Alabama Press.

Woodburn, J. 1980. Hunters and gatherers today and reconstruction of the past. In: Gellner, E. (ed.) *Soviet and Western Anthropology*: 95–117. London: Duckworth. https://doi.org/10.7312/gell92894-009

Woodburn, J. 1982. Egalitarian Societies. *Man New Series* 17: 431–45. https://doi.org/10.2307/2801707

Woodburn, J. 1988. African hunter-gatherer social organization: is it best understood as a product of encapsulation? In: Tim, I., David, R. & Woodburn, J. (eds) Hunters and Gatherers 1: History, Evolution, and Social Change: 31–64. Oxford: Berg Press.

Wright, G.A. 1978. Social differentiation in the Early Natufian. In: Redman, C.L. & Berman, M.J. (eds) *Social Archaeology: Beyond Subsistence and Dating*: 201–223. New York: Academic Press.

Yirka, B. 2016, 30 March. Study of ancient Japanese hunter-gatherers suggests warfare not inherent in human nature. Phys.org. (consulted 7 November 2017). https://phys.org/news/2016-03-ancient-japanese-hunter-gatherers-warfare-inherent.html

Young, R. & Thompson, G. 1999. Missing plant foods? Where is the archaeobotanical evidence for sorghum and finger millet in East Africa? In: Van der Veen, M. (ed) *The Exploitation of Plant Resources in Ancient Africa*: 63–72. New York: Kluwer Academic. https://doi.org/10.1007/978-1-4757-6730-8_6

Zhu, M.R.W. 2016. Reconstructing the diets of southern African farmers: comparing stable isotopes across body tissues. Unpublished MSc thesis. Cape Town: University of Cape Town.

Zhu, M. & Sealy, J. 2019. Multi-tissue stable carbon and nitrogen isotope models for dietary reconstruction: evaluation using a southern African farming population. *American Journal of Physical Anthropology* 168: 145–153. https://doi.org/10.1002/ajpa.23731

Zvelebil, M. 1986. Mesolithic prelude and Neolithic revolution. In: Zvelebil, M. (ed.) *Hunters in Transition: Mesolithic Societies of Temperate Eurasia and their Transition to Farming*: 5–15. Cambridge: Cambridge University Press.

Zvelebil, M. & Dolukhanov, P. 1991. Transition to farming in eastern and northern Europe. *Journal of World Prehistory*, 233–278. https://doi.org/10.1007/BF00974991

Zvelebil, M. & Rowley-Conwy, P. 1984. Transition to farming in northern Europe: a hunter-gatherer perspective. *Norwegian Archaeological Review* 17(2): 104–128. https://doi.org/10.1080/00293652.1984.9965402

11.0 Appendices

Appendix 1: Survey Form Used in the Study

250 m SE (

2016 SURVEY FORM

Recorder Alica
Date: 25/5/16

Site Name: Namaboni | Site No: C

District: Nyamayingo
County: Bukedi South
Sub-county: Banda
Parish: Loutolo
Location: Namboni Village

Map No:
Map Scale:
Grid Ref: 922 (MP)
Latitude (N/S) 00° 13' 24.0"
Longitude: 033° 55' 40.0"

Landowner: Alice Bwire
Address: Namaboni

Informants: Moses
Address or Location
Namaboni

Cultural characteristics: Shell, Lithics, Ceramics, possible slag (?)
(e.g) stone, iron, historic Likely Kansyore

Site type: (e.g cave, open) Open, hillside
Site activity: (eg settlement, smelting)
Site position: (eg hill top/ side/base, river bed, terrace hill side in soy bean Field
Site area: (measured/estimated) ~ 25m X 60m
Site aspect: (N,E,S,W)
Surface conditions: Sandy, soy growing, but not well
Site depth: (measured/estimated)
Vegetation: (eg forest, cultivation, grassland) Cultivation
Nearest water: (e.g stream, river, swamp, lake, dam) Lake Distance ~ 50m

Artefact seen or collected (tick):

a. flaked stone
b. ground stone
c. pottery
d. metal
e. bone
f. shell
g. glass
h. metallurgical waste ?
i. clay
j. wood
k. others (state)

Quantity collected
Place of storage

Features (tick)

a. Earthworks
b. Shrine
c. Graves
d. Paintings
e. engravings
f. mounds
g. ash middens
h. stone walls/ platforms
i. house remains
j. pits/shafts
k. others (state)

Myths, traditions and or historical association

Research History

Surface Collectors: Melkie, Mica, Moses — Date: 25/5/16

Exacavators: — Date:

Published references: (attach sheet if necessary)

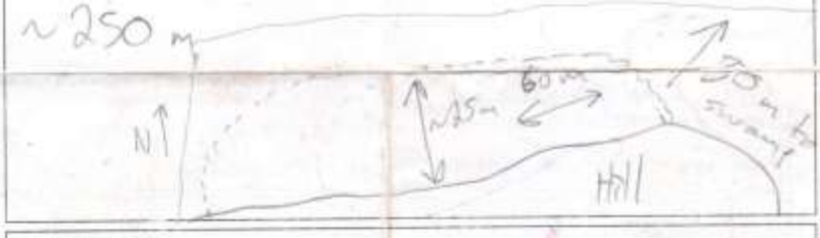
Dating: (estimate and source) 2000-8000 BP Kansyore?

Photographs: 1955 (from NW); 1954 (from N)

Photographer: Mica Jones — Date: 25/5/16 — details: (view/where kept) On Mica's memory card

Location details: (how to get there, sketch plan of site-attach separate details if necessary)

Walk SE (220° W) from Namatoni B ~250 m



Site significance

Present disturbance: (eg vandalism, tree, roc:s, animal burrows, erosion)

Possible future disturbances: (eg roads, buildings, dams) Shell mining planned for July 2016.

Cultural development potential:

Protection status: (protect/ mitigate damag. / ignore)

Note: The whole [illegible] is within a Sorghum plantation
- Poss. salt flats to NW, [illegible] between Nam B + C

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Appendix 2: Excavation Form

NORTHERN SHORES OF LAKE VICTORIA NYANZA-2016 –EXCAVATION FORM

Date 24/5/2016 Excavators M.G, B.T, A.T, M.J, T.C, N.O

Site LUGALA A Unit I N: 00° 11' 46.5" E: 033° 53' 52.2"

DATUM 100 Sub datum corner

Surface elevation ...m. Unit dimension (m) 2 X 2

1. Level designation ... depth 10 cm top 80 cm bottom 90 cm
2. Excavation methods Arbitrary

   Tools Trowels, Handshovels,
3. Flot ... Volume 10 Ltrs (l) phytolith sample(50g)

   Number of buckets of soil from each level (including Flot) ...

   Features ... Level: 8
4. Soil description: colour dry 7.5YR5/3 Brown colour wet 7.5YR4/3 Brown

   Texture: Sand Light Loam Loam Heavy loam Light Clay Clay
5. Disturbance: roots insects animal burrow other:
6. Extent and shape: Describe the shape (eg. Irregular,all-over, etc.)

   Irregular shape.

   It is regular from the North and becomes irregular from 15cm southwards
7. Sketch: show north and direction of slope if any

8. Description: Why begin a new level? What changes did you consider in terms of texture, colour artifacts? How is it different from the above level? Because we were digging spits

   The soil colour changed from pale brown to brown however the soil texture stayed sandy.
9. Observations: What is the relationship of this level with the previous one?

   Level eight is below level seven.
10. Collected materials soil, shells, Human bones
11. Datable materials
12. Trench plan (use graph book)

Appendix 3: Ceramic Analysis Form

(12)

Pottery fabric record sheet

Site Name: LUGALA A I	site code: LUG A I	
Described by: Ruth Tibesasa	Date of examination: 08/06/2017	Fabric code: DOMM
Pottery date range:	Colour range: 2.5YR 4/4 Reddish brown	sherd no: 1

Firing	Exterior: OX✓ UN, IR			Interior: OX✓ UN, IR			Core: OX✓ UN, IR
Hardiness	Soft	Hard ✓	Very Hard				
Texture	Smooth	Soapy ✓	Sandy	Very sandy	Granular		
Fracture	Conchoidal	Smooth	Fine	Irregular ✓	Hackly	Laminated	
Technology	Handmade	Wheel made	Uncertain				

Inclusions	**Frequency**	**Sorting**	**Roundness**	**size**
DO ✓	R (< 3%)	Very well sorted	'A'	VF (up to 0.1mm)
PO / Qu	S (3-9%)	well sorted	Sub 'A' ✓	F(0.1-0.25mm)
GR	M (10-19) ✓	moderately sorted	Sub 'R'	M (0.25-1.00mm) ✓
IO	C (20-29%)	poorly sorted	'R'	C (1.00-3.00mm)
MI	V (30-39%)		Well-'R'	VC (3.00mm+)
SH	A (40% +)			
RO				
SS				
QT				
IV				

Description: Red paint observed one of the sherds. The decoration Rocker-Stamp dec tech serrated edge implement, roundish

phases/layers: 20 (10cm)

*part of the inside *removed* 'missing' or washed away or weathered away'

Appendix 4: A Preliminary Report on the Fauna from Namundiri A and Namaboni B in Eastern Uganda

Mica Jones

Introduction

The Kansyore were a group of fisher-hunter-gatherers who occupied various lake and riverine environments throughout eastern and central Africa between ~8,000-2,000 BP (Dale 2007; Dale and Ashley 2010; Prendergast 2008; Prendergast and Lane 2010). It has been argued based on investment in material culture, place, and land-use patterns that hunter-gatherers living on Kansyore sites practiced a delayed-return subsistence system with concepts of ownership (Dale et al 2004, Prendergast 2008). Two types of Kanysore sites are known, shell middens on the lake shore and open air settlements close to rapids on rivers leading to the lake. Both are characterized archaeologically by the heavy use of distinctive pottery, with some change through time, and a subsistence base centered on the seasonal exploitation of fish and shellfish. In addition to aquatic resources, the Kansyore also hunted a diverse array of terrestrial/amphibious species native to the Lake Victoria region such as buffalo, hippopotamus, warthog, python, and crocodile (Prendergast 2008; Marshall and Stewart 1994; Robertshaw et al 1983). Archaeologically, the Kansyore are particularly interesting for representing the heaviest use of ceramics by hunter-gatherers prior to the arrival of food producers in eastern Africa (Dale 2007). They are also known for maintaining a relatively stable complex fisher-hunter-gatherer subsistence base throughout much of the Holocene.

Kansyore ceramics were first systematically described in the 1960s by Susannah Chapman (1967) on Kantsyore (*sic*) Island located in the Kagera River of southwestern Uganda. Since then, evidence for the Kansyore has been identified across many parts of east-central Africa (Kenya, Tanzania, Uganda, South Sudan), often in areas surrounding the banks and along rivers connected to Lake Victoria (Dale and Ashley 2010). Though interest in the Kansyore remained relatively low in the decades immediately following their initial identification, archaeologists have recently begun to examine the economic organization, settlement patterns, and subsistence strategies of this unique group of eastern African fisher-hunter-gatherers in more detail (Dale 2007; Prendergast 2008).

