Finding Their Place in the Swahili World:
An Archaeological Exploration of Southern Tanzania

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Abstract

This dissertation studies the functioning of large-scale systems of interaction and exchange on the East African Swahili coast by exploring their influence in the region around the town of Mikindani in southern Tanzania over the past two millennia. Evidence of connections across those systems – to the Middle East, South Asia, China, and the Mediterranean – exists in the form of trade goods, cultural and religious similarities, and historical documents. Such connections have been thought crucial to the development of Swahili urban society, with coastal centers exploiting a middleman position in Indian Ocean trade to obtain socio-political prominence. I selected the Mikindani region as a place to evaluate such linkages because it provided an opportunity to investigate Swahili life away from major centers in more modest towns and villages akin to the majority of coastal settlements, extending the analysis beyond the elite traders to include regional participants with different forms of involvement.

In pursuit of these subjects, data from archaeological survey and excavations in the Mikindani region are used to describe its communities' socioeconomic organization and interregional connections. These data show that after sharing in many first-millennium coastal developments, Mikindani's inhabitants did not participate in the Swahili florescence of the early second millennium CE and obtained none of the characteristic imported ceramics of the time. Instead, they began to draw deeper connections with neighboring communities to the interior, epitomized by the development of a new style of local ceramics. This absence from Indian Ocean trade was not indicative of economic failure however, as settlement expanded amidst a generally self-sufficient regional economy. This unexpected development – unique among studied

East African Swahili coastal regions – echoes archaeological studies that have emphasized the agency of marginal or "peripheral" areas within the structures of large-scale systems. It also prompts reappraisal of the popular notion of the Swahili as a mercantile society focused on Indian Ocean trade by drawing attention to coastal variability, identifying additional paths to socioeconomic success, and recognizing that elements thought "characteristic" of Swahili culture – including participation in trade – were part of social and economic strategies that were adopted, or not, to suit regional circumstances.

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CHAPTER 1: INTRODUCTION TO MIKINDANI AND THE SWAHILI COAST

Mikindani, a Town on the Southern Tanzanian Coast

The town of Mikindani sits at the southern end of a small lagoon in the southwest corner of Mikindani Bay, about 50 km from the Rovuma River and the modern border between Tanzania and Mozambique. Though today is has been eclipsed by the regional capital, Mtwara, a city 12 km away built by the British around its deeper harbor, several aspects of the town indicate Mikindani's longer and more interesting history. A fort dating to the 19th-century German colonial occupation sits on a hill above the shoreline. A restored building in the center of town known locally as the Slave Market attests to the town's role in the French-dominated southern Tanzanian slave trade during the 18th century (see Alpers 1975). Modest stone tombs said to date to the 17th century cluster around the central mosque of Mnaida ward. A house in town bears a plaque honoring the visit of David Livingstone in 1866 before he embarked on his final trip into the African interior. Some of the stone ruins Dr. Livingstone noted along the shoreline of the lagoon can still be seen, which as he said show that the area was "known and used of old" (Gray 1950: 32).

Recent archaeological research (Kwekason 2007, Pawlowicz 2009) has confirmed such expectations of ancient use, extending the occupation of the area surrounding Mikindani Bay into the Late Stone Age period of the last centuries BCE. Perhaps more importantly, the material culture evidence shows that Mikindani shared in many of the historical developments that characterize the Swahili culture of the East African coast, from the founding of Iron Age agricultural settlements in the early first millennium CE to the use of red-painted Swahili Ware ceramics in the mid-second millennium (see Chami 1998). Given that the Swahili coast is usually described as stretching between Somalia to Mozambique, such participation is not surprising, yet because Mikindani participated in the Swahili networks from its southern location, studying the region contributes to understanding of how those networks functioned and changed over time.

In this dissertation I explore that theme, investigating the local manifestations of the large-scale Swahili social and economic systems in the Mikindani region. The main question my project asks is how those systems operated at Mikindani in different periods. Documenting these local manifestations focuses the analysis on the details of Swahili networks, observing how groups and individuals balanced local capacities and constraints with the macro-scale factors that structured the entire system and with the actions of other participating groups. In that sense this dissertation aims not just to describe Mikindani's experience within coastal society over the past two millennia, but to use that experience as a foundation to better understand why coastal society during that long period is characterized by both certain pan-coastal continuities and regional differentiation. In addressing these questions about the archaeology of large-scale systems, I will incorporate historical ecology, spatial analysis, and ceramic typology into the study of the interactions between groups of various and shifting ranks.

The East African Swahili Coast

Geographical and Cultural Background

The Swahili coast, a distinctive cultural area of East Africa, runs for approximately 2500 km north-south between Somalia and Mozambique, including northern Madagascar and the Comoros Islands (see Figure 1.1). The coast is home to numerous offshore islands ranging in size from large landmasses such as Zanzibar, Mafia and Pemba Islands in Tanzania to the smaller islands of the Lamu and Quirimba Archipelagos in Kenya and Mozambique respectively. Despite its extensive spread along the coast, the Swahili region rarely extends further than 10 km inland except along river valleys. The long coastline is home to several major rivers though, including the Juba in Somalia, the Tana and Galana in Kenya, the Pangani, Wami, Rufiji, Lukuledi and Rovuma in Tanzania, and the Lurio and Zambezi in Mozambique, as well as numerous smaller rivers and streams. These watercourses would have enabled frequent contact between coastal communities and interior groups in many parts of the coast. Coastal climate and environment is dominated by the Indian Ocean monsoon system, which brings precipitation to the coast and enables long-distance sailing (see Fig 1.3). Precipitation along the coast tends to range between 50 and 130 cm annually, heaviest along the northern and central Tanzanian coast and offshore islands and falling off to the north and south (Ojany and Ogendo 1973, White 1983, Darwall and Guard 2001). Vegetation along the coast is typically classified as part of the Zanzibar-Inhambane floral mosaic (White 1983), more recently termed the “Swahilian regional center of endemism” and known generally as the East African coastal forest (Clarke 2000). The East African coastal forest is comprised of a mixture of forests, grasslands and woodlands in proportions sensitive to local variations in soil, precipitation, and groundwater availability. Distinctions in these factors produce significant local environmental differentiation that many writers have suggested contributed to interdependence between coastal regions (Horton 1987, Kusimba 1999a, Connah 2001, Fleisher 2003).

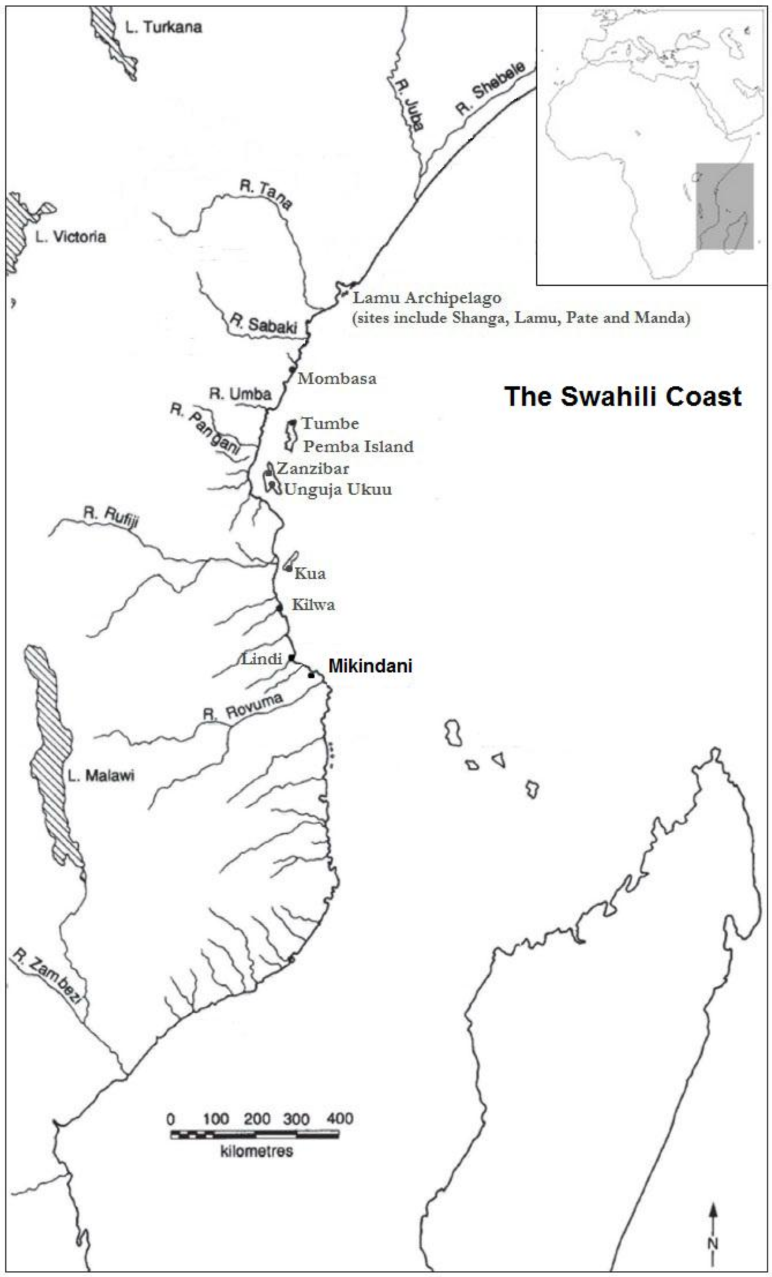

Figure 1.1 The Swahili Coast, Showing Location of Mikindani

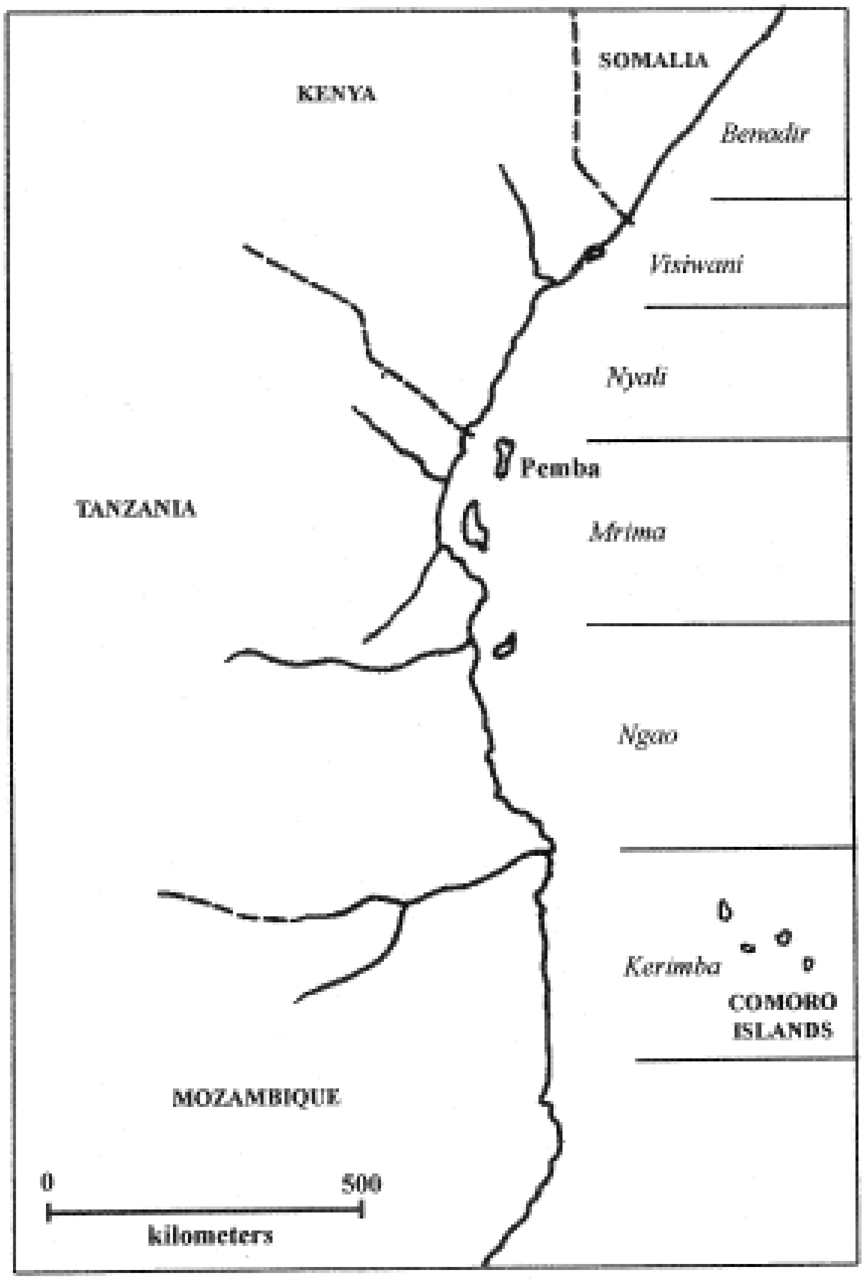

Figure 1.2 Swahili Coast Showing the Different Named Divisions of the Coast (from Fleisher 2003: 33)

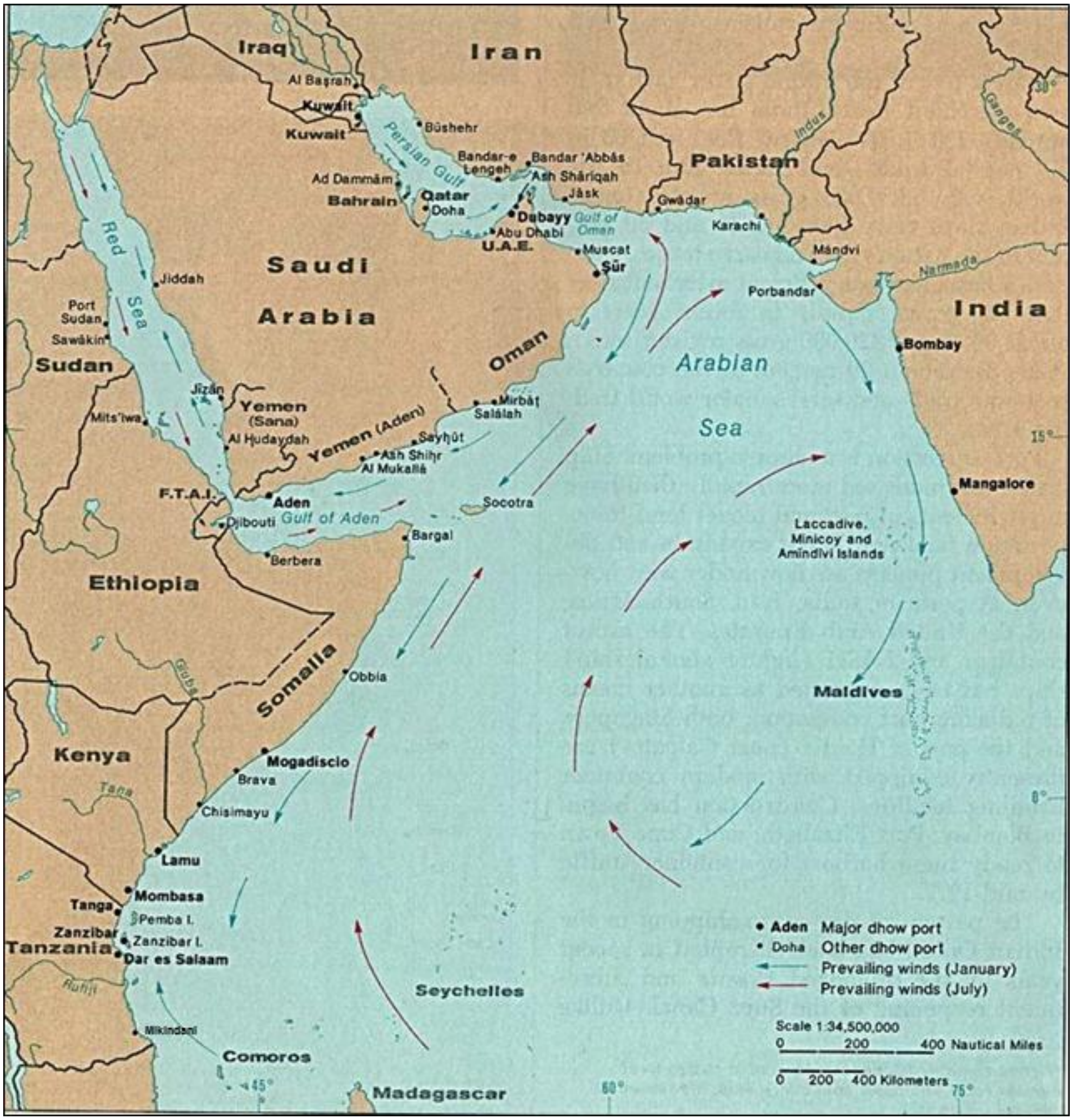

Figure 1.3 Western Indian Ocean showing monsoon trade routes (US CIA 1976)

Environmental variations between coastal regions and their surrounding hinterlands also enabled the Swahili division of the coast into named stretches that reflected both the natural as well as social and cultural differences between coastal regions (Prins 1961, 1965; Horton and Middleton 2000: 10). From north to south these named divisions are: the Benadir coast of Somalia, the Visiwani coast of northern Kenya including the Lamu Archipelago, the Nyali coast centered on Mombasa and extending to the modern Kenya-Tanzania border, the Mrima coast of northern Tanzania across from Zanzibar and Pemba Islands, the Ngao coast of southern Tanzania including the major center of Kilwa as well as Mikindani, and the Kerimba (Quirimba) coast of northern Mozambique (Fig. 1.2). As Horton and Middleton (2000: 10) have noted, these divisions recorded ethnographically in the mid-20th century broadly correspond to those found in medieval Arab geographies and travel accounts. Generally speaking, the Mrima coast is the best-watered portion, with decreasing rainfall to both the north and south. Mangrove forests and coral reefs stretch between the Visiwani and Ngao coasts. The Visiwani and Nyali coasts are best suited to take advantage of the monsoon winds for sailing in the Indian Ocean to the Middle East. The coastal environment is thus characterized by local and regional variations within a shared trend of monsoons and mixed forests.

The Swahili coast is defined, however, more by the culture of its people than the characteristics of its environment. That culture has been characterized by independent stone-built coastal cities home to Muslim traders engaged in Indian Ocean commerce since at least its mid second-millennium CE florescence. Those cities were located in each coastal region and shared a cosmopolitan material culture incorporating elements of Middle Eastern Islamic culture ranging from religion and architecture to clothing and diet. Their roots stretched back into the mid-first millennium CE, when a distinct culture marked by sailing and fishing, commercial ties to the Indian Ocean and African interior, and gradual conversion to Islam emerged on the coast from mixed-farming, iron-using and pastoralist predecessors. The prestige and opportunities of Swahili cities continually attracted migrants from the interior and from foreign locales around the Indian Ocean rim, all of whom contributed to Swahili culture and society. Though Swahili society and the independence of its cities was disrupted beginning with the arrival of the Portuguese in the 16th century, Swahili culture, while influenced and changed by historical circumstance, has endured into the present.

History of Archaeological and Historical Research

The earliest European recognition of the antiquity of coastal society came from descriptions of some of the more prominent ruins by 19th-century explorers. For instance, Sir Richard Burton described the "remarkable" ruins of Kilwa (1967[1872]: 358-9). As noted, such descriptions also included Dr. David Livingstone's remarks on Mikindani (Gray 1950). These descriptions invariably credited the ruins to external groups, owing to both widespread racist assumptions that local African people could not have built such cities on their own and persistent claims by the Swahili themselves that their ancestors, the founders of coastal cities, came from elsewhere. Indeed, in local historical chronicles Swahili communities typically claimed origins in either Shiraz (Persia) or the Arabian Peninsula (see Pouwels 1984). These claims were a very real part of Swahili identities (LaViolette 2008) and were used by them to acquire certain advantages since at least the colonial period.[1] Their assertions of Shirazi ancestry were corroborated by colonial administrators who recorded “Persian” elements in coastal ruins (e.g., Pearce 1920, Ingrams 1931).

The impression that Swahili people were different from African populations was also shaped by their presence in the historical record. There is a body of documents from the late first millennium CE written mostly by Arab visitors to the coast, but also by Persian and Chinese visitors, whose first-hand accounts record their being impressed by the cosmopolitan coastal cities ruled by kings and sultans and populated by Muslims (see Gibb 1962, Freeman Grenville 1975, Horton 1997). Most of these documents stress the coast’s connections with other societies across the Indian Ocean and the very earliest, the *Periplus Maris Erythraei* (see Freeman-Grenville 1975: 1-2; Casson 1989), describes the coast as subject to an Arab kingdom during the first centuries CE, before the emergence of Swahili culture per se. Later texts concentrate on unique aspects of the Swahili culture within Africa, from its people’s conversion to Islam to its cities’ stone-buildings made of coral-rag. With conversion to Islam, the Swahili developed a class of religious scholars literate in Arabic who produced other texts, including the aforementioned historical chronicles (Horton and Middleton 2000, Insoll 2003). Most of these texts sought to distinguish the Muslim, urban Swahili from neighboring African groups who were usually ignored and thus relegated to a status of “without history” (see Wolf 1982, Pawlowicz and LaViolette forthcoming).

[1] One example of this is the Swahili ability, using their classification as non-Africans, to obtain employment as teachers of Swahili language in German institutions such as universities in Germany, under the German colonial administration in Tanganyika (Wimmelbücker 2009)

When professional archaeologists and historians began to investigate the histories of Swahili cities in earnest during the latter half of the 20th century they largely continued to work under this model of the Swahili as non-African. The foreign texts and local chronicles inspired early attempts to practice historical archaeology on the coast combining documentary and archaeological evidence (e.g., Kirkman 1954, 1957, 1959, 1963, 1964; Chittick 1974, 1977, 1984). The mostly uncritical use of the chronicles by these archaeologists and coastal historians supported the foreign model and coastal achievements were attributed to Middle Eastern migrants (e.g., Baker 1941, Freeman-Grenville 1962; Kirkman 1964; Trimingham 1964; Chittick 1965, 1974, 1977; Saad 1979; Wilkinson 1981; Donley-Reid 1982; *cf*. Mathew 1967). Historical syntheses of Indian Ocean trade supported similar models of Middle Eastern migration by competitive merchants to control trade (e.g., Ricks 1970, Abu-Lughod 1989, Risso 1995). The early archaeological research focus on the visible remains of stone-built houses, mosques and other public buildings in the largest coastal towns with the greatest involvement in Indian Ocean commerce further widened the perceived divide between the Swahili and non-urban African groups in the hinterland.

However, as archaeological, historical and linguistic work progressed, particularly that which focused on the origins of Swahili society, the assumptions and biases of the foreign model were uncovered and challenged, and the African roots of Swahili society were recognized. The earliest moves in this direction were from the historian James de Vere Allen (1974, 1979, 1981, 1982, 1993), who reinterpreted the Shirazi traditions as migration not from Persia, but from an ancestral African polity called Shungwaya. Other historians, influenced by the groundbreaking work with African oral traditions by

Vansina (1965) and Miller (1980), similarly appreciated that the chronicles were transcribed oral traditions and used them to explore processes shaping the historical development of the coast rather than as literal records of events (e.g., Pouwels 1984, 1987; Spear 1984, 2000; Nurse and Spear 1985). According to Spear (1984: 302-3), "Shirazi" stood for a historicization of the evolving urban culture on the coast and served as an ideological statement employed to maintain stratified social structures amidst competition for the wealth and power brought by trade. While there are enduring questions regarding the applicability of the chronicles to the whole of the Swahili coast based on more careful consideration of the contexts in which they were collected (Willis 1987, 1993), they were importantly no longer viewed simplistically as direct evidence of Middle Eastern origins and migration.

Historical linguistic work on Swahili language provided a further challenge to the foreign model. While proponents of the foreign model considered Swahili to be a creole language mixing Arabic and Bantu (e.g., Krumm 1940), historical linguistic study of Swahili overwhelmingly demonstrated that it was a Bantu language (Nurse 1982, 1983, 1999; Nurse and Spear 1985; Nurse and Hinnebusch 1993). While borrowings from Arabic in the form of loan-words and three dipthongs, /au, ai, ei/, are present in Swahili, these form only about 5% of the Swahili lexicon and are largely derived from the late-second-millennium Omani colonial period (Nurse and Hinnebusch, 1993: 324). In contrast, roughly 10% of the vocabulary is derived from other African language groups in East Africa, Cushitic and Nilo-Saharan. Taken together, this limited evidence for foreign borrowing shows that the bulk of Swahili language is of Bantu origin, thus suggesting African as opposed to foreign roots for Swahili-speaking coastal communities.

Archaeological work also played a major role in the dissolution of the foreign model. Even though he continued to support a model of foreign origins, Chittick's documentation of first-millennium layers at Kilwa (1974) and Manda (1984) provided indications of longer occupations and developmental trajectories than recorded in the histories of foreign founders. Mark Horton's subsequent work at Shanga (1980, 1981, 1984, 1994a, 1996) establishing a developmental sequence for the town provided substantial archaeological evidence for the African roots of Swahili society. Particularly notable at Shanga was the incremental development of a central communal space similar to those found amongst nearby Bantu groups, particularly the Mijikenda, into a mosque compound (Horton 1994a). The spatial organization of Swahili sites in the first millennium was thus shown to have numerous similarities to the use of space seen at settlements of other African groups in the coastal hinterland.

Archaeological work with locally produced ceramics was of similar importance in demonstrating the African roots of Swahili society.[2] Horton (1984) recognized the similarity of the late-first millennium ceramics described on the coast but called by various names (e.g., Early Kitchen Ware, Pare Group C, Wenje Ware), and considered them as all belonging to what he called the Tana Tradition. Initially, these Tana Tradition ceramics were linked with earlier Pastoral Neolithic wares found in Kenya (e.g., Horton 1987, 1990; Abungu 1989, 1994/5). However, Felix Chami demonstrated that in central Tanzania Tana Tradition ceramics, which he renamed Triangular-Incised Ware (TIW) for a dominant decorative motif, derive from Early Iron Age predecessors known as Kwale ware and he has suggested that this may have been the case for the

[2] For a fuller discussion of coastal ceramics see Chapter 5

whole coast (Chami 1994, 1994/5, 1998). Archaeological survey in southern Kenya around Mombasa that showed similar developmental trajectories (Helm 2000a) supports this position. The debate over origins misses a couple of important points however. First, each position argues that the local ceramic tradition common on the coast in the late first millennium CE, whether known as Tana Tradition or TIW, is derived from African predecessors, which is a clear archaeological challenge to models of foreign origins. Second, efforts to identify a particular origin for Swahili society or a Swahili ancestral homeland fail to acknowledge both regional variations in Tana/TIW ceramics (see Horton 1994b; Fleisher 2003, 2004) as well as the linguistic (Vansina 1995, 2001; Ehret 1998, 2001; Schoenbrun 1998) and archaeological (Kiriama 1993, Robertson and Bradley 2000, Kusimba and Kusimba 2005, Lane *et al*. 2007) evidence that shows East Africa to have been home to diverse communities with overlapping languages and economies. Rather than having a single place of origin from which a homogenous culture spread, coastal society was differentiated, in part based upon the various groups that inhabited each region, such that in some coastal regions communities would have included a pastoral element alongside an agricultural unit (Abungu 1994/5) while in other areas they did not (Chami 1994/5).

With the foreign model discredited, archaeologists have increasingly addressed questions regarding the nature of Swahili society. Important recent studies have explored Swahili urbanism (Fleisher 2003, Wynne-Jones 2005a, LaViolette and Fleisher 2009), agricultural production and human-environment relationships (Chami 2003; Ekblom 2004; Walshaw 2005, 2010), Indian Ocean trade networks (Oka 2008, Oka and Kusimba 2008) and regional markets (Fleisher 2010a). In addition to their insights into these specific issues, this recent research has made two broader contributions to the study of coastal history. First, they have expanded the scope of coastal archaeological inquiry beyond the large centers and the standing stone structures of the elite. Recent research has instead concentrated on the "hidden majority" of the Swahili who lived in earth-and-thatch homes both in cities with stone architecture and in villages without such architecture (e.g., Fleisher and LaViolette 1999a; LaViolette 2000; Fleisher 2003; LaViolette and Fleisher 2005, 2009; Pawlowicz 2009; Wynne-Jones and Fleisher 2010). In expanding the scope of inquiry, archaeologists have also increasingly recognized the longstanding connections between coastal communities and those to the interior as well as the contributions of hinterland groups to Swahili society. Such work includes finds of Tana/TIW ceramics far into the interior (Mapunda and Burg 1991; Håland and Msuya 2000; Helm 2000a, 2000b; Mapunda 2001; Walz 2005) and settlement evidence showing a densely-populated coastal interior attuned to developments at Swahili sites (Abungu and Mutoro 1993, Helm 2000a).

The other significant contribution of recent archaeological research has been its appreciation of the nuances of Swahili identity, recognizing both the African roots of Swahili society and the substantial contributions made from other portions of the Indian Ocean world, especially the Middle East. Work in and around the second-millennium stone-town of Chwaka on Pemba Island has shown how Swahili inhabitants of the coast incorporated foreign material culture and practices, perhaps most notably Islam and urbanism but also a variety of imported bowls, exotic crops including rice, and new patterns of food consumption, into their daily lives in both stone-towns and surrounding villages from the late first millennium CE and increasingly in the early second millennium (LaViolette and Fleisher 2009, Fleisher 2010a). While Swahili society is indeed rooted in deeper indigenous processes, these foreign elements have been recognized as significant components of Swahili culture and identity (Fleisher and LaViolette 2007, LaViolette 2008). The Swahili possessed a complex, multifaceted identity attuned to both African and cosmopolitan expectations and managed under conditions of emerging social inequality within and between communities, whose realization had material consequences visible in the archaeological record.

Regional Differentiation along the Swahili Coast

As archaeological and historical work on the coast progressed and better appreciated the breadth and nuance of Swahili life, variations within Swahili society and patterns of regional differentiation became increasingly apparent. Appreciation of these differences relied in part on the dissolution of the foreign model, with its focus on the external elements of the largest centers, and the recent broadening of the scope of archaeological inquiry that allowed local characteristics to be better understood. To a certain extent such variation is not unexpected: Swahili identity remains a difficult concept in the present with highly mutable and situational identities resulting from nested, frequently overlapping categories of identification (Mazrui and Sharif 1994) and archaeological attempts to define cultures must do so in the face of multiple cross-cutting patterns and distributions (Shennan 1994: 11-14). Nonetheless, recognizing Swahili regional differentiation carries important implications for understanding the organization of Swahili society.

A number of aspects of modern Swahili society provide indications that regional differentiation was significant in the past, though it must be remembered they are products of the modern context. Coastal identity is complex and multivalent and, though often subsumed under “Swahili,” ethnicity is often expressed on the coast by association with an urban center: the Wa-Amu from Lamu, Wa-Unguja from Zanzibar, and Wa-Mvita from Mombasa for example (Nurse and Spear 1985, Middleton 1992, Mazrui and Shariff 1994, Kusimba 1995). Language suggests similar distinctions. There are more than 20 recognized Swahili dialects, arranged primarily in terms of their geographic locations (Nurse and Hinnebusch 1993, Hinnebusch 1999). Such an organization is to be expected insofar as linguistic communities with more contact with one another will be more linguistically similar than those communities which are not in regular contact, but it is notable that many dialects are centered on urban centers such as Pate, Malindi, Kilwa and Mombasa.

Historical documents suggest similar patterns of regional identification. They show that coastal cities were independent political entities until they were colonially dominated and still retained a good deal of autonomy even under Portuguese and Omani rule. While the wars and political machinations recorded in the historical chronicles of coastal cities (see Velten 1907; Freeman-Greenville 1962, 1975; Tolmacheva 1993, Mazrui 1995), should not necessarily be taken as literal records of events, they provide a real sense of the coast’s history and the independent, competitive coastal regions of that history. That picture is corroborated by both the early Portuguese sources, which similarly emphasize competing Swahili urban centers (Strandes 1961[1899]), and the historical record of Muslim visitors to the coast (see Freeman-Grenville 1975).

Archaeological research has increasingly recovered material correlates that are indicative of regional differentiation. As will be discussed in greater detail in Chapter 5, there has been growing awareness of regional distinctions in locally produced ceramics, such as Horton's (1994b) recognition of regional variation in Tana/TIW assemblages and Fleisher's identification of regional ceramic styles at Kilwa (2004) and on Pemba Island (2003) during the first half of the second millennium. Regional distinctions are also present in imported ceramics (Horton 1994b).

Archaeological research has also helped identify variation in elements thought to be broadly characteristic of Swahili society, such as Islam. While documentary sources do not describe the entire coast as having converted to Islam until Ibn Battuta's visit in 1331 (Horton and Middleton 2000: 47), a mosque dating to the 8th century has been found at Shanga in the Lamu Archipelago (Horton 1996) and a similar but larger mosque from the early 10th century has been found at Ras Mkumbu on Pemba Island (Horton and Middleton 2000: 51). This early archaeological evidence for Islam suggests Islamic influences on different parts of the coast originated in different parts of the Middle East amongst multiple varieties of the religion. For instance, coins with Muslim inscriptions dated to the 8th or 9th century at Shanga resemble coins produced by the Shi'ite Zaidite group in Yemen (Horton and Middleton 2000). However, the mosque at Ras Mkumbu is of an Ibadi type with the *mihrab* recess set into the thickness of the north wall. Similar early Ibadi mosques have been recovered from Chwaka, also on Pemba Island (Horton *forthcoming*). In both cases these mosques were later replaced by larger mosques of an either Sunni or Shi'ite variety, with a deep *mihrab* recess. Documentary evidence corroborates the distinctions in varieties of Islam practiced on the coast suggested by coins and mosque design. Various 13th-century documents describe Kilwa shifting between Ibadi and Shi'ite Islam, but by the visit of Ibn Battuta they followed the Shafi'i school of Sunni Islam (Horton and Middleton 2000: 67-68). Islam on the coast is integrated into coastal society – and indeed might well be seen as an indigenous achievement (Horton and Middleton 2000: 48) – but it is also dynamic and variable across space, incorporating influences from different parts of the Middle East and multiple varieties of Islamic practice, as well as other coastal regions (see Pouwels 1987, Horton 2001, Insoll 2003).

Archaeology has played a similar role in recognizing different forms of political organization on the coast. Two major forms of political organization have been identified on the coast ethnographically and ethnohistorically: a type of kingdom or principality on the one hand, and a form of oligarchy dominated by the elders of patrician clans on the other, which Allen called the Shirazi and Waungwana modes of domination respectively (Prins 1971, Allen 1993). Principalities were governed by a single paramount and were most often small collections of settlements around a dominant town (Fleisher 2003: 98). Their rulers relied on ritual authority and the maintenance of good relations with nearby groups in order to draw in people and resources. In contrast, oligarchies featured a group of ruling elite, but no single leader, and rested upon the control of resources by powerful, socially exclusive, patrician lineages. These different modes of political organization have distinct archaeological correlates. In principalities, where the king's control over people is more important than clans' control over land and space, settlements do not have city walls, there are fewer elite houses, larger non-elite neighborhoods, and less clear demarcation of urban space (Fleisher 2003: 101). The distribution of principalities and oligarchies also exhibits geographic distinction (Sinclair and Håkansson 2000). For example, during the 15th and 16th centuries principalities are replaced by oligarchies over large portions of the Swahili coast, but are mostly left intact throughout northern Tanzania.

Increasing awareness of regional variations across these various aspects of Swahili society has important implications for how we understand that society. Perhaps most importantly, it has promoted attention to regional diversity within the Swahili coast (see Horton 1994b, Sinclair 1995, Fleisher 2003: 60) complicating a long-standing view of Swahili society that assumed close contact between coastal communities brought about similar patterns of development and virtual coastal uniformity. This rejection of homogeneity within Swahili society does not deny the existence of cultural continuities between regions or close contact between regions and mutual influence. However, it does demand that elements of a "Swahili package" including ceramic types like Tana/TIW, Swahili language, Islam, and Indian Ocean trade are disentangled. For instance, the broad spatial distribution of Tana/TIW ceramics in the first millennium suggests that they could not have only been associated with Swahili-speakers, given that linguistic research (Nurse and Hinnebusch 1993, Spear 2000) suggests the language was only developing in northern Kenya at the time (Fleisher 2003: 55). Even when elements of Swahili society came into greater focus all along the coast during the 11th-15th-century florescence, similar cross-cutting patterns of variation existed regarding ceramics and material culture, involvement in Indian Ocean trade, and political organization, among other things. The significance of those cross-cutting patterns of variation is two-fold.

First, recognizing the reality of a distinct Swahili culture but one significantly marked by regional differentiation requires a reappraisal of that culture and the processes that helped shape it. In particular, studies of the Swahili coast need to consider the interplay of forces that promoted cultural similarities, such as shared participation in Indian Ocean trade, and those that prompted regional variation, including local environments and connections to diverse African groups inhabiting the hinterland. Examination of the early second millennium suggests that, despite similarities relating to their shared semi-peripheral status in the Indian Ocean economy and their influence on one another,[3] forces prompting heterogeneity on the coast, in terms of politics, culture, language, religion and social organization may have been predominant in coastal life.

The other significant repercussion of the patterns of regional differentiation on the coast is that they imply that one cannot think of Swahili culture outside of a broader African and Indian Ocean context. While there are certainly things that distinguish the Swahili from their neighbors and from other communities participating in Indian Ocean trade, many aspects of being Swahili are shared with those groups. For instance, their African neighbors share cultural and linguistic roots in the Iron Age communities of eastern Africa (Phillipson 1977a, 2005). The organization of Indian Ocean trade and the actions of the various groups participating in that trade help shape the economies of local Swahili communities and their access to goods used to establish and maintain social hierarchy (see Kusimba 1999a). The Swahili did not exist in isolation, and while local and intra-coastal factors are important to the organization of coastal society, external connections are also important and demand consideration. That the full implications of

[3] See Wright's (1993) discussion of peer-polity interaction on the Swahili Coast

such connections have not been fully explored owes largely to historiographic reasons. Early studies simply assumed the Swahili were wholly foreign and later studies redressing the weaknesses of the foreign model necessarily emphasized the African roots of Swahili society and indigenous developments. Nonetheless, because so many aspects of Swahili life are either shared with or shaped by communities from elsewhere in Africa and around the Indian Ocean, a broad view of Swahili relations is important.