Darla Dale and Ceri Ashley (2010) argue for two distinct periods of Holocene Kansyore occupation in western Kenya. The Early Phase (ca. 8,000-7,000 BP) is marked by an increasingly specialized fish-based subsistence economy, a semi-sedentary seasonal mobility pattern, and the gradual adoption of ceramics. Sites attributed to the early phase of Kansyore occupation are located on shell middens near the lakeshore (Prendergast and Lane 2010; Robertshaw et al 1983). Alternatively, the Late/Terminal Phase (ca. 3,000-1,500 BP) is characterized by an increased use and diversification of ceramic technology, a shift toward greater terrestrial animal exploitation, and the partial adoption of domesticated animals (Dale and Ashley 2010; Prendergast 2008; Prendergast and Lane 2010). The Late/Terminal phase has been primarily identified at open air sites along rivers, often near rapids. To date, only one known lakeshore site, Usenge 3, contains Late/Terminal Kansyore materials (Lane et al 2006, 2007).

Following Dale and Ashley, Mary Prendergast and Paul Lane (2010) argue for an increasingly seasonal mobility pattern in the Late/Terminal Kansyore phase. By comparing known ecological and behavioral characteristics of fish species found in and around Lake Victoria today with zooarchaeological data from sites in southwestern Kenya, they have identified a pattern of increasing subsistence specialization focused on the exploitation of certain fish species as they became available during the annual cycle of wet and dry seasons. Prendergast (2008) and Prendergast and Lane (2010) suggest that an increased focus on barbels (genus *Barbus*) at riverine versus lakeshore sites through time coincides with intensifying seasonality in the region brought on by Middle Holocene aridification across northern Africa. At lakeshore sites characterized by shell middens, a predominance of species such as lungfish (*Protopterus aethiopicus*), catfish (*Claris sp.*), and tilapia (Cichilidae) suggests occupation during the dry season when lake levels were lower and such species would have been easier to catch. A diachronic change from lungfish and catfish dominance to greater percentages of tilapia is also noted through time at lakeshore sites, which may relate "to human choice, to improvements in fishing technology, or to an increase in the natural abundance of cichlid populations; or some combination of these" (Prendergast and Lane 2010, pp. 108). Relatively few Kansyore faunal assemblages have been studied, far fewer from the earlier lake side shell middens (see Prendergast and Lane 2010 and Robertshaw et al 1983). Little is known about local or more fine grained temporal variation in patterns of faunal exploitation.

This study of Kansyore fauna from Ruth Tibesasa's excavations builds on the earlier work of Dale and Ashley (2010) and Prendergast and Lane (2010) by examining the fauna from two previously unknown sites in eastern Uganda: Namundiri A and Namaboni B. Excavations at these sites was conducted by Ruth Tibesasa and her team in the summer of 2016. Initial sorting, identification, quantification, and recording of the faunal remains was carried out during and immediately following excavations. Analysis of the fauna from Namundiri A and Namaboni B represents the first systematic zooarchaeological study of the Kansyore in this part of Uganda. As a result, the findings from this study will be compared to faunal patterns identified at other previously analyzed Kansyore sites in western Kenya. Observed similarities in environmental contexts and archaeological assemblages allows for useful comparison between sites in these two geographic regions.

Namundiri A and Namaboni B are each located ~50 m from the shoreline of Lake Victoria and are characterized by dense shell middens that contain large amounts of Kansyore ceramics and fish bones. Dates are not yet available for either site. Given that Namundiri A and Namaboni B are lakeshore shell midden sites with no evidence for domestic fauna, I assume that both can be tentatively attributed to the Early Kansyore phase (ca. 8,000-7,000 BP). Preliminary evidence suggests, however, that Namundiri A may preserve evidence of Kansyore occupation from the Early through the Late/Terminal phase. The lowest stratigraphic level at Namaboni B (Level 7) does not contain ceramics while all levels that overlay it do. This strengthens the hypothesis that Namaboni B represents Kansyore occupation during the early phase when ceramic use was first developed.

Considering the likely early period of occupation for Namundiri A and Namaboni B, this analysis tests the following hypotheses proposed by Darla Dale and Ceri Ashley (2010) and Mary Prendergast and Paul Lane (2010) for subsistence change among the Early Kansyore:

H1: If fish and shellfish use intensifies through time, then an increase in the frequency of fish bones and mollusc shell relative to other fauna between the upper and lower levels at both sites will be observed.

H2: If tilapia become increasingly important to Kansyore subsistence relative to lungfish and catfish through time, then a decrease in the frequency of lungfish and catfish bones among the fish remains between the upper and lower levels at Namundiri A will be observed.

Hypothesis 2 cannot be tested at Namaboni B since all fish bones from the site have not yet been counted and recorded. Future analysis of the fauna from these sites will elaborate on the findings from this study.

In the following section I discuss methods used in sorting, identification, quantification, and relative taxonomic frequencies of the faunal assemblages from Namundiri A and Namaboni B. Issues with collection and identification of bones in the field are also addressed.

Methods

This zooarchaeological study of faunal remains from Namaboni B and Namundiri A in eastern Uganda follows analytic methods established in similar studies in northern and eastern Africa (Brain 1981; Gifford et al. 1980; Marshall and Stewart 1994; Prendergast 2008). Natural levels excavated in the field are used to examine change through time.

Two broad categories of identification were used in this study: maximally-identifiable (ID) and non-identifiable (NID) (Gifford and Crader 1977). Following Gifford and Crader (1977), identifiable specimens are bones with characteristic landmarks that can be used to identify body part and taxonomic classification to class or higher. Non-identifiable specimens are bones with no characteristics landmarks to differentiate either body part or taxonomic classification beyond Animalia. Since fish are a particularly complex taxonomic subgroup consisting of many closely related classes, specimens identified as fish that could not be identified to class are sorted separately.

Species identification was conducted only on maximally-identifiable specimens. These were analyzed by classes separately. Classes identified include Mammalia (mammals), Reptilia (reptiles), Aves (birds), Actinopterygii (ray-finned fishes), and Sarcopterygii (lobe-finned fishes). Specimens that are identified as fish from Naumundiri A, but could not be assigned to either Actinopterygii or Sarcopterygii, are classified as Undefined (UD) Fish. Invertebrate specimens were identified separately, all of which belong to the phylum Mollsuca. In each class, specimens with diagnostic landmarks were identified to order. When possible, specimens were identified to family, tribe, genus, or species. Specimens identified to the family bovidae were analyzed separately from other identified mammalian taxa. This is a common practice in Africa due to the prevalence and diversity of bovid species living there.

Bovid bones that could not be identified beyond family were separated into 5 size classes when possible (see Table 1). I follow categories used by Brain (1981), Gifford et al (1980), and Mutundu (1999) for all size classes. Bovid bones that could not be assigned a size class are classified as Undefined (UD) Bovid. Carnivore bones that could not be identified beyond order were also sorted into 5 size classes (see Table 2). Carnivore size classes were established based on natural breaks in body weight observed among species living in eastern Uganda today.

Size class	**Known species living in eastern Uganda today**
1 (<20 kg)	*Cephalophus monticola* (blue duiker) *Sylvicapra grimmia* (bush duiker)
2 (20-60 kg)	*Redunca redunca* (Bohor reedbuck) *Aepyceros melampus* (impala) *Tragelaphus scriptus* (bushbuck)
3 (60-100 kg)	*Kobus kob* (kob) *Tragelaphus spekii* (sitatunga)
4 (100-500 kg)	*Kobus ellipsiprymnus ellipsiprymnus* (waterbuck) *Hippotragus equinus* (roan) *Alcelaphus busephalus* (hartebeest) *Damaliscus lunatus* (topi and tsessebe) *Tragelaphus strepsiceros* (greater kudu)
5 (>500 kg)	*Syncerus caffer* (African buffalo)

Table 1 Bovid size classes.

Size class	**Known species living in eastern Uganda today**
1 (<5 kg)	*Genetta felina* (feline genet) *Genetta tigrina* (large-spotted genet) *Nandinia binotata* (palm civet) *Herpestes sanguineus* (slender mongoose) *Herpestes ichneumon* (Egyptian mongoose) *Ichneumia albicauda* (white-tailed mongoose) *Atilax paludinosus* (marsh mongoose) *Helogale parvula* (dwarf mongoose) *Mungos mungo* (banded mongoose) *Felis lybica* (African wildcat) *Ictonyx striatus* (striped polecat) *Lutra maculicollis* (spotted-necked otter)
2 (5-20 kg)	*Proteles cristatus* (aardwolf) *Felis serval* (serval) *Felis caracal* (caracal) *Canis aureus* (golden jackal) *Canis mesomelas* (black-backed jackal) *Canis adustrus* (side-striped jackal) *Mellivora capensis* (ratel) *Aonyx capensis* (clawless otter)

3 (20-50 kg)	*Civettictis civetta* (African civet) *Hyaena hyaena* (striped hyena) *Lycaon pictus* (wild dog)
4 (50-100 kg)	*Crocuta crocuta* (spotted hyena) *Panthera pardus* (leopard) *Acinonyx jubatus* (cheetah)
5 (>100 kg)	*Panthera leo* (lion)

Table 2: Carnivore size classes.

Number of Identifiable Specimens (NISP) and weights provide basic data for quantification of faunal assemblages (Klein and Cruz-Uribe 1984). Minimum Number of Individuals (MNI) was not used in this analysis due to a lack of data necessary for calculating such measures. MNI counts will be incorporated into future analyses of the fauna from Namundiri A and Namaboni B. In doing so I hope to avoid the statistical errors involved with using only one or two methods of faunal quantification in analysis (Grayson 1978, 1979; Plug and Plug 1990).

NISP was counted and recorded for all specimens from Namundiri A and maximally-identifiable specimens from Namaboni B. Weights to the nearest gram were measured for all specimens excavated per level at each site. Mollusc shell was also weighed per level at Namundiri A. NISP is used in determining relative taxonomic frequencies. Weights are used to analyze the relative frequency of mollusc shell compared to animal bone excavated per level at Namundiri A. NISP and weight are used to describe the faunal assemblage from Namundiri A as a whole. Only weights are used to describe the total faunal assemblage from Namaboni B because NISP was not counted for all bones from Namaboni B due to time constraints.

A number of relative taxonomic frequencies are used in this study to examine changes in the composition of fauna from Namundiri A and Namaboni B through time. Relative taxonomic frequencies are measurements of how often certain taxonomic subgroups occur within a level relative to other subgroups within that same level (Reitz and Wing 1999). When compared between levels, this should illustrate changes in the composition of hunted or fished species, which has implications for shifting subsistence strategies through time. Relative taxonomic frequencies of various faunal types are measured per level using NISP. Taxonomic frequencies are calculated using the following formula (following Reitz and Wing 1999):

$Xn / Yn = Zxn$

Xn = NISP of faunal materials attributed to subgroup X by level n.

Yn = NISP of maximally-identifiable specimens by level n.

Zxn = Relative frequency of subgroup X in level n.

Mollusc shell was not counted and recorded using NISP, therefore it cannot be incorporated into analyses of relative taxonomic frequency along with the rest of the fauna. Instead the weight of mollusc shell is compared relative to the total weight of bone excavated per level at Namundiri A. This has implications for how often people were using molluscs relative to fish and other animals through time. Similar analyses could not be conducted at Namaboni B because all mollusc shell could not be collected and weighed during excavations. Instead, only samples of mollusc shells from each level were taken from Namaboni B. Shell samples from Namaboni B and Namundiri A may prove useful for isotopic analyses in the future.

Faunal sorting, identification, and quantification was conducted wholly in the field. A lack of comparative material and analytic resources has considerably limited the identifications made in this study. When possible, however, photographs of maximally-identifiable specimens were checked by Dr. Fiona Marshall at Washington University in St. Louis in order to confirm or deny initial identifications. Time constraints also limited my ability to identify, count, and record aspects such as age, side, and modification of bones. As a result, certain zooarchaeological analyses such as determining MNI, age profiles, and butchery practices were not possible. Future study of these assemblages will be more complete and reliable with the aid of better comparative resources and laboratory space.