Research Questions and Broader Themes

Recognition that Swahili society cannot be fully understood in isolation parallels similar developments in archaeological studies of large-scale systems of interaction more broadly. Although a variety of theoretical approaches have been used to model such systems, they share the belief that interregional interactions are crucial to understanding what was taking place at archaeological sites, holding that "even the smallest archaeological site cannot be understood only in isolation" (Hall *et al*. 2010; see also Schortman and Urban 1992a, Chase-Dunn and Hall 1997). Archaeologists interested in large-scale systems have increasingly recognized that the converse was also true: local manifestations of large-scale systems cannot be understood from external perspectives alone (Cusick 1998, Stein 2002, Hall *et al*. 2010). Large-scale networks need to be approached in a manner that incorporates multiple scales of analysis, combining knowledge of systemic factors and "global" developments with well-understood regional systems and local, idiosyncratic variation.

This dissertation seeks to answer the research question of how large-scale networks of trade and cultural exchange on the Swahili coast influenced local and regional communities using such an approach. Despite the prevalence of factors encouraging Swahili regionalism, coastal regions' shared participation in those large-scale networks distinguished Swahili communities and Swahili culture from their neighbors and was a crucial factor in their development – implying that local, regional factors alone cannot explain the developments of coastal history. To better understand the Swahili, archaeologists need to appreciate the balance of local and large-scale forces shaping coastal communities' participation. The interplay of local and large-scale must be pursued across multiple measures (see Crumley 1979). Although various world-systems analyses have amply demonstrated the significance of trade and economic organization (see Wallerstein 1974, Chase-Dunn and Hall 1997), economic forces worked in concert with environmental (Price 1977), ideological (Renfrew and Cherry 1986) and social ones (Dietler 1998), a point recognized by world-systems theorists (Hall *et al*. 2010). The research for this dissertation was designed to provide this sort of broad understanding of one region of the coast – around the town of Mikindani – that could be compared with the organization of the broader system and developments elsewhere so that local and supra-local influences could be disarticulated.

As my research and analysis progressed, a number of subsidiary themes also emerged. One of the most important methods of regional analysis employed in this dissertation integrates developments in landscape archaeology and historical ecology. This approach appreciates that the ways in which Mikindani's inhabitants interacted with the environment and understood environmental change was socially constructed and determined within the context of other regional developments (see Crumley 1994, McIntosh *et al*. 2000, Evans 2003, McIntosh 2004). My study of the local ceramics from the region also provided a platform from which to explore the significance of local ceramic typologies, both in terms of what sorts of functional information about vessel production and use they imply, and in terms of the kinds of extra-regional social relationships they document. Finally, given that archaeologists have derived considerable insight through adapting models constructed from the modern world such as world-systems theory for ancient contexts, I will also explore the extent to which this study of large-scale systems might benefit from the anthropological study of globalization (e.g., Inda and Rosaldo 2008). This topic is addressed in greater detail in the final chapter.

Mikindani and Swahili Networks

The primary question of this dissertation is thus the manner in which the inhabitants of the Mikindani region participated in Swahili networks, and the implications for Mikindani society. Effort is made to determine what factors shaped their participation and the extent to which Mikindani's inhabitants were able to influence those factors. Regional patterns of settlement locations, land use, economic production, environmental interaction, and consumption of imported and locally produced goods are studied within the context of large-scale forces working to bring about differentiation or assimilation. As the details of the Swahili networks' functioning within the Mikindani region are understood, it is also important to appreciate what sort of place Mikindani is relative to other coastal communities and how that shapes the implications of this study for the rest of the Swahili coast.

This study of Mikindani is a product of the expansion of the scope of coastal archaeological inquiry beyond the large centers. Mikindani does not have the extensive stone architecture or obvious wealth of the major Swahili centers such as Kilwa, Mombasa and Manda that were the subject of early archaeological inquiry and used as archetypes of Swahili culture, nor does it match the spatial extent of those sites. The Swahili centers were located all along the coast and dominated coastal commerce. Their resultant wealth enabled the construction of hundreds of coral-stone buildings, including monumental structures such as Kilwa's palace, Husuni Kubwa, and Great Mosque. It also prompted true urban development, which can be seen in the size of the centers. Kilwa covered an entire square kilometer at its height and Mombasa was home to around 10,000 people (Kusimba 1999a). In contrast, Mikindani is better classified as a town,[4] covering perhaps 10 or 15 ha, of mostly earth-and-thatch structures surrounding a modest stone-built core. In many ways the smaller size and less extensive wealth of Mikindani suggests that it might serve as a better model for the majority of Swahili settlements than the larger, wealthier centers, which were as exceptional when compared to their own regions as when compared to Mikindani.

Mikindani also presents an expansion of the geographic scope of archaeological inquiry on the Swahili coast. Mikindani is on the southernmost Tanzania coast, just above Cape Delgado and about 250 km south of Kilwa. The Mikindani region has only recently been the subject of archaeological study, with a brief survey project by Amandus Kwekason of the Tanzanian National Museum (2007) providing some of the first indications of its archaeological potential. This area is located south of most well-studied

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[4] This classification follows the site categories used in other surveys of the coast by Wilson (1982) and Fleisher (2003), which were adapted for this project. For a fuller discussion, please see chapter 10.

portions of the Swahili coast, but provides an important linkage between the well-known sites of the Kenyan and Tanzanian coast (e.g., Chittick 1974, 1984; Horton 1996) and sites from the Mozambican coast (Sinclair 1987, Duarte 1993, Ekblom 2004). Mikindani also sits close to the mouth of the Rovuma River, which would have allowed for relatively easy movement between the coast and the interior. The Mikindani region thus provides information about participation in networks stretching in multiple directions, and potentially documents ways in which the region's inhabitants managed varying degrees of inclusion and exclusion in each of those directions.

Organization of Dissertation

Within this dissertation, several lines of evidence are explored to better understand the Mikindani region and the nature of its participation in large-scale Swahili networks. The first steps in pursuit of this objective provide necessary background on the context of those systems and lay the groundwork for the analyses undertaken later in the discussion. Chapter 2 introduces my research project and the Mikindani region itself. In the chapter I discuss how the study region was chosen using environmental, historical and archaeological data. This chapter also presents the dissertation's research question in greater detail and describes the archaeological methodology designed to answer those questions. The chapter concludes with descriptions of the excavations undertaken in the first and third phase of the project, laying the groundwork for the analysis chapters in the second half of the dissertation.

In Chapters 3 and 4 I provide a literature review for the different scales of analysis used in the dissertation. Chapter 3 presents an overview of how large-scale systems of interaction have been studied in archaeology, with special reference to how existing models have been applied to the Swahili coast. The chapter concludes with a discussion of how existing models inform the approach to the large-scale Swahili networks taken in this project. Chapter 4 provides a literature review of regional analysis in archaeology, again with special reference to regional studies on the Swahili coast. It concludes with a discussion of how these models of regional analysis inform the approach taken to the Mikindani region.

In Chapter 5, I discuss the existing research on local ceramics from eastern and southern Africa, describing the attributes which have been used to designate and suggest relationships between different ceramic types. Particular attention is given to the history of local ceramic production on the East African coast, stressing both the diversity present in each period and shared elements between regions. The chapter concludes with a discussion of the social, economic, linguistic, and demographic implications of our existing typological framework, emphasizing what the ceramics do *not* tell us about but highlighting those things about which they are pertinent.

Chapters 6-10 present analyses of the data recovered during the project. Chapter 6 presents the environmental results of the project, with separate sections for archaeobotanical remains, faunal remains, stable-isotope analysis of soil samples, and basic soil chemistry tests. At the end of the chapter these results are interpreted to tease out the changing relationship between people and the environment in the Mikindani region over time. I also compare that historical ecological record with similar data from other parts of the coast.

Chapter 7 is a presentation of the local ceramic data, describing the vessel forms, decorative styles and ceramic metrics from the locally produced pottery recovered in the Mikindani region. These data are used to craft a ceramic typology for the Mikindani region, which is then contextualized against the ceramic traditions discussed in Chapter 5. The larger purpose of the chapter is to describe the evidence of shifting connections between the Mikindani region and elsewhere that the ceramics provide and to discuss the social implications of those connections and trends in ceramic form and function.

Chapter 8 discusses the imported goods found in the Mikindani region, comparing them to the kinds of imports typically found at Swahili sites. The most significant aspect of the discussion is the absence of nearly all common imported goods in the Mikindani region during the first half of the second millennium. The chapter concludes with a discussion of the various implications of the region's import data for the organization of interregional trade, its relationship with coastal power Kilwa, and its connections to the Middle East.

Chapter 9 presents the other artifact classes relating to local production including iron-working, weaving, and home-building, exploring their implications for the economic organization of the Mikindani region. It also includes a discussion of the stone-tool evidence recovered during the project.

Chapter 10 is a description of the spatial data recovered in the Mikindani region, presenting the survey results and providing a characterization of the recovered sites based on survey and excavation. The chapter then moves into a critical application of some of the regional-analysis models discussed in Chapter 4 to the Mikindani data.

The concluding Chapter 11 synthesizes the results of the analyses in the preceding chapters and addresses what the Mikindani region's history tells us about the Swahili system more broadly. This chapter also provides an opportunity to return to some of the subsidiary themes from earlier chapters including environmental landscapes in the region and historical ecology, the nature of interregional trade at the coast, and the dynamics of regional social and political organization.

CHAPTER 2: UNDERSTANDING THE MIKINDANI REGION: CONTEXT AND METHODOLOGY

The Swahili Coast was home to vibrant large-scale networks of exchange across which flowed goods such as ivory and gold, and ideas ranging from the fundamentals of Islam to styles of stone architecture. Mikindani interacted within coastal exchange networks from its location on the southern Tanzanian coast. By maintaining a tight focus on this area, local forms of socioeconomic organization can be compared with broader coastal trends to explain how Mikindani's experience within the Swahili world was shaped. Because Mikindani was not a major urban center aspects of this study can also be profitably compared to other coastal communities outside of the major centers to add nuance to generalized patterns of Swahili historical developments.

In this chapter I place Mikindani within its geographic and historical contexts in order to show why the region was chosen as the site for this research and to ground the discussion of historical trends on the Swahili coast within a specific regional case. I discuss the project's research questions in greater detail and outline the archaeological methodology I developed to provide answers to those questions. In doing so I describe the research undertaken during each of my project's three phases. Finally, I describe the excavations from the two excavation phases of my research.

Mikindani's Geographic Context

Mikindani sits on the southernmost Tanzanian coast, roughly 50 km from the mouth of the Rovuma River and just a bit north of Cape Delgado. This location places Mikindani towards the southern end of the stretch of the Swahili coast whose members share similar ecological and climatic signatures. Like the rest of the Swahili coast, the area around Mikindani is classified ecologically as part of the Zanzibar-Inhambane floral mosaic of broadleaf forests (White 1983) or the East African Coastal Forests (Clarke 2000) and its climate is dominated by the Indian Ocean monsoon system. These broad classifications obscure a great deal of variation which exists on the coast however. It is thus important to better specify Mikindani's geographic context to understand how local environmental characteristics distinguished the region and influenced its inhabitants.

The portion of the East African coast between the Rufiji and Rovuma Rivers in Tanzania on which Mikindani sits is typically referred to as the Ngao coast (Horton and Middleton 2000, Fleisher 2003; see Fig. 1.2). This portion of the coast, rather unfairly labeled "barren" by some (Horton and Middleton 2000: 10), possesses lower average annual rainfall than portions of the coast north of it, but is better watered than the arid Benadir coast of northern Kenya and Somalia. The average annual precipitation on the Ngao coast of between 50 and 100 centimeters approximates that from the Visiwani coast around Lamu. The Mikindani region tends to receive the least rainfall of all parts of the Ngao coast and precipitation in the area sometimes falls below 50 centimeters a year (Darwall and Guard 2000), though precipitation data from the 20^{th} century suggest that on average the region has been fairly typical for the Ngao coast (WMO 2010). The Mikindani region shares abundant coral reefs and substantial mangrove swamps with the rest of the Ngao coast and with much of the East African coast more broadly. While the Ngao coast is described as lacking good harbors, the town of Mikindani sits on a well-protected lagoon at the southwest end of Mikindani Bay and possesses expansive beaches suitable for landing dhows (see Juma 2004) as 19th-century European reports described taking place (Gray 1950).

There is also substantial local ecological variation around Mikindani resulting from the local geology, though a comprehensive botanical survey of the area has yet to be undertaken. The soils around Mikindani are derived from some of the youngest rocks in southern Tanzania (Aitken 1961). The hills and plateaus coming towards the coast in this region are composed of the Neogene period "Mikindani Formation" (previously referred to as "Mikindani Beds") of unconsolidated, fine-grained sandstones, brick red in color (Aitken 1961, Schlüter 1997). Recent geological testing in the region dates this formation to the late Oligocene or early Miocene, between 10 and 20 million years ago (Orphir Energy 2008). The Mikindani Formation is likely derived from the older Makonde Beds, which are widespread to the north and are significantly older, dating to the Cretaceous over 65 million years ago (Aitken 1961). The soils of the lower rolling plains adjacent to the coast are derived from fossilized coral limestone formed during the Pleistocene 130,000 years ago and exposed by a drop in sea levels (Darwall and Guard 2000, see Figure 2.1). Alluvial sediments deposited by the regional waterways comprise a third important soil type in the area. Distinctions between the sandstone plateaus, the limestone material closer to the coast, and the alluvial sediments are significant to local floral variation. All of this is described in greater detail in Chapter 6.

A further key element of Mikindani's geographic context is its place within the Indian Ocean monsoon system. Mikindani sits at the southern end of the area in East Africa where monsoon winds blow, with important implications for climate and precipitation. The most frequently mentioned geographic cut-off for significant monsoon influence is Cape Delgado, located just south of the Tanzania-Mozambique border. The Inter-Tropical Convergence Zone (ITCZ) which drives the monsoon sits around 18º S in January and February (Clemens *et al*. 1991), just 7º south of Mikindani. Because of the town's location so far south, the dependability of the monsoon for Mikindani is not assured. Indeed, some have suggested that the limit of a reliable monsoon is not further south than Kilwa (e.g., Wynne-Jones 2005a) or even Zanzibar (Horton and Middleton 2000), and that few Indian Ocean traders would have sailed as far south as Cape Delgado (Allen 1993). Given the strong connections between monsoon winds and Indian Ocean trade, less reliable winds would have provided challenges to aspiring traders in the region. The decreased dependability of the monsoon winds also plays a role in the lower average precipitation for the Mikindani region relative to regions further north.

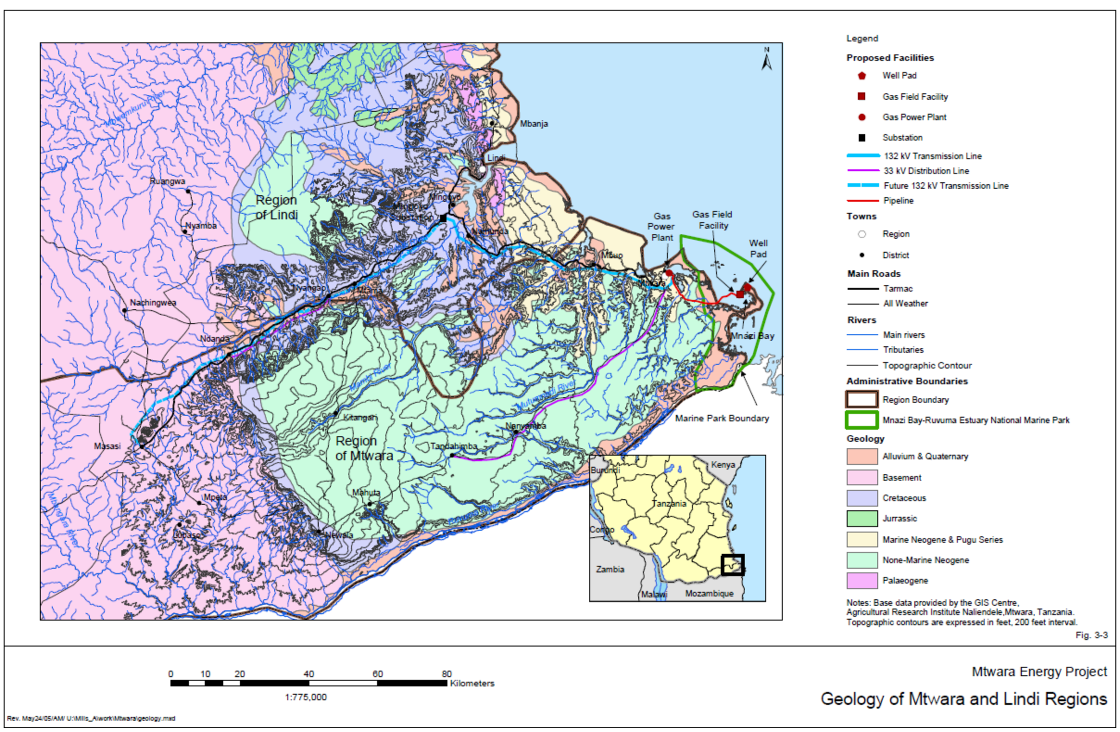

Figure 2.1 Geologic map of Mtwara Region (Artumas Corp. 2005)

Mikindani's Historical Context

Due to its location on the Swahili coast, Mikindani might be expected to have shared some of the historical developments common to other places on the coast. However, because the region has been the focus of so little study, the extent to which the Mikindani region might be said to possess a "Swahili history" remained poorly understood prior to this study. The prior research into the region's history consisted of an oral history collected by the German Professor Carl Velten (1907), two short historical articles published in *Tanganyika Notes and Records* (Johnston 1947, Gray 1950), two conservation reports (Amuli 1987, Lombard and Moon 1985), and, importantly, a three month archaeological reconnaissance survey by Amandus Kwekason of the Tanzanian National Museum (2007). These efforts suggested certain patterns for the historical development of the region suitable for more detailed study.

Historical Records of Mikindani

The first European historical record to make note of Mikindani is a French map from the 18th century reproduced by Alexander Dalrymple in 1796 (Gray 1950). In the latter part of that century a number of French vessels visited the southern Tanzanian coast in search of slaves for their plantations on Mauritius and Réunion. The French material refers to the town as "Quindarmis" and speaks of a "king's residence" being present. There is no historical evidence of the character of the people who lived in Mikindani at this juncture, though a century later a woman descended from Swahili people and the Makonde, the largest local non-Swahili ethnic group, claimed hereditary rights to the town's throne through her maternal relations (Gray 1950). Throughout the 19th century various British sailors and missionaries visited the region, most notably David Livingstone. Their reports refer to the inhabitants around Mikindani Bay as Arabs or "coastal Arabs," terms which likely either referred to Swahili populations or which would have included Swahili individuals. They also describe a trade in gum copal and sesame, and increasing local plantation slavery in the second half of the 19th century as the British impeded seaborne traffic of slaves. A number of these outlying farms and plantations, and the slaves who worked them, were owned by Makonde individuals. During the 19th century Mikindani was nominally under the authority of the Sultan of Zanzibar, though British reports indicate that his authority was largely dependent on the agreement of the Makonde and that "when sent a distance of two days inland, [the Sultan's] soldiers were helpless, having to trust entirely to … the peaceful disposition of the people" (Gray 1950: 35). In the 1880s the town became subject to the Germans, and was thereafter under European administration until Independence in 1961.

Despite the lack of European records dated earlier than the 18th century, those records indicate that settlement around Mikindani Bay existed quite a bit earlier. David Livingstone described a ruined stone mosque found in Pemba, a village on the north coast of the southwest lagoon of Mikindani Bay, during his visit in 1866. The remains of this mosque are still in existence, located adjacent to the modern mosque, but its date could not be obtained archaeologically due to its current use as a graveyard for important local citizens. The inhabitants of Pemba in 1866 told Livingstone that they had not been settled there for long, a point repeated in oral histories I collected in 2008, but Livingstone noted that a number of ruined stone houses dotted the shoreline in the vicinity, which indicated that it was "known and used of old" (Gray 1950: 32). Outside of Pemba, an old stone mosque thought to date to the 16th or 17th century has been noted at Msemo, a settlement on the ocean about 10 km away from modern Mikindani to the east (Johnston 1947). In 1824 a British sailor from the HMS Barracoutta described, perhaps incorrectly, "a fine castellated building of the old Portuguese" existing on the southwest lagoon of Mikindani Bay (Gray 1950: 30). But the most telling indication of early settlement comes from the earliest French documents, which speak of an existing settlement and social hierarchy headed by a king at the time of first European contact. This would seem to indicate, much as Gray suggests (1950: 29), that Mikindani Bay's history held much in common with other regions of the coast, and was likely inhabited by African fishers, farmers and traders long before it achieved notice in European historical records. This latter point is reinforced by the oral history of Mikindani's founding, which records that, "there was a Makonde man, named Katindi, and it was he who built it" prior to the coming of Arabs (Velten 1907: 278; translation from Swahili by the author).

Despite these indications of early settlement, there is no historical evidence to indicate that Mikindani was a major Swahili center. The town, whether known as Mikindani or Quindarmis, is not named in the oral histories of other Swahili towns until they describe events in the 19th century. Regarding pre-19th-century architecture, the entire region possessed only the modest stone mosques at Pemba and Msemo and perhaps a king's residence and/or Portuguese castellated building at Mikindani, as recorded in the European accounts (Gray 1950). The paucity of such buildings as compared to the extensive stone architecture – multiple mosques, hundreds of stone buildings, and occasional monumental architecture – found at major Swahili centers is undeniable. Historical accounts similarly suggested that Mikindani was more modest in size and population than major centers such as Kilwa or Mombasa. The European accounts nonetheless consistently suggest that Mikindani and the other settlements around Mikindani Bay were regionally significant (Gray 1950). Such regional significance and involvement in interregional trade, combined with the lack of stone architecture and the town's relatively modest overall size, suggests that Mikindani fits the model of a mid-level Swahili town (Wilson 1982, Kusimba 1999a, Fleisher 2003).

Archaeological Work around Mikindani Bay

The expectation of settlement earlier than the 18th century around Mikindani Bay was borne out by archaeological excavations in 2006 (Kwekason 2007). Kwekason's work consisted of a reconnaissance survey done in the area immediately surrounding the southwest lagoon of Mikindani Bay in February 2006, and some excavations carried out in July and August 2006. From these activities he was able to demonstrate settlement dating back to the last centuries BCE and to suggest five distinct periods of occupation based on local ceramic types. The first and earliest of these is a phase characterized by ceramics which bear similarities to Neolithic Ceramics of the Rift Valley and Sudan (Kwekason 2007; and see Chami and Kweakason 2003). This pottery consisted primarily of wide-orifice pots and bowls, and was decorated with rocker-stamped dotted lines, sometimes forming a wavy or zigzag pattern. It was not found in association with any iron implements or evidence of iron-working. The radiocarbon date obtained from an associated charcoal sample was 2195 ± 35 BP (Kwekason 2007: 35).

The second period of occupation determined by Kwekason was characterized by Early Iron Age pottery that was a variant of types known as Kwale or Early Iron Worker

(EIW). These ceramics were found near to Pemba village, and their style most closely matched the Mwangia phase of coastal EIW ceramics described by Chami (1998), which he dates to 500-600 CE. The radiocarbon dates obtained from two associated charcoal samples collected at Pemba are 1560 ± 35 BP and 1480 ± 35 BP (Kwekason 2007). These dates suggest a 5th century occupation at Pemba, and place the EIW ceramics in the Mikindani region towards the tail end of the EIW period.

The third period of occupation in the Mikindani region was characterized by pottery similar to the "Plain Ware" tradition (Chami 1998, but *cf*. Fleisher 2003). Kwekason recovered two such sites between the shoreline and the higher plateau surrounding Mikindani. These wares have typically been dated to the first centuries of the second millennium CE (Chami 1998), but Kwekason obtained a radiocarbon date of 1070 ± 35 BP from the bottom of cultural materials at one site. In one instance this period of occupation was clearly overlain by later material of the fifth period.

The fourth period of occupation is characterized by pottery found at one site with a large proportion of shallow bowls, thin rims, and a variety of design motifs including punctates and stamps, panels of oblique lines and shell impressions. At that site the ware was dated with two radiocarbon samples to the 12th century (Kwekason 2007). Kwekason suggests that there are certain affinities with Khartoum Late Neolithic pottery, including globular shape, fingernail impressed patterns, and lip notching, though the 12th-century dates are much later than the Neolithic pottery, and there is no obvious cultural connection between the two locations. Ultimately this caused him to conclude that this "distinctive pottery type" bears an uncertain relation to other pottery along the East African coast (Kwekason 2007: 36) though closer analysis suggests certain parallels with types from Malawi and Mozambique (see Chapter 7). Also of interest are a number of characteristic red/brown barrel beads associated with this material, which were also found overlaying material at one of the Plain Ware sites.

The last occupation period described by Kwekason is characterized by the "Swahili Ware" of the mid-second millennium CE (see Chami 1998). Common features of these ceramics include carination, red paint, and neck punctates. Kwekason frequently found these ceramics in the upper levels around Mikindani in association with significant quantities of shell. While this material does, as described, show affinity with ceramics from Pangani on the northern Tanzanian coast (Gramly 1981) and Chwaka on Pemba Island (LaViolette *et al*. 2004) from the 14th and 15th centuries, it is not dated here and it is not clear how much of this material should be distinguished from the 18th- and 19th-century material known to have existed in the area.

Persistent and Fundamental Questions

Previous archaeological and historical work thus demonstrates that the Mikindani region participated in the broad economic and cultural networks of the Swahili Coast. The historical record shows a tradition of long-distance trade and a multi-ethnic population of Arabs, "coastal Arabs" or Swahili, and indigenous Africans. The archaeological record demonstrates the presence of more than two-thousand years of settlements whose inhabitants made and used variants of shared coastal and broader East African ceramic traditions. Nonetheless, the question of how the large-scale Swahili networks were functioning in this place and their importance for these people at different moments in time remained unanswered in prior research. It is therefore useful at this juncture to raise again the research questions which orient this study, and to elucidate the fundamental unknown facts which need to be understood in order to address those questions.

The central research question of this project asked how the large-scale Swahili trade and exchange networks in evidence at Mikindani functioned and changed over time. Answering that question demands knowledge of the basic details of what was taking place in the region at different moments in time, so that the extent of the influence of both local and external forces might become clear. One key area for such study was the economy, where numerous questions persisted. For instance, how was the local economy organized? What sorts of goods were being produced, and who was consuming them? How were those goods being produced? Was there evidence of specialization? What evidence was there for trade? What sorts of goods were being imported into the region, in what numbers, and where did they end up? What were those imports being exchanged for? What was being exported from the region?

Similarly, the project required knowledge of the environment, and the relationship of the region's inhabitants to their surroundings. Environmental questions included: what plants and animals were most common in the region at different moments in time? Did human activities (e.g., cultivation, animal husbandry, ironworking) have appreciable effects on the plants and animals that lived around the region's settlements, or the soil? What sorts of natural resources were in the area, and to what extent were they exploited? Who was exploiting them? Did a particular orientation towards the environment, a cultural construction of landscape, exist and if so how did it change over time?

The social characteristics of the Mikindani region were a further subject of analysis and brought a further set of questions. How was coastal society around Mikindani structured? Was there settlement hierarchy in the area? Was there hierarchy within any settlement? What level of socio-political organization existed? Was there political control by a polity from outside the region? What religion(s) was practiced? What role did religion play in organizing the socio-political networks of the region? What sort of cultural connections to groups outside the region existed?

While all of these questions can be seen as straightforward, even these rely upon a further, simpler set of evidential questions. To determine whether or not there was a settlement hierarchy, or how humans impacted the regional environment, or how production might have been organized, basic questions of land use and settlement patterning needed to be answered. Where did people live? Where did they carry out certain activities? How intensely were those places used, and for how long? What was the environment like in those places? What is the spatial relationship between those locations and other places in the region where people lived and worked? Where are certain classes of artifacts found? A similar set of evidential questions about the artifacts themselves also needed to be answered to illuminate the forms of economic and social organization in the past. So I also ask, for example: what are the characteristics of ceramics here? What is the nature of the evidence for ironworking or iron tools? What sorts of architectural forms and features are evident?

Archaeological Methodologies to Address Research Questions

Archaeology provides a means to answer these questions, and I designed this project to provide the evidence to address them. The project was split into three phases: (1) a phase of test excavations around Mikindani Bay, (2) an archaeological survey of the Mikindani region, and (3) excavations at significant sites found in the survey. The second phase of the project would provide spatial evidence while the first and last phases would yield sufficient samples of the archaeological materials in the region. But prior to these phases the first necessary step was to determine an appropriate study region on the basis of Mikindani's historical and geographic context.

Defining a Study Region

Given the archaeological evidence for early settlement around the Mikindani Bay lagoon and historical evidence suggesting the regional significance of that area in the second half of the second millennium CE, the settlements surrounding the lagoon formed an appropriate core for the study region. The regional context which provided the local influences on those settlements' participation in the broader Swahili system then had to be defined. The settlements surrounding Mikindani Bay needed to be placed within the smaller-scale network of towns and villages with which they would have regularly interacted (see Kramer 1994), and the extent and characteristics of that network needed to be determined. In the absence of broad-scale archaeological testing prior to this study, this determination was made primarily on the basis of environmental and historical data.

There are indications that the area around Mikindani should be considered geographically distinct from portions of the coast to its immediate north. Located at

10°17’ S, Mikindani has less reliable monsoon winds and precipitation than areas further north, and therefore receives less total annual precipitation on average (Darwall and Guard 2000). Unlike much of the Ngao coast, the region around Mikindani possesses several protected bays for harbors: Mnazi Bay, Mikindani Bay, Mtwara Bay, and Sudi Bay. The area around Mikindani is also geologically distinguished from nearby areas of the coast, with alluvial soils near the Rovuma River and limestone-derived soils along the coast abutting the Neogene Mikindani Formation, as opposed to the older Makonde Beds. Given the strong influence of these environmental and geological factors on the ecological, and thus ultimately economic, potential of the area around Mikindani, they were taken into account when determining the study area.

Other means for delimiting the study area around Mikindani were obtained from the town’s historical record and from anthropologically-based expectations of spatial organization. The major historical concern was to distinguish the Mikindani region from nearby areas that were more deeply involved socially, economically, and politically with other Swahili towns. No large settlements have been reported between Mikindani and the Mozambique border at the delta of the Rovuma, but there are records of the existence of another mid-level stonetown at Sudi northwest along the coast (Velten 1907, translated in Freeman-Grenville 1962). The modern village of Sudi is about 10 km west of Sudi Bay (see Fig. 2.2) , or just slightly closer to that bay than Mikindani, and Sudi’s oral history references “countries” of Sudi with the names of villages nearby Sudi Bay (Velten 1907). While the extent of Sudi’s control over these areas in the past, or indeed even at the time of the history’s telling, remains an open question, it is clear that caution should be used when extending the boundary of the Mikindani region up the coast.

Anthropological expectations regarding the spatial organization of regional networks similar to that surrounding Mikindani provide similar cautions. A scale of 10 to 15 km has been suggested for the radius of restricted regional networks (Kramer 1994). This distance was defined from ethnoarchaeological fieldwork in Iran regarding the movements of various goods between settlements. It corresponds with the observed distance between lower-tier markets (first or second level) in Central Place Theory (see Hodder and Orton 1976; and see Chapter 4) and with data from ethnoarchaeological work on ceramic production in Nigeria documenting the distance from which craftspeople usually acquired raw materials (Nicklin 1979; see discussion in Kramer 1985). The distance has been used in East African coastal surveys interested in regional analysis (Fleisher 2003), in part because it seemed to approximate the maximum radius before overlap around adjacent stonetowns. Perhaps most importantly for the Mikindani region, it is also half of the distance between Mikindani and Sudi.

Bearing this evidence and these cautions in mind, a study region of 510 square kilometers was defined. This region stretched from Mnazi Bay in the east to Sudi Bay in the west and extended roughly 10 kilometers off the coast (see Fig. 2.2). Environmental factors including similar latitudes for the monsoon and shared geology suggested that the whole area surrounding both bays and extending many kilometers inland might reasonably be grouped together. This portion of the coast also runs mostly east-west, rather than north-south like the portions of the coast located on either side. However, the presence of a potentially rival stonetown at Sudi indicated that Sudi Bay and the Mbuo waterway which flows into it, would more reasonably serve as a boundary to the region, rather than a major component of it. In the same fashion, it did not make sense to extend the region further inland than about 10 km owing to Kramer's recommendations (1994) and the noted inability of even large Swahili cities to extend effective political control over a broad hinterland (Sinclair and Håkansson 2000, and see Gray 1950).

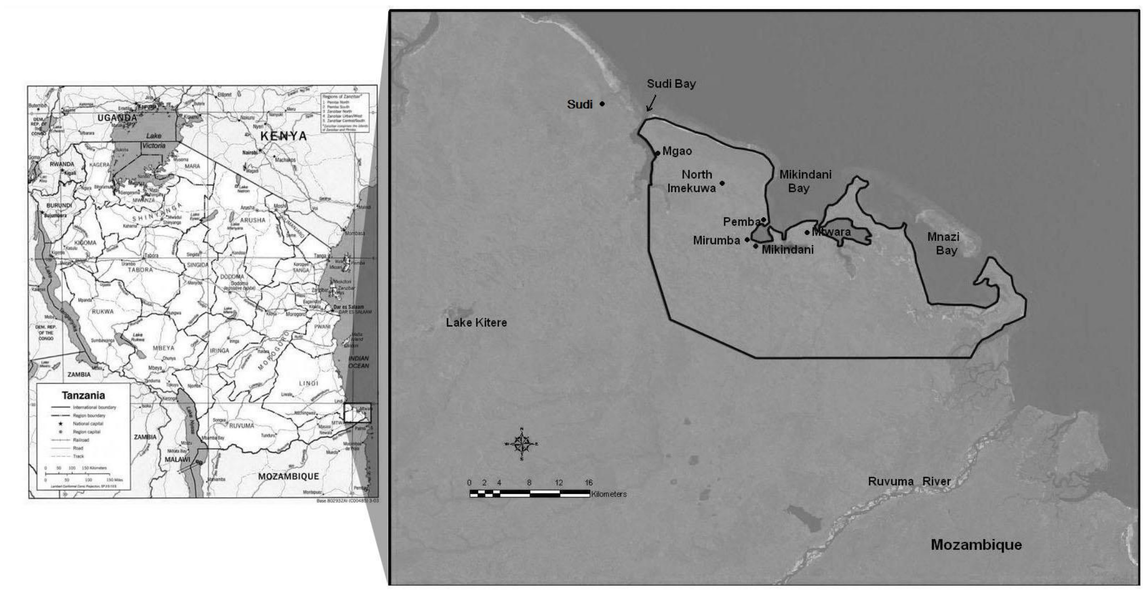

Figure 2.2 Study region around Mikindani

While this region was clearly distinguished from portions of the coast to the north and south, there were also environmental variations within the Mikindani region that would have influenced the form of the regional socio-economic structure. Kwekason noted some of this variation in his survey report (2007), describing a landscape ranging from forests with dense undergrowth to rolling grasslands with only intermittent thicket. Reconnaissance work I conducted in 2006 suggested that a good deal of this variation was based on geological and topographic conditions. Many of the areas with the densest forest and thicket cover were located at higher elevations on soils derived from the Mikindani Formation. The grasslands were more commonly found at low elevations and on soils derived from either limestone or alluvial deposits. Of course, this forest/grassland distinction is also the product of human activity. Still, many of those anthropogenic influences, perhaps including a greater impulse to clear lowland forests to realize that area's agricultural potential, are responses to environmental conditions. The highland and lowland areas clearly supported different agricultural regimes during my reconnaissance, with a far greater emphasis on cassava in the highlands and grains dominating at lower elevations, including rice which was not grown at higher elevations at all. The implications of these differences are discussed in greater detail in Chapter 6.

This environmental differentiation suggested that the Mikindani region should be split into microenvironments for survey in order to identify trends in land use and settlement patterning. Other microenvironments existed in addition to the highland and lowland plains. There were areas where seasonal or perennial streams flowed through land at various elevations, and which thus combined alluvial and Mikindani Formation soils. These areas, referred to as the valley microenvironment, were also relatively more likely to exhibit rice cultivation in the present, likely because of increased opportunities for irrigation. Similarly, there were areas where the highland and lowland elevations met which experienced sharp elevation changes of several hundred feet within a few hundred meters of horizontal distance. These areas also combined different soils types, and I referred to them as the ridge microenvironment. The shoreline, with its sandy soils and easy access to marine resources, provided a fifth set of distinct environmental conditions. This was especially the case as significant portions of all the other microenvironments were too far away from the sea to be expected to have regularly exploited marine resources (see Higgs and Vita-Finzi 1972). Based on these considerations, the study region was divided into the five microenvironments I identified within it (see Fig. 2.3):

(1) the immediate shoreline area, comprising 14 percent of the total study area; (Fig. 2.4) (2) the lowland plains off of the shore, 37 percent; (Fig. 2.5) (3) the ridges and slopes of the transition zone, 7.5 percent; (Fig. 2.6) (4) the upland plains, 28.5 percent; and (Fig. 2.7) (5) the valleys where water flowed from the uplands to the ocean, 13 percent (Figure 2.8).

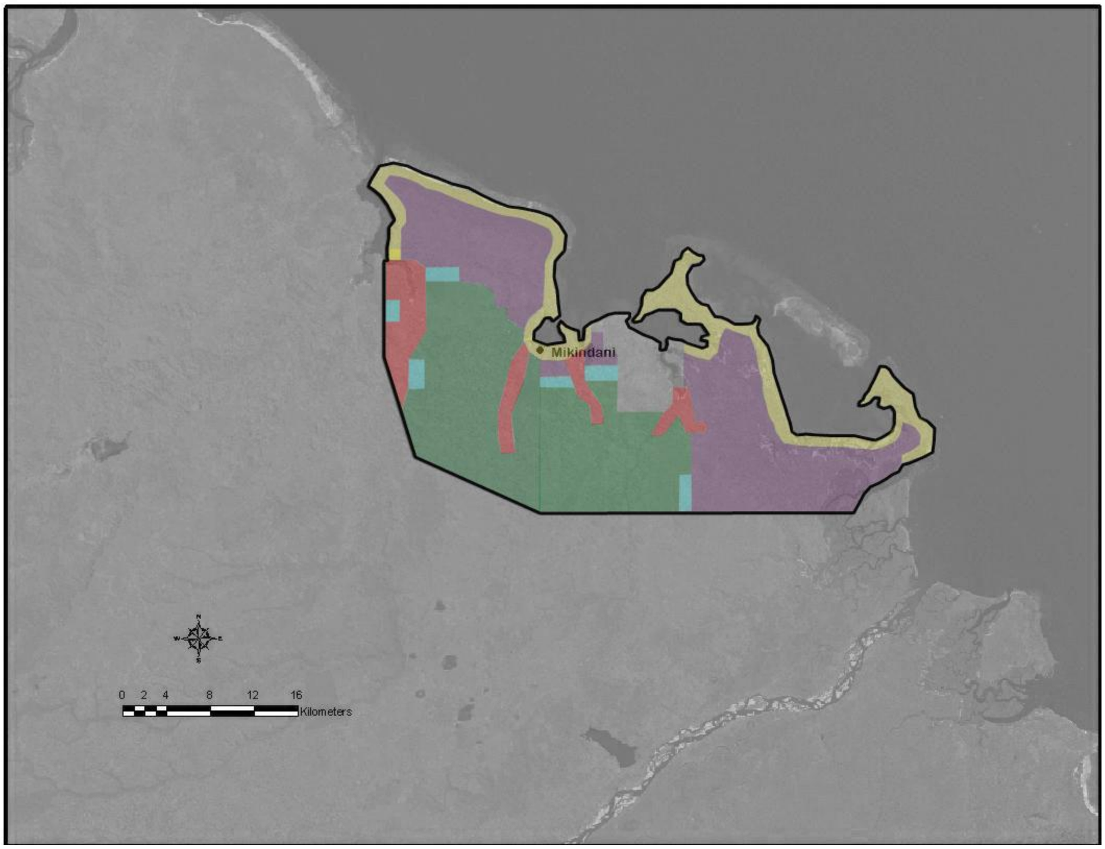

Figure 2.3 Schematic of the approximate areas covered by the five microenvironments. The lowlands are in purple, highlands in dark green, coast in yellow, valley in red, and ridge in light blue.

Phase I: Excavations at Mikindani

The first phase of the project comprised test excavations at Mikindani town and other sites surrounding the southwest lagoon of Mikindani Bay including Pemba. These were conducted between October 2007 and January 2008. Historically this area was the center of the region's interactions with the wider Indian Ocean world (see Gray 1950) and Mikindani was the largest settlement in the study region. The Phase I excavations were intended to study the material culture sequence of this area and to see what sorts of economic activities may have been taking place there. The excavations thus established a material baseline for the core of the study region.

One of the primary benefits of this excavation phase compared with prior research around Mikindani was its extension of archaeological work into previously unstudied areas. In particular, the decision to test not only outside of modern settlement, but also within present-day towns and villages when indications suggested such excavation would be fruitful allowed the project to study the past settlements in the region more completely. To wit, I excavated test units within all five of the wards of Mikindani town, in Mirumba, throughout Pemba village and its surrounding fields, and in and around both Mvita on the western shore of the lagoon and Mitengo on the southeastern edge (Fig 2.9).

In order to achieve this broad coverage within a reasonable timeframe and still control the stratigraphy of the excavated areas, the units were all 1m-x-1m. The placement of the units depended on local landscape features, surface artifacts noticed during reconnaissance conducted prior to opening the excavations, oral histories detailing which parts of the town and its surrounding villages were the oldest, and consultations with local officials. Universal Transverse Mercator (UTM) coordinates for the units were recorded using hand-held GPS equipment and detailed descriptions of the surrounding areas were put into notes. Because little was known regarding the local stratigraphy prior to excavation, the units were excavated by arbitrary ten centimeter levels within natural layers, so that vertical control over the artifact distribution might be maintained even if layer changes were subtle.

Figure 2.4 View of coastal microenvironment

Figure 2.5 Example of lowland plain microenvironment

Figure 2.6 View of ridge microenvironment in distance

Figure 2.7 Example of highland plain microenvironment

Figure 2.8 Example of valley microenvironment

Figure 2.9 Map showing towns and villages around Mikindani Bay where Phase I excavations occurred

Phase II: Archaeological Survey

The second phase of the project consisted of a systematic, broad-scale archaeological survey of the Mikindani region conducted between January and July of 2008. The survey was intended to provide a representative sample of the settlements in the study area and their dates, as well as to produce basic land use and settlement patterning data. Importantly, the survey was designed to estimate land use and settlement patterning over the entire area, beyond the recovery of archaeological sites. This emphasis distinguishes the survey from Kwekason's (2007) earlier reconnaissance in the area. It also demanded that careful scrutiny be paid to issues of sampling and recovery so that the biases inherent in the survey design regarding which types of evidence the survey would *not* likely find would also be understood and controlled for.

As the survey region was too large for complete, 100% areal coverage (and see Wobst 1983), determining a representative sample to survey was critical so that accurate estimates of regional settlement patterns could be produced. Because of its small-scale environmental diversity the region was stratified to ensure that each microenvironment was represented according to its relative prevalence in the survey universe. Stratification ensured that a sparsely or densely inhabited microenvironment would not unduly influence the survey results (Plog *et al*. 1978). Such stratification also follows previous successful stratified surveys in East Africa (e.g., Mapunda and Berg 1991). Maintaining a statistically robust sample size was of equal importance. Thirty 500m-by-1km units were randomly selected to be surveyed, with the microenvironment proportions maintained as closely as possible. While covering less than three percent of the total study area, a sample of this size insured that multiple units of each microenvironment were surveyed and provided a dataset that would produce statistically-valid expectations of settlement patterning across the entire region (see Plog *et al*. 1978). The desire to obtain the most accurate description of regional settlement possible also influenced the decision to survey in blocks rather than straight transects. Although surveying in block units is not as efficient at finding sites as surveying in straight transects, block units do not have as great a risk of overestimating the number of sites in a region (Plog *et al*. 1978) and were therefore more suitable for this survey, in which obtaining an accurate estimate of the number of sites in each microenvironment was paramount.

In order to accurately gauge settlement patterns, clear expectations for the survey's recovery capabilities had to be established. The survey incorporated a program of regular sub-surface testing to accomplish this. Because of their utility in surveys where the location of sites is not already known, subsurface probes were favored over magnetometry, resistivity or chemical techniques. Shovel-test pits (STPs) were preferred to auguring or coring as the method of subsurface probe because they are more likely to locate artifacts and other indicators of human occupation (McManamon 1984). Survey with STPs involves the excavation of circular holes between 30-50 cm in diameter to determine the positive or negative presence of artifacts, soil horizons, and the minimum depth of subsoil (McManamon 1984). STPs are more likely to recover artifacts than coring owing to their larger diameter, and hence greater volume of excavated soil. An additional benefit of systematic subsurface testing with STPs is the ability to know with a fairly high degree of accuracy the sizes of sites which will or will not be found in the survey (Krakker *et al*. 1983, Kintigh 1988). When STPs are excavated at a regular interval the probability of recovering a site of a given size is known in accordance with the formula $p=(\pi r^2)/i^2$, where r is the site radius and i is the interval between STPs (see Krakker *et al*. 1983), provided that artifacts are present at the site in sufficient density to be recovered in the STPs. Simply put, the probability of finding a site of any size is inversely related to the distance between regularly spaced STPs: as the interval decreases the probability goes up, and vice versa. The caveat regarding artifact density is significant though, and an STP program will exhibit a tendency towards the recovery of sites with greater artifact densities.

The decision to undertake sub-surface testing was also made in consideration of the characteristics of the East African archaeological record. Previous archaeological work on the coast has demonstrated the difficulty of identifying wattle-and-daub settlements and their associated artifacts based on walk-over surveys alone (Fleisher and

LaViolette 1999a, 1999b). Even large settlements which lack stone architecture may possess no surface remains because of the dense tropical growth covering most of the coast and the subsequent buildup of organic materials. This problem becomes acute for smaller and earlier sites. Even when surface artifacts are present they can vastly underestimate the size and density of past settlement (see Fleisher 2003: 123). It is thus little surprise that previous surveys on the coast which have incorporated subsurface testing have identified many more sites than those without such testing and provided a far more accurate picture of coastal settlement patterns (e.g., LaViolette *et al*. 1989, Fawcett *et al*. 1989, Fleisher and LaViolette 1999b, Fleisher 2003).

The final survey methodology for the project was developed in accordance with these concerns for sampling and recovery. As mentioned above, 30 500m-by-1km units were randomly selected for survey. In the few cases where selected units were inaccessible, replacement units were also selected randomly. During the survey each unit was divided into five transects, each measuring 100 m by 1 km. Teams of three or four evenly spaced individuals then proceeded along the transect in a walk-over survey, inspecting the surface for artifacts and to characterize local environmental and topographic characteristics. The surveyors excavated STPs in the center of each transect every 100 meters, stopping excavations at either subsoil or the bottom of cultural deposits. This STP interval detected every site above one hectare, which the size used to distinguish village sites elsewhere on the coast (Wilson 1982, Kusimba 1999a, Fleisher 2003). It was also likely to detect sites as small as 50 meters in diameter, allowing the project to approach the smallest organized levels of Swahili settlement (Fleisher 2003, *cf*. Wilson 1982, Kusimba 1999a). Areas where STPs yielded five or more artifacts were further investigated with additional STPs placed at 20-meter intervals from the initial test along an "iron cross" formation radiating out in the four cardinal directions in order to designate sites and site boundaries (see Lightfoot 1986). In total, 1,910 STPs were dug during the survey.

Site designations were made on the basis of artifact concentrations and extant architecture visible at the surface, or by multiple positive STPs. When the survey located a site by either of these methods, the survey team determined the site's boundaries via STPs dug along cross axes, which produced samples of the artifacts present at the site. The team also recorded the site's location with a hand-held GPS device, and its present-day environment, vegetation, soil type, and water availability. Additionally, small soil samples were taken from sites for laboratory analysis and control samples were taken from negative STPs to establish baseline measures across the region. The survey thus yielded information regarding the age of the site from collected ceramics, subsistence and production activities which may have been taking place there, the prevalence of imported goods, and the relationship of the site to significant resources (i.e., fresh water, arable land, the ocean) and to other sites in the region. Such data allowed me to describe the functional roles of sites within the region and the ways in which those roles relate to economic, social and cultural concerns.

Phase III: Selective Excavations at Recovered Sites

The project's third phase comprised excavations at selected sites recovered by the survey. Those excavations took place in July-August and October-December 2008. The object of these excavations was to provide larger samples of the material culture of the selected sites, including evidence of economic activities, in order to produce a clearer view of each site's functions (economic, political, social, etc.) and its relationship to other sites in the region. Excavations, which reveal the stratigraphic layers of occupation at sites, provided better and fuller data at this phase of research when the archaeological sites had already been located. The greatly expanded sample allowed closer examination of the material culture sequence of the region and brought greater clarity to some of the suggested settlement patterns and land use trends from the survey.

Excavations were placed at 29 percent (16 of 55) of the sites during this phase (Fig. 2.10), which is in line with other recent surveys of the coast (e.g., Fleisher 2003, Wynne-Jones 2005a). Sites from each of the five microenvironments were tested. Sites that were larger and more intensely occupied and those which produced artifacts in the STPs indicative of activities such as long-distance trade, ironworking, and marine exploitation were preferentially excavated. The excavations involved 2m-x-2m trenches placed in the richest parts of sites as determined by the STPs during Phase II. These trenches were excavated by arbitrary 10-cm levels within natural sediment layers. All excavated soil was screened using quarter-inch mesh to recover artifacts, five-liter soil samples were taken for the recovery of archaeobotanical materials from each natural layer, and small soil samples were taken for laboratory analysis from every excavation level. The excavations were expanded where necessary in order to accommodate a fuller exploration of any uncovered features. The excavations were thus designed to produce full explorations of archaeological features and to recover in-context evidence from artifacts, botanical materials, and stratified soil samples.

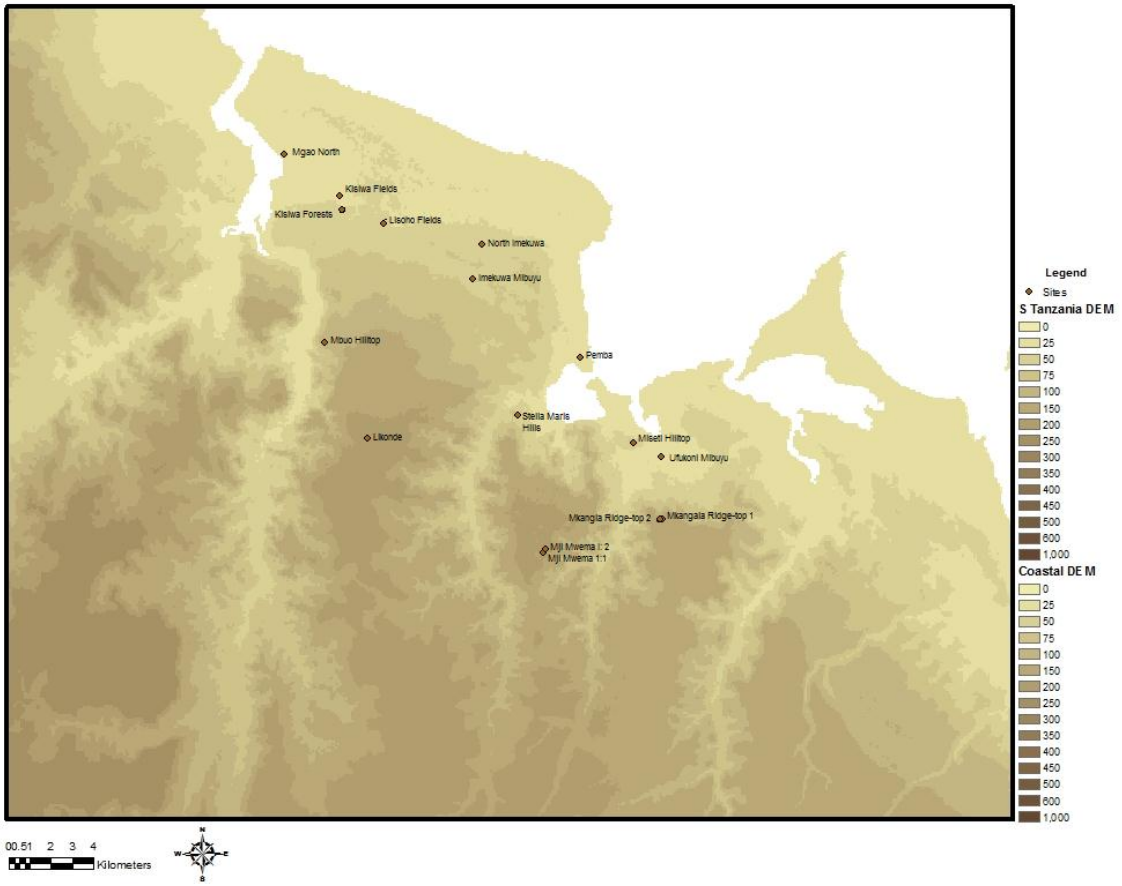

Figure 2.10 Map showing the sites excavated during Phase III

Excavations from Phase I and Phase III

Thirty-four 1m-x-1m excavations were undertaken during Phase I. Twenty-two 2m-x-2m trenches were excavated during Phase III. This section describes those excavations, paying special attention to the anthropogenic layers and features encountered.

Phase I

As mentioned above, the first phase of the research was designed to study and potentially reaffirm the occupation phases around Mikindani outlined by Kwekason (2007), with the additional benefit of testing within the town of Mikindani (see Pawlowicz 2009). The units produced over 3500 ceramic sherds, including almost 400 imported sherds, 132 bits of slag, nearly 2000 pieces of worked iron, and almost a metric ton of fossilized coral (coral rag) from building construction. In describing the excavations I consider the excavations from each studied area around Mikindani Bay in turn.

Mnaida Ward

Four excavations were located in the Mnaida ward of the town of Mikindani. The first of these (Unit 5) was located in the open plaza between the seafront and the large building known locally as the Slave Market. This unit produced a wealth of artifacts spread over 8 different sediment layers. Like Unit 4 from the base of Boma hill, the upper levels of this unit, a pale brown sand topsoil layer and a brown sandy loam second layer, had a heavy load of mortar and coral debris from stone construction in the area. The third layer, which produced some European refined earthenware, was a thin 5-9 cm layer of strong brown sand. The next layer was a brown sandy loam very similar in nature to the second layer, running between 45 and 61 cm below the surface and producing local ceramics decorated with impressed triangles. The fifth layer was rubble-rich strong brown loamy sand and during this layer a coral wall stump was uncovered at 94 cm below the surface. Diagnostic artifacts from this level continued to be imported

European ceramics. Underneath this layer were a thin, 6-cm thick layer of red sandy loam and then a thicker layer of dark brown sandy loam with denser artifacts and notable shell refuse. This dark brown layer was beneath the coral wall stump and contained red-painted local ceramics with graphite decorations and evidence of mending, as well as the humped-line and areal-impressed decorated ceramics. This dark brown material was on top of a sterile brownish-yellow sand and extended down into that material in the west, likely as a pit feature though this could not be fully determined in the small excavation unit. The brown, artifact-bearing material was gone at a depth of 191 cm. The brownish-yellow sand was excavated to a depth of 205 cm.

The second unit from Mnaida (Unit 10) was located at the eastern edge of Mikindani in an open field south of the town's modern cemetery. The excavation revealed four layers: reddish brown sandy loam topsoil, a red sandy loam without artifacts, a reddish brown loamy sand layer, and a sterile, compact, leached dark reddish brown sandy clay loam subsoil layer. The topsoil layer contained some non-diagnostic local ceramics and the third loamy sand layer also contained ceramics, including some decorated with impressed dots and perpendicular lines.

The third Mnaida unit (Unit 11) was located in an open area between the modern Friday mosque and the Aga Khan building. This excavation was placed due to the presence of imported pearlware ceramics observed in a roadside ditch excavated nearby. The excavation went down through 10 layers. Underneath a 15-24 cm thick dark grayish-brown loamy sand topsoil, there were 5 alternating layers of 4-cm thick yellow compact sandy loams, interpreted as floors, and 15-20 cm thick layers of dark brown sandy loam fill. These layers contained many European refined earthenware imports and local ceramics decorated with incisions. At a depth of 65 cm, below the last floor, there was an 8 cm layer of strong brown sandy loam. The eighth layer was a grayish brown loamy sand layer 26-30 cm thick, which produced local ceramics with impressed decorations. Underneath that was a layer of light gray sand with a few non-diagnostic ceramics, and then sterile very pale brown sand. This unit was excavated to a depth of 172 cm.

The fourth excavation in Mnaida ward (Unit 22) was located in a vacant lot in the eastern part of town at a spot remembered as the site of a wealthy Arab's home. The excavation had 12 sediment layers, indicating multiple episodes of construction. Underneath a dark grayish-brown loamy sand topsoil layer with modern refuse were two thin, flat, compact sandy layers, one red and one yellow, which were interpreted as floors. The fourth layer was a dark brown sandy loam which extended to 49 cm below the surface. This was followed by two thick fill levels with abundant artifacts, including a variety of incised local ceramics, one of strong brown loamy sand and the other of dark reddish-brown sandy loam. This fill also contained a variety of rusted car parts, indicating relative recent disturbance of any early material that might have existed in the area. The seventh layer, encountered at 121 cm below the surface, was a dark brown sandy loam that contained similar material. Underneath that was a thick brown sandy loam layer with many large chunks of coral rubble. Then at 150 cm below the surface a layer of very pale brown sand with high gravel content was encountered, though the eastern portion of the unit was dominated by coral rubble. This gravel-rich layer extended for 12 cm, after which there was a strong brown sandy loam. The 11th layer was yellowish brown loamy sand which continued to a depth of 222 cm below the surface. This was the last layer to produce artifacts, including a sherd from a red-painted open bowl. The final layer was very pale brown sand, which was excavated to a depth of 258 cm.

Magangeni Ward

During Phase I four test units were excavated in the Magangeni ward of Mikindani. This area possessed some 20th-century stone architecture, but also some marshy areas reclaimed from mangrove swamp. The first unit (Unit 1), located in the garden of EdUKAid house, exemplified each of these characteristics. The unit was excavated to a depth of 104 cm, and consisted of two layers: a layer of thick dark grayish-brown sandy loam topsoil above a layer of yellowish brown sand. The human cultivation in the garden appeared to have increased the topsoil depth, as the first layer extended 24 cm beneath the ground surface. The excavation also uncovered a buried coral wall stump between 28 and 77 cm and encountered groundwater about 15 cm afterwards, which eventually halted the excavation. Artifacts were found throughout, including European refined earthenwares from both layers.

The second unit (Unit 15), placed in an open area further south in the ward and southwest of the Boma hill, also dealt with more recent construction activity. Underneath a dark brown sandy loam topsoil layer the unit had 11 layers of alternating clay loam floor levels and gravel-rich fills. These layers produced European refined earthenwares and local ceramics decorated with parallel incisions. Underneath these construction-related layers was a layer of dark brown sandy clay, which hit the water table at 184 cm below the surface and produced refined earthenware ceramics as well.

The third unit (Unit 16) was located further south than Unit 15 below the stone-built portion of the ward. This excavation unit contained two levels: a thick, gravel-heavy yellowish-red loamy sand layer that extended down to 132 cm, and a strong brown loamy sand layer beneath that. The unit produced very few artifacts, with occasional non-diagnostic local sherds in the top layer.

The fourth Magangeni unit (Unit 27) was located in a vacant lot in the stone-built portion of town off of Ndoro Street, at another location identified as a former house site of a wealthy Arab merchant. This excavation encountered 6 layers before the high water-table forced its cessation. The first layer was very dark gray loamy sand topsoil, which was rubble-heavy and came down on a buried concrete floor at a depth of 26 cm. There was a thick rubble layer underneath the concrete floor, and then a second concrete floor at 40 cm. Underneath the rubble associated with that floor was the fourth layer of very pale brown sand, which produced European refined earthenware sherds and incised local ceramics. That layer also had a charcoal lens from a possible hearth. The fifth layer, encountered at 73 cm and running for 15 cm, was of yellowish-red sand loam, which produced numerous local sherds and Indian earthenware imports. The bottom layer was a brownish-gray loamy sand, though the north part of the unit contained rich coral and daub surrounded in more of the yellowish-red matrix, possibly from an old mud-and-coral sill wall. That material had not disappeared when the excavation was stopped at a depth of 134 cm.

Jangwani Ward

Three test excavations were located in Jangwani ward in Mikindani. The first unit (Unit 17) was located on the outskirts of the market area of the ward. The topsoil was dark brown sandy loam that was 31 cm deep. It produced a mix of modern refuse, daub and local ceramics. The second layer was of grayish-brown sand that produced local ceramics with deeply incised decorations. There were posthole features in this level. Underneath this at 81 cm below the surface was a dark gray sand layer, which came down on the water-table within 10 cm. Local ceramics continued to be found until water halted the excavation.

The second Jangwani excavation (Unit 18) was located atop a low ridge above the market. This excavation's stratigraphy contained two layers, a brown 17-cm thick sandy loam topsoil and a deep, compact reddish-brown loamy sand. The topsoil produced some non-diagnostic local ceramics, modern refuse, and an abundance of shell, interpreted as being a modern deposition.

The third Jangwani excavation (Unit 20) was placed atop a hill to the west of town which had evidence of ceramics eroding from it. The topsoil layer in this unit was a dark brown sandy clay loam that produced local sherds, including some decorated with parallel incised lines. However, underneath this soil at 25 cm below the surface weathered limestone from the bedrock was encountered. The excavation was closed on limestone bedrock at a depth of 43 cm.

Mtonya Ward

Three units were excavated within the Mtonya ward of Mikindani. Two of these were located in the ruins of the Prison/Customs House located near the seashore. The first Prison unit (Unit 12) went through five layers. There was a dark grayish brown sandy loam topsoil layer that had a good deal of modern refuse from recent dumping. Underneath this was a layer of rubble about 20-cm thick. The third layer was of yellowish-brown loamy sand, which produced some local ceramics with incised decorations and European imported ceramics. The final layer was a pale brown sand, which had a few artifacts in its uppermost levels, but was then sterile until it hit the water-table around 140 cm below the surface.

The second Prison unit (Unit 13) had a similar stratigraphy, but with a few important distinctions. It too had a dark gray sandy loam topsoil layer with abundant modern refuse above a thick layer of rubble mixed with brown loamy sand. Underneath the rubble was a layer of mottled yellowish red and strong brown sandy loam, which produced many local ceramics with incised decorations and European refined earthenwares. At 97 cm below the surface this gave way to the fourth layer, which comprised mottled brown and yellow loamy sand. This layer continued to produce European refined earthenwares as well as triangle- impressed local pottery. At 133 cm the fifth layer of sterile gray loamy sand was encountered, and shortly thereafter the water-table. A pit was excavated into this layer and it contained numerous heavily corroded iron artifacts. The excavation continued to 193 cm below the surface excavating the pit before the water seeping into the unit halted excavation.

The third unit excavated in Mtonya (Unit 14) was placed in a vacant lot across from the ward officer's office. This unit had two layers: yellowish red sand loam topsoil and a dark brown sandy clay loam underneath. The topsoil produced a few non-diagnostic artifacts amidst modern refuse, and the second layer went 30 cm without artifacts before encountering the water-table and stopping excavation.

Boma Area

Three test excavations in Mikindani were placed around the Boma, the restored German fort. The first of these (Unit 2) was located a bit east of the fort. The excavation went through three layers: 16 cm of dark brown loamy sand topsoil, 12 cm of grayish brown loamy sand, and then a thick layer of dark reddish brown loamy sand. This bottom layer was excavated to a depth of 209 cm. It possessed a concentration of mostly undecorated local ceramics between 100 and 125 cm, and these were the only notable artifacts recovered from the unit.

The next Boma excavation (Unit 3) was located at the top of the hill above the Boma. It consisted of four layers: a brown sandy loam topsoil layer, a very dark brown loamy sand layer, a yellowish red sandy loam with some brownish-yellow sand mottling, and then a reddish yellow loamy sand subsoil. The unit produced relatively few artifacts and no diagnostic ceramics. However, notable quantities of coral and mortar came out of the brownish yellow sand mottling, perhaps dumped during one of the several construction phases of the fort.

The third Boma excavation (Unit 4) was located by a fountain at the foot of the hill on which the Boma sits. This excavation recovered a wealth of artifacts and several features through 5 sediment layers. The top layer was a brown sandy loam that with a high coral and mortar content, perhaps unsurprising given that the unit was in the middle of the town's stone-built core. At the base of this level a coral wall-stump was encountered. Alongside the wall stump running to a depth of 60 cm was a layer of yellowish-brown loamy sand, which was also heavy in coral and mortar and possessed some refined earthenware artifacts. Underneath that layer was a layer of red sandy loam about 20 cm thick. This layer was daub-rich, produced numerous local ceramics, and also contained a pit feature with concentrated daub. Some of the local ceramics were decorated with impressed triangles and deep incisions. The fourth layer was a thick very dark grayish-brown sandy loam, containing numerous local ceramics, lenses of daub and sand, and concentrations of coral. It yielded imported porcelaneous stoneware as well as local ceramics decorated with humped lines and areal impressions and, towards the bottom, a red-painted open bowl. The bottom layer began at 159 cm below the surface and consisted of brown loamy sand. Towards the top some artifacts were present, perhaps having worked down from above, but layer was sterile by the closing depth of 211 cm.

Mirumba

Three excavations were placed in Mirumba village, a settlement across a creek at the western edge of Mikindani. The first excavation at Mirumba (Unit 19) was placed near the village's mosque. This excavation contained 8 layers. The topsoil layer was grayish brown loamy sand. Underneath the topsoil were several layers containing a great deal of construction debris and some non-diagnostic local ceramics, alternating three brown sandy loam fill layers with two of yellow coral rubble. The seventh layer, encountered 72 cm below the surface, was of brown loamy sand. The bottom layer was of light gray sterile sand, which was excavated to a depth of 143 cm.

The second excavation at Mirumba (Unit 21) was located at the edge of an open area west of the town's mosque. This unit had three sediment layers: a very dark grayish-brown sandy loam topsoil layer, a grayish-brown silt layer, and light brownish-gray sand at the bottom. The first two layers produced dozens of local ceramic sherds, including several decorated in a similar fashion to the early second millennium Mikindani type. Then, after a decline in the number of artifacts towards the bottom of the second layer, upper levels of the light brownish-gray sand contained some other local ceramics with first-millennium decorative motifs. This layer was excavated to a depth of 113 cm.

The third Mirumba excavation (Unit 23) was placed at the edge of the village market near a fallen baobab tree. This unit had five layers: a dark brown loamy sand topsoil layer, then a dark brown sandy loam layer from 12 to 36 cm below the surface, a 12-cm thick dark brown sandy clay loam layer, a 26 cm thick brown sandy loam, and light yellowish brown sand subsoil. The second layer contained an abundance of shell, yet this was mixed with modern refuse and was deemed to be recent. The sandy clay loam layer had the heaviest artifact density, with incised local sherds and European refined earthenware imports. Similar artifacts but in smaller numbers were recovered from the fourth layer, which also contained a posthole feature extending down into the subsoil. The subsoil was sterile except for a few isolated small sherds in its top level.

Mitengo

Four units were excavated around the village of Mitengo located along the southeast edge of the Mikindani Bay lagoon. The first of these (Unit 6) was located near a seaside mosque at the western edge of town. That unit contained three layers: a thick light brownish-gray loamy sand topsoil layer, a brown sandy loam layer, and a light yellowish brown sand layer. The topsoil layer was heavy with construction debris (i.e. coral, mortar) likely from building episodes at the mosque. The sandy loam layer produced many local ceramics, including some decorated with impressed triangles and incised crosshatching, and imported Indian earthenwares. The bottom sand layer contained no artifacts, but a great deal of shell, which was deemed to be natural, given its small size and the absence of shellfish types exploited elsewhere in the region.

The second Mitengo unit (Unit 7) was located in a bottom area closer to town. This excavation went through 4 layers, all containing more clay than the units excavated adjacent to the shore. The topsoil was a thick layer of dark brown clay loam, which produced a couple of non-diagnostic local ceramics. Underneath the topsoil the soil became progressively more clay-rich, from sandy clay loam to clay loam to clay and contained no artifacts. The unit was excavated to a depth of 98 cm.

The third Mitengo unit (Unit 8) was located on a short hill overlooking the bay above the modern road and bike path to Mtwara. This unit produced no artifacts, either in the brown loamy sand topsoil or the reddish brown loamy sand subsoil. This subsoil layer bore some resemblance to the bottom layer of the excavation atop the hill above the Boma.

The fourth Mitengo unit (Unit 9) was also located on the hill above the road and bike path. This unit had a heavy load of modern metal refuse in a dark brown sandy loam topsoil layer, along with some non-diagnostic local ceramics. Underneath the topsoil starting at a depth of about 49 cm sterile red loamy sand was encountered. This layer was excavated to a depth of 103 cm.

Mvita

Three test units were excavated at Mvita, a village along the western side of the Mikindani Bay lagoon. The first of these (Unit 24) was located on a hill above town. It was placed because of abundant limestone rock on the surface of the hill, thought to potentially indicate a site of old stone construction. However, the unit had but one layer, a very dark grayish-brown clayey loam and produced a single non-diagnostic sherd before encountering the limestone bedrock at a depth of 51 cm.

The next unit excavated at Mvita (Unit 25) was placed in the village. Its topsoil layer was of brown sandy clay loam and produced several sherds of local ceramics with incised decorations and red paint over the rim only, each of which is characteristic of more recent deposits. The second layer of yellowish-brown loamy sand produced similar artifacts. It also encountered a series of possible postholes surrounding a rectangular feature at a depth of 31 cm. After consultation with a local elder during a break in excavation it was decided that this feature could possibly be from the upper portion of a child's burial and the excavation was abandoned before a skeleton was encountered.

The third excavation at Mvita (Unit 26) had better luck than the other two. It contained four layers: 9 cm of very dark brown sandy loam topsoil, 35 cm of dark yellowish-brown sandy loam, 10-16 cm of brown loamy sand, and light gray sand subsoil. The second layer produced the most artifacts, including local ceramics with incised designs, as well as the outline of a daub wall. Artifacts continued to be found in the third layer, which also produced a set of tightly spaced postholes. The subsoil was sterile; while a few shells were recovered from it, they were deemed to be natural. The excavation was closed at a depth 115 cm when the water-table was encountered.

Modern Pemba

The last seven test excavations from Phase I were located in and around the modern village of Pemba, located across the lagoon from Mikindani. Pemba was subject to such attention because it was reputed to have been the site of the earliest settlement around the bay, and Kweakson (2007) demonstrated that this part of the bay had been inhabited in the mid-first millennium. The first excavation at Pemba (Unit 28) was located between the village's mosque and the beach. The excavation encountered numerous artifacts, including more than 300 local sherds, amidst six layers. The topsoil was brown loamy sand. Underneath was a layer of reddish brown sandy loam with numerous local ceramics with incised decorations. The third layer, encountered at 36 cm below the surface, was a brown sandy loam and produced several local ceramics with incised crosshatch decoration and a small porcelain sherd. The fourth layer was of brown sand about 30-cm thick. It continued to produce dozens of local sherds. The fifth layer was of very pale brown sand and the artifact count diminished in this layer with depth. The excavation was closed shortly after pale yellow sterile subsoil was encountered at a depth of 117 cm.

The second Pemba unit (Unit 29) was located in a field at the northeast edge of the village where local sherds were observed on the surface. Sixty-six local sherds were encountered in the dark reddish brown topsoil of the excavation, but the limestone bedrock was encountered at a depth of just 44 cm.

The third Pemba test unit (Unit 30) was located near the beach to the east of the village between two large baobab trees. This unit encountered three sediment layers before it was also stopped due to the emergence of the limestone bedrock. The first topsoil layer was dark reddish brown sandy loam and contained over 163 local sherds as well as a Sasanian Islamic imported sherd. The second layer, a reddish brown sandy loam encountered at a depth of 29 cm and running about 20 cm, continued to produce dozens of local sherds and varieties of first-millennium imported ceramics. The third layer was red silty clay loam which surrounded the emerging limestone bedrock and contained no artifacts. Because the unit produced sherds clearly dated to an earlier period than the rest of the Modern Pemba tests it was designated as a site, Pemba Mbuyu Pwani.

The fourth Pemba test (Unit 31) was located in the fields north of the third test and the modern village. Only one kind of sediment was encountered in this unit, a reddish brown sandy clay loam. This sediment produced a single sherd and was excavated to a depth of 79 cm before the unit was abandoned when the sediment became increasingly leached and difficult to excavate and screen.

The fifth Pemban excavation (Unit 32) was located along the beach in an area reported to have been the site of some old houses. It contained 7 sediment layers. The topsoil was dark reddish brown sandy loam. Underneath the topsoil, between 22 and 37 cm below the surface, was a layer of brownish yellow sand. This material produced more local sherds (77) than any other, as well as a coin from 1954. The third layer was a dark reddish brown sandy clay loam, which produced incised local ceramics. The fourth layer, encountered at a depth of 59 cm, was of light brown sand and produced just 13 sherds of local ceramics. The sherd count continued to decrease amidst the thick fifth layer of brownish-yellow loamy sand, but some sherds bore characteristic Swahili Ware neck-punctate decoration. The sixth layer between 104 and 124 cm was white sand and contained only shell. The seventh and final layer was sterile yellow sand, which was excavated to a depth of 165 cm.

The sixth test unit from Pemba (Unit 33) was located towards the eastern edge of town behind some houses. The excavation had four layers: dark brown sandy clay loam topsoil, reddish brown sandy clay, yellowish brown sandy clay, and grayish brown clayey loam. The topsoil extended to a depth of 26 cm and produced over 230 local sherds and numerous sherds of imported refined earthenwares. The second layer reached a depth of 61 cm and also produced refined earthenwares and numerous local sherds. A single sherd was recovered in the third layer. The fourth layer, encountered at a depth of 84 cm and excavated to a final depth of 116 cm, was sterile.

The last test excavation near Pemba was located well north of the town near a ruined building that a local elder had noted as a German colonial building. This excavation had three sediment layers, but produced only one sherd, from the brown clay loam topsoil. The second layer, encountered 8 cm below the surface was a red clay loam and the bottom subsoil layer was reddish brown clay. The excavation was closed at a depth of 83 cm.