In the following section I discuss the results of my analyses of the faunal remains from Namundiri A and Namaboni B. Results from each site will be discussed separately. Comparison of faunal patterns observed at both sites will be made in the Discussion section following Results. Identified fauna from surface collections at various other sites is reported in a table at the end of the section. These results are purely descriptive and will not be analyzed or discussed further.

Results

Namundiri A

Over half of the faunal specimens recovered from Namundiri A are identified as undefined (UD) Fish (see Fig. 1). These are fish bones that could not be classified to either of the two classes of fish identified in this study: Actinopterygii (ray-finned fishes) or Sarcopterygii (lobe-finned fishes). Far fewer specimens were identified to class or higher taxonomic rank. The faunal assemblage from Namundiri A totals 9,416 specimens and weighs 26,025 grams. Specimens identified as UD Fish comprise 61.0% (NISP=5,741) of the total assemblage, while maximally-identifiable specimens (not including UD Fish) comprise only 16.8% (NISP=1,584). Non-identifiable specimens comprise 22.2% (NISP=2,101) of the total assemblage. A total of 11,200 grams of mollusca shell was excavated at Namundiri A.

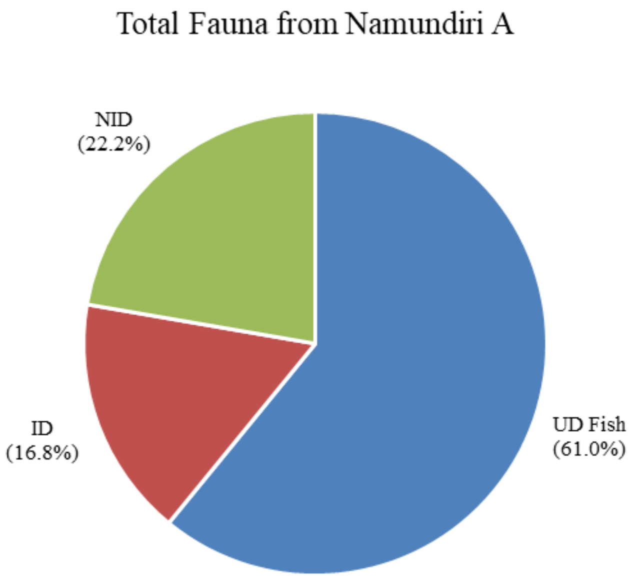

Figure 1: Percentage of IDs, UD Fish bones, and NIDs of the total assemblage at Namundiri A.

Fish bones (including UD Fish) dominate the identifiable specimens at Namundiri A (89.6%, 6563/7325) (see Table 3). *Clarias* (catfish) and *Protopterus aethiopicus* (lungfish) are the only fish taxa identified. This is due to lack of experience with the identification of other known species in the region including cichilidae (tilapia) and cyprinidae (carp or barbels). I assume such taxa are present in the assemblage, particularly tilapia, though further identification using comparative specimens held at the National Museum of Kenya in Nairobi will confirm or deny this suspicion. It is likely that the number of catfish and lungfish specimens in the assemblage will also increase with further study.

After fish, mammal bones are the most commonly identified taxa in the assemblage (9.9%, 726/7325). Bovids are the most abundant mammalian family. They make up 7.7%, (56/726) of the mammal assemblage. Bovid species identified include: *Syncerus caffer* (African buffalo), *Kobus ellipsiprymnus* (waterbuck), and *Tragelaphus scriptus* (bushbuck). Non-bovid mammal species identified include: *Hippopotamus amphibius* (hippopotamus), *Potamochoerus larvatus* (bushpig), *Cercopithecus* (guenon monkeys), and *Felis* (cats). Reptiles were also identified at Namundiri A (0.2%, 17/7325). Identified reptilian taxa include: Testudines (turtles and tortoises) and Sepentes (snakes). The presence of birds in the assemblage is evidenced by only 4 identified specimens. These could only be identified to class (Aves).

Taxon	**LVL 10**	**LVL 9**	**LVL 8**	**LVL 7**	**LVL 6**	**LVL 5**	**LVL 4**	**LVL 3**	**LVL 2**	**LVL 1**	**Total**
UD Fish	121	581	1,183	1,188	1,377	968	58	196	49	19	5,740
Protopterus aethiopicus (lungfish)	9	100	123	123	140	84	33	55	15	10	692
Claris sp. (catfish)	0	22	25	20	29	20	0	11	3	1	131
UD Mammal	21	120	123	97	141	96	16	28	4	1	647
cf Syncerus caffer (African	0	3	0	1	6	2	1	1	0	0	14

buffalo)											
cf Tragelaphus scriptus (bushbuck)	0	0	0	0	1	0	0	0	1	0	2
cf Kobus ellipsiprymnus (waterbuck)	0	0	0	0	1	0	0	0	0	0	1
cf Kobus sp.	0	0	0	0	2	0	0	0	0	0	2
cf Reduncini	0	0	0	0	1	0	0	0	0	0	1
UD Bovidae	0	0	0	3	0	0	0	1	0	0	4
Bovidae 2 (20-60 kg)	0	2	0	0	0	1	0	0	0	0	3
Bovid 3 60-100 kg)	0	4	2	3	1	3	0	0	0	0	13
Bovid 4 (100-500 kg)	0	1	0	0	8	3	3	1	0	1	17
Hippopotamus amphibious (hippopotamus)	0	1	7	1	1	1	1	1	0	0	13
Potamochoeru	0	1	1	0	0	0	0	0	0	0	2

s larvatus (bushpig)											
Suidae (pigs)	0	0	0	1	0	0	1	0	0	0	5
cf Cercopithecus (guenon monkeys)	0	0	0	0	0	0	2	1	0	0	3
Felis (cats)	0	0	1	0	0	0	0	0	0	0	1
Carnivora (carnivores)	0	1	0	0	0	0	0	0	0	0	1
Reptilia (reptiles)	0	0	0	0	0	2	0	2	1	1	6
Serpentes (snakes)	0	0	1	0	0	0	0	0	0	0	1
Testudines (turtles and tortoises)	0	2	1	0	7	0	0	0	0	0	10
Aves (birds)	0	2	1	1	0	0	0	0	0	0	4

NID	168	357	535	339	281	302	68	41	7	3	2,101
Mollusca* (molluscs)	700	3,050	3,425	2,675	1,075	125	25	100	25	0	11,200

Table 3: Identifiable taxa per level for Namundiri A, values reflect NISP counts (except Mollusca*, measured in grams).

Three separate sets of relative taxonomic frequencies were analyzed. These are calculated using various subsets of the faunal remains from Namundiri A. The first set examines the relationships among fish, mammal, reptile, and bird bones identified per level. This provides evidence for changes in the intensity of fishing relative to hunting as well as changes in hunting strategies through time.

Fish are by far the predominant taxa found relative to all other identified taxa regardless of level (see Table 4). There is, however, a slight jump in the percentage of fish relative to mammal, reptile, and bird bones between levels 9 and 8. The frequency of fish bones remains particularly high in all levels overlaying level 8, except for level 4. Level 4 shows a considerable spike in the percentage of mammal bones present. This may, however, be the result of there being far fewer bones in level 4 than in levels before and after it. Levels overlaying level 4 show a slight trend toward greater diversity among non-fish remains in the levels overlaying level 4, evidenced by an increase in the percentage of reptile and bird bones and decrease in the percentage of mammal bones.

-	Level 10	Level 9	Level 8	Level 7	Level 6
Fish	86.1% (NISP=130)	83.7% (NISP=703)	90.7% (NISP=1331)	92.6% (NISP=1331)	90.1% (NISP=1546)
Mammals	13.9% (NISP=21)	15.8% (NISP=133)	9.1% (NISP=134)	7.4% (NISP=106)	9.4% (NISP=162)
Reptiles and Birds	0.0% (NISP=0)	0.5% (NISP=4)	0.2% (NISP=3)	0.0% (NISP=1)	0.4% (NISP=7)

-	Level 5	Level 4	Level 3	Level 2	Level 1
Fish	90.8% (NISP=1072)	79.1% (NISP=91)	88.2% (NISP=262)	91.8% (NISP=67)	90.9% (NISP=30)
Mammals	9.0% (NISP=106)	20.9% (NISP=24)	11.1% (NISP=33)	6.8% (NISP=5)	6.1% (NISP=2)
Reptiles and Birds	0.2% (NISP=2)	0.0% (NISP=0)	0.7% (NISP=2)	1.4% (NISP=1)	3.0% (NISP=1)

Table 4: Relative taxonomic frequencies of fish, mammal, reptile, and bird bones within the total fauna from Namundiri A.

The second set of relative taxonomic frequencies examines the relationships among lungfish and catfish relative to the total amount of fish bones excavated per level at Namundiri A. This provides evidence for changes in fishing strategies through time. In other studies of Kansyore subsistence strategies, tilapia dominate lakeshore assemblages (Prendergast 2008; Prendergast and Lane 2010). Given that I was not ready to identify fish bones at the level of tilapia in this preliminary study, I assume that many UD Fish specimens belong to the family Cichilidae or other unidentified taxa. Therefore, changes in the percentage of UD Fish specimens relative to *Protopterus aethiopicus* and *Clarias* bones suggests a shifting focus on lungfish and catfish versus other species such as tilapia through time. This would need to be verified with future analysis.

Not surprisingly, UD Fish are the predominant taxonomic category throughout all levels at Namundiri A (see Table 5). Fluctuations in the relative frequency of UD Fish to lungfish and catfish bones, however, are observed. Level 9 shows a slight decrease in the percentage of UD Fish specimens and a coincident increase in the prevalence of both lungfish and catfish. In levels 8, the frequency of UD Fish bones increases and lungfish and catfish bones decrease slightly. This patterns remains very stable through level 5. Level 4 provides evidence for a considerable decrease in the frequency of UD Fish specimens and a particular increase in lungfish bones. This decrease might be the result of far fewer total specimens found in level 4 compared to levels before and after it. Following level 4, there is a steady decrease in the number of UD Fish remains and increase in lungfish. Catfish bones remain relatively low yet consistent in levels 3, 2, and 1.

-	**Level 10**	**Level 9**	**Level 8**	**Level 7**	**Level 6**
UD Fish	93.1% (NISP=121)	82.6% (NISP=581)	88.9% (NISP=1183)	89.3% (NISP=1188)	89.1% (NISP=1377)
***Protopterus aethiopicus* (lungfish)**	6.9% NISP=9)	14.2% (NISP=100)	9.2% (NISP=123)	9.2% (NISP=123)	9.1% (NISP=140)
***Clarias* sp. (catfish)**	0.0% (NISP=0)	3.1% (NISP=22)	1.9% (NISP=25)	1.5% (NISP=20)	1.9% (NISP=29)

-	**Level 5**	**Level 4**	**Level 3**	**Level 2**	**Level 1**
UD Fish	90.3% (NISP=968)	63.7% (NISP=58)	74.8% (NISP=196)	73.1% (NISP=49)	63.3% (NISP=19)
***Protopterus aethiopicus* (lungfish)**	7.8% (NISP=84)	36.3% (NISP=33)	21.0% (NISP=55)	22.4% (NISP=15)	33.3% (NISP=10)
***Clarias* sp. (catfish)**	1.9% (NISP=20)	0.0% (NISP=0)	4.2% (NISP=11)	4.5% (NISP=3)	3.3% (NISP=1)

Table 5: Relative taxonomic frequencies of UD Fish, lungfish, and catfish bones within the total fish remains from Namundiri A.