Summary

At this juncture, a few useful themes can be pulled from the Phase I excavations. First, because many excavations were placed in an around modern towns and villages there was a heavy overburden of relatively recent artifacts and building materials from the 19th and especially the 20th centuries. These levels were characterized by European refined earthenwares and local ceramics with incised decorations and others with red paint just over the rim. However, beneath this modern material there was also evidence of earlier second-millennium occupation at many locations around Mikindani Bay characterized by red-painted open bowls, Mikindani's "unique" local ceramic style with areal impressions, and porcelain and Indian earthenware imports (e.g., Units 4, 5, and 22 at Mikindani, perhaps Unit 6 at Mitengo, and Units 28 and 32 at Pemba). At Pemba and Mirumba there was also evidence of first-millennium settlement, from characteristic decorated local ceramics and imported ceramics. The excavations also helped confirm some expectations regarding the region's geology, with sandy soils near the coast, greater clay content above the limestone bedrock, and leached red subsoil on the hills above Mikindani.

Phase III

The Phase III excavations were intended to more carefully explore some of the most interesting sites recovered during the survey. In total, 22 units were excavated at 16 sites. All excavations were laid out as 2m-x-2m units. The discussions of each site are intended to introduce the excavation and provide an overview of the finds, but the analysis of excavated material and discussion of their implications are reserved for later chapters. The excavations are grouped together by microenvironment so that trends in the excavations might be more easily identified.

Three sites from the highland plain microenvironment were excavated during Phase III. The first two of these were the first-millennium sites near Mji Mwema, and the third at Likonde. One trench was placed at all three of these sites

Mji Mwema I: 2 (Unit 100)

Mji Mwema I:2 was located at the south edge of a broad, cleared cassava field towards a thicket, amidst the agricultural land spread out south of the modern village of Mji Mwema. The highland plain around the site had no source of water, though a valley where water could be obtained was within a kilometer of the site down a steep slope. STPs indicated that the site was buried about 75 cm below the surface with no surface indications of its existence. The recovered artifacts included slag and local ceramics with characteristic EIW decorations (see Chami 1994, 1998), and the STPs suggested the site had a density of artifacts approaching 10 per STP at its core. As will be discussed in greater detail in Chapter 10, the site was relatively small and quite nearby to Mji Mwema I:1, yet it was spatially distinct from that site.

The excavation of Mji Mwema I:2 was located in the cassava field near the core of the site identified during the survey. Three sediment layers were identified at the site:

> Layer 1: (0-45 cm) Brownish-red sand topsoil; the topsoil layer was quite thick, likely resulting from modern agricultural activity at the site. It produced relatively few artifacts, mostly undecorated local sherds.
> Layer 2: (45-140 cm) Reddish-brown sandy clay; this layer was distinguished from the layer above it by its increased clay content and slightly redder color. It was also the most productive layer of the unit, though the bulk of the recovered

artifacts were found in the top 30 cm of the layer, declining substantially thereafter. No artifacts were found beneath 110 cm.
Layer 3: (140- 165 cm) Leached red clayey sand subsoil; this subsoil matches the C Horizons described for the Mikindani Formation by geologists (Aitken 1961, Schlüter 1997). The subsoil was sterile, though soil samples taken for chemical and stable isotope analysis provided important environmental information.

The excavation produced 203 local sherds, 10 pieces of slag, and a small amount of daub. No imports were recovered. The form and decorative motifs of the local sherds – the latter prominently featuring bands of incised lines between dot impressions – confirmed our expectations from the STPs that this site's primary affiliations were with first-millennium material culture.

Mji Mwema I: 1 (Unit 101)

Mji Mwema I:1 is another site from the highland plains that the artifacts from STPs suggest was occupied in the first millennium. The site was situated amidst cleared fields and surrounding woody thicket. There is no water on the plain itself, but the site was located within a hundred yards of the slope leading down into the valley where water could be found. As with Mji Mwema I:2, STPs showed that the site was buried under nearly a meter of sediment and had no surface indications. Compared to other sites in the highlands Mji Mwema I:1 was relatively large and dense, though by size it was classified as a small village or large hamlet (see Kusimba 1999a, Fleisher 2003).

The excavation at Mji Mwema I:1 was located in a small clearing amidst the woody thicket just south of a cleared field. Three layers of sediment were identified in the excavation, and these were similar to the sediment layers identified at Mj Mwema I:2.

Layer 1: (0-24 cm) dark reddish-brown loamy sand topsoil; the topsoil here was not as thick as at the other Mji Mwema I site. This layer produced quite a few artifacts including a red glass bead and 50 local sherds including one with incised crosshatch decoration.
Layer 2: (24- 120 cm): red sandy loam; this layer was distinguished from the topsoil above it by a lighter shade of red and less sand content. The layer produced many artifacts but these were spread over two discrete concentrations. Forty sherds came from the upper levels of this layer and were likely affiliated with the material in the topsoil. Then after 25 cm of very few artifacts another artifact concentration was encountered at a depth of around 60 cm. These artifacts were mostly thick local sherds and bore some first-millennium decorative motifs.
Layer 3: (120-185 cm): leached red sandy clay loam subsoil; this layer had no artifacts. There was, however, significant root action evident throughout the layer that seemed to have moved some material down from above, as fishbone was recovered in the heavy fraction of the soil sample taken from the top level of this layer.

This excavation produced 125 local sherds, a small amount of daub and slag, and some fishbone. The only imported good in the unit was the broken red bead from the topsoil. The most significant result from the unit was the presence of two distinct artifact concentrations. The latter concentration was present at depth and confirmed the expectations of first-millennium affiliation from the survey. The other concentration was located in the upper levels of the unit and consisted of thinner ceramics. It thus might be suggested to be younger, though without clearly diagnostic artifacts the dating remains uncertain beyond its postdating the lower material.

Likonde (Unit 120)

The third highland-plain site excavated during Phase III was Likonde. This site was located in the western section of the study area a few hundred meters north of the village of Likonde. As with the other two highland sites there was no water available in the immediate vicinity, but valleys of the Mbuo River watershed were located only a couple of kilometers to the west. The site itself covered approximately 1 ha, with a dense core surrounded by many other STPs that produced single sherds and some isolated surface sherds.

The excavation at Likonde was placed at the core area identified during survey amidst a mixed grassland and brush area that had been burned recently. Three layers of distinct sediments were identified in the excavation. Though Likonde is more than 12 km away from the Mji Mwema sites, the similarities in their stratigraphies are telling.

> Layer 1: (0-15 cm) dark brown loamy sand with red mottles; there is abundant evidence of natural disturbance from the vegetation that had been at the site in terms of remnant stumps and grassy root mat, which probably contributed to the sediment mottling. There are only 4 sherds in the layer however.
> Layer 2: (15- 75 cm) reddish-brown sandy loam; this layer was distinguished from the topsoil by its redder color and lower sand content. At a depth of 35 cm numerous artifacts were encountered, including many fragments of a globular vessel type with crosshatched incisions on the rim. These artifacts were associated with daub clumps that resembled material found around temporary hearths. No artifacts were recovered in the layer beneath 65 cm.
> Layer 3: (75- 165 cm) compact red sandy clay loam; this layer was sterile and with increasing depth showed evidence of mineral leaching. It could be distinguished from the other layers by its increased clay content and lighter red color.

The excavation at Likonde produced 170 sherds of local ceramics and a modest amount of daub. It identified a single dense artifact concentration beginning at a depth of 35 cm in the second layer. This site component had a characteristic ceramic form later dated to the mid-second-millennium (see Chapter 7).

Two sites from the ridge microenvironment were excavated during Phase III, Mkangala Ridge-top I and Mkangala Ridge-top II. These two sites were spatially distinct, but located quite close to one another atop a ridge in the central portion of the study area. One trench was placed at each of these sites.

Mkangala Ridge-top 1 (Unit 102)

Of the two sites atop Mkangala ridge, Mkangala Ridge-top 1 was the smaller and less dense site according to the survey results. The site was buried at a depth of about 80 cm and had no surface indications of its existence, and the recovered ceramics from its STPs were thick and one bore a characteristic first-millennium decoration. The site was located in a cleared field very close to the edge of the ridge above the modern village of Mkangala, giving it a commanding view of the land to the north and quick access to the lowland area beneath the ridge.

The excavation at Mkangala Ridge-top 1 was placed adjacent to the richest STP location in a fallow portion of the cleared field. Four distinct sediment layers were encountered in the excavation. Notably, the stratigraphy was quite similar to the various highland excavation units, except for the addition of a distinct layer associated with the settlement.

> Layer 1: (0-12 cm) dark brown loamy sand topsoil; this topsoil layer produced only a few non-diagnostic local sherds and some modern artifacts like brown bottle-glass that indicate the area's modern use.
> Layer 2: (12-55 cm) reddish-brown sandy loam; this layer was distinguished from the topsoil by its redder color and lower proportion of sand. Like the topsoil this layer produced only a few non-diagnostic sherds.
> Layer 3: (55-85 cm) brown sandy loam; this layer was clearly distinguished from the others by its color and the abundance of artifacts found in it. This layer produced over 300 local sherds, 7 pieces of slag, and other indications of human occupation including a hearth and several postholes. The sherds were decorated with characteristic first-millennium motifs. Towards the bottom of the layer some potential quartz lithics were also recovered.
> Layer 4: (85- 175 cm) red sandy clay loam subsoil; this layer was similar to the subsoil encountered elsewhere in the highlands above the ridge. As with that

> subsoil this layer had greater clay content than any of the layers above it. It was mostly sterile except for a few small sherds found in the upper levels of the layer that had probably migrated from the artifact-rich layer above.

The excavation produced 363 local sherds, several pieces of slag, a piece of glass, and some daub. The bulk of this material came from the third layer, which also possessed several features indicative of human occupation. The nature of the material in that layer suggested a first-millennium occupation, corroborating expectations from the survey.

Mkangala Ridge-top 2 (Unit 103)

Mkangala Ridge-top 2 was located just east of the other site along the ridge. It was within a kilometer of fresh water located below the ridge and within 5 km of the ocean. The survey suggested that this site was slightly larger, denser, and younger than its neighbor and its artifacts came from higher up in the STPs and were not as thick. Larger is a relative term however, as this site was only the size of a small hamlet.

The excavation at Mkangala Ridge-top 2 was placed in a cleared cassava field near the edge of the ridge. Four layers were identified in that unit.

> Layer 1: (0-17 cm) dark brown loamy sand topsoil; this layer produced one diagnostic sherd with decoration characteristic of the unique style developed at Mikindani in the early second millennium. The layer was subject to significant disturbance by modern charcoal-making activity.
> Layer 2: (17- 55 cm) brown loamy sand; the layer was distinguished from the topsoil layer by its lighter color and reduced charcoal load. Towards the bottom of the layer an artifact concentration was encountered, consisting primarily of local pottery, some of it decorated with first-millennium EIW motifs.
> Layer 3: (55-90 cm) mottled sandy clay loam, with brown, red, reddish-brown, and yellowish-red components identified; this layer possessed a few non-diagnostic local sherds in its upper levels.
> Layer 4: (90-150 cm) red sandy clay subsoil; this layer was distinguished from layer 3 in part by color but also by the decreased proportion of sandy grit relative

> to clay. The layer was mostly sterile, but some possibly worked quartz was recovered from its lower levels.

The Mkangala Ridge-top 2 excavation produced only 26 sherds, but those sherds provided evidence of at least two distinct periods based on their decorations and their recovery from two distinct layers. Unfortunately, evidence for the most recent period was greatly impeded by the modern charcoal-making disturbance. Nonetheless, the excavation provided evidence that this ridge location was reused through time. It also possessed intriguing evidence for potential LSA occupation.

Two sites were excavated from the valley microenvironment during Phase III, Mbuo Hilltop and Stella Maris Hills. One trench was excavated at Mbuo Hilltop and three units were excavated at Stella Maris Hills. Two of the Stella Maris Hills units were contiguous, with the second being opened in order to fully explore a large pit feature, while the other unit was located in a different part of the site.

Mbuo Hilltop (Unit 113)

The Mbuo Hilltop site was situated in agricultural fields and orchards atop a hill overlooking the Mbuo River valley and Sudi Bay. The site was the size of a small town and numerous local sherds were recovered during survey, though erosion on the hilltop was clearly a significant issue and the depth, stratigraphy, and age of the site were all uncertain, though several of the artifacts seemed to indicate connections with the unique second-millennium ware developed in the region.

The excavation of Mbuo Hilltop was located along a flat portion atop the hill just west of a cashew orchard, in the hope that erosion might not have been as significant a post-depositional issue where there was less of a slope. The excavation identified three sediment layers.

> Layer 1: (0-15 cm) reddish-brown sandy loam topsoil; towards the bottom of the layer a concentration of local pottery was encountered, including a broken shallow red-burnished open bowl with external decoration and sherds similar to the diagnostic vessel recovered at Likonde.
> Layer 2: (15-45 cm) red sandy clay loam; this layer was distinguished from the topsoil on the basis of its lighter color and higher clay content, which caused it to be quite compact. This layer also had significant evidence of insect activity. Relatively few artifacts were present in its upper levels, providing a nice break from the topsoil concentration, but a separate concentration of sherds occurred at the bottom of the layer along with some slag.
> Layer 3: (45- 135 cm) dark red sandy clay loam/silty loam; this layer was distinguished from the preceding one based upon its finer texture and darker color. In its upper levels the layer produced occasional sherds, which were typically thick and thus possibly older, and in its lower levels stone artifacts including several chert flakes. Because of the sediment's similarities to subsoil the excavation was stopped at 135 cm, though given the presence of stone artifacts just above this depth that might well be judged too soon.

The Mbuo Hilltop excavation produced 128 sherds, 1 piece of slag, and several stone artifacts. Importantly, these seemed to represent at least three separate periods of use/occupation of the site by both stone-tool- and iron-implement-using groups.

Stella Maris Hills (Units 108, 109 and 110)

The Stella Maris Hills site was situated along several hilltops and ridges south of the Stella Maris Mission located about a kilometer west of Mikindani. The survey revealed the site to be large, above 5 ha, with several patches of artifact density located atop hills and lower-density areas in between. In some portions of the site cultural materials were well buried, while in others they had been brought to the surface. Most of the site was just above valleys and ravines that flow into Mirumba Creek, so water would have been available at the site. The ocean is within 2 km.

Because of the site's size and variable artifact density, excavations were placed at two locations on site that the survey had revealed to be of high artifact density. The first location was at the margin of a grassy area and a patch of trees and thicket. During the course of that unit's excavation a pit feature was encountered in the south wall, so a second contiguous unit was opened up to fully explore the feature. These two units, 108 and 110, shared the same stratigraphy, which was comprised of four layers.

> Layer 1: (0-15 cm) brown loamy sand; this area is not the site of a great deal of human activity at present and the topsoil reflects that with relatively few artifacts, none of which were diagnostic. The topsoil had a heavy root mat from grassy surface vegetation.
> Layer 2: (15- 50 cm) reddish-brown sandy loam; this layer was distinguished from the topsoil on the basis of its redder color and loamier texture. The layer produced a moderate amount of sherds, but not in the same density as lower layers. The sherds were decorated with motifs from the unique style developed at Mikindani in the second millennium, including shell impressions and bounded areal impressions.
> Layer 3: (50- 95 cm) dark red sandy clay loam; this layer was distinguished by its darker color but especially by its higher clay content. The artifact count increased substantially in this layer and a variety of features, including shell deposits and the aforementioned large pit were uncovered. Interestingly, the layer seemed to contain multiple ceramic types, with a dense layer of thinner undecorated sherds possible representing a Plain Ware phase found on top of a concentration of thicker sherds with EIW decorative motifs, though there is no natural stratigraphic break between the ceramics. This layer also produced an imported sherd likely dated to the first millennium.
> Layer 4: (95- 175 cm) red sandy clay loam; this is the subsoil. The layer produces a few sherds in its upper levels but is otherwise without artifacts. However, the pit feature extends into the subsoil to a depth of 154 cm, and it contains a variety of artifacts including shell, daub, and broken sherds bearing EIW decorative motifs.

The second excavation unit was placed atop a hill about 100 m away to the northeast in another area of artifact density revealed by the survey. The excavation was in a relatively clear area amidst mixed grass and brush vegetation. Four sediment layers were identified in this unit

> Layer 1: (0-20 cm) grayish-brown sandy loam topsoil; this layer was the site of heavy root activity and possessed quantities of charcoal, though whether this resulted from past episodes of burning or charcoal-making activities was not determined. The layer produced over 100 sherds of local ceramics, including some bearing decorative motifs characteristic of the second-millennium style developed in the region.
> Layer 2: (20-60 cm) reddish brown sandy loam; this layer was described as a transition between the topsoil and redder, higher-clay layers below. It also contained a high concentration of local ceramic sherds with second-millennium motifs as well as many pieces of slag.
> Layer 3: (60-115 cm) red clayey sand with yellowish-brown mottles; this layer contained a couple of sherds in its upper levels that likely originated in the layer above. It possessed numerous large, burnt roots, around which were bands of hard, dark red soil.
> Layer 4: (115-160 cm) red sandy clay subsoil; this subsoil layer was, unsurprisingly, very similar to that identified in the other Stella Maris Hills excavations. It contained no artifacts.

These first two excavation units at Stella Maris Hills, 108 and 110, produced 915 and 1358 sherds of local pottery respectively, as well as daub, slag, coral, shell, and a sherd of imported pottery. On the basis of the stratigraphy and associated local ceramic types this location showed multiple phases of occupation. The third excavation unit, 109, produced 437 sherds of local pottery with mostly second-millennium affiliations, 40 pieces of slag, and small amounts of shell and daub. It thus provided a counterpoint to the first excavation, where the second-millennium material was relatively underrepresented, and showed that the different occupations of the site were not spatially coterminous.

Three sites were excavated from the coast microenvironment during Phase III: Miseti Hilltop, Pemba, and Mgao North. Two units were excavated at Miseti Hilltop, while one unit was excavated at both Pemba and Mgao North.

Mgao North (Unit 117)

The site of Mgao North was located along Sudi Bay at the western edge of the study area in a place surrounded by baobab trees. The survey had revealed it to be both a large site, covering more than 7 ha, and a densely occupied one, producing more than 10 sherds per STP. It was not clear where the nearest available fresh water source was located, though the site was well-placed to exploit both marine resources and good agricultural land.

The excavation at Mgao North was placed near one of the densest parts of the site revealed by the survey near a tree in a fallow field. It was located about 100 m from the ocean in an effort to avoid water-table problems when excavating. Four sediment layers were identified in the excavation.

Layer 1: (0-15 cm) very dark brown sandy loam topsoil; the topsoil produced several more recent artifacts, including some European refined earthenware sherds.

Layer 2: (15-40 cm) dark reddish-brown sandy loam; this layer contained a very dense concentration of local sherds, shell, and coral. More than 1,000 local sherds were produced from this layer, many decorated with motifs characteristic of the second-millennium Mikindani style. The layer also produced red beads, a spindle whorl, more than 1 kg of shell, and daub with pole impressions.

Layer 3: (40-70 cm) reddish-brown sandy clay loam; this layer was distinguished from the preceding one by its higher clay content. This level was also marked by the presence of several tree roots. In its upper levels this layer bore artifacts similar to those from the preceding layer, but in decreased quantities. However, as the layer continued the artifacts recovered had characteristics from earlier periods and a late-first millennium imported sherd was found.

> Layer 4: (70-135 cm) red sandy clay; this layer was the subsoil and contained no artifacts. While compact from the high clay content and red, this subsoil was not as heavily leached as that found at excavations in areas of higher elevation.

The Mgao North excavation produced 1209 sherds of local ceramics, abundant coral, more than 5 kg of shell, a significant quantity of daub with clear evidence of use in construction, beads, imported ceramics, and slag. It provided the largest material culture sample for early second-millennium settlement in the region as well as intriguing indications of continuities with late first-millennium settlement.

Pemba (Unit 111)

Pemba was a site on Mikindani Bay which Kwekason's (2007) work had suggested belonged to the mid-first millennium, but which my survey indicated may have had a longer occupation or multiple occupations. The site itself was situated on a small peninsula with access to the ocean, several nearby water sources and relatively good limestone-derived soils, though these last were thin in certain areas. It was located just to the northwest of the modern village of Pemba where Phase I excavations had been placed. The survey showed the site to cover 10 ha with several loci of artifact density.

The excavation at Pemba was placed on the west side of this peninsula atop a low hill just above a tidal area. The excavation identified four layers of sediment.

> Layer 1: (0-25 cm) dark brown sandy loam or loamy sand topsoil, the topsoil produced relatively few artifacts, but these included some Tana/TIW sherds.
> Layer 2: (25- 110) reddish-brown sandy loam; this layer was distinguished from the topsoil by its color and possession of some clay. In the north this layer was penetrated from above by a shell and sherd filled refuse pit. The layer was present above, below and adjacent to the shell midden uncovered in the excavation (Layer 3). It produced quite a few artifacts, though not in the same concentration as from the midden. These show first-millennium affiliations.

> Layer 3: (40-80 cm) shell midden, containing abundant shell in a very dark brown sandy clay loam matrix; this layer did not extend to the northern and eastern limits of the excavation. It also continued below 80 cm in a pit in the southern part of the unit to a depth of 125 cm. The midden contained charcoal and broken sherds with first-millennium decorative motifs.
> Layer 4: (110-130) yellowish-red to red sandy clay loam; this layer was hard to distinguish from the second layer, and has a discontinuous interface with it, but it did have higher clay content. While some elements of this layer emerged in the southern third of the unit as high as 80 cm, the soil is not consistently present until the lower depth. The layer was also marked by extensive mineral leaching. The layer was sterile subsoil, and contained no artifacts.

The Pemba excavation produced 723 local sherds, over 33 kg of shell, 12 pieces of slag, and daub and coral. It revealed the emphasis on marine resources at Pemba and provided a large sample of first-millennium ceramics. It failed however to provide evidence of a second-millennium occupation suggested by the survey.

Miseti Hilltop (Units 104 and 105)

The site at Miseti Hilltop was located on a hill overlooking the ocean and the Miseti salt flats east of Mitengo. Survey showed this site to be town-sized, covering 6 ha with artifacts from multiple periods found at different depths. The two excavations, located in agricultural fields in different parts of the site about 100 m apart, thus hoped not only to provide a broad material culture sample but also to clarify the site's stratigraphy. The first excavation (Unit 104), identified 6 sediment layers

> Layer 1: (0- 10 cm) dark grayish-brown sandy loam topsoil; this layer has been heavily mixed from modern agricultural activity. It yielded a few non-diagnostic sherds.
> Layer 2: (10-45 cm) light reddish-brown sandy loam; this layer was distinguished from the topsoil by its lighter color. It produced very few artifacts and was likely subject to agricultural disturbance as well.
> Layer 3: (45- 80 cm) reddish-brown compact sandy loam; this layer was distinguished from the preceding one largely on the basis of texture, as this sediment contained some clay. The layer also yielded substantial quantities of

artifacts, including hundreds of local sherds with decorative motifs characteristic of the Mikindani early second-millennium style and abundant shell material in a midden (Layer 4).
Layer 4: (55-70 cm) shell midden, shell in a dark red sandy clay matrix; this layer was contained within Layer 3 yet its unique sediment characteristics and size designated it as a distinct layer. The shell was associated with a great deal of charcoal and sherds similar to those found in the preceding layer.
Layer 5: (80- 110 cm) dark brown compact sandy loam mottled with reddish-brown sandy clay loam; this layer was distinguished from Layer 3 by its darker color, higher clay content, and numerous small bits of charcoal found in its matrix. While mottling was present throughout the unit, the dark brown charcoal-rich material was concentrated in the northeast quadrant of the unit, where it was associated with posthole and hearth features. Eventually the dark brown material took on a semi-rectangular shape outlined by postholes, so it was interpreted as a house floor. That portion of the unit produced the most artifacts, including several sherds with first-millennium EIW motifs.
Layer 6: (110- 185 cm) yellowish-red sandy clay loam; this material was sterile except for a sherd in its uppermost level that had likely come from above. With increasing depth this material became heavily leached.

The second excavation at Miseti Hilltop (Unit 105) was located a bit to the east of the first excavation. Five layers were identified in that excavation.

Layer 1: (0-25 cm) dark brown sandy loam topsoil; layer was disturbed from modern agricultural activity. It produced no diagnostic artifacts.
Layer 2: (25-80 cm) light brownish-red sandy clay loam, significant mottling with dark brown, light brown and reddish-yellow sediments; there were very few artifacts from this layer, providing a clear break between the topsoil and cultural material underneath it.
Layer 3: (80- 130 cm) dark red sandy clay with a slight brown tint; this layer was distinguished from the preceding layer by its higher clay content and slightly redder color. It possessed a dense concentration of artifacts including local sherds with first-millennium affiliations, slag, and daub.
Layer 4: (85-100) shell midden layer, abundant shell and other artifacts in a light brown sandy clay loam matrix; the midden was contained within Layer 3 but was designated as a layer because of its distinct sediment and because it encompassed more than half of the excavation unit. In addition to shell the midden produced a great deal of charcoal and several large sherds with first-millennium decorative motifs.
Layer 5: (130- 170 cm) reddish-brown sandy clay; this layer was much more compact than Layer 3 and had significant mineral leaching. The only artifacts recovered were from the top level, otherwise the layer was sterile.

The two Miseti Hilltop units (104 and 105) produced 599 and 1003 local sherds respectively, as well as 6 and 3 kg of shell. Each unit possessed slag, though neither had any imported artifacts. The excavations showed that this site had multiple occupations, yet also that those occupations were not spatially equivalent, as only one excavation yielded second-millennium material.

Six sites from the lowland-plains microenvironment were excavated during Phase III. Five of these – Kisiwa Fields, Kisiwa Forests, Imekuwa Mibuyu, North Imekuwa and Lisoho Fields – were located on the peninsula between Mikindani Bay and Sudi Bay. The other, Ufukoni Mibuyu, was located between Mikindani Bay and Mtwara Bay to the east. A number of these sites were located relatively close together and the survey suggested roughly contemporaneous occupations, so the excavations offered an opportunity to investigate potential differentiation between ostensibly similar settlement contexts.

Imekuwa Mibuyu (Unit 106)

Imekuwa Mibuyu was a site in the lowland plain set amidst agricultural land on a low rise above a marshy area with standing water that is the current site of the wells of the modern village of Imekuwa, which is located several hundred meters to the north. Survey had revealed the site to be artifact dense and the size of a small town.

One unit was excavated at Imekuwa Mibuyu. This unit was placed in a dense portion of the site 25 m south of a large baobab tree. Four sediment layers were identified from the excavation.

Layer 1: (0-15 cm) very dark grayish-brown sandy loam topsoil; this layer produced many sherds of local pottery including sherds decorated with notched rims and incised crosshatched designs. Because of the intense recent agricultural use of the area some mixing of older and more recent artifacts was expected for this layer.

Layer 2: (15-35 cm) grayish-brown sandy loam; this layer was distinguished from the topsoil by its lighter color and decreased sand content. The layer produced hundreds of local sherds, decorated with notched rims, shell impressions, and stab impressions, as well as several pieces of slag and red beads. With increasing depth the layer became increasingly difficult to excavate as the clay content increased.

Layer 3: (35-90 cm) yellowish-brown sandy clay loam; this layer was distinguished from preceding layers mostly by its increasing clay content. At the time of excavation this clay was dry and solid which slowed progress with the excavation. The layer produced hundreds of sherds of local ceramics, though the greatest concentrations were in the upper levels, falling off thereafter, as well as many chunks of slag. Towards the top of the layer these ceramics were decorated with heavy impressions, often set off within incised lines, as well as notched rims, indicative of an early second-millennium date. A late-first-millennium imported earthenware sherd was recovered from the bottom level of the layer.

Layer 4: (90-170 cm) brownish-yellow sandy clay with mottles of dark brown clay toward the bottom; this layer was exceedingly difficult to excavate due to its high content of dry clay, which eventually prompted the bisection of the excavation. There was evidence of multiple roots through the layer. The layer produced only occasional local sherds, which had likely been brought into the layer through root activity.

The Imekuwa Mibuyu unit produced 1144 sherds of local ceramics, imported beads and ceramics, dozens of pieces of slag, and daub. It provided a large sample of local ceramics with early second-millennium affiliations and important information linking settlement in the late-first and early-second millennia.

North Imekuwa (Unit 107)

North Imekuwa was a large town site located in cleared agricultural fields and fallow grasslands north of the village of Imekuwa about 1.5 km distant from Imekuwa Mibuyu. The closest available fresh water was likely that near Imekuwa Mibuyu, but the town was surrounded by valuable agricultural land. Survey suggested that the site had multiple phases of occupation, so the excavations here hoped to get a better sense of its chronology and stratigraphy.

One unit was excavated at North Imekuwa. That unit was placed in a dense portion of the site in a cleared fallow field in the vicinity of a large baobab tree. The excavation identified four distinct sediment layers.

> Layer 1: (0-25 cm) dark brown sandy loam topsoil; this layer showed evidence of disturbance from agricultural and charcoal-making activities. It produced only five local sherds, none of which were diagnostic.
> Layer 2: (25-70 cm) mottled light brown and yellowish-red sandy loam; this layer produced hundreds of artifacts whose concentration increased with depth. The upper levels contained primarily sherds with second-millennium decorative motifs, while EIW motifs were dominant for the dense lower portion of the layer. These latter levels also yielded the most pieces of slag
> Layer 3: (70-100 cm) mottled red, reddish-brown and yellowish-red sandy clay; a few local sherds were found in the upper levels of this layer and several potential quartz flakes were found throughout the rest of the layer.
> Layer 4: (100-145 cm) red sandy clay; this material was homogenous and had higher clay content than the preceding level. Its upper levels produced a few small slag pieces and additional pieces of quartz that could have been either flakes or natural shatter. With increasing depth it became sterile.

The North Imekuwa excavation produced 640 sherds, 26 pieces of slag, some daub, and some shell. It confirmed the expectation from the survey that multiple components were present at the site, but was unable to identify a stratigraphic break between them. There were also intriguing indications of potential stone-tool use among early agricultural populations at the site or the presence of LSA populations.

Kisiwa Fields (Units 114, 115, 116)

The site of Kisiwa Fields was located in agricultural fields east of the modern town of Kisiwa. This location placed it in the western third of the peninsula between

Mikindani and Sudi Bays. Survey showed that this site was relatively large, covering 5 ha, and dense, producing more than 9 sherds per STP. The nearest available source of fresh water is unknown, and the ocean was about 3 km away to the west.

Three adjacent trenches were excavated at Kisiwa Fields. Two additional trenches were excavated north and northwest of the initial 2m-x-2m excavation unit in order to follow a coral feature. While the coral feature was clearly incorporated into architecture at the site, further inspection showed that the site's inhabitants had utilized the upper portion of a natural outcrop of the limestone coral bedrock. Being adjacent, the three units shared the same stratigraphy and 4 distinct sediment layers were identified.

> Layer 1: (0-23 cm) dark brown sandy loam topsoil; the layer was likely disturbed by agricultural activities. It produced a moderate amount of local sherds, including some with characteristic EIW decorative motifs, and some pieces of slag, as well as some refined earthenware imported ceramics. The former may have been brought up into the topsoil from below.
> Layer 2: (23-50 cm) brown sandy clay loam with some red mottles; this layer was distinguished from the topsoil by its lighter color and patches of compact clay-rich sediment. It produced many sherds with first-millennium affiliations that became more numerous at greater depth, as well as red beads and shell. The bottom of the layer also had the emergence of the coral feature.
> Layer 3: (50-80 cm) reddish-brown sandy clay with some dark brown mottles; the sediment in this layer was very compact where the clay portion had dried and hardened, which made excavating and screening the material more difficult. The layer produced hundreds of local sherds in all three excavation units. It also marked the appearance of a second coral feature.
> Layer 4: (80-140 cm) red sandy clay; this layer was extremely compact. The artifact count decreased substantially in the upper levels of this layer, to less than 10 sherds per 10 cm level, and eventually sterile soil was encountered. The coral features remained through the entire unit and actually expanded in size, providing indications that they were natural.

The three excavations at Kisiwa Fields produced 1080, 419, and 711 sherds of local ceramics respectively. They also produced 60 pieces of slag, some marine shell, some daub, and quite a bit of loose coral associated with the features. The excavations thus provided a large material culture sample dated to the first millennium on the basis of decorative motifs. The coral feature also provided an interesting example of local experiments with stone architecture.

Kisiwa Forests (Unit 121)

The site of Kisiwa Forests was located amidst patches of forest and cleared agricultural fields southeast of the town of Kisiwa. The site was a few hundred meters south of Kisiwa Fields. One trench was excavated at the site in the area of densest artifact concentration revealed by the survey in a cleared agricultural field just south of a patch of forest. Though the survey had only produced first-millennium artifacts, the site was located close to a second-millennium site, Kisiwa Small, so it was thought the expanded material culture sample from the excavation might reveal a second-millennium component at the site if there was one. Three sediment layers were identified in the excavation.

> Layer 1: (0-10 cm) dark brown sandy loam topsoil; this layer was subject to some slight disturbance from modern agricultural activity. The layer produced a few non-diagnostic local sherds and a piece of slag.
> Layer 2: (10- 40 cm) dark reddish-brown sandy loam; this layer was distinguished from the topsoil by its redder color and some clay content. It contained an abundance of artifacts, including more than 1000 local sherds, which were decorated predominately with EIW motifs of bands of incised lines between dot impressions.
> Layer 3: (40-100 cm) reddish-brown sandy clay loam; this layer was distinguished by its clay content, which led to more compact sediment that was hard to excavate. The upper levels of this layer contained hundreds of first-millennium sherds, but the bottom levels contained no artifacts at all.

The excavation at Kisiwa Forests produced 1550 sherds of local ceramics, which had clear first millennium affiliations, 58 pieces of slag, and some daub, shell and bone.

It provided an important sample of first-millennium material culture. It did not, however, provide any evidence of a second millennium component.

Lisoho Fields (Units 118 and 119)

Lisoho Fields was the fifth site from the lowland plains between Mikindani and Sudi Bays excavated during Phase III. The site was located amidst fields and orchards north of the village of Lisoho. It was surrounded by fertile agricultural land on limestone-derived soils. The site was located roughly halfway between the Kisiwa and Imekuwa sites. The survey suggested that the site contained multiple temporal components, but that these components may not have been located in the same part of the site. It also showed the site to have been the size of an average town with an artifact density of nearly 7 sherds per STP.

The excavations at Lisoho Fields were located in the central-west portion of the site. The second excavation was placed away from the first after the first unit produced a disappointing material culture sample. The first unit identified three sediment layers.

> Layer 1: (0-15 cm) strong brown sandy loam topsoil; this layer produced a few thin, oxidized non-diagnostic local sherds.
> Layer 2: (15-40 cm) reddish-brown sandy loam; this layer was distinguished by its red color. The layer produced only a few local ceramics, none of which were diagnostic, but several pieces of slag.
> Layer 3: (40-130 cm) red sandy clay loam; the layer was identified by its clay content. Its upper levels contained some local sherds and slag, but the layer was sterile below 70 cm.

The second excavation at Lisoho Fields was located in a fallow agricultural field about 150 m northeast of the first excavation. That excavation identified the same three stratigraphic layers, with similar depths, but provided a more robust material culture sample.

> Layer 1: (0-10 cm) dark brown sandy loam topsoil; greater agricultural activity in this portion of the site may have contributed to greater disturbance here. The layer produced 22 local sherds and a tuyere coated in slag. The decorations on the sherds, which included several of deeply incised motifs, suggested a relatively recent date.
> Layer 2: (10-50 cm) reddish-brown sandy loam; here this layer provided a material culture sample of more than 150 local sherds, including some bearing decorative motifs associated with the unique ceramic style developed in the region in the early second millennium. The artifact count had dropped off substantially by the bottom of the unit however.
> Layer 3: (50-110 cm) red sandy clay; layer produced occasional daub and sherds but was largely sterile, and produced no artifacts below 100 cm and only one small sherd below 60 cm. The sherds from this layer were not diagnostic but were thicker than those from Layer 2.

The two Lisoho Fields units produced 29 and 188 local sherds respectively, which was a relatively small sample, but also good evidence for ironworking from 44 pieces of slag and a slag-covered tuyere fragment. Despite the small sample size, the excavations also seem to confirm the expectation of multiple occupation phases from the survey.

Ufukoni Mibuyu (Unit 112)

The final lowland site excavated during Phase III was Ufukoni Mibuyu, located between Mikindani and Mtwara Bays. As the name suggests, the site itself was situated atop a low hill around two large baobab trees. Though in the lowland plains, the site was within 2 km of both the ocean and fresh water. Survey showed the site to be the size of a small town (2.5 ha) with a relatively dense artifact concentration of 7.7 sherds per STP.

The excavation at Ufukoni Mibuyu was located in a cassava field about 50 m southeast the larger baobab tree. Six sediment layers were identified in the excavation.

Layer 1: (0-16 cm) dark grayish brown loamy sand topsoil; this layer contained some daub and shell as well as a few non-diagnostic local sherds
Layer 2: (16-100 cm) brown sandy loam; this thick layer produced a steady amount of local sherds, daub and coral, as well as a few pieces of slag. The absence of decorated sherds in the upper levels suggested a possible Plain Ware affiliation, though first-millennium decorative motifs were common by the bottom of the layer. Fish scales were also found in the layer, having been recovered in the heavy fraction of a flotation sample.
Layer 3: (80-100 cm) pale brown compact sandy loam; this layer did not produce any particular concentrations of artifacts, but its rectilinear shape, light color and presence of clay which contributed to the sediment's compact nature suggested that this might be an occupation floor. However, the absence of any associated features prevented a definitive identification, and the layer was a bit thicker than would be expected based on clay floor levels excavated during Phase I. This layer was confined to the northeast quadrant of the excavation.
Layer 4: (100-155 cm) yellowish-brown sandy loam; this layer was distinguished from Layer 2 by its lighter color. It produced artifacts throughout, especially local sherds, though in reduced quantities compared to Layer 2. The predominant decorative motifs were bands of incised lines within dot impressions.
Layer 5: (125-140 cm) pale brown compact sandy loam; the sediment of this layer was virtually identical to that of Layer 3. Again, the roughly rectilinear shape and clay content suggested that this might be a floor level. This layer was confined to the southwest quadrant of the excavation.
Layer 6: (155- 185 cm) yellow compact sandy loam; this layer was distinguished by the presence of clay and some mineral leaching, each of which made the material compact and difficult to excavate. Very few local sherds were recovered from the layer, and these may have been introduced from above.

The Ufukoni Mibuyu excavation produced 202 sherds and a moderate amount of daub, coral, and slag, as well as evidence for the exploitation of marine resources. The local ceramics suggest a robust first-millennium occupation potentially followed by a Plain ware phase. Perhaps the most intriguing result from the excavation, however, were the two potential floor layers of pale brown compact sandy loam.

Summary

The Phase III excavations thus met their intended outcomes handily. The 22 excavation units produced a large material culture sample including more than 13,000 sherds of local pottery from periods throughout the past two millennia and covering all five microenvironments. The excavations were also able to identify and confirm the existence of multicomponent sites and begin to make sense of those sites' stratigraphies. Importantly, the excavations at Stella Maris Hills and Miseti Hilltop showed that settlement at such sites in different periods was likely to be of variable spatial extent. Strikingly, the excavations also produced very few imported ceramics, certainly fewer than would be expected for a region of the Swahili coast. The implications of the excavations' finds will be discussed in greater detail in Chapters 6-10.

CHAPTER 3: INTERREGIONAL ANALYSIS AND THE SWAHILI COAST

The communities of the East African coast, Mikindani included, cannot be understood without careful attention to the connections they cultivated with groups and individuals from other regions. As discussed in the preceding two chapters, the Swahili communities of the coast had important relationships with groups from the African interior and across the Indian Ocean. The origins of Swahili society are found among East African communities and non-Swahili Africans continued to make important contributions to Swahili life into the colonial period as trade partners, political allies and rivals, and sources of cultural inspiration. At the same time, coastal communities have participated in Indian Ocean trade since at least the first centuries CE (see Freeman-Grenville 1962, 1975, 1988; Chami 1999b, 2006), exchanging goods and ideas with people from the Roman World, the Middle East, India and China. Some of the things they acquired, in particular those from the Islamic Middle East, became important elements of Swahili society, which was characterized in part by a cosmopolitan material culture during the second millennium CE (LaViolette 2008).

Despite the significance of these interregional connections to coastal communities, the nature of the relationships between the coast and other regions has been difficult to determine. The way in which archaeologists and historians have understood those relationships has shifted over time and remains an unsettled question despite new and more extensive evidence regarding the types and quantities of goods exchanged (e.g., Pearson 1998, Killick 2009a). In many ways the shifts in understanding of Swahili external relationships parallel developments in archaeological theory more broadly regarding the study of interregional interactions. It is thus important to place coastal interregional analyses in the context of the theoretical discussions that inform them. In this chapter I discuss the history of archaeological approaches to interregional interaction, paying special attention to how certain approaches were applied to the Swahili case with varying degrees of success, before outlining an approach to interregional interaction suitable for the Mikindani region.

Initial Analyses of Interregional Interaction: Migration and Diffusion

Archaeologists have recognized the importance of interregional interactions since the origins of the field as an academic discipline, as far back as Thomsen's explanations of the Stone, Bronze and Iron Ages (Trigger 2006: 129). At this early stage, most interpretations of interregional connections relied on the concepts of diffusion and migration. Diffusion theories posit that different ideas and cultural elements would have transferred between interacting groups, while migration theories hold that the movement of ideas and traits depended on the movement of people themselves. Support for diffusion over migration or vice versa tended to rely on the degree to which an archaeologist thought human cultures were capable of change. Still, each of these concepts became increasingly popular towards the end of the 19^{th} century, when previous ideas about humanity's "psychic unity" and capacity for invention began to wane in the context of the later Industrial Revolution (Trigger 2009: 217-9). The notion of diffusion featured prominently in the ideas of Franz Boas (e.g., 1974 [1887]), who was so influential to North American anthropology, and Oscar Montelius, whose syntheses of European prehistory (1899, 1903) were similarly important within European archaeology.

These influences carried over into the development of culture-historical archaeology in the early 20^{th} century, which continued to rely on migration- and diffusion-based interpretations while moving away from a strictly evolutionary approach (Trigger 2006: 240). One of the pioneers of the culture-history approach, Gustaf Kossina, relied heavily on migration to explain movement and change amongst archaeological cultures, which he equated with ethnic groups (e.g., 1911), though his extreme nationalism tainted his work to a notable degree. V. Gordon Childe later adapted the concept of a cultural group from Kossina, combining it with Montelius's ideas regarding diffusion and popularizing it within English-speaking archaeology (Trigger 2006: 241-8). Childe (e.g. 1925, 1929) also equated archaeological cultures and past peoples. But he possessed doubts about archaeologists' ability to trace specific peoples in the archaeological record and thought that diffusion, especially of functional advantages, played a significant role in cultural change. This approach remained important well into the second half of the 20^{th} century as it increasingly borrowed concepts from the acculturation literature of socio-cultural anthropology (e.g., Herskovits 1938, Beals 1952, Spicer 1961; see Cusick 1998).

Nonetheless, there are problems with migration and diffusion explanations, several of which had become clear to archaeologists by the 1940s (see Schortman and Urban 1992b). These explanations often imply a lack of creativity and agency for the group to whom ideas spread or who previously inhabited a territory, which has contributed to their use in a number of racist interpretations of the past. This problem is particularly relevant for African archaeology, where the "Hamitic myth" suggested that sub-Saharan Africa's developments depended on foreign migrants (e.g., Seligman 1930) and denied African involvement in the construction of sites such as Great Zimbabwe (e.g., Bent 1891, Wallace 1936). The worst examples of such interpretations were dispelled with reference to archaeological evidence (e.g., Caton-Thompson 1931). Yet migration and diffusion continued to exhibit other theoretical weaknesses. Though useful for describing patterns of interregional interaction, neither migration nor diffusion provided a means for describing the processes that governed that interaction, such as mechanisms for intersocietal contact or reasons for the adoption of traits. Each, but perhaps migration in particular, relied on the concept of bounded cultures that were equated with distinct ethnic groups; in African archaeology this idea found clear exposition in Bantu Migration theories. As discussed more fully in Chapter 5, this concept has not held up to ethnographic or archaeological study and the equation of archaeological cultures with peoples obscured the complexities of group interaction. This weakness shows why diffusion and migration were largely abandoned as explanatory devices by processual archaeologists and have remained mostly unpopular since. In Bruce Trigger's words, they lacked "the will to learn how individual cultures had functioned and changed as systems. Without such understanding, diffusion and migration were doomed to remain non-explanations" (2006: 311).

Despite those clear and significant weaknesses, diffusion and migration continue to have importance in archaeological interpretation. Part of this continued importance comes from the fact that each has occurred in the past. Groups of people have obtained knowledge and adopted traits from other groups, and people have moved from one place and settled in another. Indeed, the origin stories of numerous African groups begin with a migration from some other named place, including many of the groups in southern

Tanzania (see Weule 1909). Yet archaeologists now recognize that these occurrences need to be placed in the broader context of interaction, describing why certain traits were adopted within particular social and cultural contexts rather than such adoption being assumed to be the "natural" outgrowth of "superior" ideas and adaptations. This recognition has forced archaeologists to become more adept at handling the complexity of inter-group interactions.

The other enduring contribution of diffusion is the notion, common to diffusionist approaches since the 19th century, that ideas and adaptations spread out from cores of innovation to other areas, sometimes termed peripheries (e.g., Palerm and Wolf 1957, Adams 1965; see discussion in McGuire 1996). Thus, even in their language diffusionist approaches prefigure some of the later models used to explain interregional interaction, particularly those inspired by world-systems theory (e.g., Schneider 1977; Kohl 1978, 1979). Still, the mechanisms by which cores and peripheries interacted and ideas moved are not elucidated within diffusionist approaches and, as will be discussed in greater detail below, the one-way movement of ideas was not automatic or natural.

Applications to the East African Coast

Given their popularity in archaeology as a whole, it is hardly surprising that migration and diffusion have been invoked on the Swahili Coast. Migration has been a particularly prominent explanatory scheme: for much of the 20th century the Swahili were described as the descendants of Arab and Persian colonists who migrated to the coast and intermarried with local Africans (e.g., Velten 1903; Prins 1961; Kirkman 1964; Chittick 1965, 1974; Saad 1979; Wilkinson 1981; Donley-Reid 1982; *cf*. Mathew 1967). These interpretations emphasizing foreign origins were in part the product of an intellectual climate in which migration was a widely accepted explanation for cultural change in the broader colonial context of the 20th century. But they also had roots with the Swahili people themselves, who often claimed a non-African identity as a means of acquiring and maintaining higher status, a practice that may have been especially prevalent during the colonial period (see Glassman 1995: 32-3; Horton and Middleton 2000: 15-16). While limited migration from foreign lands to the coast may have happened in earlier periods, the prevalence of foreignness in Swahili claims of identity likely increased in recent centuries.

Of course, as described in Chapter 1, Swahili society was not the creation of colonists from the Middle East. The foreign model was challenged and nuanced by linguistic, historical, and archaeological studies that emphasized the Eastern African roots of Swahili society. While this new Swahili scholarship has succeeded in invalidating the foreign migration model, it is worth remembering that migration and diffusion did play significant roles in coastal history, albeit on a much more limited scale. Swahili society may not have been the product of Middle Eastern migrants, but it was certainly influenced by goods and ideas from that region (LaViolette 2008). Other continuing influences came from non-Swahili African groups. Some demographic exchange also surely took place over the long history of interactions between these various groups. While the foreign migration model can be discarded, external influences cannot be wholly disregarded given the coast's dynamic history of interregional connections in multiple directions to many different groups, though the nature of the interaction needs further explanation.

As will be discussed in Chapter 5, a new diffusionist position has also recently been put forth to explain the archaeology of the East African coast (Chami 2001b, 2006, 2007). This approach was a reaction against the failures of migration explanations, most notably the so-called "Bantu Migration." It holds that ideas, language, and technologies diffused among long-settled populations throughout East Africa along well-established routes of interregional contact and exchange. However, like many other diffusion approaches, it relies on the equation of material cultures and peoples and so fails to appreciate the complex processes that governed inter-group relations on the coast.

Approaches Appearing with the Development of Processual Archaeology

Migration and diffusion lost favor in archaeology because they were unable to provide cogent explanations for documented patterns of interaction (Taylor 1948, Willey and Phillips 1958, Binford 1968, Renfrew 1975). As concepts they were of little use to archaeologists operating under the aegis of processualist "New Archaeology," which not only sought explanations, but also general laws which governed human activity. More broadly, this generalist, nomothetic element of processual archaeology had relatively little interest in understanding the particular interactions between specific societies (see Schortman and Urban 1992b; Trigger 2006: 395). Instead, it sought to understand social processes through tightly-focused studies of the various systems that comprised a single society (Flannery 1967, 1968). Yet in practice such studies (e.g., Trigger 1982) consistently revealed both cross-cultural variations that thwarted the search for general laws (see Odell 2001, Trigger 2006: 440) as well as the importance of inter-societal linkages (e.g., Lamberg-Karlovsky 1975, Flannery 1983). The latter issue compelled archaeologists to reconsider interregional interaction. In the process, they developed and adapted models for interaction that continue to influence archaeological interpretation. Four such models are discussed in greater detail here: the gravity model, cluster interaction, peer-polity interaction, and world-systems theory.

Interaction and Gravity Models

Concomitant with the return to the study of interregional interaction was a search for models of interaction that would allow researchers to produce testable expectations for spatial data (e.g., Renfrew 1975, Plog 1976, Hodder 1978). One well-discussed example is the gravity model (e.g., Plog 1976, Crumley 1979). This model emphasizes the frictional effect of distance on interaction – whereby increased distance between communities makes interaction less likely – and proposes that interaction between two communities is directly proportional to their populations and inversely proportional to the distance between them, typically represented using the following formula:

$$I_{ij} = \frac{P_i P_j}{D_{ij}^b}$$

This relationship between interaction, population and distance has been demonstrated ethnographically for a variety of types of interaction (Zipf 1949, Chisholm 1968, Schiffer 1971) and also seems to hold for a number of archaeological examples (see Plog 1976: 257). Gravity models thus measure the intensity of interaction between settlements that can, in turn influence settlement patterns.

There are a number of weaknesses with the gravity model (see Plog 1976, Johnson 1977). Distance is of great importance to the model, but is difficult to measure.

While the model assumes that interaction decreases with distance equivalently in all directions, elements of the natural terrain and built environment could make travel in a particular direction easier (rivers, roads) or more difficult (mountains, forests, walls). Further, perception of distance is as influential on interaction as actual physical distance and the two may not coincide. Another difficulty with gravity models is that the frictional effect of distance does not come into effect within an area close to a community, referred to as the "plateau effect" (Olsson 1966). The plateau effect seems strongest at distances below 8 km (Plog 1976), though for trade in high-value materials like obsidian has been shown to occur at distances greater than 300 km (Renfrew 1969). The model also assumes that the populations are comprised of undifferentiated persons, when in truth interaction may be driven by portions of the population only (Johnson 1977). Distance can also be shown to act differently on different classes of artifacts, so that varying results for interaction intensities may be obtained by focusing on the distribution of certain types of artifacts or by looking at types of artifacts rather than entire assemblages. These distinctions have caused some to advocate the disarticulation of "cultures" into their component parts for study (Hodder 1978). More generally, such discrepancies indicate that additional factors beyond population and distance help shape patterns of interaction such that the gravity model by itself produces overly simplistic explanations for interregional interactions.

Despite such difficulties, the recognition of frictional distance that is central to the gravity model is important to understanding artifact distributions and the movement of goods under various models of exchange (Fig 3.1; Renfrew 1975), as are the predicted levels of interaction more broadly. The simplicity of the gravity model provides a degree

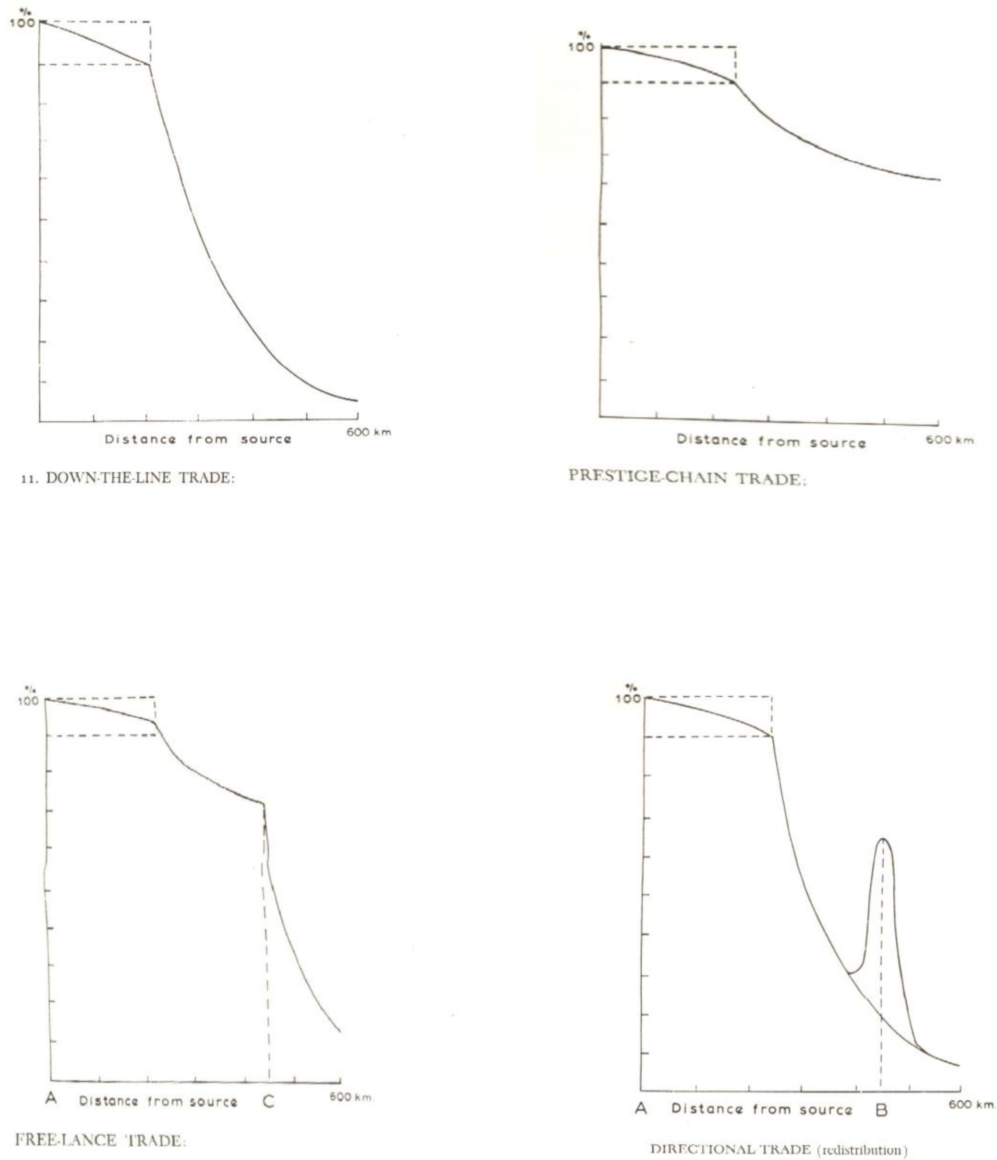

Figure 3.1 Models of trade-good distribution under different forms of trade (Renfrew 1975: 47-51)

of utility when evaluating the extent to which particular cases deviate from the predicted fall-off with distance, clearly indicating the influence of additional factors beyond distance and population. The different models of trade proposed by Colin Renfrew (1972, 1975) show how these additional factors can influence artifact distribution (see Fig 3.2). While down-the-line trade follows a standard distance-decay path, the other models deviate from that distribution model. The forms of redistributive or directional trade, facilitated by either the market or some central-place polity, produce higher than expected quantities at distant locations. Long-distance trade, whether managed by free-lance middlemen or directly controlled by a polity, also produces greater than expected quantities. Finally, some prestige-goods, while ostensibly following a down-the-line pattern, may show much slower rates of decay, indicating again that distance is not equal for all artifact classes.

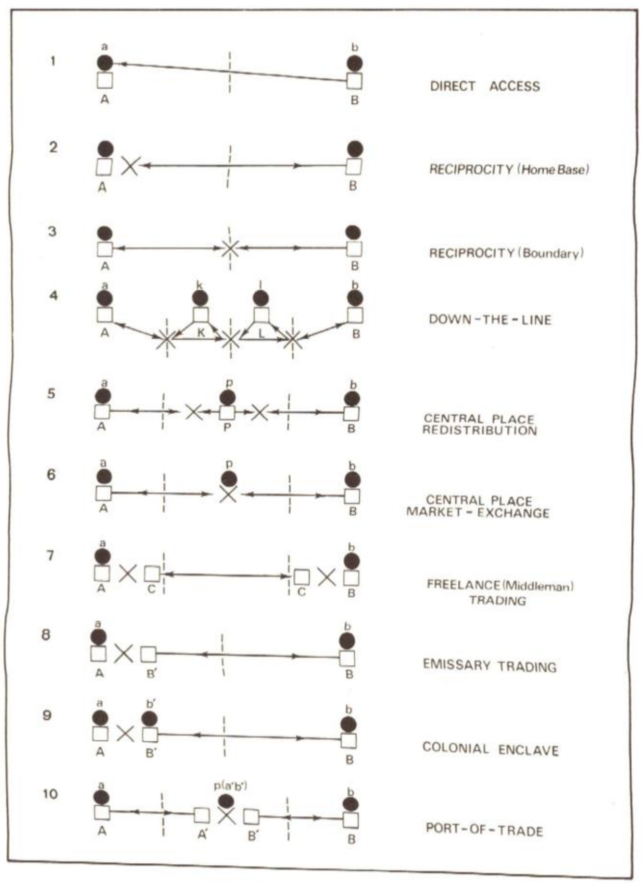

Figure 3.2 Models of trade interactions (from Renfrew 1975: 42)

Importantly, each of these models not only predicts the distribution of resources, but also suggests the nature of the interaction between regions. For instance, both home-base reciprocity and emissary trading involve inhabitants of one region travelling to another to trade and presumably learning things about that region that they can then communicate home (Renfrew 1975: 45). This implies a link between the distribution of artifacts and the organization of networks of interaction. Still, these suggestions regarding the nature of interaction should be corroborated with additional evidence, rather than being assumed from particular artifact distributions, especially given the caution that different artifact classes often show different distribution patterns. Nor do these modes of trade explain how a particular pattern of interregional interaction developed, outside the suggestion that the listed sequence of modes of trade might prove evolutionary (Renfrew 1975: 43).

Models of Trade suggested for the East African Coast

The distribution of imported ceramics, and their deviation from standard distance-decay models, has allowed archaeologists to suggest different models for interregional trade on the Swahili coast (e.g., Wright 1993). During the latter part of the first millennium CE, imported ceramics did not follow the distance-decay path, but are elevated at certain locations, with Manda in particular being suggested as a special "break-in bulk" point and relatively high proportions of imported goods are also reported for Zanzibar and the Comoros (Wright 1993: 664-5). Nonetheless, the directional trade that such distribution implies is suggested to be the result of home-base reciprocity, with particular locally available goods allowing specific sites greater access to imported ceramics.

During the second millennium, the similarly elevated numbers of imported ceramics from sites up and down the coast have been used to support a view of the Swahili and their participation in interregional trade which has become the normative description of the second-millennium coastal economy: the Swahili were middlemen in interregional trade, extracting wealth as they brokered the exchange of products from the Indian Ocean world for the raw materials of the African interior (e.g., Horton and Middleton 2000: 3). The actual form of this trade as commonly envisaged is somewhere between Renfrew's (1975) central-place redistribution and freelance-middleman modes. While it seems clear that many Swahili communities did engage in such trade, what has remained relatively underappreciated is how such patterns of trade and interaction developed over time from first-millennium antecedents and how local contexts might have influenced such development.

Cluster Interaction

Another model for interregional interaction developed by Barbara Price (1977), cluster interaction, sought to extend the concept of essentially autonomous-but-open systems commonly used in processual analyses to encompass the similarly autonomous-but-open super-system of a cluster. In effect, it added the recognition of the importance of interregional interactions into the preexisting systems-theory framework that had been developed for archaeology. In many respects, cluster interaction thus represented the extension of processual archaeological theory into interregional interpretation. Its corresponding focus on diachronic explanations of interregional interaction patterns represented a clear advance on both diffusion and migration models, which were largely bereft of explanatory power, and mostly synchronic descriptions of trade organization to explain particular artifact distributions.

Explanations within the cluster analysis model relied heavily on neo-evolutionary and cultural-materialist concepts. The model suggested that the pattern of shifts in modes of production described within several regions of Mesoamerica at about the same time was “a specific instance of the operation of a nomothetic process” by which such interrelated regions were instrumental in enabling one another to attain greater complexity (Price 1977: 220). The members of a given cluster might change through time, but importantly all must be comparable to one another in terms of size, power, and socio-political structure. The various member groups interact with one another through either trade or competition and warfare. Within this overall framework of interaction the explanations for the developments that cluster members catalyze in one another are ecological-evolutionary: that agriculture brings about social stratification and intensified, irrigated agriculture brings about state formation, as first suggested by Wittfogel (1957).

This reliance on neo-evolutionary explanations is the most significant weakness of the cluster interaction approach. While admirably recognizing the role of interregional interaction among similarly sized polities as important to early state development in Mexico, Price (1977) spends relatively little effort trying to understand the nature of those interactions or how they contributed to such developments in any concrete fashion. Instead, efforts to determine the actual relationships which existed between regions, in terms of whether a specific region might have contributed something to another or the process(es) by which such a contribution might have been made, are described as “epistemologically illegitimate” and subordinated to general assumptions about demographic and ecological determinants of social organization (Price 1977: 210). Such neo-evolutionary assumptions have been shown to fail in some contexts and do not account for the range of diversity present in the archaeological record among societies in similar contexts (Trigger 1982). In that light, failure to consider the nature of the interactions that helped stimulate shared developments among cluster members, even to the extent of distinguishing between trade and warfare, robs cluster interaction of much of its explanatory power.

Peer-Polity Interaction

The association of interacting polities of comparable size with the development of complex forms of social organization that was central to cluster interaction formed the basis for another closely related model of interregional interaction, peer-polity interaction (Renfrew and Shennan 1982, Renfrew and Cherry 1986). Peer-polity interaction was developed for Greek city-states in the Aegean, but has been applied to a variety of other contexts including the Maya area (Friedel 1986) and the Hopewell culture in North America (Braun 1986). The model maintained the focus on development through the interaction of similar polities from cluster interaction, but emphasized structural homologies and symbolic interaction rather than neo-evolutionary concepts (Renfrew and Cherry 1986). It tried to explore the diachronic development of social structures including political institutions, systems of specialized communication in ritual, and conventional patterns of monumental architecture in the context of various forms of interaction such as warfare, competitive emulation, and symbolic entrainment (Renfrew 1986). Many of these forms of interaction have archaeologically visible correlates, ranging from architectural styles to religious or symbolic artifacts to patterns of consumption. Importantly, the peer-polity model recognized that such interactions could take place outside of conditions of domination and subordination which characterized most diffusion models and, as will be discussed below, models associated with world-systems theory.

Though it is not hobbled by over-reliance on ecological causation, peer-polity interaction faces some of the same difficulties as cluster interaction. Peer-polity interaction suggests archaeologically visible modes of interaction that influence historical developments, but it does not explain the nature of interaction between communities. For instance, in instances of competitive emulation the model does not help determine who decided to construct a temple, where they got the idea, or whom they were trying to impress. As Renfrew (1986) notes, it can be hard to distinguish the source of a particular innovation. So while the peer-polity model provides a useful focus on identifying processes of interaction that inspire change over time, it does not study the relationships between interacting units that could have initiated such processes.

The other significant limitation that has been identified with peer-polity interaction has to do with what the model tries to explain. Because the model focuses on polities of similar size and characteristics it often fails to encompass the full range of societies that interact in a particular system, an issue shared with cluster interaction. It thus tends to be applied to polities within a region – the Aegean, for instance – where the demonstration of similarities is straightforward and lacks a more expansive view of the operation of interregional systems (McGuire 1996). This issue of scale does not impinge on its utility at explaining change within a region however, and there is no particular reason why peer-polity processes would not have operated at supra-regional scales as well, so the model's regional "myopia" would seem to be largely a problem of application. Still, even if applied at a supra-regional scale peer-polity interaction is limited to similar polities – peers – rather than all interacting groups of an interregional system.

Application to the East African Coast

Peer-polity interaction has particular relevance for the East African coast because several archaeologists have suggested that the model can help explain the socio-political developments that took place within Swahili city-states during the early second millennium CE (e.g., Wright 1993; Wynne-Jones 2005a, 2005b). In many ways the model is quite a good fit: Swahili polities were of similar size and power, are known to have competed with one another, and emulated one another in things such as mosque architecture (LaViolette and Fleisher 2009). Moreover, though some Swahili polities were clearly more powerful and economically successful than others, there is no substantial evidence that any one polity was able to establish hegemony or dominate another for an extended period of time. Still, peer-polity interaction as applied to the Swahili coast suffers from the same difficulties identified for the model more broadly, including a focus on how peer-polities instigate change in one another at a general level, leaving out both other participants in the larger interregional systems to which the coast belonged and the specific relationships between polities that informed the interactions.

World-Systems Theory

As archaeologists paid more attention to the importance of interregional interaction, the other main body of theory they used to explain how interaction influenced historical developments was world-systems theory. World-systems theory was developed by Immanuel Wallerstein (1974, 1980, 1989) to explain the development of capitalism in Western Europe and the United States. It holds that the important scale of analysis is not a particular society or region but the "world system," which importantly does not imply the entire world but rather the complete group of interacting societies. Within the "entire system" scale, the model stresses the economic interrelations of culturally-distinct participants and the social consequences of such relations. It distinguishes between "core" and "periphery" polities, with the former exerting economic domination over the latter, exchanging manufactured goods produced by wage laborers for natural resources extracted via coerced labor. Importantly, while conditions of domination form the important structures of the system, the existence of the entire system is vital to the reproduction of each participating social unit, whether part of the core or the periphery, and shifts in the larger system produce changes in all units. Indeed, the model was not meant to be static. Much of Wallerstein's opus is taken up with describing the processes by which core polities either maintained or lost their core status and how non-core polities that are not relatively less dependant – referred to as semi-peripheries – sometimes became core polities within the system.

World-systems theory thus provided a clear model for studying interregional interactions at a macro-social, supra-regional scale. For those archaeologists frustrated with neo-evolutionary approaches, it provided an important new model to explain interregional interactions. Yet from the beginning there were questions regarding the applicability of the world-systems model to pre-modern contexts. Wallerstein crafted the model to explain the capitalist world system that developed from the 16th century, and did not intend for it to be applied to earlier contexts (see Rowlands 1987). However, Jane Schneider (1977) argued that aspects of world-systems theory were applicable to pre-capitalist systems and many archaeologists began to explore ancient patterns of interaction in terms of core and periphery relations (e.g., Kohl 1978, 1979, 1987; Eckholm and Friedman 1979; Blanton *et al*. 1981; Kristiansen 1987). They were able to show that pre-modern world systems did not always convert into "world empires" – where the entire system is under the political authority of one core polity – as Wallerstein imagined (Pettinato 1981, Larson 1987). Still, the world systems which archaeologists described had important differences from the capitalist world system described by Wallerstein. Most importantly, there were constraints on core power such that cores in such systems were less able to "underdevelop" their peripheries (Kohl 1987, 2001). These constraints included transportation difficulties and transferrable technologies, including techniques of social organization, which made technology gaps difficult to maintain (see Adams 1974). The existence of multiple nearby "world systems" also meant that peripheral areas could switch their participation between different cores unless they were conquered (Kohl 1987).

These differences in pre-capitalist world systems have led to a reimagining of the theory for past systems, sometimes called the world-systems perspective to distinguish it from Wallerstein's model (e.g., Chase-Dunn and Hall 1991, 1997; Peregrine 1996; Hall *et al*. 2010). This reimagining retained the focus on the entire system as the unit of study and the importance of macroscale processes of interaction. As with classic world-systems theory, the interactions between units are held to be important to their reproduction. It also holds that all world systems have differentiated cores and peripheries, but hierarchical relationships of exploitation and domination must be proven rather than assumed. Because core-periphery relationships in different world systems exhibited varying degrees of hierarchy, an important effort of these studies is trying to determine a typology of world systems (Chase-Dunn and Hall 1991, 1997).

The world-systems perspective, and specifically its recognition that core-periphery relationships were not always hierarchical, addresses several of the difficulties that occur when applying world-systems theory to pre-capitalist systems. Of course, the emphasis on non-hierarchical relations shares Wallerstein's emphasis on the variability and dynamism of inter-polity relations within the larger system. Moreover, the world-systems perspective retains some of the difficulties of the original model. It is overly concerned with economics, stressing exchange at the expense of other forms of interaction, such as warfare (Kohl 2001). Even when advocates of the world-systems perspective pay greater attention to non-economic forms of interaction (e.g., Chase-Dunn and Anderson 2005), these other kinds of interaction have remained poorly theorized (McGuire 1996, Stein 2002). Another legitimate concern is that the model, shorn of core dominance and peripheral dependency, weakens as an explanatory device. It is clear that hierarchical relationships between cores and peripheries did not exist in several archaeological cases, but without them the world-systems perspective is mostly an assertion that long-range interactions are significant, failing to show how such interactions are bound up with the processes of change. Others have challenged the focus on that scale in any case, claiming that world-systems analysis shows a "gross overemphasis on systems-level process" at the expense of other scales of analysis (Feinman 1996, McGuire 1996). One effect of this focus on macro-scale process is that differentiation within the interacting polities is often overlooked (McGuire 1996, Stein 2002).

Applications to the East African Coast

Because of its focus on the role of economic transactions within broad interconnected systems, variants of world-systems theory have been regularly applied to the Swahili coast (e.g., Pearson 1998, Beaujard 2007, Campbell 2008, Killick 2009), whose communities are known to have participated in trade networks stretching across the Indian Ocean for millennia. One major feature of all of these works has been an effort to determine the place of coastal cities within the broader world system. Michael Pearson (1998) similarly referred to Swahili cities as semi-peripheries, but noted that interior groups, while important in the histories of coastal cities, could be classed as either peripheral or external to the system. More recently Phillipe Beaujard (2007) and David Killick (2009) have argued that Swahili cities were semi-peripheries and helped drive the peripheralization of the African interior and outlying coastal islands. Because Swahili merchants often traded natural resources, ranging from luxuries such as ivory and gold to more mundane items like mangrove poles, for manufactured goods including ceramics and cloth and Swahili cities were not noted production centers[1] they did seem to fit a non-core position. Their ability to manipulate the terms of trade with interior

[1] While certain Swahili cities such as Kilwa and Mogadishu did sustain textile industries (see Chittick 1974, Horton 1996), these were not competitive when compared to cloth production situated in core area of the Indian Ocean system such as India (Pearson 1998).

African groups to acquire and turn a profit on those raw materials suggested they were semi-peripheries.

There is substantial disagreement as to whether or not Swahili communities were able to convert their trading partners in the African interior into peripheries. Several scholars have argued that is difficult to show unequal, asymmetric exchange in those relationships rather than exchange based upon mutual windfalls under diverse value systems (e.g. Hall 1990), which is why Pearson (1998) equivocated between periphery and external for the African interior. Killick (2009) challenges this position for southern African participants in Indian Ocean commercial networks. While he notes peripheral agency and argues for the role of trade in the emergence of states, he insists that "the region gave up much of real value and received almost nothing of enduring worth in return" (Killick 2009: 206), correctly pointing out that a periphery can have agency and still participate in unequal exchange. Yet to more properly show peripheralization southern African societies should exhibit political effects and a reorganization of labor to expand and sustain the trading relationship. Therein lies the disagreement, between those like Hall and Pearson who characterize trade as a discretionary, mostly benign activity carried out within polities not dependent on trade, some of which were large states, that remained mostly concerned with agriculture and especially cattle-herding (see also Connah 2001: 260-1) and those like Killick who credit such trade, and in particular the gold trade, for the development and subsequent decline of states at Mapungubwe and Great Zimbabwe, which are described as "highly centralized," demanding subjects engage in mining activities and produce gold as tribute.

Perhaps a more important question for the Mikindani region is determining the extent to which long-distance trade relations structured the political-economies of Swahili communities. The world-systems position – that such relations were crucial to the reproduction of Swahili society – evokes Coquery-Vidrovich's (1978) "African mode of production." First developed for West Africa but applied since throughout the continent, the African mode of production held that African elites depended on long-distance trade for their position and that such trade served as a powerful impetus for the development of more complex forms of social organization (see Killick's position above). Long-distance trade was clearly important to the economies of many Swahili cities, but as archaeological investigations have extended beyond the stone-built districts to encompass the broader Swahili majority living in earth and thatch (e.g., LaViolette 2000; Fleisher 2003; LaViolette and Fleisher 2005, 2009; Wynne-Jones and Fleisher 2010) it is clear that such trade was a relatively minor component of the Swahili economy for many centuries. The focus on long-distance trade as a driver of complexity also obscures important internal forces such as clan-based control over subsistence resources (Kusimba 1999b), and implies a somewhat passive role for Swahili society, stirred into complexity by "more-advanced" trade partners coming to the continent in search of resources. Still, such trade brought luxury items and, significantly, Islam that Swahili elites living in stone-houses used to maintain their authority and social position whether by managing access to these items (Wright 1993, Allen 1993, Kusimba 1999a) or by attracting followers (Fleisher 2003, 2010b), as well as to create an identity distinct from other African groups (LaViolette 2008). The Swahili incorporated the ideological statements that Islamic identity and control over luxury items provided into pre-existing forms of local hierarchical organization, although the former became increasingly important over time. The world-systems perspective, emphasizing macro-scale economic relationships, is thus important to understanding Swahili society but those economic relationships did not create Swahili social organization by themselves, particularly given the absence of asymmetric trade or core dominance with respect to the coast itself.

Overview

While the gravity model provided a beginning in the effort to quantify and explain interregional interaction, its reliance on population and distance meant that its explanations were usually far too simplistic to describe most real-world situations. More problematically, studies of the distribution of various trade goods showed that the effect of distance was highly variable based on a variety of geographic and social factors. Subsequent studies of trade and exchange (e.g., Renfrew 1975) were able to combine the main contribution of gravity models – the frictional effect of distance – with social factors influencing trade activities to produce useful descriptions of interregional exchange. However, such descriptions remained largely synchronic accounts, failing to explain the causes underlying the development or maintenance of a particular mode of trade.

Such weaknesses helped prompt the development of additional models that offered diachronic explanations within interregional systems. Two of these, cluster interaction and peer-polity interaction, studied the relationships of political units of similar size and complexity. Cluster interaction relied heavily on neo-evolutionary explanations. Peer-polity interaction extended such explanations to include ideological causation across modes of interaction such as competitive emulation and symbolic entrainment. However, each of these interaction models possessed weaknesses in terms of their application only to similar polities and often within a single region, as well as their difficulty describing the actual relationships between interacting polities.

World-systems theory provided an alternative approach to diachronic explanations of interacting systems. This model stressed the macro-scale, system-level economic relationships as explanations for changes among participating groups divided into cores and peripheries. However, there has consistently been little archaeological evidence for key components of the model such as core dominance and the subsequent creation of peripheral dependence and underdevelopment in ancient world systems, raising questions about the utility of the larger model. Subsequent efforts to tweak the model (e.g. Chase Dunn and Hall 1991, 1997) have suggested that system-wide interactions could still prove important causes of change and reproduction among members even absent core-periphery hierarchy. This reimagined model has reduced explanatory power however, while perhaps retaining an over-emphasis on economic and systems-level processes (see McGuire 1996; Stein 1999, 2002).