The final set of relative taxonomic frequencies analyzed in this study examine the relationship between mollusc shell and total non-mollusc fauna excavated per level at Naumundiri A. This provides evidence for changes in the intensity of shellfish use relative to fishing and hunting through time. Since mollusc shell was not counted, weights are used in this set of analyses.

The frequency of mollusc shell compared to non-mollusc fauna shows considerable change through time (see Table 6). A gradual, yet consistent trend toward less mollusc shell relative to non-mollusc fauna is observed in levels 10 through 7. This is followed by a significant decrease in mollusc shell in level 6 and another substantial decrease in shell in level 5. A gradual trend toward a greater frequency of mollusc shell is observed in levels 4 through 2, though these percentages remain relatively low. No mollusc shell was recovered from level 1.

-	**Level 10**	**Level 9**	**Level 8**	**Level 7**	**Level 6**
Mollusc Shell	46.7% (700g)	44.0% (3050g)	39.0% (3425g)	38.1% (2675g)	16.5% (1075g)
Total Fauna	53.3% (800g)	56.0% (3875g)	61.0% (5350g)	61.9% (4350g)	83.5% (5450g)

-	**Level 5**	**Level 4**	**Level 3**	**Level 2**	**Level 1**
Mollusc Shell	3.4% (125g)	3.0% (25g)	6.3% (100g)	10.0% (25g)	0.0% (0g)
Total Fauna	96.6% (3550g)	97.0% (800g)	93.7% (1500g)	90.0% (225g)	100.0% (125g)

Table 6: Relative taxonomic frequencies of mollusc shell relative to the total fauna from Namundiri A.

Namaboni B

Only maximally-identifiable specimens are considered in this analysis of the faunal remains from Namaboni B. The total fauna excavated at the site weighs 6,175 grams. Of the faunal remains from Namaboni B, 307 specimens are considered identifiable.

Fish bones dominate the maximally-identifiable assemblage from Namaboni B (82.7%, 254/307 specimens) (see Table 7). *Protopterus aethiopicus* (lungfish) and *Clarias* (catfish) were the only fish taxa identified in the assemblage. UD Fish bones were not counted or recorded, and so do not factor into this analysis.

After fish, mammal bones are the most commonly identified taxa in the assemblage (9.1%, 28/307 specimens). Bovids are the most abundant mammalian family. They make up 53.6% (15/28 specimens) of the mammal assemblage. Bovid taxa identified include: Bovini (African buffalo and domestic cattle), Tragelaphini (spiral-horned antelope), and Cephalophini (duikers). Non-bovid mammal species identified include: *Hippopotamus amphibius* (Hippopotamus), *Phacochoerus* (warthog), *Potamochoerus larvatus* (bushpig), *Equus burchelli* (common zebra), Cercopithecus (guenon monkeys), and Carnivora (carnivores). Reptiles were also identified at Namundiri A (2.0%, 6/307 specimens). Identified reptilian taxa include: *Python* (python) and Testudines (turtles and tortoises). The presence of birds in the assemblage is evidenced by only 2 identified specimens. These could only be identified to class (Aves).

Taxon	**LVL 7**	**LVL 6**	**LVL 5**	**LVL 4**	**Total**
Protopterus aethiopicus (lungfish)	68	30	59	97	254
Clarias sp. (catfish)	6	2	1	6	15
cf Bovini (African buffalo	1	0	0	0	1

and domestic cattle)					
Cephalophini (duikers)	1	0	0	0	1
cf Tragelaphini (spiral-horned antelope)	0	0	0	4	4
Bovidae 2 (20-60 kg)	3	0	0	4	7
Bovidae 3 (60-100 kg)	0	0	4	0	4
Hippopotamus amphibius (hippopotamus)	0	4	0	0	4
Phacochoerus (warthog)	0	0	1	1	2
Potamochoerus larvatus (bushpig)	0	0	1	0	1
Suidae (pigs)	0	0	0	3	3

Equus burchelli (common zebra)	1	0	0	0	1
cf Cercopithecus (guenon monkeys)	1	0	0	0	1
Carnivora (carnivores)	0	1	0	0	1
Python (python)	1	1	0	2	4
Testudines (turtles and tortoises)	0	0	2	0	2
Aves (birds)	2	0	0	0	2

Table 7: Identifiable taxa per level for Namaboni B, values reflect NISP counts.

Relative taxonomic frequencies examine the relationships among fish, mammal, reptile, and bird bones in the maximally-identifiable assemblage from Namaboni B. This provides evidence for changes in the intensity of fishing relative to hunting, as well as changes in hunting strategies, through time.

Fish bones dominate the identifiable assemblage from each level at Namaboni B (see Table 8). The frequency of fish bones relative to all other identified fauna increases in levels 5 and 4. This coincides with a slight decrease in the frequency of mammal bones from levels 6 through 4. Mammal bones show a slight spike in frequency in level 6. Reptile bones remain relatively stable throughout the sequence and bird bones are only found in level 7.

-	**Level 7**	**Level 6**	**Level 5**	**Level 4**
Fish	87.2% (NISP=74)	84.2% (NISP=32)	89.5% (NISP=60)	90.4% (NISP=103)
Mammals	8.2% (NISP=7)	13.2% (NISP=5)	7.5% (NISP=5)	7.9% (NISP=9)
Reptiles and birds	3.6% (NISP=3)	2.6% (NISP=1)	3.0% (NISP=2)	1.8% (NISP=2)

Table 8: Relative taxonomic frequencies of fish, mammal, reptile, and bird bones within the maximally-identifiable fauna from Namaboni B

Other sites

Fauna was collected from surface collections during survey of other sites in the area. Identifiable specimens are listed by site in the table below (Table 9)

Site	**Identified Taxa (NISP)**
Hatecka Island 011	UD Fish (1), Bovidae 2 (1), Bovidae 4 (1)
Buloosi 018	*Hippopotamus amphibius* (1)
Majanji A 018	*Potamochoerus larvatus* (1)
Maduwa B 003	*cf* Bovini (1)
Lukaba 210	*Protopterus aethiopicus* (1)

Table 9: Identified fauna from surface collections at various other sites located in eastern Uganda.

In the following section I will discuss possible interpretations of faunal patterns observed at Namundiri A and Namaboni B and compare the results from both sites. I will then discuss potential limitations faced during this analysis. Finally, I will propose possible future directions for zooarchaeological research at these sites and others in the region.

Discussion

Taxonomically, the fauna from Namundiri A and Namaboni B are very similar to assemblages reported from other Kansyore lakeshore sites in western Kenya such as Pundo, Luanda, Kanjera West, and White Rock Point (Prendergast and Lane 2010; Robertshaw et al 1983). A predominance of fish, particularly lungfish, with a secondary emphasis on a diverse array of terrestrial/amphibious animals such as hippopotamus, African buffalo, wild pigs, small carnivores, primates, and reptiles is found among all known shell midden lakeshore sites including Namundiri A and Namaboni B. This suggests a relatively similar subsistence strategy used by most if not all Kansyore groups occupying the length of shoreline stretching from western Kenya through eastern Uganda during the Early Kansyore phase (ca. 8,000-7,000 BP).

Minor differences, however, can be detected between the fauna from Namundiri A and Namaboni B, particularly among the non-fish assemblages. Namundiri A contains a greater proportion of large mammals such as African buffalo (*Syncerus caffer*) and Hippopotamus (*Hippopotamus amphibious*) than does Namaboni B. Alternatively; Namaboni B has a slightly higher proportion of medium-sized mammals such as wild pigs and antelope in the bovid 2 size class. Additionally, Namaboni B contains multiple large python vertebrae spread throughout its stratigraphy whereas Namundiri A provides evidence for a greater number of smaller reptiles such as turtles and tortoises (Testudines). Disparity between the faunal compositions of both sites may reflect slight differences in ecological context, time period, human choice, sampling, or a combination therein. Given that Namundiri A and Namaboni B are very geographically close and situated in similar environments near the lake's edge, however, it seems likely that such faunal dissimilarities are not the result of ecological variation.

Taxonomic differences aside, preliminary evidence for subsistence change through time is observed within the faunal assemblages from Naumundiri A and Namaboni B. Fish dominates throughout the archaeological sequence at Namundiri A. There is a shift early on, however, toward increased fish exploitation that may relate to the intensified use of non-lungfish, non-catfish fish taxa such as tilapia. This shift coincides with a decreased emphasis on mammals as well as shellfish. The presence of mollusc shell drops significantly midway through this period and remains particularly low, occasionally nonexistent, thereafter. Following a relatively long, stable period characterized by a strong focus on fish (possibly tilapia), the pattern shifts. The composition of non-fish taxa diversifies slightly while the proportion of lungfish and catfish present among the fish assemblage increases. Increased lungfish and catfish exploitation continues throughout the rest of the sequence and coincides with a slight increase in shellfish.

The initial shift toward increasingly specialized fish exploitation at Namundiri A aligns well with Dale and Ashley's (2010) hypothesis that the Early Kansyore phase is marked by the gradual intensification of aquatic resources. Similarly, a pattern of fewer lungfish and catfish among the fish assemblage at the site tentatively agrees with arguments made by Prendergast and Lane (2010) for a growing dependence on tilapia during a period of increased seasonality at the onset of Middle Holocene aridification. Patterns observed in later levels at Namundiri A, however, are less clear. Perhaps the incorporation of a more diverse non-fish animal assemblage with increasing lungfish and catfish exploitation during the most recent occupations at the site reflect similar patterns of diversifying subsistence at sites related to the Late/Terminal Kansyore as observed by Dale and Ashley (2010). This would suggest, however, that Namundiri A represents Kanysore occupation extending from the Early through the Late/Terminal phase and may provide evidence for the little known Middle Kansyore period (ca. 7,000-3,000 BP) (Dale and Ashley 2010). The absence of domesticated fauna from the uppermost levels at Namundiri A could indicate that they are not as recent as I have proposed. Early herders, however, are not well represented in this region during the Middle and Late Holocene (Phillipson 2005), and so domestic stock may not have been as readily available to the Kansyore living in Holocene eastern Uganda as they were in western Kenya. In addition, domestic stock was not present in later Kansyore faunas at Siror (Dale 2007). Radiocarbon dates are needed to test these ideas.

Less time was available to study the fauna from Namaboni B than Namundiri A and less faunal data is presently available for analyzing changing subsistence strategies at Namaboni B. Regardless, a general pattern is observed. As at Namundiri A, fish dominate the faunal assemblage in all levels at Namaboni B. The lowest level at the site does not contain ceramics and is characterized by a relatively diverse subsistence base composed of fish, mammals, reptiles, and birds. Overlaying this level is the first evidence for Kansyore ceramics at Namaboni B, which also coincides with a shift toward greater mammal use and fewer fish, reptiles, and birds. This is followed by a gradual increase in fish exploitation and a decrease in the relative proportion of mammals present. Intensification on fish use is evidenced throughout the rest of the archaeological sequence. Fewer reptile and bird bones are found in the uppermost level at Namaboni B.