Yet rather than focusing only on the weaknesses of these various models, it is important to recognize the contributions they have made to the study of interregional interaction as well. All of them attempt to explain patterns of interregional interaction in terms of diachronic social processes, whether ecological, economic, or ideological, rather than assuming the spread of "more advanced" cultures during contact as with the diffusion model. They all also emphasize that broad-scale interactions stimulate change within societies, redressing the migratory focus on the expansion of bounded cultures.

When taken together the models also describe both hierarchical and non-hierarchical forms of interaction, accommodating archaeological reconstructions of social organization. Finally, despite their various weaknesses these models highlight some important aspects of interregional interaction. For instance, cluster and peer-polity interaction each identified interaction as an important driver of social and cultural change and world-systems theory showed that macro-scale economic relationships produce significant effects in local contexts.

Post-processual Influences on Interregional Studies

More recently archaeologists have developed a series of new approaches to interregional studies that combine critiques of existing models with theoretical developments rooted in post-processual archaeology emphasizing agency, practice and social identity. One emergent consensus has stressed an active role for "peripheral" regions as zones for the exercise of agency influencing the nature of change, instead of passive, core-dominated places (see Rice 1998, Stein 2002), extending ideas of innovative semi-peripheries from world-systems theory (Wallerstein 1974, Chase-Dunn and Anderson 2005). Other efforts have worked to break down "atomistic" models of interacting groups, identifying important social distinctions within them that helped shape patterns of interaction (e.g., Brumfiel 1992) and demonstrating that conditions of culture contact can provide opportunities for transculturation or ethnogenesis (e.g., Deagan 1983, 1988, 1998). The successes of those efforts compelled archaeologists to explore large-scale interactions and their structural consequences with an eye towards the local systems of meaning within which exchanges took place (e.g., Dietler 1998). Taken together, these three new approaches have compelled archaeologists to try to address the range of interactions that have taken place in the past, with perhaps the most notable effort being Schortman and Urban's attempts at an "interaction paradigm" (1987, 1992a, 1998).

Peripheral Agency and the Distance-Parity Model

The mounting archaeological evidence indicating that cores often were not able to dominate their peripheries and impose asymmetric trade relations prompted many archaeologists to reexamine the relationships between core and peripheral groups. Central to this effort was the recognition of the ability to exercise power as a variable in interregional interaction subject to change over time.[2] Differences in the exercise of power explained why core regions were able to dominate some peripheries but not others. Stein (1998, 1999) suggested that the root of these distinctions in power could be explained by consideration of the distance between the periphery and the core. According to his distance-parity model, the core's ability to exert hegemonic power decays with increasing distance, particular when transport is difficult – points made from within world-systems theory (e.g., Kohl 1987) and consistent with the gravity model – to the point where economic relationships eventually become symmetrical and necessitate alternative modes of interaction from the core in order to obtain goods, such as trade diasporas (see Curtin 1984). Elsewhere Stein (2002) identifies other influences on power differentials, including technology, population size, military organization, and degree of social complexity. This effort to identify a range of power relationships corresponded with broader developments in archaeological theory emphasizing the diversity of

[2] Note that such dynamic, contested power relationships are also described within world-systems theory, which places explanatory power not on the existence of any particular core polity but on the exercise of power by core states generally within the wider system

sociopolitical organization, the existence of both heterarchical and hierarchical forms of organization, and the fluid movement of many societies back and forth between forms (Crumley 1987; Ehernreich *et al*. 1995; S. McIntosh 1999; McIntosh and McIntosh 2003; Chilton 2004; R. McIntosh 2005).

Recognition of varying power differentials for core-periphery interaction spurred acknowledgment of peripheries as a dynamic, variable category more broadly (Rice 1998). This dynamism resulted in no small part from the exercise of agency by peripheral groups. Anthropologists and archaeologists studying colonial encounters increasingly saw that the process of cultural contact was not a one-way transmission and that colonized groups – those inhabiting the periphery – played important roles determining the history of colonization (e.g., Wolf 1982, Sahlins 1985, Hantman 1990). People, whether in core polities or peripheral ones, interacted from their own cultural contexts and according to their own ambitions. In circumstances where core power was less pronounced, peripheral groups would have been even more influential, a point made in applications of world-systems theory which identified peripheries and semi-peripheries as important loci of innovation in the past (Kohl 1987, Chase-Dunn 1988, Chase-Dunn and Anderson 2005). Consideration of the agency of all actors proved crucial to understanding interactions ranging from Germanic groups trading with the Roman Empire (Headeger 1987) to the gradual Greek colonization of Iron Age Gaul (Dietler 1998) to those linking lowland Maya centers with wider southeast Mesoamerica (Schortman and Urban 1994).

Identity and 'Bottom-up' Models

These ideas of agency and people interacting according to their own goals and desires meant that understandings of the interacting groups needed to become more complex and incorporate diversity within groups (Schortman 1989). Class, gender, and ethnic distinctions existed within regions – even among egalitarian societies – and these distinctions influenced the goals people brought into interregional interactions but also the capacities and constraints they operated under (Brumfiel 1987, Feinman 1995). At the same time, interaction provided important new opportunities to change salient attributes of one's identity or to create new identities. Deagan (1983, 1988, 1998), drawing on the ideas of anthropologists Fernando Ortíz (e.g., 1940) and George Foster (1960), has shown that early Spanish colonialism in the Americas was not marked by the diffusion of Spanish culture so much as the creation of a mixed, creole identity that incorporated aspects of Spanish and Native American cultures yet was clearly distinct from each.

Just as interaction provides the opportunity for such new identities to emerge, social identities also help pattern interactions, creating and maintaining important contacts among spatially dispersed populations (Schortman 1989). Perhaps the clearest instance of such patterning would be in a trade diaspora, where interregional trade is managed through the relations of a single ethnic group (see Cohen 1971; Curtin 1984). More quotidian identities are also influential in the shape of interregional interactions, helping to establish roles and possibilities. Identities can also become ensnared in disadvantaged, asymmetrical power relationships. The extreme example of this process is slavery in the Americas (e.g., Singleton 1998) where slaves had the capacity to invent a black identity and black culture, but one whose cross-cultural interactions were largely confined to forced participation in the dominant, white culture. However, archaeologists would do well to remember the effects of power on processes of identity formation and expression in instances of interaction with less extreme power differentials as well.

While interaction can thus be both structured and structuring with respect to identity, not all interactions result in ethnogenesis and elements of identity which do not change can be as important as those that do. Some forms and contexts of contact prompt only minor, superficial changes that can continue indefinitely without leading to changes in ideology, values, and cultural identity, and resistance to change can be significant (see Cusick 1998). Archaeologists thus need to consider a diachronic "bottom-up" approach that incorporates local identities and meanings, which are capable of changing or not changing and through which agency is exercised, as part of the study of interregional interaction.

Non-Economic Models: Marrying the Systemic and the Idiosyncratic

While archaeological studies of interregional interaction increasingly focused on issues of agency and identity within the diverse interacting groups, power relationships and systemic structural constraints on behavior are still important (Schortman and Urban 1992a, Cusick 1998). To borrow Cusick's (1998) formulation, interactions are structured but not deterministic, and archaeologists need to balance systemic effects with more idiosyncratic ones springing from the multitude of actors operating within their unique contexts. Archaeologists thus turned to non-economic models that stressed the ways in which large-scale interactions, and the structural changes and constraints that resulted from them, were responsive to local contexts and specific cultural systems of meaning.

For instance, a number of archaeologists explored elite goods not as commodities but as sources of power within local socio-political systems. Dietler (1990, 1998) showed that local agency drove choices surrounding wine consumption in Iron Age Gaul according to the importance of drink within indigenous politics and society, but that the region's increasing entanglement with Mediterranean states altered native economic and social relationships. This led to increasingly asymmetrical economic and political relations that constrained local agency in important ways. Similar perspectives have been applied to the exchange of copper in the Powhatan world of the Middle Atlantic United States (Hantman 1990, Hantman and Gold 2002). Some have criticized such focus on prestige goods for focusing on rare exotica, whose elite connections are sometimes poorly theorized and demonstrated (Kowalewski *et al*. 1992), at the expense of factors such as labor procurement and military strength (Kowalewski 1996). Yet this critique misses the point: culture-specific attitudes towards elite goods influence decision-making regarding a community's interaction with others within a particular set of systematic constraints and opportunities that includes the organization of labor and military power. Those decisions in turn have structural consequences for later interactions. It is not an either/or proposition but rather an effort to better understand the nature of past interactions in which both were significant.

Overview: The Interaction Paradigm

Ultimately, if there is a critique to be made of the post-processualist-inspired approaches to interaction, it is that in their rush to disavow some of the weaknesses of world-systems theory they sometimes moved too far in the opposite direction, focusing on the local contexts in which agency was exercised at the expense of systemic factors. Stein's claim that "human agency is as important as macroscale political economy" (2002: 907) and his general focus on the specifics of interaction at one site, Hacinebi, is indicative of this trend. To a certain degree, this emphasis on local contexts of interaction might also be related to the archaeological data that is available, which tends to be collected at the scale of the site or, at most, the region. This criticism is not to imply that local contexts, agency, and identity are unimportant to understanding interregional interaction, but rather to stress that systemic effects are not just as important but in some contexts *more* important and they should not be discounted because of criticisms of older models or difficulty studying them. In light of this critique it is worth noting a number of impressive counterexamples that work to balance systemic and idiosyncratic effects while interpreting real archaeological data (e.g., Hantman 1990; Schortman and Urban 1992a, 1994; Dietler 1998).

Given this awareness of both macro-scale and micro-scale influences on interaction, multiple authors have suggested a continuum of types of interactions that take into account a range of power differentials and other systemic constraints (e.g., Schortman and Urban 1992a, 1998; Alexander 1998). In general form the continuum ranges from conditions where interacting groups are not able to dominate one another and are mostly self-sufficient, through a situation where they come to rely on another to maintain social and economic structures but where neither is able to fully dominate the relationship, to conditions where one partner in interaction is able to determine the pattern of interaction and the other exists in a dependent relationship. Schortman and Urban (1998) call these types egalitarian, coeval, and hierarchical respectively, while Alexander (1998) terms them symmetrical, entanglement, and colonization. The identification of a range of interaction types went along with the recognition of variable conditions of power that formed a key plank of post-processual-inspired approaches to interaction (e.g., Stein 1999). It also had roots in world-systems approaches that distinguished independent peripheries capable of reproducing themselves outside of the system, often on the basis of subsistence self-sufficiency, from dependent peripheries that were not capable of doing so (Ekholm and Freidman 1985, Kristiansen 1987). The continuum forms the basis of Schortman and Urban's (1998) interaction paradigm, which marries the world-systems focus on the constraints that exist through the functioning of the entire system (see Chase-Dunn and Hall 1991) with a variable approach to understanding the nature of relations between regions. In attempting to generalize the model they suggest that control of labor between and within societies is the driving force for interaction, but this would seem to reproduce an over-emphasis on economic aspects of interaction at the expense of other motivations.

Applications to the Swahili Case

Studies of the Swahili coast have not referenced these new developments in interaction studies as overtly as they have previous models such as migration, diffusion, peer-polity interaction and world-systems theory, which is somewhat ironic given that descriptions of Swahili society are used as examples of Schortman and Urban's (1998) coeval interaction type. However, recent studies from the coast have been informed by the theoretical developments that shape new approaches to interaction. Perhaps most significantly, archaeologists have increasingly demonstrated that multiple groups, occupying a range of distinct identities, contributed to Swahili society and participated in interregional interactions according to their own logics. Such groups include the sultan of Kilwa interacting with the Portuguese in a manner informed by the erosion of his wealth and challenges to his authority by members of the local elite (Fleisher 2004) and Swahili elites incorporating exotic material goods as they crafted a distinct, cosmopolitan identity (LaViolette 2008). They also include non-Swahili Africans occupying the coastal hinterland, sharing some connections to the Indian Ocean world, and capable of influencing coastal developments (Abungu and Mutoro 1993, Allen 1993, Helm 2000b, Horton and Middleton 2000, Pawlowicz and LaViolette *forthcoming*). Acknowledging the contributions of these diverse groups brings Swahili archaeology in step with the more expansive agency incorporated into interaction studies. Like those studies, Swahili examples at times fail to acknowledge adequately the structural, systemic effects on patterns of interaction however.

Another notable development has been a reconsideration of imported goods on the Swahili coast, stressing their non-economic meaning. Such goods have been understood primarily as drivers of wealth, with distribution tightly controlled by the merchant elite in order to obtain trade goods and other products at profit (Kusimba 1999a, Sinclair and Håkansson 2000). Fleisher (2003: 422-27), inspired by his recovery of a wide distribution of imports on Pemba Island, instead treats them as the material correlates of an emergent Islamic social and political ideology, cementing the participation and ultimately the allegiance of non-elites through widespread gift exchange and associated feasting (see also Fleisher 2010b). Their use in this fashion has structural consequences, spurring the growth of “regal-ritual” stonetowns on Pemba Island, and pulling those communities into deeper connections with the Islamic Middle East. Importantly, this view of imported ceramics provides greater insight into Swahili decision-making within Indian Ocean commercial networks and a more nuanced view of Swahili society. This is not to suggest that the economics of Swahili decisions were less important or filed to have real consequences, but rather to distinguish the motivtions of the medieval Swahili from those of modern capitalists.

Summary

At this juncture it is worth taking a step back from the diversity of theoretical approaches and focusing on the practical knowledge gained regarding interaction in the past that can be applied to the Mikindani case. First, there has been a great diversity of kinds of interactions: people have migrated, innovations have diffused, and societies have engaged in trade, warfare, colonialism, competitive emulation, and symbolic entrainment, among other things. This variety has important implications for the nature of relationships between groups, as the kinds of interactions a group engages in provide insight into their relative power and position within large-scale networks and the ways in which those networks were structured (i.e. hierarchically, egalitarian, or coevally). Second, interaction can be an important driver of change, but it is important to determine what is changing and what is not changing, which demands consideration of the agencies of the diverse participating groups.

Broadly then, interaction is a hugely complex process, involving a range of forms, multiple internally diverse groups, and changing power relationships. This complexity has largely frustrated attempts to formulate a single overarching theory. Still, the basic tenets of a general approach to interregional interaction have come into much sharper focus (Schortman and Urban 1992a, 1998; Alexander 1998; Cusick 1998). This general approach focuses on open-ended systems and stresses the interplay of systemic and idiosyncratic factors in determining the nature of interaction. Systemic factors describe macro-scale constraints and capacities, including economic, demographic, political and ideological characteristics (Chase-Dunn and Hall 1991, 1997; Sherrat 1997). Idiosyncratic factors describe the cumulative effects of agency exercised by all participating parties within their own contexts (see Stein 2002). Taken together these two sets of factors provide dynamic structures for the processes of interaction based on both shifting capacities and power differentials between groups as well as changes in each groups' culture that were instigated or enabled by interaction.

Inherent in the recognition of systemic and idiosyncratic influences on interaction is the need to explore multiple scales of analysis. Analyses which include only macro-scale "top-down" or micro-scale "bottom-up" approaches are each incomplete. Instead, interpretations should consider the opportunities and constraints on all groups produced as the entire system is integrated with local contests. After all, several scholars have recognized the "nested" nature of most large-scale systems, which contain several subsystems of core-periphery interaction (Wallerstein 1974: 86; Chase-Dunn and Hall

1991; Rice 1998). It is thus important to investigate interactions at local, regional and supra-regional scales. The extensive literature on regional analysis yields additional detail regarding the integration of local and systemic influences within specific areas, and is the subject of the next chapter.

These insights inform the approach taken to large-scale systems in this project. The local and regional data for the Mikindani region provided by the project will be compared with that found elsewhere on the coast and patterns in the data will be contextualized with known historical trends in the Indian Ocean system. Within this attention to both macro-scale and idiosyncratic factors, efforts will be made to identify the details of the Mikindani region's participation in the broader Indian Ocean system in terms of goods they acquired, cultural influences they took on board, and products and natural resources they exported. Those details in turn allow us some idea of which groups the Mikindani residents were interacting with and the kind of interactions that occurred. That enables us to begin to explore the structures and implications of those interactions using models from world-systems theory, peer-polity interaction, and the continuum of the interaction paradigm.

CHAPTER 4: REGIONAL ANALYSIS IN ARCHAEOLOGY: LESSONS FOR THE MIKINDANI REGION

Spatial analyses of archaeological remains are as old as the discipline itself (Kroll and Price 1991, Seibert 2006). The influence of Scandinavian archaeologists such as Thomsen and Worsaae transformed early antiquarian studies into systemic analyses of artifacts in context during the late 18th and early 19th centuries (Trigger 2006). A further advance took place in the mid-20th century as the view of spaces suitable for archaeological examination was broadened to include regional analysis. Bruce Trigger has argued that, “For archaeologists interested in studying social and political organization, [regional analysis] constituted the most important methodological breakthrough in the history of archaeology” (2006: 379). Regional analysis in the Mikindani region provided a means to investigate the ways in which the region was influenced by developments in the broader Swahili world at different moments in time.

In this chapter, therefore, I provide an outline of the history of regional analysis in archaeology so that the insights useful to the Mikindani case might be better understood. I explain the major interpretative models and theoretical constructs that have been used in regional analyses, paying close attention to their critiques and their enduring explanatory strengths. I then review the different kinds of regional analysis that archaeologists have undertaken on the Swahili coast. Finally I suggest aspects of a regional approach that might be effectively applied in the Mikindani region to answer this project’s research questions.

Settlement Archaeology

The pioneer of regional analysis was Gordon Willey, whose work in the Viru Valley of Peru (1953) demonstrated the effectiveness of a research strategy that encompassed all settlements within a region. At the time most archaeologists were primarily interested in determining cultural sequences at individual sites and constructing artifact typologies as they tried to define "archaeological cultures" (see Willey 1974; Trigger 2006: 235-247, 278-290). While this approach remains an important component of archaeological practice, it has clear limitations in both theory and scope. The impetus for regional study, which concentrated on the relationships between sites rather than the typological sequences within them, came from Julian Steward, Willey's superior at the Smithsonian Institution during the 1940s (Willey 1974). For Steward, regional analysis fitted into an ecological approach to cultural change (see Trigger 2006: 372-73). Archaeology provided a means to study changes in subsistence economies, population size, and settlement patterns over time, documenting the relationship between culture and environment. Indeed, Steward (1937) had combined ethnographic and archaeological settlement-pattern data himself in a study of the culture and environment of the American Southwest. While limited in terms of theoretical scope and over-reliant on models of environmental causation, this ecological approach produced useful and sometimes groundbreaking archaeology, perhaps most notably Braidwood's Jarmo Project (1974) and MacNeish's Tehuacan Project (1974). Because Willey's methodology provided a means of obtaining such data, ecological interpretations of regional settlement data remained popular, perhaps epitomized by Sanders, Parsons, and Santley's (1979) study of central Mexico.

However, Willey's own interpretation of the settlement data from the Viru Valley differed significantly from Steward's ecological approach. He approached settlement patterns as a "strategic starting point for the functional interpretation of archaeological cultures" (Willey 1953: 1). This approach did not deny a significant role for ecological factors, but it also sought social, economic, political and cultural explanations for settlement patterning. Willey linked changing distributions of population in the Viru Valley to the development of more complex forms of social and political organization and more intensive forms of food production. He argued that "settlements are a more direct reflection of social and economic activities than are most other aspects of material culture" (1956: 1). Seeking social and political explanations represented a clear advance in archaeological thought, "identifying social and political organization as a legitimate object of archaeological study," while at the same time Willey provided a methodology for such study (Trigger 2006: 377). This development inspired a number of important functionalist studies of settlement patterns elsewhere in the world, including Robert McCormick Adams' study of settlement, irrigation systems, and political change in Iraq (1965) and K.C. Chang's study of settlement patterns and socio-political continuity in northern China (1963). In all such studies regional settlement was placed in the context of what was going on ecologically, politically, economically, socially, and demographically. Changes in settlement patterns within a region were associated with developments in political structures, social organization, economic systems, and the environment and vice versa. Settlement archaeology thus provided a means to explore other aspects of the past within a holistic framework.

The novelty and obvious significance of settlement archaeology inspired a healthy debate about how to make sense of new archaeological categories. Central to this debate was a controversy over whether or not settlement archaeology was mostly a methodological development, or rather a new theoretical approach to the study of the past. These two positions are perhaps best epitomized by the articles of K.C. Chang (1968b) and Irving Rouse (1968) in Chang's *Settlement Archaeology* (1968a). Chang, arguing the methodological position, pursued a standard definition of settlement which archaeologists might apply cross-culturally. In reference to the anthropological category of community defined as the boundary of an individual's social activities, he defined settlement as the "physical locale or cluster of locales where the members of a community lived, ensured their subsistence, and pursued their social functions in a delineable time period" (1968b: 3). Rouse challenged Chang's easy linkage of archaeological and socio-cultural ideas, and stressed that in the absence of explication of archaeological data as practiced in culture-historical archaeology, settlement archaeology in fact represented a new theoretical approach to the study of prehistory. Willey, in his conclusion to that volume, sided with Chang, "I concluded that the investigation of settlement patterns did not, and could not, in itself, comprise a self-contained approach to prehistory, that it was not a 'new archaeology.' At the same time, it was, to a very great extent, a new 'approach' within archaeology …" (1968: 208). Over time, Willey and Chang's position held sway, and the development of settlement archaeology was and is viewed primarily not as a theoretical development, but as a methodological broadening of the archaeological perspective.

Still, this left archaeologists with the problem of defining what they were recovering in the field. Perhaps the most important development in this regard was the recognition of a hierarchy of spatial levels which organized settlement relations (Chang 1968b, Trigger 1968). Different factors are influential in determining spatial patterning at the level of the dwelling, or settlement, or collection of settlements, so that the study of multiple levels offers a more comprehensive approach to understanding the linkages between settlement patterning and past forms of social and political organization (Trigger 1968). Chang (1968b) similarly advocated for the creation of models to understand both microstructure, the culture and social organization of a settlement, and macrostructure, the culture and social networks comprised of settlements, noting that a single community will possess one microstructure but can potentially participate in multiple macrostructures. The larger goal of these efforts was to create a standard framework with which to organize the data collected during settlement archaeology studies so that such data was more amenable to interpretation.

Models of Settlement Patterning

Settlement archaeology thus provided an important means by which to approach questions regarding social organization in the past, and was developing increasing methodological rigor. Still, its functional approach and methodological focus proved to be rather sterile theoretically. Archaeologists were eager to embrace its methods, but "the general acceptance of settlement pattern survey as an archaeological research strategy [produced] a demand for both new theory and analytical methodology appropriate to regional data" (Johnson 1977: 479). Such demand coincided with the increasing prominence of processual archaeology. Processual archaeologists often employed data about spatial patterning as they tried to describe inter-cultural regularities of human behavior. In this sense, the efforts of processual archaeologists mirrored those of other anthropologists engaged in locational analysis to "reveal the patterned movements of people, goods, services and information that underlie and express the structure of a given regional system" (Smith 1976a: 6) Processual involvement in settlement archaeology prompted two significant and related developments in regional analysis: the application of quantitative methods and statistical analyses to spatial data and the explicit use of theoretical models to provide testable hypotheses for regional spatial patterning.

Statistical Treatments of Spatial Data

While representing a clear advance in archaeological practice, settlement pattern studies initially retained many of the preceding culture-historical concerns that dominated the discipline. Willey's monographs from Viru Valley (1953) and the Belize Valley (Willey *et al*. 1965) have been described as "focused analyses of buildings, their groupings, and their distribution … [and] included placing the construction of these groups chronologically" (Vogt 1983: xix). In contrast, processual archaeology advocated a more "scientific" approach to archaeological study that emphasized quantitative analysis. The strongest early calls for a quantitative approach to spatial patterning came from England during the 1970s, particularly from David Clarke (1977) and Ian Hodder (1978). Hodder and Orton's *Spatial Analysis in Archaeology* (1976) demonstrated an explicitly statistical approach to archaeological spatial patterning, employing trend surfaces, nearest-neighbor analysis, and Kolmogorov-Smirnov best-fit tests as they analyzed several different sets of spatial data. Though not all regional studies of settlement patterning matched their statistical rigor, Hodder and Orton exemplified the trend in regional studies towards quantitative analysis as archaeologists sought explanations for spatial patterning that could be generalized across different contexts.

Uniform vs. non-Uniform Distribution Patterns

Concomitant with this trend towards quantitative analysis was a search for theoretical models to produce testable expectations for spatial data. The models used to create expectations of settlement patterns needed to include the various factors influencing settlement. They also needed to incorporate various forms of settlement distribution. Hodder and Orton (1976) identified three different types of settlement distributions which archaeologists might encounter: random, clustered and uniform (Fig. 4.1).

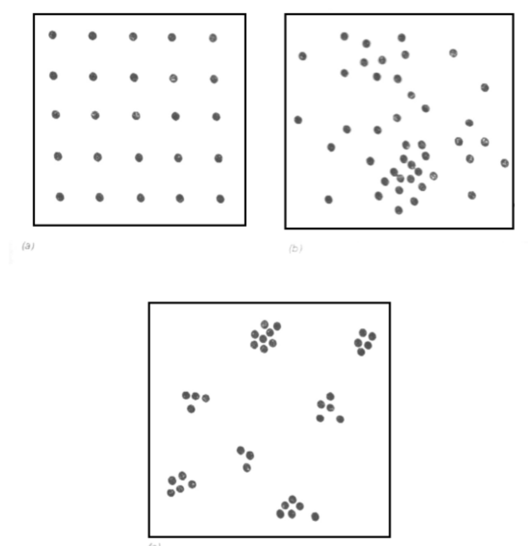

Figure 4.1 Types of settlement distribution: (a) uniform, (b) random, and (c) clustered (Hodder and Orton 1976: 31)

Random distributions, of course, are random only insofar as they escape archaeologists' capacity to determine the factors shaping settlement decisions. This type of patterning might result if the settlement choices are made in response to different locational factors at different settlements, or because individual settlements have differing responses to the same factor. For instance, some settlement location choices might be more dependent on the distance to fresh water, others on the availability of good soil, and still others on the location of nearby settlements, which could be considered either an incentive or disincentive to settlement. The likelihood that these various factors will produce a random distribution increases in situations where there is less competition for land and considerable freedom to settle in a location that provides access to any preferred resource (Johnson 1977). Random distributions are often thought to be characteristic of the initial settlement phase of an area for this reason (Hodder and Orton 1976). Preservation could also be a significant influence in the creation of a "random" distribution, for "if [individual cases] are eliminated randomly from a non-randomly distributed population, a random distribution will eventually be produced" (Greig-Smith 1964: 217). Random distributions escape any predictive model that archaeologists might employ, or perhaps more correctly they fail to show a good fit with any of them, but nonetheless provide insights into the societies that produced them.

Unlike random distributions, clustered distributions possess a degree of predictability, but one dependent on the characteristics of the region. Clustered distributions commonly occur due to the localization of a particular resource influential in determining settlement location (Haggett 1965, Hodder and Orton 1976). Three categories of localized resources exist: zoned resources such as preferred soil types, linear resources such as rivers, and point resources such as a geological outcrop of a particular mineral (see Fig. 4.2). Importantly, such resources are not restricted to environmental attributes, but can also include social or economic resources: roads, a major city, or a religious center, each of which is also capable of attracting agglomerations of settlement. Archaeologists can test the fit of their settlement distributions to distributions of various resources to determine the extent to which settlement clustered around those resources in the past. Basic town functions such as the facilitation of transport (linear clusters), the extraction of natural resources for export (zonal or point), or manufacturing for an external market (point) can produce clustered distributions.

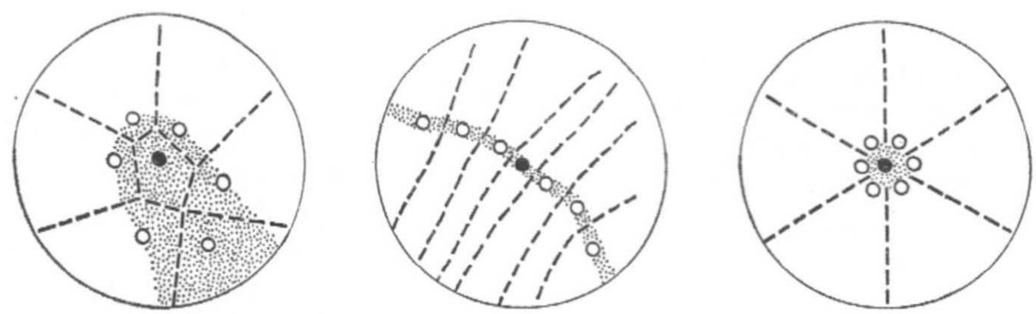

Figure 4.2 Clustered settlement patterns associated with an increasingly localized resource, i.e. zonal, linear and point (from Hodder and Orton 1976: 85)

The third potential type of settlement distribution archaeologists might encounter is uniform distribution. Uniform distributions are perhaps the best theorized of the three distribution types because their patterned organization invites comparison with theoretical models. One feature of uniform distributions is that settlements in such distributions provide limitations on the potential locations of other settlements. Indeed, "unless sites are located on some regularly spaced environmental or physical feature, the uniform arrangement indicates some degree of competition between sites" (Hodder and

Orton 1976: 55). Such competition rests on the notion that the region is fully-settled or "packed," otherwise there would be no reason to compete if resources could be had elsewhere (Smith 1974). The notion of competitive settlements invited a range of economic models into settlement analysis. Such models depend on assumptions regarding minimization (of effort), maximization (of return), and optimization (of return on expended effort) which generate expected behavior patterns (Morill 1974, Johnson 1977). Those patterns are then used to model the organizational structure of settlements at a variety of scales, both horizontally/heterarchically and vertically/hierarchally (Hodder and Orton 1976, Crumley 1979). Decision-making theory would suggest that the core assumptions of these models do not always hold, perhaps especially not in non-capitalist societies (see Johnson 1977). But the ability to generate expectations also provides insight into the situations when those expectations are not matched by the observed data. Three of the most frequently used distribution models --Central Place Theory, Site Catchment Analysis, and the Rank-Size Rule-- are discussed in greater detail below.

Central Place Theory

As archaeologists were incorporating economics-based assumptions of maximization and minimization into their models of settlement distributions, economic anthropologists were also trying to emphasize the study of the general dynamics of markets (e.g., Skinner 1964, Smith 1974, 1976a). This effort borrowed heavily from the work of human geographers (e.g., Berry 1961, 1967) pursuing spatial understanding of agrarian markets. One model, Central Place Theory, originally postulated by the German geographer Walter Christaller (1966[1933]), was especially well-used to explain observed regularities in market locations. Central Place Theory (CPT) predicts the regular arrangement of market centers both vertically – relative to different-order centers – and horizontally – relative to same-order centers. Centers are centrally located in hexagonal areas and are horizontally spaced into a triangular lattice relative to other similar-order centers (see Fig. 4.3). Such spatial arrangements have been found in rural China (Skinner 1964), parts of the United States (Berry 1967), and regions in Africa (Jackson 1971).

The CPT model relies on straightforward assumptions regarding competition between centers and minimization of the cost associated with movement to a center. It holds that market centers of the same hierarchical level provide the same products and services and serve a regularly spaced region around each center. Outside the region, potential visitors to the market instead attend the same-order market nearest to them. The regular spacing of markets is achieved over time through competition, as markets spaced too closely together do not draw enough visitors to survive and markets spaced too far apart do not service the population efficiently, leading to the creation of additional markets. Higher-order markets are distinguished from lower-order markets by providing additional services that allow them to attract visitors from a wider area. As these higher-order centers cover larger areas but remain regularly spaced relative to one another, clear ratios between the number of higher-order centers and lower-order centers exist. Empirical evidence has suggested that the third-order markets are located about 33 km apart, second-order markets are about 13 to 16 km apart, and the lowest-level markets are 6 to 10 km apart (see Hodder and Orton 1976). For these forces to produce the normative hexagonal structure it is also assumed that no transportation or geographic inequalities exist in the region, and that the region is populated by undifferentiated persons with equivalent purchasing power and demands.

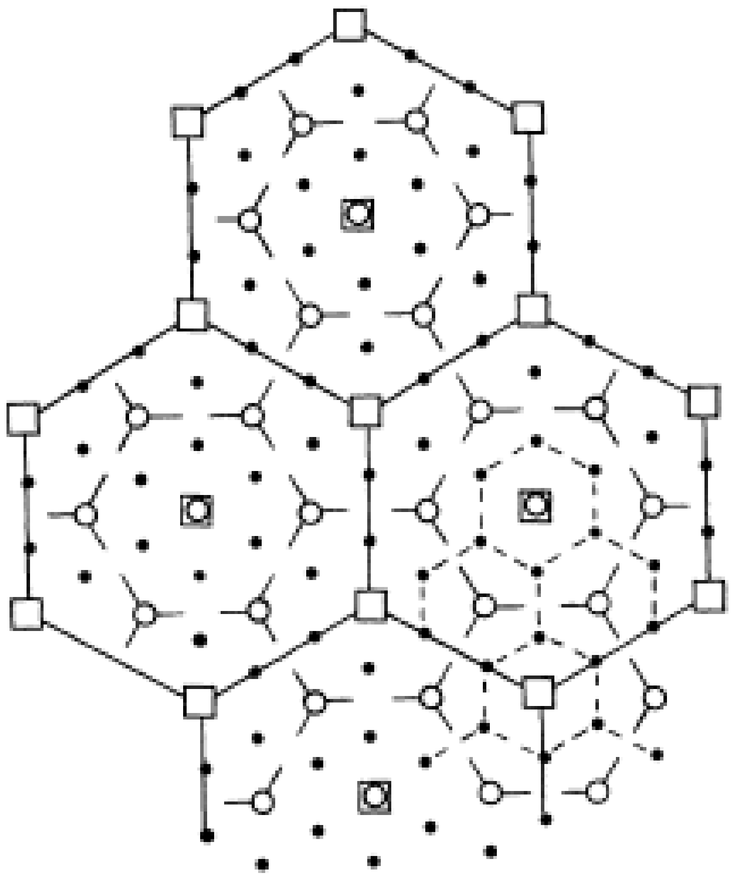

Figure 4.3 Model of Central Place Spatial Organization (Smith 1974)

Those assumptions of the absence of geographic inequality and undifferentiated persons are unlikely to be met in practice and the competition between the lowest-order centers at a given moment is likely to be either competitively or locationally imperfect. These difficulties imply that real-world regional data is unlikely to match the model's perfect hexagons. Indeed, even the proponents of the theory admit that it is "probably untestable" (Smith 1974: 172). But the deviations of empirical data from the normative model postulated under perfect conditions do not negate CPT's utility because the model is also predictive in terms of how its assumptions are *not* met (Smith 1974). Deviations from different assumptions of the model produce different effects, allowing the model to explain market processes and pinpoint market imperfections in irregular patterns. This flexibility allows CPT to handle both variations on its hexagonal arrangement as well as clear deviations from the regular nested hierarchy.

The regular hexagonal arrangement of settlements can actually take a variety of forms depending on the location of the lower-level centers around each main center. Christaller (1933) identified three major patterns – k=3, k=4 and k=7 – on the basis of the number of smaller hexagons it takes to make up the total area of a larger hexagon, though additional patterns have also been shown to be possible (Lösch 1954[1940]; see Fig. 4.4). In the k=3 pattern lower-level centers are found at the vertices of the main center hexagon. Such arrangements are the most efficient for providing market services to a dispersed population. In the k=4 pattern the lower level centers are built at the midpoints of the main center's hexagon. This pattern reduces transport costs by minimizing the number of roads which must be built between high-order centers. In the k=7 pattern all lower-level centers are contained within the hexagon surrounding the main center. Such a pattern reduces competition between high-order centers by dividing up the lower level centers into discrete administrative units. Importantly, the three patterns are not mutually exclusive, such that a suitably large region might encompass all three at different hierarchical scales (Smith 1976a: 20). For instance, lower-level centers might associate with second-order centers on the marketing (k=3) basis, while second-order centers are arranged on the transport (k=4) pattern and the highest-order centers are spaced according to the administrative (k=7) pattern to manage the second-order centers.

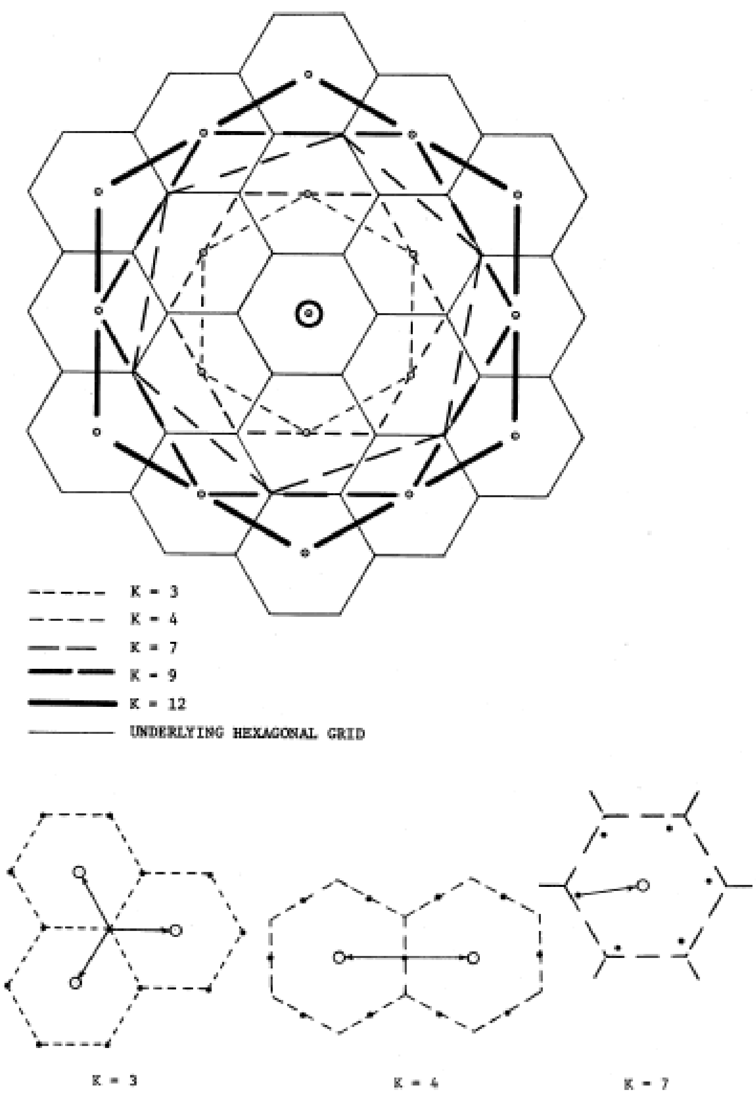

Fig. 4.4. Different hexagonal patterns around central places (Smith 1974: 174)

Other variations in the basic model exist when the regular vertical and horizontal relationships between different order centers are not maintained. Perhaps the most common such case is a “dendritic system” dominated by one big center where vertical economic connections are prominent and the horizontal links between lower-level centers are weak or absent (see Fig. 4.5). These situations often occur when market activity is imposed on lower-level centers. Inhabitants of the lower-level centers are significantly disadvantaged in such systems because all trade is mediated through the higher levels. Dendritic systems are sometimes referred to as mercantile because of these disadvantages to rural populations (Smith 1976a). Dendritic systems are often associated with conditions of primacy with the rank-size rule, discussed in greater detail below.

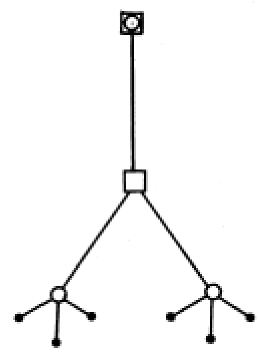

Figure 4.5 Schematic representation of a dendritic system (Smith 1974: 178)

Another variation of the central-place model is a “solar system,” where localized market systems surround each major administrative center but are poorly integrated with one another, despite integration between the major centers themselves. Some cases of marketing solar systems seem to exist under conditions similar to the k=7 model, where there is a high degree of local political autonomy working towards the suppression of direct trade between lower-level centers. Other cases of solar systems seem to have resulted from particularly high transportation costs, which similarly restrict direct connections, rather than political reasons.

A third variation is the “market ring” or “network” model where the vertical connections between the lowest-order markets and higher-order markets are weak or absent (Smith 1976a, and see Bohannon and Bohannon 1968). This situation serves rural interests, and is often associated with poorly developed, non-stratified economies (Smith 1974). In many cases, such networks or market ring patterns can be incorporated by hierarchical systems as the lowest levels of a dendritic system (Smith 1976a: 42).

Central Place Theory thus provides a variety of different models to associate spatial patterns with different forms of economic and perhaps political organization. Distinct spatial patterns are suggested for markets organized by the marketing, or transport, or administrative principle, or for mercantile systems, or for systems where transport between centers is excessively difficult. Yet a significant problem remains for the use of CPT within archaeological regional analysis: precisely that it predicts the spatial organization of *markets*, not settlements. Carol Smith notes that the theory often fails when called upon to explain the distribution of settlements, but states that this failure "should come as no surprise to anyone acquainted with the assumptions of the theory" (1974: 171). She goes on to criticize archaeologists who have employed CPT to predict or explain settlement distribution without reference to market data as "going far beyond the limits of the theory." When examining settlements rather than markets, "one virtually never finds a perfect Christallerian, stepwise distribution of [different order] centers, each level an exclusive category" (Smith 1976a: 26). Instead, settlements are much more likely to conform to the rank-size rule (Smith 1974, 1976a) as discussed below, though stochastic variation may explain some of the discrepancy in the fit between the two models (see Johnson 1977).

Despite its creation to study marketing behavior, Smith does argue that the Central Place model might be applied judiciously to study social behavior in conditions where there is an impulse to locate authority centrally (Smith 1976b). Indeed, the second volume of her *Regional Analysis* contains examples that link regional central place models to patterns of intermarriage (Adams and Kasakoff 1976, Crissman 1976) and social stratification (Smith 1976c). Such an extension of CPT to social behavior makes a certain degree of sense, insofar as aspects of those behaviors can be organized hierarchically. Johnson, for instance, points to "locational implications of centrality" including differential success in mate acquisition and differential reproductive success for villages participating in supra-village marriage networks (Johnson 1977: 491). Economic concerns are bound up in the totality of a given society or cultural system, so there is no particular reason why a model that explains the economy could not also be applied to other aspects of society.

But it is also clear that a model such as CPT designed to explain economic marketing behavior does not necessarily encompass other aspects of a culture or society. Indeed, the most scathing critiques of the theory argue that one cannot begin with an economic model and expand it to take in other aspects of society, claiming that the contributors to Smith's volume "have made the same fallacious connections: regional marketing structure equals regional system" (Crumley 1979: 156). Similar critiques are made of the emphasis placed on the economic functions of urban centers in central place models above other functions, as well as the shared functionality for centers of the same rank. Generally speaking, these critiques presage the eventual dissatisfaction with processual settlement-pattern models for their failure to incorporate holistic regional context. In this vein, Crumley (1979) follows her critique of CPT with an effort to employ and then systematize a variety of models applicable to different aspects of society, showing how settlement in southern Burgundy shifted according to different trends during different periods.

Rank-Size Rule

The rank-size rule is one means archaeologists have used to get around the lack of functional data that might obstruct their use of locational models such as Central Place Theory. The rank-size rule is a means of ordering settlements so that they might be compared with the regional settlement distributions suggested by theoretical models. Rank-size analyses assume that larger sites will carry out more functions, and thus command a more central role in regional settlement organization following effort-minimization models. Two major analytical streams have followed from this assumption: the study of size against rank and its implications, and the study of the fit between rank-size patterns and those predicted by CPT.

The rank-size rule predicts that settlements will display a lognormal pattern where the size of each settlement of rank r is equivalent to $1/r$ of the largest settlement (Hagget 1965, Smith 1974). Many regions appear to have followed this predicted linear relationship. Berry (1961) suggested that it is especially common in mature, large-scale, highly urbanized complex economies. Similar suggestions that linear relationships represent regions with high levels of political and economic integration have also been made (Zipf 1949, Stein 1994). The rank-size relationship can vary from predicted linear form in two ways. In the first instance, known as the primate-city pattern, there is extreme population agglomeration in the primate city such that largest site is much larger than the lower-ranking sites and a concave curve is produced. Primate patterns are usually thought to represent indications of imperfect economic competition within the system and often denote dendritic spatial organization. In terms of the central-place model, primate systems are thought to suppress the development of intermediate-rank centers (Smith 1976a). The other deviation from the linear pattern occurs in the case of several sites of roughly the same size and no site which clearly stands out as the largest, producing a convex rank-size curve rather than a concave one. This pattern is typically described as evidence of poor regional economic and political integration, with the suggestion that convexity is produced by several competing, independent settlements (Stein 1994). Other suggested reasons for convex curves include slowing in the regional growth rate and, more problematically, the pooling of multiple regions into the same analysis (Johnson 1977)

While the rank-size rule relies on assumptions about larger sites carrying out central-place functions, the linear fit between size and rank does not match the pattern predicted by Central Place Theory (Hodder and Orton 1976, Johnson 1977). Because central-place models describe the regular distribution of sites of the *same* rank, CPT instead predicts a stepped relationship between size and rank. This discrepancy is rather easily explained because CPT was crafted to explain marketing behavior, while the rank-size rule is responsive to the physical size of a settlement. Stochastic effects of variability in attributes such as population density and demand have been found to be more powerful in determining the size of individual cities than the effects of a central-place hierarchy (Beckman 1958), blurring the distinctions between levels suggested by CPT (Hodder and Orton 1976). Settlements with different sizes could easily share the same marketing rank, though if one carries this point too far it challenges the central assumption that large sites carry out central-place functions.

The major weaknesses of the Rank-Size Rule are fairly obvious. Large sites do not necessarily incorporate greater functionality. Indeed, many have argued that archaeological applications of the rank-size rule often lack the understanding of site function and cultural context necessary to corroborate such an assumption (e.g., Johnson 1977) and Hodder notes that “a number of different measures could be substituted for size as indicators of the relative importance of centers” (1978: 235). When they are without a substantial understanding of the regional context archaeologists tend to find recourse to size, but it always remains to be demonstrated that such recourse is appropriate. The other main weakness is that, even where the relationship between size and function has been found appropriate, the rank size rule by itself does not predict or explain the location of settlements. As Smith has stated, “the rule has no … theoretical foundation – i.e. the observation has not been adequately explained” (1974: 171), except by an assumed association with functional determinants of spatial patterning from CPT. In some cases settlement size may well be an associated phenomenon of such functions, but this needs to be proven rather than assumed.

Site Catchment Analysis

The other major model applied to archaeological data to explain settlement distributions has been Site Catchment Analysis (SCA). This model differs from the others in that it shares Steward’s emphasis on the environment, assuming “the primacy of man-land relationships in determining site locations” (Roper 1979: 119-20). It does however share the association with models from human geography, borrowing from Johan von Thünen's (1966[1826]) differential patterning of agricultural land-use moving out from a settlement. Its basic premise is that site function and site location are correlated and that function can be determined by studying "the relationships between technology and those natural resources lying within the economic range of individual sites" (Vita-Finzi and Higgs 1970: 5). SCA is related to regional analysis because the resources of a demarcated area around the site, not just at the site, are considered important to determining its location and resources available elsewhere in the region are also considered.

SCA employs a cost-benefit study of resources and distance from settlements to "quantify the relative cost of settling at alternative locations" (Roper 1979: 121). Relying on ethnographic studies of hunter-gatherer groups (e.g., Lee 1969), pastoralists (e.g., Cribb 1991), and agriculturalists (e.g., Chisholm 1968; Stone 1991, 1992), archaeologists defined the maximum distances people would have ordinarily travelled in order to obtain particular resources, usually no more than 10 km and often much less than that for agricultural populations (Stone 1991, 1992; Horne 1994). They then determined which resources were available in the areas delimited by those distances around the sites they were studying. The results were used to derive hypotheses about settlement patterning which could be tested with further data, such as whether or not settlement patterns reflected seasonal movements of population (Vita-Finzi and Higgs 1970). The results of site catchment analysis have also been used to model the spatial distribution of functionally distinct sites (e.g., Roper 1975, Browman 1976).

There are weaknesses inherent in SCA. Perhaps the most significant of these are related to the model's reliance on modern data. Because past resource availability is usually unknown, archaeologists practicing SCA have been forced to rely upon modern resource distributions, which may not accurately reflect past conditions. Study of regional geological and environmental history can ameliorate this difficulty, but cannot remove it. A similar but less profound weakness is the model's reliance upon modern ethnographic analogy to delimit the area likely to have been exploited in the past. The same issues regarding distance, time for travel, and perception of distance that caused difficulties with the gravity model (see Chapter 3) are also significant here. The use of timed-walk contours in addition to circles of fixed radii helps overcome this problem to some degree, but treats a site's inhabitants as if they were on a leash. In part this stems from the model's design, which studies the territory which was habitually exploited rather than the catchment, the entire area from which the contents of a site were derived. Flannery (1976) has shown that this problem can be circumvented by flipping SCA on its head, starting with data on the resources used by a site and then determining the distances over which they must have come. Such an approach explores the relationship between population size and local resources, drawing attention to situations where local resources were insufficient to satisfy a settlement's demands.

Overview

The locational models adapted for archaeological data and employed as part of the entanglement of processual archaeology with settlement archaeology moved regional analysis in archaeology forward. The models allowed archaeologists to formulate and test hypotheses regarding expected spatial distributions of sites. They connected settlement distributions with social and economic forces. They incorporated statistical analyses of spatial data into descriptions of spatial relationships. They also demonstrated that archaeology was well-positioned to contribute to spatial theorizing because of its unique access to long-term diachronic records.

Nonetheless, as Crumley's (1979) critique of Central Place Theory indicates, the locational models also possessed significant limitations, such that by the late 1970s some scholars began to question the very relevance of these models to regional analysis (see Seibert 2006). The element which drew the strongest criticism was their reliance on ideas of maximization, minimization and economic rationality, viewed as both too deterministic and too associated with Western ideology (Crumley 1979, Tilley 1994). The former criticism misses the mark to a certain degree, insofar as the locational models, CPT in particular, make predictions based upon a set of "perfect" conditions which are not expected to be met in actual practice and it is the deviations which are significant. But the larger impetus for these critiques existed in part due to the success of the models emphasizing the relationship between settlement location and settlement function. As evidence for the power of that relationship became overwhelming and functional approaches to urbanism gained traction, it was also clear that existing models possessed too simplistic an understanding of site function to be universally applicable. In particular, additional models for non-economic aspects of society would have to be incorporated into regional analyses so that the social and cultural implications of spatial distributions might be given greater weight. The development of such models is considered in the next section.

Post-Processualist Models and Landscape Archaeology

The growing discontent with processual locational models coincided with the emergence of postprocessual theories in archaeology more broadly. As with the locational models used for regional analysis, processual archaeology generally was criticized for being overly deterministic and paying too little attention to ideology, power relations and social structures. Postprocessual archaeology pursued such topics to a much greater degree. One significant development in this regard was the recognition that material culture was used as part of social interaction and the meanings attached to things were multiple, fluid, and highly significant to how those things were used. This discovery, theorized by Hodder (1982) through ethnographic studies in sub-Saharan Africa, refuted the processual premise that material culture primarily reflected social organization (see Trigger 2006: 453-55). It also served as the cornerstone for what Hodder (1987) called "contextual archaeology," which advocated a holistic approach to archaeological material such that the context in which materials were used and given meaning might be better appreciated.

For regional analyses, this appeal to meaning and to studying settlements within a contextual framework responded to concerns regarding processual locational models. After her critique of CPT, Carole Crumley advocated the "integrated" study of regional cultural systems by "a variety of humanistic, social, physical and natural science techniques and methods" (1979: 166). The active role of material culture in social life was shown to apply to geographic space (Hodder 1984). This idea of space that carries meaning and social significance was first developed by geographers (e.g., Tuan 1975, 1977; Cosgrove 1984). Particularly important was Tuan's (1977) distinction between "space" as the physical attributes of a location and "place" as the meaning-suffused location as humans perceive and experience it. Following this conception and the realization that peoples' perception of the land around them influences the manner in which they interact with that land, archaeologists interested in regional analysis sought ways to approach the meanings attached to the regions they studied. Two approaches to the study of land and meaning within archaeology stand out: structuralist efforts and landscape archaeology.

Structuralist Archaeology and Regional Analysis

The structuralist approach followed Levi-Strauss (e.g., 1963) in suggesting that deep structures organized by conceptual dichotomies such as culture/nature, male/female, and light/dark governed cultural phenomena. The application of this approach to regional archaeological data is best epitomized in Hodder's (1990) *The Domestication of Europe,* which explains transitions in European settlement between the Neolithic and the Iron Age in terms of shifts in the spaces seen as wild or domestic, belonging to the field (*agrios*) or house (*domus*), or which were understood as male or female. These oppositions serve as metaphors for the proper organization of human activity, thereby impacting decision-making and producing tangible effects. To the extent that the ideological structures that help shape the relationships between humans and the land around them are identified – for Hodder's study those surrounding the adoption of agriculture and development of Neolithic society – the structuralist approach was able to accomplish something truly remarkable.

But it is ultimately unclear that the structuralist approach is able to identify those structures. Again, *The Domestication of Europe* may be taken as a case in point. In his effort to establish long-term, large-scale ideological trends, Hodder (1990) gives short shrift to important local factors encouraging variation in the expression of the very trends he is pursuing. Environmental, technological and economic factors are undervalued. Similar weaknesses exist in the treatment of depositional and post-depositional forces. But perhaps the greatest weakness of structuralist approaches to regional archaeology was the inability to demonstrate convincingly the validity of the meanings assigned by archaeologists to observed patterns in material culture (see Trigger 2006: 465-6). The sorts of meanings which Hodder describes for Neolithic Europe may instead relate more closely to his own position and understandings, rather than those of the people who created the archaeological record he studies. More generally, the inability to conclusively test the specific meanings of prehistoric data has "resulted in archaeologists slowly losing interest in structuralism" (Trigger 2006: 467).

Landscape Archaeology

The other significant postprocessual approach to regional archaeology, landscape archaeology, has stayed very close to the ideas about land developed by cultural geographers. The central premise of landscape archaeology is that the land with which societies interact is in fact a human creation, as both the product of human-environmental interaction and in terms of how place is perceived and acted upon (Gosden and Head 1994, Tilley 1994, Anschuetz *et al*. 2001). This idea of landscape as a human creation has found broad ethnographic support (Bender 1993a, Hirsch and O'Hanlon 1995).

Archaeologists sought to study the dual nature of landscape both in terms of its physical reality and its culturally situated perceptions of place. The complementary components of landscape carried a number of important implications for archaeological practice. The culturally constructed aspect of landscape implies that there is no single way to understand and relate to the land, and that different cognitive "landscapes" exist based on the gender, age, class, caste, ethnicity, etc. of the group or individual experiencing that landscape (Bender 1993b, Bloch 1995). The clear implication is that competing "landscapes" can be advanced for the same physical space. At the same time, because landscapes possess a physical reality, these cognitive landscapes need to be "lived," "socialized" and made real in order to endure (Bender 1993b, Taçon 1994, Richards 1996). This imperative echoes Gordon Childe's (1949, 1956) belief that worldviews need to accord to a significant degree with the world as it actually is to persist. Indeed, the difficulties that exist for groups unable to live out their cognitive landscapes are a common feature of the geographic and anthropological literature (e.g., Bender 1993b, Ireland 2003). In terms of regional archaeological analyses, landscape archaeology promises attention to the social and cultural perceptions of land and the meanings attached to it. Equally important to interpretation are the archaeological correlates of the activities by which those perceptions and meanings were made real.

That is not to say that landscape archaeology has, in practice, always made good on that promise. In their focus on ideology and symbolic meaning many landscape analyses have paid too little attention to sociopolitical and economic data from the societies being analyzed (see Trigger 2006: 473 and *cf*. Bradley 1998, Smith 2003). The analytical grounding of cognitive landscapes in the interaction between society and the environment must not preclude a similar grounding of those landscapes in the social relationships that existed within that society. Such grounding is particularly important given the multiple cognitive landscapes which can exist simultaneously across age, class, gender, etc. A more problematic aspect of many landscape analyses has been the adoption of phenomenological methodology (e.g., Tilley 1994, Frazer 1998). Such analyses hold that, because "the meaning of place is grounded in existential or lived consciousness of it" (Tilley 1994: 15), archaeologists' own experience of the "objective reality" of space registering on the body provides them with insight into what those places would have meant in the past. These views give too little attention to the dynamic nature of the studied landscapes, as well as the social and ecological circumstances of the past (see Shennan 2002). Moreover, the notion that the perceptive biases of modern archaeologists, and the perspective of past inhabitants, can be subordinated to common human nature and bodily needs is hard to justify, despite its general coherence with phenomenological philosophy (see Trigger 2006: 474). Phenomenological approaches have proved useful in emphasizing that the cultural and ideological significance of an area is realized in the experience of that area, but they have not shown a capacity to recover aspects of past peoples' experience, and difficulties doing so do not justify a speculative approach if other data exists (*cf*. Bender *et al*. 1997).

A more fruitful means of studying past landscapes pays greater attention to the manner in which they are "socialized" and given meaning within a particular societal context. Because landscapes must be lived, and the different meanings they are given must accord with the world as it is in order to persist, the socialization of landscape must possess material correlates. The most explicit example of such correlates is direct modification of the landscape to reference an ideology or group history, such as is found with Neolithic monuments (Richards 1996) or rock art (Taçon 1994, Bernardini 2005). Yet more mundane examples such as land-use patterns are also effective, as shown by ethnographic cases where such patterns are associated with kinship relations in the Amazon (Gow 1995) and ethnicity in Madagascar (Bloch 1995). Such material correlates do not imply, as the phenomenologists assert, that archaeologists can extract the exact cognitive meanings of landscape relevant to past societies, but the focus they provide on the practices and social processes which were bound up with landscape meanings is perhaps just as important for understanding the functioning of past societies as the meanings themselves (Thomas 2001).

The theoretical underpinnings of the relationship between cognitive landscapes and human behavior as recorded in the material correlates of socialized landscapes are connected to practice theory as outlined by Bourdieu (1977, 1990). While this connection is not always made explicit, the focus on the recursive construction of landscape through the interactions, both physical and mental, between humans and their environment mirrors Bourdieu's well-used description of *habitus*. Indeed, the language used to describe landscape and *habitus* clearly overlaps: *habitus* as "structured structures predisposed to acting as structuring structures" (Bourdieu 1977: 72), and landscape as "both constituted and constituting" (Tilley 1994: 17), "both created and creating" (Gosden and Head 1994: 114). From a historical perspective, *habitus* – which at once reproduces existing social relationships by providing dispositions to structure daily practice and remains responsive to subtle changes according to circumstance and human agency – can serve as a link between behavior and social meaning. In her discussion of memory and landscape in Sierra Leone, Rosalind Shaw (2002) explored the implications of such links. Because *habitus* serves as the "active presence of the whole past" (Bourdieu 1990: 56), she showed that the patterns of behavior regarding land and settlement that comprise *habitus* evoke historical memories and meanings given to land that reference colonialism and the slave trade. The behaviors that socialize other landscapes no doubt carry similarly important memories and meanings within their contexts. Of course, an archaeologist working in the absence of the detailed historical documents Shaw accessed faces significant challenges in recovering such meanings, and there is an inherent logical danger in reconstructing an ideology on the basis of material culture remains which were supposedly created by that ideology's existence. Nonetheless, the tight relationship between *habitus* and history on the one hand and the broad time scales which archaeology is able to access on the other, suggest that material correlates of regional activity that comprise landscape data, when placed in within a well-understood long-term context, provide insight into how cognitive landscapes influenced behavior in ways that could not be predicted by ecological or economic concerns. In this sense landscape archaeology is best served if it adopts Crumley's integrated regional approach allowing a more detailed understanding of regional context, though it need not share her emphasis on an "ecological/environmental perspective" (1979: 158).

Regional Analyses on the Swahili Coast

Relatively few regional studies have taken place along the Swahili Coast. Most early studies either concentrated on particular sites (e.g., Chittick 1974, 1984, Horton 1996) or relied largely upon site-specific studies in overviews of coastal history (e.g., Kirkman 1964). Garlake's (1966) survey of coastal architecture and Wilson's (1978, 1980, 1982) survey of the Kenyan coast stand as early exceptions to this trend. More recently the imbalance towards single-site analyses has begun to correct itself, and a number of regional survey projects have taken place, chiefly under the auspices of the University of Dar es Salaam (e.g., Fawcett *et al*. 1989, LaViolette et al. 1989, Chami and Mapunda 1998), or for dissertation-research projects (e.g., Helm 2000a, Fleisher 2003, Wynne-Jones 2005a, Kwekason 2007, Pawlowicz 2009).

Regional surveys have provided important baseline data regarding settlement patterns in many parts of the coast. The focus of many of these projects has been to describe the development of Swahili urban centers and corresponding changes in regional settlement hierarchies over time. Both Wilson (1982) and Fleisher (2003) provided explicit size-based hierarchies of sites (see discussions in Chapters 2 and 10), though Fleisher's notably covers smaller levels of settlement without stone architecture that Wilson's hierarchy, and indeed his survey, did not identify. Each of them did so in an effort to describe the organization of coastal settlement and trajectories of regional development. Wilson adopted the central-place assumptions of the rank-size rule, suggesting larger sites had centralized political and administrative functions and smaller sites were organized around them. Fleisher similarly interrogated his rank-size hierarchy and settlement distribution for evidence of integrated central-place patterns. His data provided a contrasting picture of coastal settlement patterns, with the emptying of the countryside to populate emergent stonetowns, rather than the foundation of lower-tier sites in a hierarchy around dominant stonetowns. Fleisher also combined spatial data with data regarding interregional trade, ceramic styles, and production activities to provide deeper context for these settlement patterns. Wynne-Jones' (2005a) study of the urban trajectory of Kilwa suggested a similar pattern to Wilson's data from Kenya, with a profusion of small-scale sites around the urban center and the possible development of second-tier sites. In eras when a settlement hierarchy around Kilwa is most pronounced, material culture data from the city of Kilwa suggest that its economic activities, in particular its participation in interregional trade, made it quite distinct from the other sites in the region. Yet at the same time important patterns of settlement continuity existed in the Kilwa region throughout its history and evidence of political or administrative control over the hinterland was weak.

There are several strengths in these analyses focused on settlement hierarchies and the development of urbanism. They provide clear expectations regarding site hierarchies, and in the more recent cases provide material evidence to test the built-in assumptions about the functionality of larger places. Fleisher (2003: 411-13) also tests the regularity of the settlement distribution using nearest neighbor-analysis, allowing him to demonstrate competition between sites of the same order. These analyses are thus able to combine diachronic settlement data with theories of political and economic organization, and in the best cases correlate such connections with additional strands of material culture data.

One less explored but growing aspect of Swahili regional studies is landscape and environment. Researchers are increasingly cognizant of the surroundings of Swahili settlements: Juma (2004) describes the environment surrounding Unguja Ukuu, Wynne-Jones (2005a) refers to settlements located by permanent watercourses and the increased occupation of coastal environments during certain periods, and Fleisher (2003) similarly notes the locations of fertile soils in northern Pemba. Similar attention to the environment is present in studies of Madagascar (Radimilahy 1998) and Mozambique (Sinclair 1987). A welcome trend is that more surveys are moving towards providing general descriptions of the most common environmental settings during different time periods (e.g., Kwekason 2007), though detailed analyses of the relationships between the inhabitants of sites and their environments would also be welcome. Other regional analyses of Swahili settlement patterns have attempted to take on environmental issues more directly, such as Felix Chami's (2003) worthy attempt to account for the influence of climate shifts. Yet here too more detailed investigation of local environmental conditions around settlements would be enlightening. However, it is clear that archaeologists on the coast are increasingly aware of the significance of the human-environment relationship. For instance, Wright (1992) notes changing agricultural patterns associated with the expansion of towns in the Comoros. A further standout example of such work is Ekblom's (2004) study of the region around Chibuene in Mozambique, which effectively engages the dynamic relationship between people and the environment, making use of both material-culture data and local lake cores. Importantly, engaging the environment on this level also allowed Ekblom to begin to suggest some of the ways in which ideas of the environment influenced settlements and land-use behavior. Her suggestions of the prevalence of ideas among Chibuene's population regarding "environmental insecurity" and "sacred forests" are largely preliminary, but they begin the discussion of how landscapes around Chibuene relate to social and political structures (Ekblom 2004: 140).

Previous coastal research thus provides effective examples of regional analyses exploring topics ranging from the development of urbanism to the dynamic relationships between coastal inhabitants and their environments. These analyses sometimes relied too heavily on the assumptions of locational models, but they provided important information regarding the organization of coastal settlement and some of the influences on that organization. More recently, significant strides have been made to demonstrate and better understand the functional roles of sites atop rank-size hierarchies, providing an evidential basis for the observed rank-size relationship founded on contextual data. Importantly, regional studies on the coast increasingly incorporate environmental issues into these economically and politically oriented analyses. Nonetheless, with some exceptions the local manifestation of the human-environmental relationship is not explored in depth from both a physical and cognitive perspective, as this study intends to do. Given Crumley's (1979) caution that regional analysis must include a range of models across ecological, economic, political and cultural disciplines, this should indicate that additional improvements can be made to our understanding of settlement distributions in coastal regions.

The way in which this project studies the Mikindani region draws upon these lessons. In particular, spatial data is integrated into a holistic approach to settlement so that the application of landscape archaeology and locational models to settlement patterns is grounded within a regional social, economic, and environmental context. The fit of rank-size models and CPT is explored, but the performance of central-place functions and the existence of multiple orders of settlements is demonstrated rather than assumed. Ways in which Mikindani's residents socialized their landscapes at different moments are explored using data on human-environment relations within the context of broader society. In this fashion, settlement in the Mikindani region can be shown to correspond to certain social, economic, and environmental imperatives, but only to the extent that such imperatives were understood and addressed within the regional societal context.

The following chapters will elucidate that context, providing data regarding the ceramic traditions of surrounding regions (Chapter 5), the Mikindani region's environment (Chapter 6), its local ceramics (Chapter 7), imported goods (Chapter 8), and production activities (Chapter 9). The spatial data from the region are then analyzed within that context using locational models and landscape approaches in Chapter 10.

CHAPTER 5: THE CERAMIC TRADITIONS OF EASTERN AND SOUTHERN AFRICA: DESCRIPTION AND IMPLICATIONS FOR REGIONAL TRENDS

Ceramic analyses play a central role in the archaeology of eastern and southern Africa. The time-depth of such ceramics (from ca. 6000 BCE) and their post-depositional durability make ceramics the most common type of artifact found at archaeological sites, and thus one suited to a range of analytical objectives. Most commonly, ceramics have been used as chronological markers and as indicators of interaction between regions. Ceramic types have been used to distinguish "Early Iron Age" sites from "Late Iron Age" sites and similarities between the ceramics types found in different regions have been used to suggest connections between the regions.

While these approaches continue to be an important means of contextualizing archaeological sites and entire regions, in recent years they have been subject to three major critiques. The first critique finds fault with the continuing association of ceramic types with ethnic groups and peoples. Such associations have been criticized since the early 20th century (e.g., Jacob-Friesen 1928) and were expressly rejected by processual-archaeology theorists in the later 20th century (e.g., Clarke 1968, Ucko 1969, Binford 1972, Hodder 1978). The critique of linking archaeological cultures to ethnic groups relied significantly on ethnoarchaeological studies conducted in Africa (e.g., Posnansky 1973; Crossland and Posnansky 1978; Hodder 1982; Dietler and Herbich 1989, 1998; Wandibba 2003). Nonetheless, the legacy of research on the spread of Bantu languages enabled the association between ceramic types and linguistic and ethnic groups to endure in eastern and southern Africa (e.g., Phillipson 1977a; Huffman 1980, 1989, 2006; Ehret and Posnansky 1982; Chami 2006). Unsurprisingly, those linkages have been subject to extensive criticism (e.g., Stewart 1993; Karega-Munene 2002, 2003; Lane 2004; Kusimba and Kusimba 2005; Croucher and Wynne-Jones 2006; Lane *et al*. 2007; Ashley 2010) which has largely restated the many weaknesses identified in such relationships (see Shennan 1994).

By this juncture the debate ought to be settled – ceramic types are not equivalent to peoples – but it is worth reexamining what ceramic types tell us. Types or cultures are "descriptions of patterns of spatial variation" (Shennan 1994: 11) and thus tools which archaeologists can use to get a handle on the differentiation of the material culture record. Of themselves they are not of particular analytical utility – they do not explain why a certain type might be in one area and not another – but types are crucial for documenting the spatial patterns within regions and the material culture similarities between regions that archaeologists should seek to explain. The archaeological endeavor must not cease with the description of types, but their documentation is an important step.

The second major critique regards chronology. The association of ceramic types with terms such as "Neolithic" or "Early Iron Age" has been shown to be problematic insofar as those terms themselves are rather poorly defined, both in terms of absolute chronology and conceptual framework (Sinclair *et al*. 1993a). The ever-increasing number of radiocarbon dates associated with ceramic types has helped overcome the former issue. The latter problem remains difficult, as it is still unclear how to categorize, for example, stone-tool-using peoples with knowledge of iron-working, and a variety of different behaviors have been associated with "Neolithic" and the "early" or "late" portions of the Iron Age. Still, the terms continue to have currency within African archaeology, which prompts their use as a general framework within this dissertation, though efforts are made to define them both in terms of behavior and absolute chronology.

Some of the difficulties surrounding the definitions of terms associated with ceramic types are indicative of a broader problem within ceramic analyses and perhaps the most significant critique of typological approaches: namely, how to handle variation. Defined ceramic types often cover relatively broad spatial and chronological scales, and thus necessarily subsume a degree of variation. Time and again, archaeologists have criticized types from eastern and southern Africa as insufficiently attentive to such internal variation, to the extent that it is sometimes suggested that certain types should not be considered distinct wares (e.g., Kiriama 1993, Stewart 1993, Ashley 2010). But this critique is more than a "lumper vs. splitter" debate. It also suggests that the way in which these typologies were created, primarily by identifying co-varying decorative and morphological traits (e.g., Soper 1971a; Huffman 1970, 1984; Sinopoli 1984), is inherently flawed, producing "impenetrable typological edifices" which not only obscure variation but also obstruct metrical analyses aimed at identifying ceramic function (Ashley 2010: 137; see also Stewart 1993, Fleisher 2003: 218, Dale 2007: 90). In their place, several archaeologists have employed or suggested a *chaîne opératoire* approach (e.g., Caneva 1987, Dale 2007, Dale and Ashley 2010, Ashley 2010).

While the emphasis on internal variability is welcome, the call for abandonment of the typological enterprise is a bit hasty. Despite the absence of extensive metrical data in many typologies, the information contained in them can contribute to analytical studies of ceramics. Rather than being "impenetrable" many typologies contain enough readily accessible information that, as Fleisher (2003) notes, they have been reinterpreted on the basis of that information alone. Ceramic types are descriptive rather than analytical units, but some of the data by which types are defined are useful to functional analyses. More importantly, setting aside typological analyses leaves behind the important evidence of connections between regions that they provide. Typologies are not intended to provide detailed analyses of internal variation, or even to explain why a type exists, but comparisons between typologies contextualize archaeological sites within the broader interregional picture of ceramic variation and point to connections between regions that archaeologists can then work to explain with additional data.

The chronology Kwekason (2007) produced from his survey around Mikindani, indicate that the locally-produced ceramics from the Mikindani region need to be contextualized with the ceramic traditions produced elsewhere throughout eastern and southern Africa in such a fashion. Different categories of ceramics from the past 2,200 years are present at Mikindani, some of which show strong associations with ceramics found elsewhere on the coast, and while others relate to material found in the interior. In this chapter, I therefore describe the ceramic types from the coast and the interior so that the full range of potential influences on Mikindani's ceramic production might be understood. I then discuss some of the social and economic implications of the distribution of these ceramic types in East Africa, in pursuit of a richer understanding of the similarities of ceramics from the Mikindani region with types from other regions.

Before I undertake this description, a note on terminology is warranted. I borrow most of the terms used to describe the ceramic assemblages discussed in this chapter and the Mikindani material in Chapter 8 from David Phillipson's (1976a) study of ceramics in

Zambia. He described eight different vessel forms: open bowl, in-turned bowl, necked vessel, pot with up-turned rim, globular vessel, convergent mouth pot, beaker, and carinated vessel. Globular vessels are often described as narrow-mouthed bowls or pots in the literature (e.g., Soper 1967a) and, confusingly, in-turned bowls are sometimes referred to as up-turned rim vessels (e.g., Soper 1967a, 1971b), though the artifact drawings enable us to assign them to the former category. Similarly, Phillipson's category of open bowls subsumes bowls divided into open bowls and hemispherical bowls elsewhere depending on the extent to which the rim approximates the vertical (e.g., Soper 1971b). One additional vessel form that is also referenced in the literature (e.g., Lynch and Robbins 1979) and used here is comprised of shallow vessels, alternately referred to as shallow bowls or dishes/platters depending on the rim circumference. Phillipson also described eight rim types: rounded, beveled, squared/flattened, fluted, tapered, externally thickened, internally thickened, and bilaterally thickened. These vessel forms and rim types are depicted below (Fig. 5.1 and 5.2). In addition to the terms from Phillipson, I will also sometimes use the terms "restricted," "restricted simple," restricted dependent," "restricted independent" and "unrestricted," which are common in publications from the University of Uppsala (e.g., Sinclair 1987, Forslund 2003). Unrestricted refers to vessels whose widest point is at the rim, while restricted vessels have narrower rims than the widest point of the vessel. While those terms have utility, they are covered by vessel forms from Phillipson's schema (e.g., restricted dependent is equivalent to carinated, unrestricted is equivalent to an open bowl) and in general Phillipson's terms are preferred.