It is unclear why the frequency of mammals initially rose at Namaboni B when ceramics first appeared. Increased fish use and decreased mammal, reptile, and bird exploitation following the adoption of pottery, however, mirrors patterns observed in the lower and middle levels at Namundiri A. This supports the notion that an intensification of fish use among early phase Kansyore communities is ubiquitous at most, if not all, lakeshore sites in eastern Uganda and western Kenya. It does not, however, explain why the percentage of lungfish and catfish bones reverses in the most recent levels at Namundiri A. As Darla Dale (2007) and Mary Prendergast (2008) have suggested, perhaps subsistence changes among the Kansyore relate to minor ecological shifts brought on by Holocene climatic fluctuations. Dates as well as a better understanding of the Holocene palaeoclimatic chronology for the Lake Victoria region are needed in order to fully test this hypothesis at Namundiri A and Namaboni B.

What is clear, however, is that the Kansyore of eastern Uganda practiced a relatively stable subsistence strategy through time focused on the specialized exploitation of aquatic resources available in Lake Victoria. This stability likely results from a combination of interconnected environmental and social factors related to the unique geography of the Lake Victoria basin in east-central Africa. Ecological stability resulting from lake-effect softening of increasing Holocene aridity and climatic fluctuations in northern Africa may have allowed the Kansyore to focus their subsistence strategies on the relatively reliable resources provided by the lake (Berke et al 2012). Through time, such focus might have led to increasingly complex social organization among the Kansyore.

James Woodburn (1982) argues that subsistence specialization centered on the exploitation of particular resources, such as fish, requires increasingly complex socio-economic organization in order to manage and maintain resource availability within a given environment. For the Kansyore to sustain their primary focus on fish use through time would have certainly involved what Woodburn (1982) refers to as a delayed-return, or at least a moderate-return, hunter-gatherer subsistence system (Dale et al 2004; Prendergast 2008). As mentioned, however, much more research is needed in order to better understand the Holocene climatic chronology of eastern Uganda as well as the subsistence strategies and social organization of the Kansyore living in the area.

This study suffers somewhat from an incomplete understanding of the data available in the fauna from Namundiri A and Namaboni B. Inadequate time and comparative collections for zooarchaeological analysis in the field are the primary reason for this shortcoming. A lack of radiocarbon dates at the present also constrain the interpretations that can be made. Regardless of such issues, however, the major patterns described in this analysis are robust and provide useful hypotheses for future testing.

Further analysis of the fauna from Namundiri A and Namaboni B using comparative collections housed at the National Museum of Kenya in Nairobi will produce more refined data for examining the prehistoric past of eastern Uganda. Continued excavations at these sites, as well as others nearby, will also allow for testing of hypotheses regarding the Kansyore in eastern Uganda and western Kenya. Perhaps most importantly, however, radiocarbon dates are needed in order to position Namundiri A and Namaboni B within a broader context of climatic fluctuations and human adaptations during the Holocene of northern and eastern Africa.

References

Berke, Melissa A., Thomas C. Johnson, Josef P. Werne, Kliti Grice, Stefan Schouten, and Jaap

S. Sinninghe Damsté 2012 Molecular Records of Climate Variability and Vegetation Response since the Late Pleistocene in the Lake Victoria Basin, East Africa. *Quaternary Science Reviews* 55: 59-74.

Brain, Charles K. 1981 *The Hunters or the Hunted?* University of Chicago Press.

Chapman, Susannah 1967 Kantsyore Island. Azania 2: 165-191.

Dale, Darla D. 2007 *An Archaeological Investigation of the Kansyore, Later Stone Age Hunter-Gatherers in East Africa*. Unpublished Ph.D. dissertation, Department of Anthropology, Washington University in St. Louis.

Dale, Darla, and Ceri Z. Ashley 2010 .Holocene Hunter-Fisher-Gatherer Communities: New Perspectives on Kansyore Using Communities of Western Kenya. *Azania: Archaeological Research in Africa* 45 (1): 24–48.

Dale, Darla, Fiona Marshall, and Tom Pilgram 2004 Delayed-Return Hunter-Gatherers in Africa? Historic Perspectives from the Okiek and Archaeological Perspectives from the Kansyore." *Hunter-Gatherers in Theory and Archaeology, Center for Archaeological Investigations Occasional Paper* 21.

Gifford, Diane P., and Diana C. Crader 1977 A Computer Coding System for Archaeological Faunal Remains. *American Antiquity*, 225–238.

Gifford, Diane P., Glynn L. Isaac, and Charles M. Nelson 1980 Evidence for Predation and Pastoralism at Prolonged Drift: A Pastoral Neolithic Site in Kenya. *AZANIA: Journal of the British Institute in Eastern Africa* 15(1): 57–108.

Grayson, Donald K. 1978 Minimum Numbers and Sample Size in Vertebrate Faunal Analysis. *American Antiquity*, 53–65.

1979 On the Quantification of Vertebrate Archaeofaunas. *Advances in Archaeological Method and Theory*, 199–237.

Klein, Richard G., and Kathryn Cruz-Uribe 1984 *The Analysis of Animal Bones from Archeological Sites*. University of Chicago Press, Chicago.

Lane, Paul, Ceri Ashley, and Gilbert Oteyo 2006 New Dates for Kansyore and Urewe Wares from Northern Nyanza, Kenya. *Azania: Archaeological Research in Africa* 41 (1): 123–38.

Lane, Paul, Ceri Ashley, Oula Seitsonen, Paul Harvey, Sada Mire, and Frederick Odede

2007 The Transition to Farming in Eastern Africa: New Faunal and Dating Evidence from Wadh Lang'o and Usenge, Kenya. *Antiquity* 81: 62–81.

Marshall, Fiona, and Kathlyn Stewart 1994 Hunting, Fishing and Herding Pastoralists of Western Kenya: The Fauna from Gogo Falls. *Archaeozoologia* 7(1): 7–27.

Mutundu, Kennedy K. 1999 *Ethnohistoric Archaeology of the Mukogodo in North-Central Kenya: Hunter-Gatherer Subsistence and the Transition to Pastoralism in Secondary Settings*. Vol. 775. British Archaeological Reports.

Phillipson, David W. 2005 *African Archaeology*. Cambridge University Press.

Plug, Cornelius, and Ina Plug 1990 MNI Counts as Estimates of Species Abundance." *The South African Archaeological Bulletin*, 53–57.

Prendergast, Mary E. 2008 *Forager Variability and Transitions to Food Production in Secondary Settings: Kansyore and Pastoral Neolithic Economies in East Africa*. Unpublished Ph.D. dissertation, Department of Anthropology, Harvard University: Cambridge, MA.

Prendergast, Mary E., and Paul J. Lane 2010 Middle Holocene Fishing Strategies in East Africa: Zooarchaeological Analysis of Pundo, a Kansyore Shell Midden in Northern Nyanza (Kenya). *International Journal of Osteoarchaeology* 20(1): 88–112.

Reitz, Elisabeth J., and Elisabeth S. Wing 1999 *Zooarchaeology, Cambridge Manuals in Archaeology*. Cambridge University Press, Cambridge.

Robertshaw, Peter, David Collett, Diane Gifford, and Nubi B. Mbae.

1983 Shell Middens on the Shores of Lake Victoria. *AZANIA: Journal of the British Institute in Eastern Africa* 18 (1): 1–43.

Woodburn, James 1982 Egalitarian Societies. *Man*, 431–51.

Appendix 5: Report on the Manufacturing Technology and Use-Trace Evidence on Bone Artefacts from Namundiri A and Namaboni B

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This report presents the results of a technological and use-trace analysis of ten-pointed bone artefacts from Namundiri A and Namboni B in Uganda (Figure 1). Each bone artefact was analysed using an Olympus BX 51 reflected light microscope and images recorded using a mounted SC 30 camera. Analytic protocols outlined in the literature (e.g. Newcomer 1974; Bradfield 2015a; Evora 2015) were followed.

Based on cortical thickness seven of the ten bone artefacts are made from large mammal long bone (Bov 3 and upwards). One (Figure 1C) is made from the ulna of a Bov 1-sized animal, while two (Figure 1G, 1J) are made from the long bones of a Bov 2-sized mammal. Table 1 presents the metric results of the individual bone artefacts while Table 2 presents a comparison the mean metrics of these two sites against the mean metrics of bone points at 13 southern and eastern African sites spanning the Middle Stone Age through to the twentieth century. It is apparent that the bone artefacts from Namundiri A and Namboni B are much larger than those from other sites and bear the closest metric affinities to Still Bay bone implements recovered from Blombos Cave and the bulbous stemmed points from Uniondale (Leslie-Brooker 1989; Henshilwood et al. 2001; d'Errico & Henshilwood 2007; Bradfield 2015b). The bone artefacts from Namundiri A and Namboni B are unusually large and squat for their age and, except for Figure 1F, no attempt was made to modify the bone into a cylindrical form. In most cases the artefacts retain both periosteal and endosteal surfaces with some specimens retaining significant amounts of trabeculae. This is an uncommon feature among bone tools from eastern and southern Africa.

On nine of the artefacts blank reduction seems to follow the same chain of operations described by Smith & Poggenpoel (1988) for herder bone tools at Kasteelberg in South Africa. Indeed, long bone blank reduction strategies do not seem to differ much throughout the world (see Savchenko 2010). Further modification to the Namundiri A and Namboni B artefacts alternates between scraping with a sharp metal or stone blade longitudinally to the long axis of the bone, and grinding against a fine-grained abrasive surface. Scraping is present on five tools (Figure 1A, 1B, 1F, 1H, 1I), grinding on three tools (Figure 1D, 1E, 1J), while Figure 1G displays both types of manufacturing traces. The hollow ulna bone (Figure 1C) displays no evidence of manufacture and, except for the indeterminate use wear on one of the break facets, it is doubtful whether this is in fact a tool. Based on the grouping of the grinding striations one may infer that the same or similar rock type was used to modify these five artefacts. Fresh damage in the form of scratch marks is seen on some pieces, most noticeably Figure 1A and 1E, likely due to the retrieval conditions and are consistent with removal from shelly or gravelly sediment.

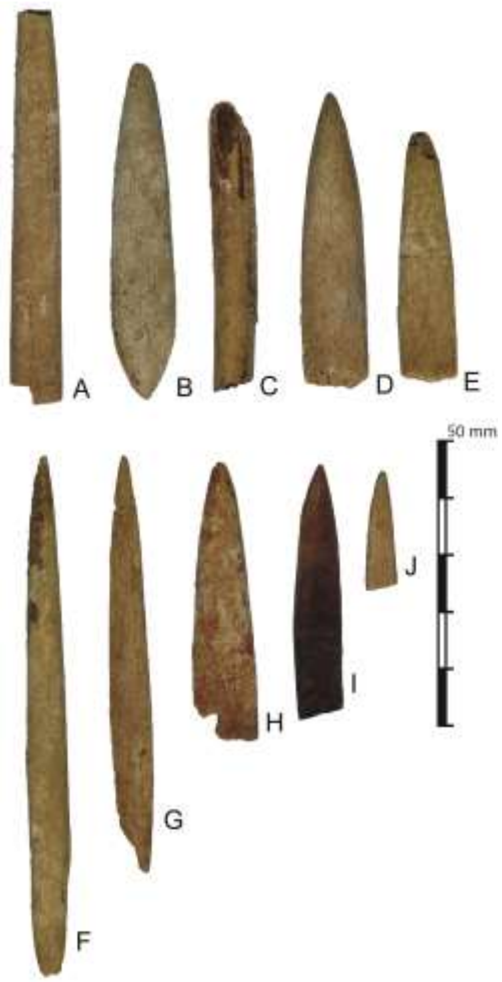

Figure 1. Pointed bone artefacts analysed in this report. A) Namaboni B shell harvesters; B) Namaboni B Skeleton 2; C) Namaboni B Skeleton 2; D) Namundiri A Level 5; E) Namundiri A Level 3; F) Namundiri A Level 6; G) Namundiri A Level 6; H) Namundiri A Level 6; I) Namundiri A Level 8; J) Namundiri A Level 6.

Table1.: Bone point metrics from the two sites referred to in this report. The alphabet identifiers correspond with Figure 1. All measurements are in millimetres.

	Width from tip		Width at centre	Maximum width	Length	Thickness
	1cm	3cm				
A	/	/	8.9	9.1	>71	6.8
B	6.8	10.5	10.6	11.6	60.1	8
C	/	/	7	7.1	>48	7.1
D	6.6	11.7	12.1	12.9	>56.5	7.6
E	6	9	8.9	8.9	>39	5.9
F	3.9	6.1	7.6	7.6	98	7.1
G	3.7	6	7	7	70.3	4.2
H	6	10	10.5	11	>49	6
I	4.9	5.5	5.6	5.6	>40	7.4
J	4.4	/	5.2	5.2	>21.6	2.9

Table 2.: Averaged metrics from Namundiri A and Namaboni B in comparision with averaged metrics of pointed bone tools from other sites in southern and eastern Africa. All measurements are in millimetres. AVG = the averaged metrics from Namundiri A and Namaboni B; Lux = Luxmanda; KC = Kuumbi Cave; NBC = Nelson Bay Cave; BRS = Bushman Rock Shelter; KRM = Klassies River Mouth; BBC = Blombos Cave; Union = Uniondale; SC = Sibudu; Map Klassies River Mouth; BBC = Blombos Cave; Union = Uniondale; SC = Sibudu; Map = Mapungubwe; Ethno = combined metrics of several ethnographi and historical collections of unpoisoned robust bone points; Nkupe = eponymous; SHH = Sehonghong; Lik = Likoaeng; KwG = Kwagadaganda

	Width from tip		Width at centre	Maximum width	Length	Thickness
	1cm	3cm				
AVG	5.2	8.4	8.3	8.6	76.1	6.3
Lux	/	/	/	4	23	/
KC	3.4	/	/	4.8	44.5	3.1
NBC	3.1	5.1	4.8	5.5	50.2	/
BRS	3.2	4.2	3.9	4.4	44.4	/
KRM	3	4.4	4	5	77.1	/
BBC	4.7	6.8	7.5	8.3	88.1	/
Union	5.9	/	/	9.5	46	/
SC	3.3	5.1	5.5	5.5	49.3	5.5
Map	3.1	3.8	/	5.4	85.5	5.4
Ethno	4	6	6.7	6.7	112.5	6.7
Nkupe	3.2	3.4	/	4.2	35.6	/
SHH	2.9	/	/	3.9	25.4	/
Lik	3.2	4.9	/	5.3	47.6	/

KwG	3.4	4.6	/	5.7	93.8	/

The general preservation of the bones' surface is very poor. Use-wear features are unremarkable, patchy and confined to high point topography in most instances. The poor development and inconclusive nature of use-wear in these cases may be due to 1) infrequent use, 2) use that does not conduce to prolonged fricative contact, like hunting, or 3) the friable nature of the bones' surface caused by weathering conditions may have erased identifiable use-wear that may have been present. On one specimen (Namundiri A Level 8) appear a series of cut marks that were created after manufacture, thus precluding the possibility that they are associated with defleshing (Figure 2). These marks seem consistent with cut marks produced when retrieving a weapon from inside an animal carcass during butchering (see Letourneux and Pétillon 2008; Langley 2013). On the side of another specimen (Figure 1B) near the base appear a group of deep cut marks (Figure 3). The concentration of these marks is suggestive of a clamp-like device and may be the result of hafting. The three other bone artefacts of this morphological variety are broken just above the area where these clamp marks appear making it impossible to verify whether these marks are indeed from hafting or whether they are unique to one specimen. Macrofractures are present on several artefacts, but no spin-off fractures that could unambiguously indicate a hunting-related function. Ancient residues were found on only one specimen from Namandiri A Level 6 (Figure 1H). The artefact's surface is covered in a resinous substance (sensu Cooper & Nugent 2006) with ochre inclusions and bits of plant tissue (Figure 4). The plant tissue appears as burnt and unburnt examples of the same taxon. The taxon is not identifiable based on the small quantity of material preserved. The resin appears to be of plant origin and therefore the plant tissue could relate to the application of the resin. The resinous substance covers most of the bone surface and is not confined to a specific area. It is therefore unclear whether this substance was applied as an adhesive or whether it results from incidental contamination.

Figure 2: Possible retrieval cut marks on Namundiri A Level 8). Micrograph taken at 50X magnification

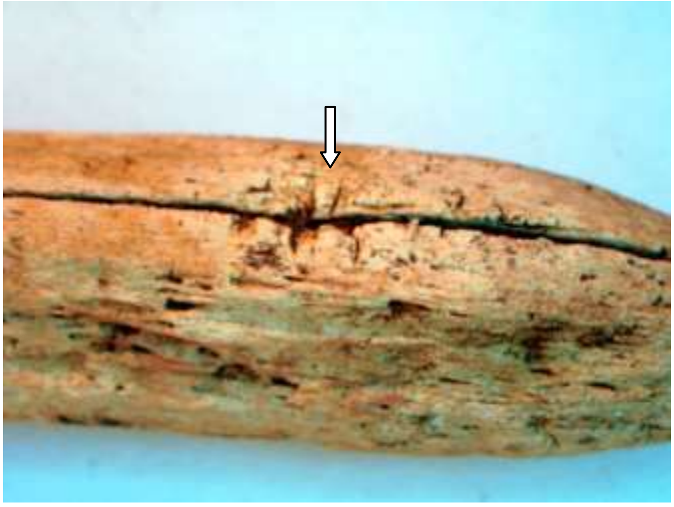

Figure 3: Possible clamp marks that could result from a peculiar hafting method. Micrograph taken at 10X magnification

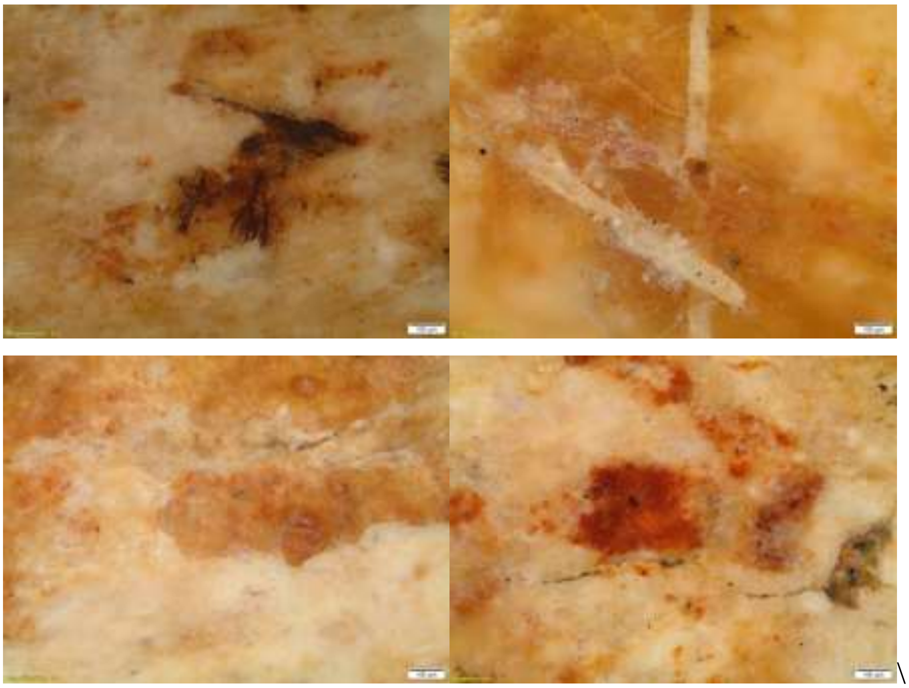

Figure 4: Residues present on the bone tool illustrated in Figure 1H. Clockwise from top left: i) burnt plant tissue, ii) unburnt plant tissue embedded in resin, iii) resin, iv)concentrations of ochre. Micrographs taken at 50X and 100X magnification.

Apart from the well-known barbed harpoons (Yellen 1998) only a handful of publications exist detailing the unbarbed variety of bone points in East Africa and around the Lake Victoria region in particular. Fragmentary remains were found in shell middens at White Rock Point, Luanda, Kanjera West and Kanam East (Robertshaw et al. 1983). Bone artefacts associated with Kanysore pottery have also been recovered from GoGo Falls and Pundo (Robertshaw 1991; Prendergast 2010) where their various morphologies have led to their being described as awls and spear heads. Although no use-trace analyses have been performed on any of these examples, there is general consensus, given their recovery context and association with large water bodies that functioned as part of a fishing toolkit (Robertshaw et al. 1983; Langley et al. 2016).

The results of two recent studies, one of 13 000 year-old poisoned bone points from Kuumbi Cave, Zanzibar (Langley et al. 2016) and the other of unbarbed bone points from the pastoral site of Luxmanda, Tanzania (Langley et al. 2017), are the only existing works on bone tool from this region incorporating use-trace analysis. The older bone tools from Kuumbi Cave are morphologically similar to those found at many LSA sites in South Africa, but seem to have been fashioned primarily via scraping (Langley et al. 2016), contrary to most South

African examples (Bradfield 2015b). The numerous spin-off fractures and poison on some of the artefacts, as well as the fact that the site is dominated by terrestrial fauna, strongly suggests that these artefacts were used to hunt game. The Luxmanda bone tools, on the other hand, were made from small bovid (Bov 1-2) bone and were modified primarily by grinding against an abrasive surface (Langley et al. 2017). A variety of tool types were recognised, including projectile points, matting needles and informal utilised splinters. Use-wear was confined to the tips of tools and was consistent with hide and plant piercing. The Luxmanda faunal assemblage is dominated by domestic caprine and kine (Langley et al. 2017).

The Namundiri A and Namboni B bone implements are much larger and more poorly preserved than the bone tools from Luxmanda and Kuumbi. There are four examples of a single morphological type (Figure 1B, 1D, 1E, 1H) that occur at both Namundiri A and Namboni B and which appear to be unique to the region. Based on the apparent clamp marks on the one complete example of this type (Figure 1B) we may infer that these were hafted probably as spear points. Unfortunately, the lack of well-defined diagnostic use-traces on the majority of bone tools from Namundiri A and Namboni B prohibit definitive functional interpretations.

References

Bradfield, J. 2015. "Use-trace analysis of bone tools: a brief overview of four methodological approaches." South African Archaeological Bulletin 70: 3–14.

Bradfield, J. 2015. Pointed bone tool technology in southern Africa: results of use-trace analyses. Southern African Humanities 27: 1-27.

Cooper, J. & Nugent, S. 2006. Tools on the surface: residue and use-wear analyses of stone artefacts from Camooweal, northwest Queensland. In: M. Haslam, G. Robertson, A. Crowther, S. Nugent & L. Kirkwood, eds, *Archaeological science under a microscope: studies in residue and ancient DNA analysis in honour of Thomas H. Loy*. Terra Australis 30. Canberra: ANU E-Press, pp. 207–27.

d'Errico, F. and Henshilwood, C.S. 2007. "Additional evidence for bone technology in the southern African Middle Stone Age." Journal of Human Evolution 52: 142–163.

Evora, M. 2015. Use-wear methodology on the analysis of osseous industries. In: J.M. Marreiros, J.F. Gibaja Bao & N. Ferreira Bicho, eds, *Use-wear and residue analysis in archaeology*. Switzerland. Springer International Publishing, pp. 159–70.

Henshilwood, C.S., d'Errico, F., Marean, C.W., Milo, R.G., and Yates, R. 2001. "An early bone tool industry from the Middle Stone Age at Blombos Cave, South Africa: implications for the origins of modern human behaviour, symposium and language." Journal of Human Evolution 41: 631– 678.

Langley, M.C. 2013. "Investigating maintenance and discard patterns for Middle to Late Magdalenian antler projectile points: inter-site and inter-regional comparisons. DPhil. diss., University of Oxford.

Langley MC, Prendergast ME, Shipton C, Quintana Morales EM, Crowther A, Boivin N (2016) Poison arrows and bone utensils in late Pleistocene eastern Africa: evidence from Kuumbi Cave, Zanzibar. Azania 51(2):155–177.

Langley, M., Prendegast, M., Grillo, K., 2017. Organic technology in the Pastoral Neolithic: osseous and eggshell artefacts from Luxmanda, Tanzania. Journal of Archaeological and Anthropological Sciences. DOI 10.1007/s12520-017-0528-z.

Leslie-Brooker, M. 1989. The Holocene sequence from Uniondale Rock Shelter in the Eastern Cape. South African Archaeological Society Goodwin Series 6: 17-32.

Letourneux, C. and Pétillon, J.M. 2008. “Hunting lesions caused by osseous projectile points: experimental results and archaeological implications.” Journal of Archaeological Science 35: 2849– 2862.

Newcomer, M.H. 1974. “Study and replication of bone tools from Ksar Akil (Lebanon).” World Archaeology 6: 138–153.

Prendergast, M. 2010. Kansyore fisher-foragers and transitions to food production in East Africa: the view from Wadh Lang'o, Nyanza Province, Western Kenya. Azania: Archaeological Research in Africa 45: 83-111.

Robertshaw, P.T. 1991. “Gogo Falls. Excavations at a complex archaeological site east of Lake Victoria.” Azania 26: 64–195.

Robertshaw, P.T., Collett, D., Gifford, D. and Mbae, N.B. 1983. “Shell middens on the shores of Lake Victoria.” Azania 18: 1–43.

Savchenko, S. 2010. Experiments on manufacturing techniques of Mesolithic and Early Neolithic slotted bone projectile points from Eastern Urals. In:A. Legrand-Pineau & I. Sidéra, eds, *Ancient and modern bone artefacts from America to Russia: cultural,technological and functional signature*. BAR International Series 2136, Oxford: Archaeopress, pp. 141-147.

Smith, A.B. and Poggenpoel, C.A. 1988. “The technology of bone tool fabrication in the southwestern Cape, South Africa.” World Archaeology 20: 103–114.

Yellen, J.E. 1998. “Barbed bone points: tradition and continuity in Saharan and Sub-Saharan Africa.” African Archaeological Review 15: 173–198.

Appendix6: Botanical Preliminary Reports

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Ceri Ashley <u04533764@up.ac.za>

Re Namaboni, Lugala and Namundiri floatation samples

Alison Crowther <a.crowther@uq.edu.au> 8 October 2017 at 16:17
To: RUTH TIBESASA <tibesasa@yahoo.com>
Cc: Ceri Ashley <ceri.ashley@up.ac.za>

Hi Ruth,

Thank you again for your patience, and my apologies this has taken so long. So far, I have competed the analysis of two sites: Namaboni and Namundiri. I still have Lugala to complete, and after that Budecho. I will prepare a report for you of the results soon, but a quick update here.

The flots are not very rich, unfortunately. Many have little charred material of any kind.

So far there are no confidently ID'd crop seeds, including no baobab. There is a single *possible* pearl millet grain in one of the Namundiri flots (level 6, 49-60cm), but I'm not confident of the identification and am being cautious in this instance. It is very similar to pearl millet morphologically, but some diagnostic features, especially the embryo, are not as clear as I would like to make a confident ID.

There are a couple of charred legumes, including one cotyledon that is consistent with *Vigna unguiculata* (cowpea) (Namaboni, trench 1 level 2 136-222cm BD), but is much smaller than the domesticated type. It is possibly an immature or wild specimen. I have identified it tentatively as *Vigna* cf. *unguiculata*.

A second legume has features that are consistent with *Lablab purpureus (*Hyacinth bean) (Namundiri, level 4, 40-45cm), in particular the distinctive strophiole/hilum (in a fresh/ uncharred grain, the white filament that protrudes around part of the circumference). However, I need to compare the morphology of the seed more closely with my reference specimens, and I'd also like to have Dorian Fuller look at my photos, as I've never encountered archaeological lablab before (it's very rare in archaeobotanical assemblages) and am not as confident with the identification.

There is nutshell in several of the flots, particularly in association with the skeletal material from Namaboni (I think nearly all of the skeleton-associated flots had nutshell), and several also from Namundiri. The pieces are very fragmentary and in many cases are very tiny (too small to identify), but some have features consistent with *Canarium*, including the pieces you bagged from Namundiri as possible *Canarium* (level 8, 75-84cm).

Many of the flots have unidentified charred seeds that I suspect are not taxonomic. In Namundiri, they are quite abundant. These are all unidentified at present but I'm hoping I might be able to at least get a Family ID for you. I don't think any of these are necessarily economic.

I hope this short progress report is helpful. I'm off to Germany next Saturday for a month at the Max Planck Institute in Jena, so I will do my best to get the Lugala results to you this coming week, before I leave. I have already taken photographs of the Namaboni and Namundiri finds, so at minimum I can write up a report with figures for you while I'm away.

I'd be interested to hear your thoughts on these results, in particular the apparent absence of crops. Is this consistent with your expectations - are they hunter-gatherer sites or were you expecting agricultural assemblages?

All the best,
Ali

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Appendix7: Human Remains from the Study

By Gabriele C.Kruger

Adult female – lower limbs and pelvic girdle fragments only

Lugala A1 EIA Skeleton 2

Adult female – upper limb, shoulder girdle and thorax fragments only

Most likely a 7-12 year old sub-adult. Sex not estimated due to lack of reliability in sub-adult remains.

Namaboni B LSA Skeleton 2

Most likely female

Namaboni B LSA Skeleton 3

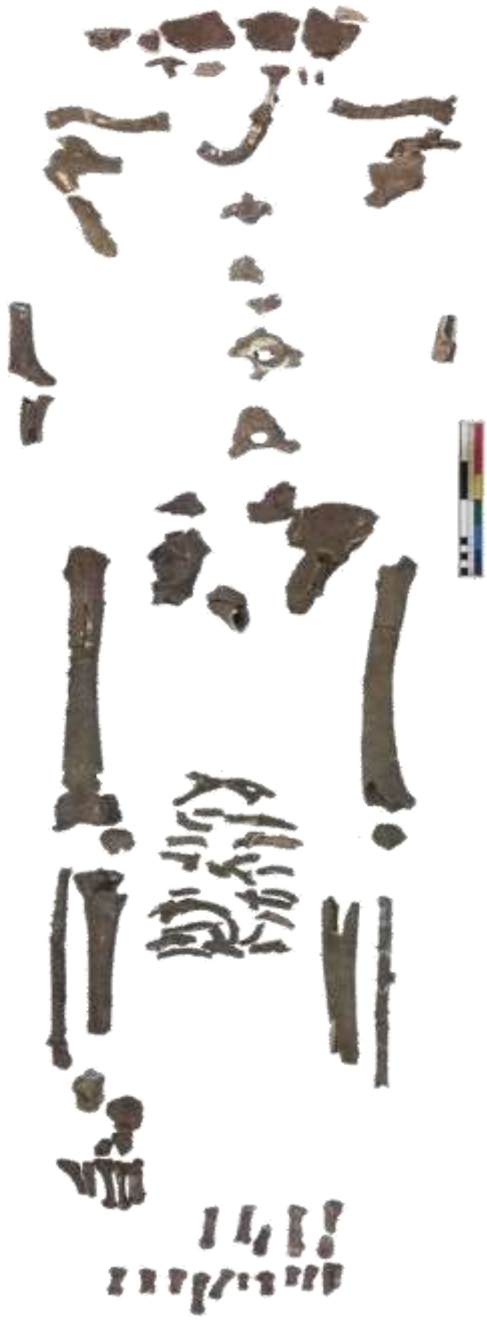
Older adult male – osteophytes on lumbar vertebrae indicate most likely older although osteophytes have also been associated with hard manual labour.

Younger adult male – lack of fusion of S1

Namaboni B LSA Skeleton 5

Most likely adult male – only upper limb fragments

Namaboni B LSA Skeleton 6



Most likely older adult male – extensive dental wear, although this may be as a result of their diet

Namaboni B LSA Skeleton 7

Most likely adult female – single femur only

Namaboni B LSA Skeleton 8

1-5 year old sub-adult – based on modern standards and may therefore not be very reliable

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Namaboni B LSA Skeleton 9

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Namaboni B LSA Skeleton 9

Younger adult male – skull only
limited dental wear on 3rd molars may indicate a younger adult individual

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Namaboni B LSA Skeleton 10

Adult – no sex estimate as mandible is not very sexually dimorphic. Possibly older individual – extensive dental wear and antemortem tooth loss on left side

Namaboni B LSA Skeleton 10

Sub-adult – no sex estimate. Distal femoral epiphysis only. Older than 8 years (epiphysis fully formed) but most likely younger than 18 (not fused to diaphysis)

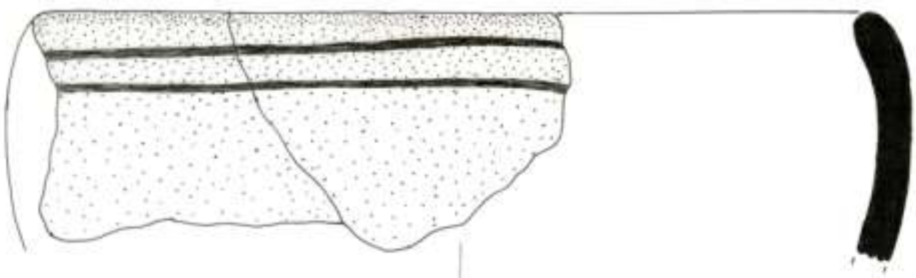
Namaboni B LSA Skeleton 12

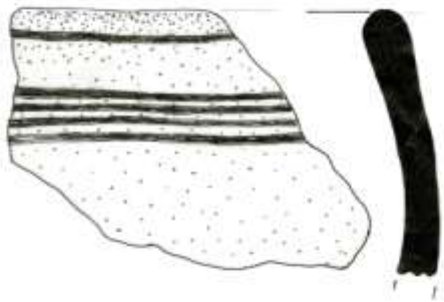
Adult female – no specific age indicators

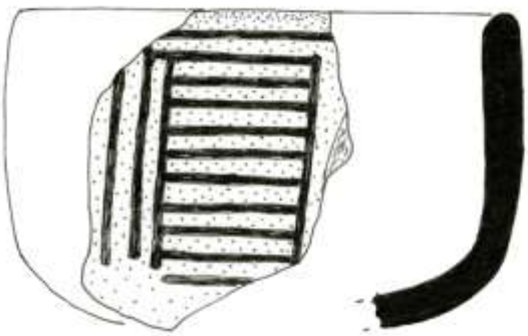
Appendix 8 Ceramics from the study (all images are 1:1cm)

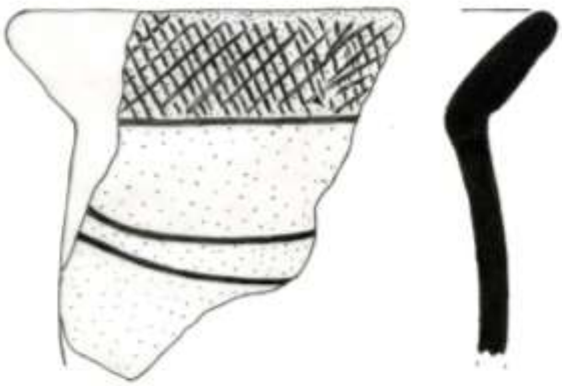
By Gilbert Oteyo

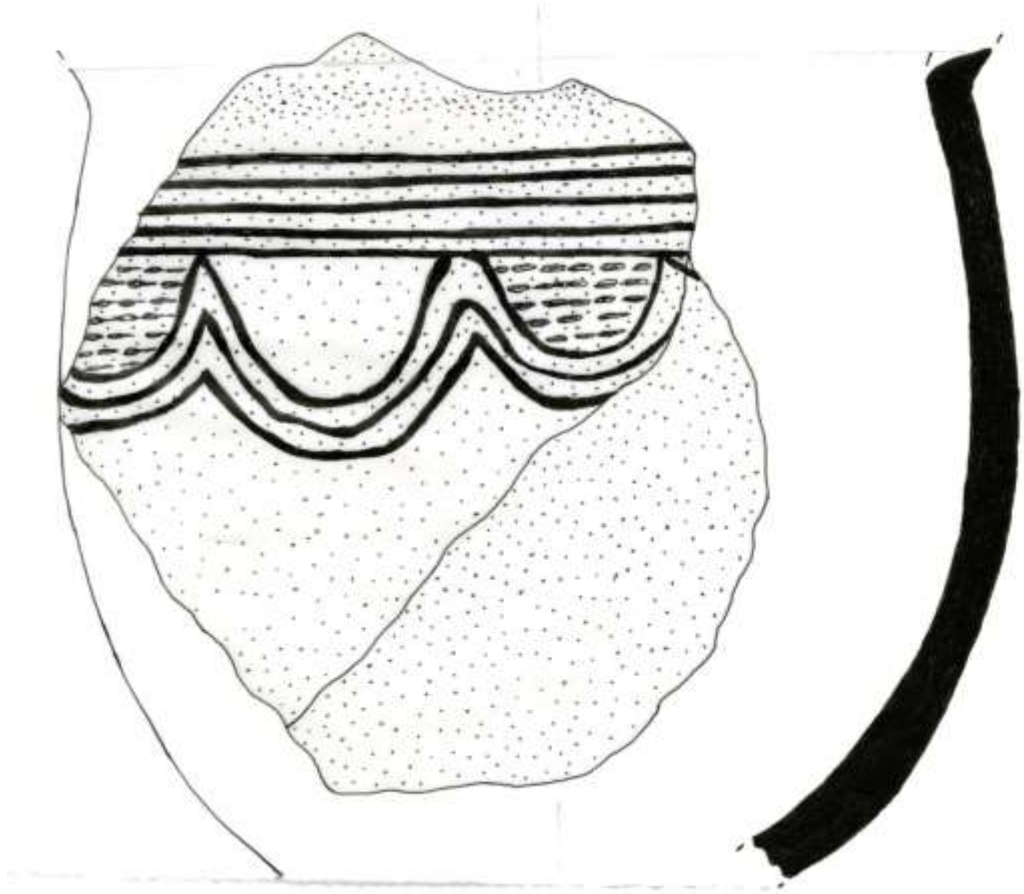
Lugala A1 Early Iron Age ceramics



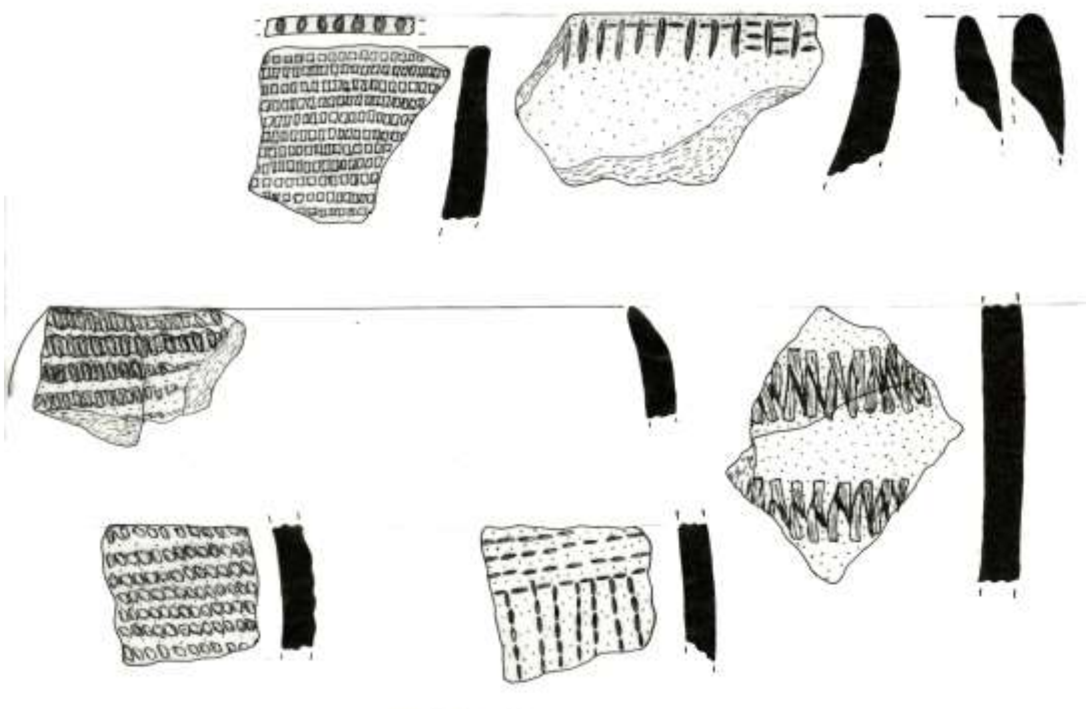




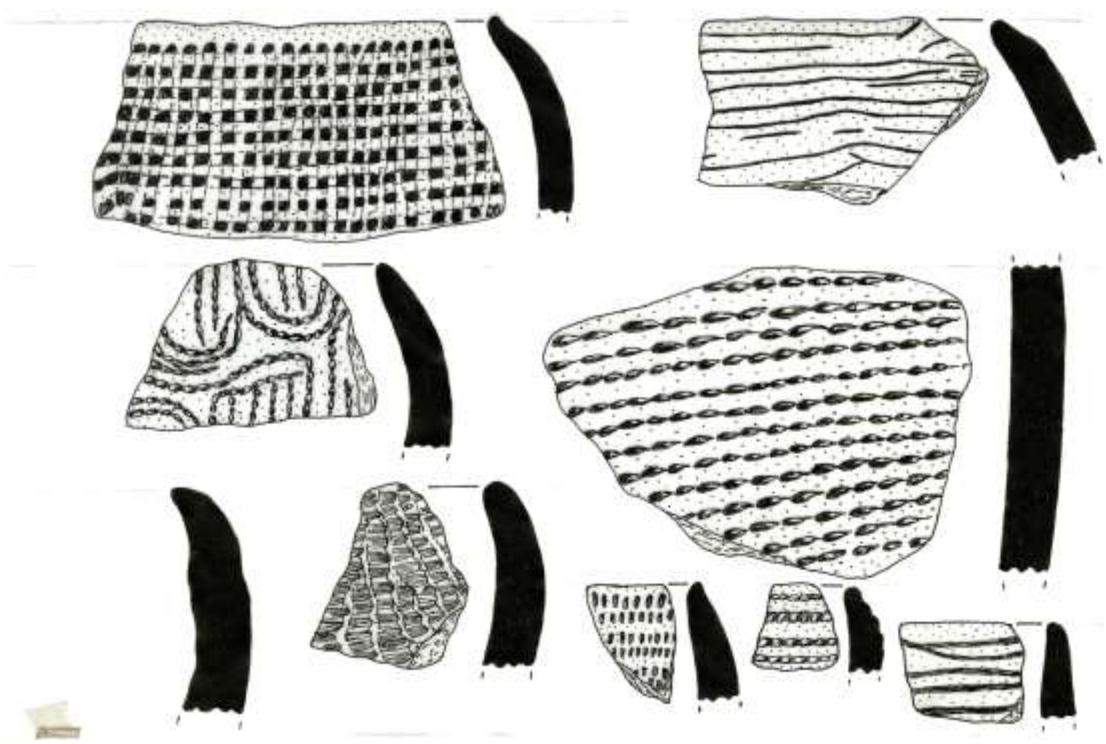


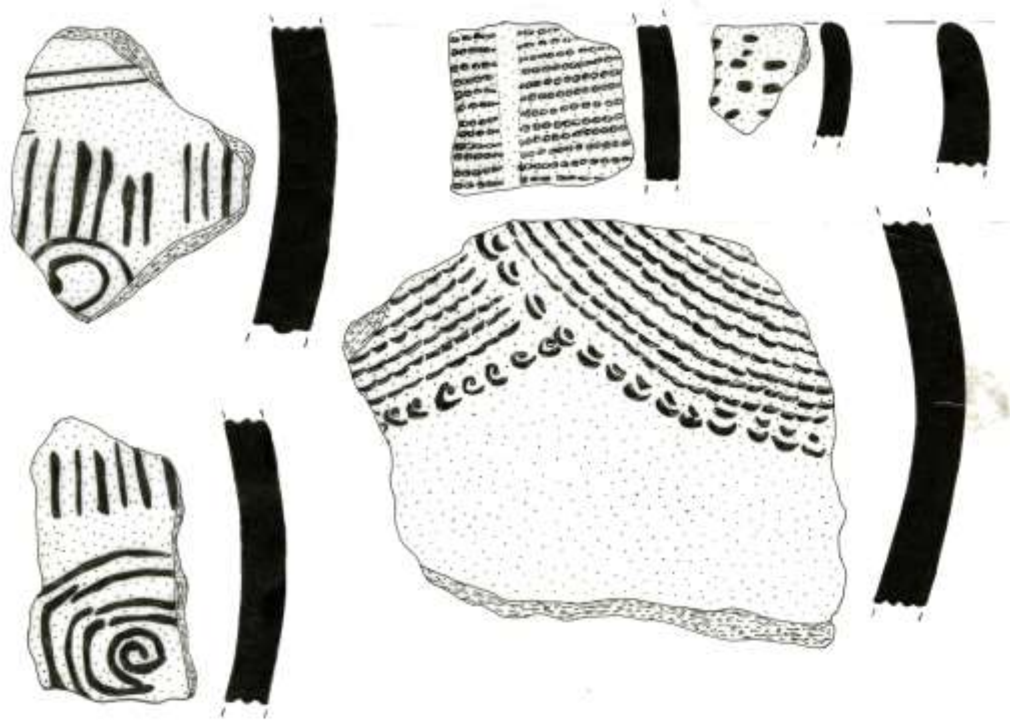


Kansyore ceramics from Lugala A1



Kansyore Ceramics from Namundiri A





Kansyore ceramics from Namaboni B