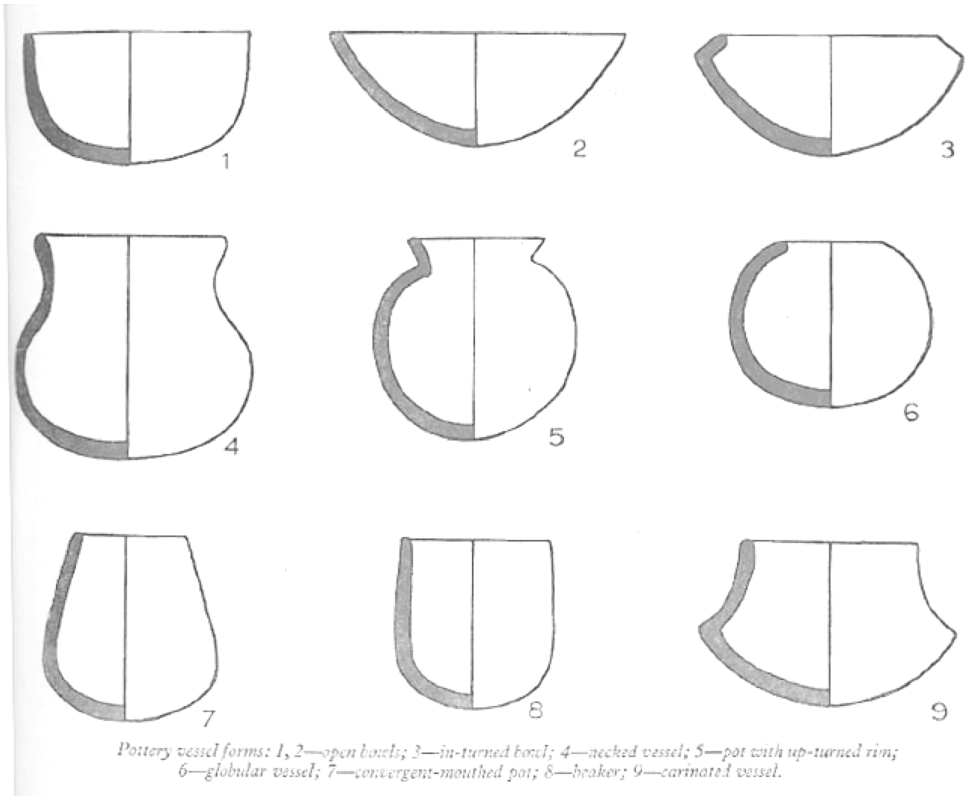

Figure 5.1 Ceramic vessel forms following Phillipson 1976a: 21

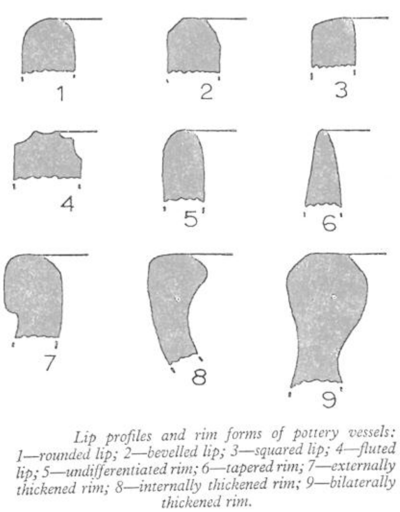

Figure 5.2 Rim types following Phillipson 1976a: 22

Late Stone Age Ceramics

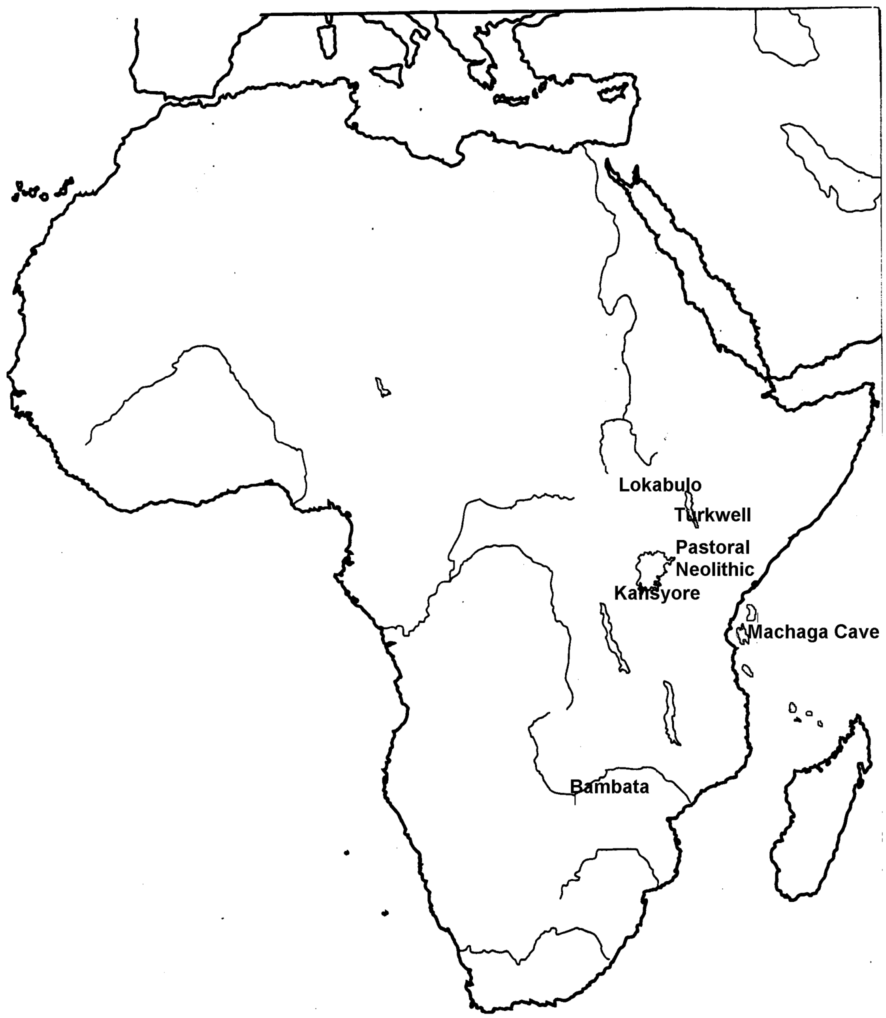

Figure 5.3 Map showing the location of the major LSA traditions named in the text

The earliest ceramics found in East Africa were produced by stone-tool-using communities. Initially, many of these communities seemed to have been either experimenting with or engaging in agriculture and herding. Their wares were thus often described as Neolithic or, in the case for the pre-iron ceramics of the Kenyan and northern Tanzanian Rift Valley, as Pastoral Neolithic. While many archaeologists continue to employ these terms (e.g., Gifford-Gonzalez 1998, Chami and Kwekason 2003, Chami 2006, Lane *et al*. 2007), not all such pottery is associated with farmers or herders and some is clearly associated with foragers, such that the term "Neolithic" is sometimes misleading. Similarly, though they were herders, it is not clear that the makers of "Pastoral Neolithic" wares were pastoralists in the strict sense of the term, or whether they might have farmed (Bower 1991, Phillipson 2005: 208). It is perhaps thus more useful to refer to the ceramics by their clear association with stone tools, rather than iron ones. This technological association does not imply a temporal one however, and these types have been found from contexts covering several millennia.

Kansyore

The earliest Late Stone Age (LSA) ware in East Africa was from the area around Lake Victoria. This ware, called Kansyore from its type site on an island in the Kagera River near the lake (Chapman 1967), is also sometimes referred to as Oltome (Collett and Robertshaw 1983, Robertshaw 1990a). Kansyore ceramics found amidst shell middens near Lake Victoria date back as early as the 6th millennium BCE (Robertshaw *et al*. 1983, Dale *et al*. 2004, Lane *et al*. 2006) and the type continued to be made well into the first millennium BCE (Soper and Golden 1969, Collet and Robertshaw 1980). Many have noted that this chronology represents an unusually long period for a single ware (e.g., Mehlman 1979, Collett and Robertshaw 1980). Mehlman (1979) suggested that the chronology indicates either a very conservative tradition or significant dating errors. Others have added the possibility that some sites do not belong within the Kansyore type (Collett and Robertshaw 1980). Doubts have been raised regarding some of the dates obtained, particularly some early dates from shell and bone apatite (Robertshaw *et al*. 1983, Robertshaw 1984), but a large enough corpus of dates now exists to indicate that ceramics described as Kansyore do indeed cover this broad chronology (see Dale *et al*. 2004, Lane *et al*. 2007). In addition to its broad temporal range, Kansyore ceramics have also been found over a broad spatial range, extending east from Lake Victoria into the Serengeti (Soper and Golden 1969, Collett and Robertshaw 1980, see Lane 2004), south into Tanzania near the Wami River (Thorp 1992), and possibly as far south as Kilwa (Chami 2006). Many sites bearing these ceramics possessed almost exclusively wild faunal assemblages (Robertshaw 1982), and other instances were found on multicomponent sites where mixing of sediments cannot be ruled out (Lane 2004), so legitimate questions exist as to whether Kansyore should be considered "Neolithic." However, recent evidence suggests that some first-millennium BCE Kansyore sites did possess significant quantities of domesticated animal resources (Karega-Munene 2002, Lane *et al.* 2007).

While finds of Kansyore ceramics remain mostly fragmentary and described from small assemblages (Wandibba 1990, Phillipson 2005), certain characteristics of the ware can be described. Kansyore vessels were distinguished by rounded, tapered rims. Most vessels were open to hemispherical bowls, sometimes with slightly restricted rims (Soper and Golden 1969, Collett and Robertshaw 1980). In-turned bowls and "polygonal bowls" whose rims were polygonal rather than circular were rarer (Fig. 5.4). Many sherds were distinguished by visible coil-breaks from the manufacturing process (Mosley and Davison 1992). Decorated sherds far outnumbered undecorated ones and the most common motifs were tightly packed sets of lines of impressions and/or incisions, and compressed zigzag hatching, each likely carried out using a comb (Soper and Golden 1969, Ambrose 1982). The impressed lines were sometimes arranged into blocks pointing in different directions to produce a paneled effect (Soper and Golden 1969). Internal decoration was also present, but rare (Chapman 1967). The surface of Kansyore vessels was often hard, well-fired and grayish brown in color (Soper and Golden 1969).

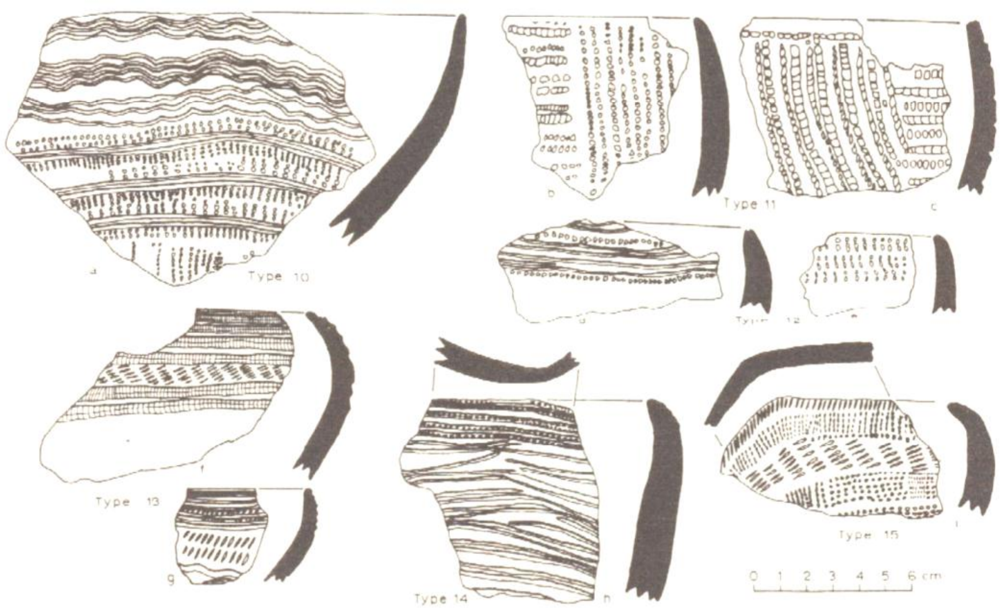

Figure 5.4 Examples of Kansyore pottery types (Collet and Robertshaw 1980: 136)

Sudanese Wares (Lokabulo and Sudanese Neolithic)

Kansyore ceramics are also notable because they provide evidence of cultural connections with communities further north in southern Sudan. They bear particular affinities to Lokabulo ceramics from that region (Robertshaw 1982). Shared decorative motifs include alternating horizontal and vertical panels of impressions, internal decoration, and rocked zigzag hatching (Fig. 5.5). Lokabulo ceramics also show evidence of rounded, tapered rims and share several vessel forms with Kansyore. However, the “polygonal” bowls found with Kansyore were not present (Robertshaw

1982) and Lokabulo rims were often more restricted, featuring globular vessels rather than open bowls (see David *et al*. 1981, David 1982). Kansyore and Lokabulo are also each associated with stone tools and hunting-and-gathering lifeways, and have been dated to similar periods, as the earliest Lokabulo finds dated to either very late in the third millennium BCE or early in the second. Lokabulo ceramics continued to be made throughout the first millennium CE.

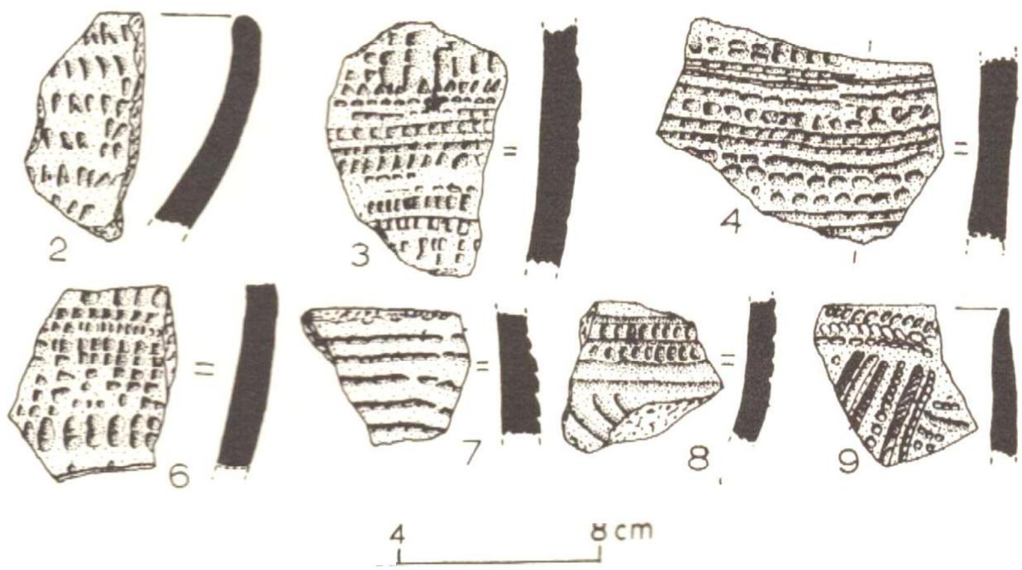

Figure 5.5 Examples of Lokabulo ceramics (Robertshaw 1982: 93)

Similar connections between Kansyore ceramics and Sudanese Neolithic wares at Khartoum and Shaqadud Cave (Arkell 1949, Robertson 1991) have also been suggested (Chapman 1967, Chami and Kwekason 2003, Chami 2006). Such connections rely upon similarities in the tapered rims and the comb-impressed decorative motifs, though wavy-line motifs were also common on the Khartoum ceramics but not Kansyore. Chapman (1967) suggested that these similarities were superficial and not indicative of developmental links. Such caution is warranted as Robertshaw noted that the Khartoum Neolithic pottery "shows none of the pottery types, defined on the basis of vessel form and decoration modes, recognized in Kansyore tradition assemblages" (1982: 92). The most common forms with Sudanese Neolithic wares were vessels with flaring necks, globular vessels, shallow dishes, and thick-walled open bowls. Many of the Khartoum ceramics showed evidence of slip (Arkell 1949, Robertson 1991), which was not common with Kansyore.

The idea of a connection between the Khartoum material and Kansyore evokes David's (1982) hypothesized "comb-punctate tradition" from Sudan. However, David did not definitively ascribe Kansyore to that tradition and the emphasis on one decorative type obscures significant variation in Sudanese ceramic assemblages in terms of vessel forms and overall decorative motifs. More recently Chami has resurrected this idea of a broadly shared tradition (e.g., 2006), but in doing so he privileges the shared decorative techniques at the expense of holistic considerations of the ceramics and recognition of internal variability.

"Pastoral Neolithic" Ceramics

The later pre-iron-working ceramics found in the Kenyan and Tanzanian Highlands and Rift Valley are often grouped together as "Pastoral Neolithic." This term has been used to refer to societies with Late Stone Age technology and an economic base heavily reliant on domestic cattle, sheep, and goats (Bower *et al.* 1977) likely speaking Southern Cushitic languages (Ehret 1974, *cf.* Chami 2006). Although there is some question as to whether these communities were truly pastoralist (Bower 1991, Phillipson

2005), the zooarchaeological data regarding herd sizes, culling patterns, and the proportion of cattle to sheep and goats are all similar to data from modern pastoralist groups (Marshall 1990). The term Pastoral Neolithic encompassed several different pottery wares, including Elmenteitan, Nderit, Narosura, Maringishu and Akira, many of which co-existed within East Africa (Bower *et al*. 1977, Wandibba 1980). Although these ceramics were contemporary with the later dates for Kansyore ware, their spatial relationship with Kansyore was "nearly mutually exclusive" (Ambrose 1982: 134). Multivariate analysis of these wares (Collett and Robertshaw 1983) suggested that they represented distinct traditions and that the term "Pastoral Neolithic" implies a cultural unity among the traditions which did not exist (Ambrose 1985: 65; Robertshaw 1990a). Collett and Robertshaw (1983) suggest that Nderit and Maringishu should be subsumed within one tradition, which they name Olmalenge, and Narosura and Akira should be subsumed within another, called Oldishi. Nonetheless, although they remain poorly defined from relatively small samples, the original ware names continue to be used (e.g., Chami and Kwekason 2003, Chami 2006), perhaps because the broader terms are admittedly "gibberish" and without any descriptive value or geographic connection of their own, though they replace ware names deemed "inappropriate" (Collet and Robertshaw 1983: 121).

Elmenteitan

The Elmenteitan tradition was present in central rift by 600-500 BC (Ambrose 1984), in the Mara region by 400 BC (Robertshaw 1990b) and around Lake Victoria by the first centuries AD (Robertshaw 1990a), though there is some suggestion that the tradition may have dated back as early as 1300 BCE (Karega-Munene 2002). Most Elmenteitan sites were restricted to the western side of the Kenyan Rift Valley (Phillipson 2005). Elmenteitan ceramics are associated with faunal evidence of herding and a stone-tool industry also known as Elmenteitan. The ceramics were first defined as a particular tradition based on decoration and vessel form in 1980 (Wandibba 1980), though they were found and described in the literature as early as the 1930s (e.g., Leakey 1931, 1935). The most common vessel form was the globular bowl (Collett and Robertshaw 1983; Fig. 5.7). Open bowls were also common, such that most Elmenteitan ceramics fell on a continuum between restricted, globular bowls and open bowls, and some difficulty has been expressed in distinguishing between vessel forms (Robertshaw 1990b). Occasionally shallow bowls were present, and rarely lugs and spouts were used on vessels. In contrast to Kansyore ceramics, most Elmenteitan sherds were undecorated. For instance, only 7 of the 159 (4%) reconstructed vessels at the Elmenteitan site of Ngamuriak in Kenya possessed decoration (Robertshaw 1990b). Mica temper was used in the fabric of many vessels in order to produce a shiny, sparkling surface (Langdon and Robertshaw 1985), and as many as 10% of sherds were burnished for similar reasons (Robertshaw 1990b). When decorated, the decorations on Elmenteitan ceramics were overwhelmingly punctates, though incisions were sometimes present (Collett and Robershaw 1983). The decorations were usually placed either at the rim or just below. Elmenteitan ceramics were produced in a variety of different locations and circumstances, and thus show a variety of fabrics and vessel colors (Langdon and Robertshaw 1985, Ambrose 1985). Sites with Elmenteitan ceramics continue to be found until about 500 CE (Robertshaw 1990a). There is some suggestion that a later phase of the Elmenteitan persists until about 900 CE, though these later ceramics exhibit clear distinctions in vessel form and decoration from the material produced between 2500 and 1500 years ago (Collett and Robertshaw 1983, Robertshaw 1990a).

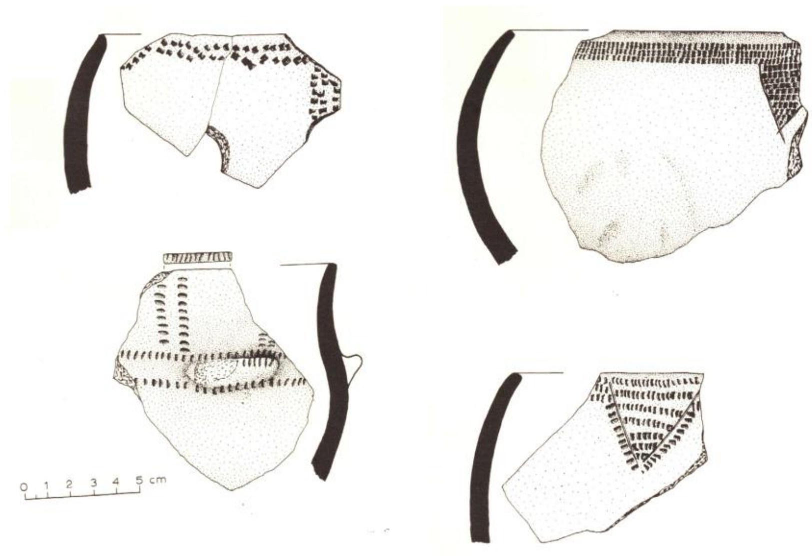

Figure 5.6 Examples of Elmenteitan ceramics (Ambrose 1984: 88-89)

Oldishi Tradition (Narosura and Akira)

The chronology and definition of the other ceramic types considered part of the Pastoral Neolithic are less assured, but some general comments regarding the ceramics' characteristics are still helpful. I begin by discussing the two wares that Collett and Robertshaw (1983) subsume into the Oldishi tradition, Narosura and Akira. Akira ceramics date from the last centuries BCE or first centuries CE into the second half of the first millennium CE (Bower *et al.* 1977, Robertshaw 1990b). They were thin-walled and frequently burnished. Indeed, Akira vessels were initially known as 'TIP ware' for their main characteristics: thin, usually less than 5mm, incised, and with paneled decoration (Bower 1973, Bower *et al.* 1977). Akira vessels typically had flat or nearly flat bases and straight walls, representing either beaker or convergent mouth vessel forms (Collett and Robertshaw 1983); these two forms can be difficult to distinguish depending on the degree to which the rims are restricted. Akira rims exhibited some variability, but both externally thickened and rounded rims were produced (Robertshaw 1990b; Fig. 5.7). A large percentage of vessels were decorated. Motifs were most frequently panels of incised lines or incised crosshatching, though some punctate decoration was also present. Interestingly, there is suggestion based on petrographic study and the characteristics of the ware that Akira ceramics may have been prestige items traded over long distances (Langdon and Robertshaw 1985, Robertshaw 1990b), perhaps along preexisting networks for obsidian exchange (see Ambrose 1982). This suggestion is supported by the fact that Akira ceramics are often found with larger quantities of other ware types such as Narosura, though of course it also depends on recognition of Akira as a unique type. Also of note is the fact that many sites that are dominated by Akira ceramics have greater concentrations of wild animal bones than other contemporary sites (Robertshaw 1990b).

The other ceramic type grouped into the Oldishi tradition is Narosura. Named for the type site (Odner 1972), Narosura ceramics are found throughout the Rift Valley in the last millennium BCE and are described as "the most widespread ware associated with [Pastoral Neolithic] sites" in that region (Ambrose 1982: 125). Recent evidence has suggested that these ceramics were also found further east in the Tsavo region (Wright 2003). Like Akira, Narosura ceramics were distinguished by flat bases, and the vessel forms were mostly convergent-mouth bowls, beakers, or open bowls depending on the degree of rim restriction (Collet and Robertshaw 1983). Additionally, some globular vessels and shallow bowls with restricted rims were produced (Odner 1972). Most

Narosura bowls showed evidence of burnishing (Phillipson 1977b). Narosura ceramics were also usually decorated. For instance, 92 of the 157 sherds (59%) found at Lemek North-East in Kenya were decorated (Robertshaw 1990b). Decoration usually consisted of multiple bands of hatching. These were most commonly comb-stamped but often incised, in closely spaced vertical, oblique, or crosshatch designs or sometimes pendant triangles (Bower *et al*. 1977, Onyango-Abuje 1977, Ambrose 1982, Collett and Robertshaw 1983, Robertshaw 1990b) (Fig. 5.8). In many later Narosura sites, Narosura ceramics were in association with Akira ceramics, and the relationship between the two types is unclear. Unlike Akira types and the Pastoral Neolithic Marigishu ware, Narosura ceramics have not been found after the last centuries BCE.

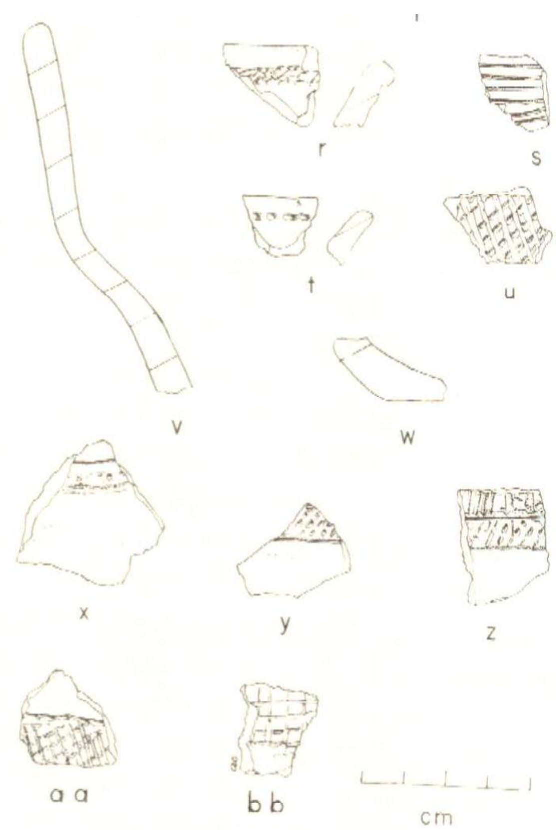

Figure 5.7 Examples of Akira ceramics (Bower *et al*. 1977: 130)

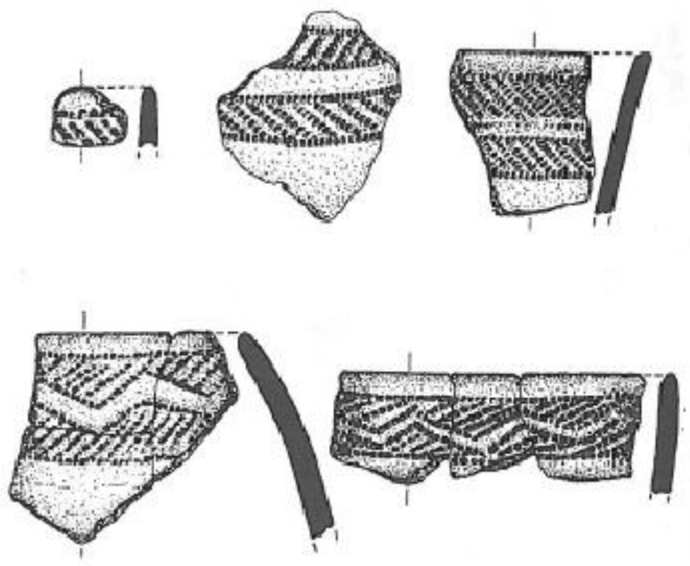

Figure 5.8 Examples of Narosura Pottery (Odner 1972: 65)

Olmalenge Tradition (Nderit and Maringishu)

Much as there was overlap between the Narosura and Akira ceramics of Collett and Robertshaw's Oldishi tradition, so too have Maringishu and Nderit ceramics been found in association at several sites. As with Narosura and Akira, this has confused understanding of the relationship between the two ware types. Nderit ceramics, formerly known as Gumban A (Leakey 1931), are found primarily in the central rift area of southern Kenya, but have also been found near Lake Turkana further north and in northern Tanzania to the south (Bower *et al.* 1977). Nderit forms most often comprised globular vessels, though open bowls of varying depths with straight or externally thickened rims were also common (Collett and Robertshaw 1983). Nderit ceramics usually possessed scored or scraped interiors. The most distinctive decorative motif of Nderit ceramics was impressed or punctate designs covering large areas of the pot's exterior produced by jabbing the pot with a triangular wedge (Ambrose 1982, Phillipson

2005; Fig. 5.9). However, some vessels were decorated with punctates on or at the rim only (Collett and Robertshaw 1983).

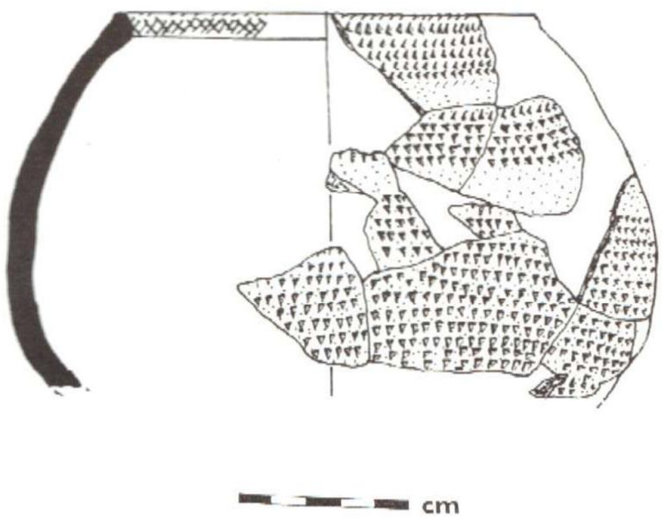

Figure 5.9 Example of Nderit Ceramics (Phillipson 2005: 209)

Dates for Nderit ceramics remain hard to come by, but it appears that sites with these ceramics were older than many other Pastoral Neolithic sites, with some sites dating to the early second millennium BCE (Collett and Robertshaw 1983). Many scholars (e.g., Gifford-Gonzalez 1998) have also associated Nderit wares with ceramics in northern Kenya at North Horr (Phillipson 1977a) and the Ileret area east of Lake Turkana (Barthelme 1977, Phillipson 1977b) that date to third millennium BC. Such associations are most frequently made because the earlier ceramics were also decorated with jabbed punctate motifs and exhibited internal scoring. Some have remained wary of definitively describing these ceramics as Nderit however (e.g., Phillipson 2005).

Maringishu ceramics are also relatively poorly defined. The most frequent vessel types were globular and shallow open bowls (Collett and Robertshaw 1983) but the ware was also defined by distinctive “ovoid beakers,” with long flat walls and a rounded base (Ambrose 1982; Fig. 5.10). The most common decorations on Maringishu ceramics were belts of deep diagonal incisions, though a curvilinear trellis motif and bands of punctates parallel to and near to the rim were also common (Ambrose 1982, Collett and Robertshaw 1983). Though Maringishu ceramics are often found at sites that also possessed Nderit ceramics, showing spatial overlap, Maringishu ceramics seem to have been a later development. One associated radiocarbon date of 1695 ± 105 b.p. from Nderit Drift has been recovered, placing at least some portion of the ware’s chronology in the early first millennium CE (Bower *et al*. 1977)

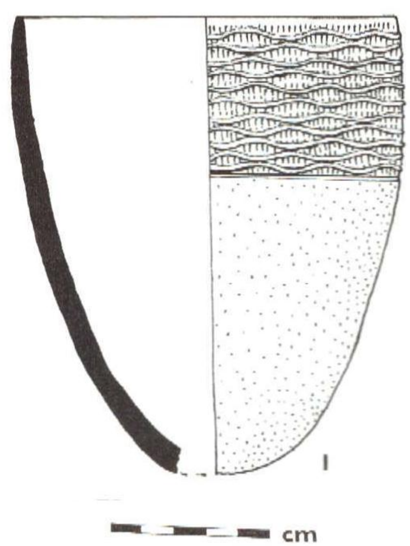

Figure 5.10 Example of Marangishu ovoid beaker (Phillipson 2005: 209)

Turkwell

The last Late Stone Age ceramic type from this region deserving mention is Turkwell. Turkwell sites were found throughout the first millennium CE into the early second millennium in Kenya west of Lake Turkana and in adjacent northeastern Uganda

(Lynch and Robbins 1979), perhaps extending into southern Sudan (Robertshaw and Siiräinen 1985). Turkwell ceramics are typically associated with mixed pastoral, hunting, and fishing communities. The most common vessel form was the open bowl, followed by shallow dishes and platters. The ceramics were often covered in parallel horizontal grooves, sometimes broken up by oblique grooves and incisions or by rows of deep comb-impressions (Lynch and Robbins 1979; Fig. 5.11). Undecorated ceramics were also common. It has also been suggested that ceramics found in southern Sudan at Jebel Kathangor represent a variant of this tradition (Robertshaw 1982) with deep, thin horizontal incisions, rather than broad, shallow horizontal grooving, though comparison of vessel forms between Turkwell sites and Jebel Kathangor has not yet taken place.

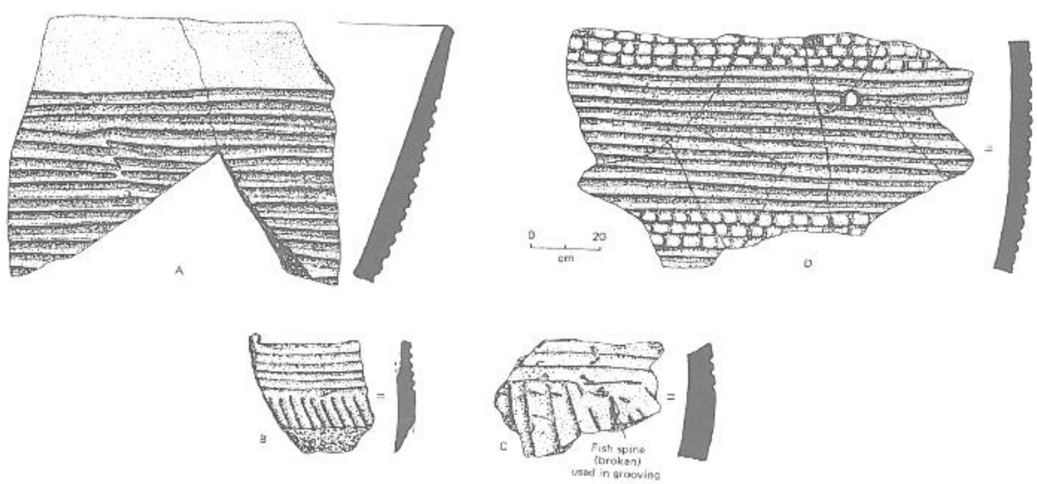

Figure 5.11 Examples of Turkwell ceramics (Lynch and Robbins 1979: 326)

Stone-Age Ceramics Elsewhere in Eastern and Southern Africa

Due to the widespread association of the above ceramic types with pastoralism, and of pottery with settled life and domesticated food-production, for some time it was thought that these ceramics represented the only pre-iron-working ceramic traditions in

East Africa. It was also thought that pottery was restricted to the Lakes Region and Rift Valley, with the rest of the region populated by low density hunter-gatherer groups who were not using pottery (e.g., Phillipson 1977a). These assumptions also related to the existence of optimal conditions for pastoralism in the Rift Highlands, and the difficulties posed in the forested regions further south and towards the coast that were thought to be tsetse-infested (Robertshaw 1990a). However, recent research has demonstrated that this geographic restriction of LSA ceramics did not exist and that pottery use was widespread throughout East Africa in the LSA. One clear example is the Kansyore pottery found in Central East Tanzania by Thorp (1992). Similarly, pottery has been found in pre-iron-working levels at the Machaga cave site on Zanzibar (Chami 2001a, 2006), though the sample is too fragmentary to be compared confidently with known ceramic types.

While recognition of the larger geographic spread of LSA pottery is welcome, the evidence used to support the presence of known LSA ceramic types at some sites in Tanzania and its offshore islands (e.g., Chami and Kwekason 2003, Chami 2006) is not as robust as might have been hoped. Many of the ceramics described as Neolithic from southern Tanzania are small samples from surface collections (e.g., Kitere, Tendaguru, Kilwa) and similarities in decoration are given precedence over holistic analyses including decorative motif, vessel form, rim form, and other ceramic attributes. This reliance on decoration is particularly dangerous given the tendency for certain decorative motifs to recur in ceramic types that are widely separated chronologically. For example, the presence of comb-stamps on surface finds whose vessel form could not be determined at Tendaguru (Chami and Chami 2001) is not a sufficient argument for the presence of Narosura ceramics there. Similarly, the necked vessels at Kitere in Mtwara region

(Chami and Kwekason 2003), decorated on both the interior and exterior with bounded impressed designs and shell-edge impressions, are not sufficient evidence to support a claim of Nderit ceramics, as the vessel form is wrong and the decorative motifs also occur with second-millennium CE Iron Age types from the region. It is not that there are no examples of sites producing LSA ceramics in southern Tanzania and beyond – Chami's (2001a) research in Zanzibar clearly demonstrates that there are – but that our understanding of such sites is weakened if we designate sites as belonging to the period too hastily and with insufficient evidence.

Further, it should not be assumed that all LSA ceramics throughout Eastern and Southern Africa should resemble those of the Rift Valley and Lakes Region. Another distinct LSA ceramic type known as Bambata was produced south of the Zambezi River. Bambata ceramics were first discovered at the type-site cave in the Matopos Hills of Zimbabwe in the first half of the 20th century (Arnold and Jones 1919, Schofield 1940, 1948), but have been found as far away as Botswana (Denbow 1986). Bambata sites often date to the BCE/CE changeover though some extend into the mid-first millennium CE. They are usually associated with the first pastoralist groups in the region (Walker 1983, Reid *et al.* 1998), but may not always have been made by them and in some cases were clearly in the possession of foragers (Robinson 1966b, Pikirayi 2001). Vessel forms were mostly open or globular bowls and necked vessels (Robinson 1966b). Rims exhibited some external thickening, but such thickening was not made into a large band for decoration as with several Early Iron Age wares, but instead has been described as "crenellated" (Robinson 1966b: 83). Common decorative motifs included incised diagonal/oblique lines that often extended over the lip of the rim, and less frequently oblique comb-stamping (Fig. 5.12). Bambata pottery is described as explicitly not related to Gokomere ceramics from the Early Iron Age, as it was thinner, smoother and the vessel forms and decorative motifs were different (Robinson 1966b).

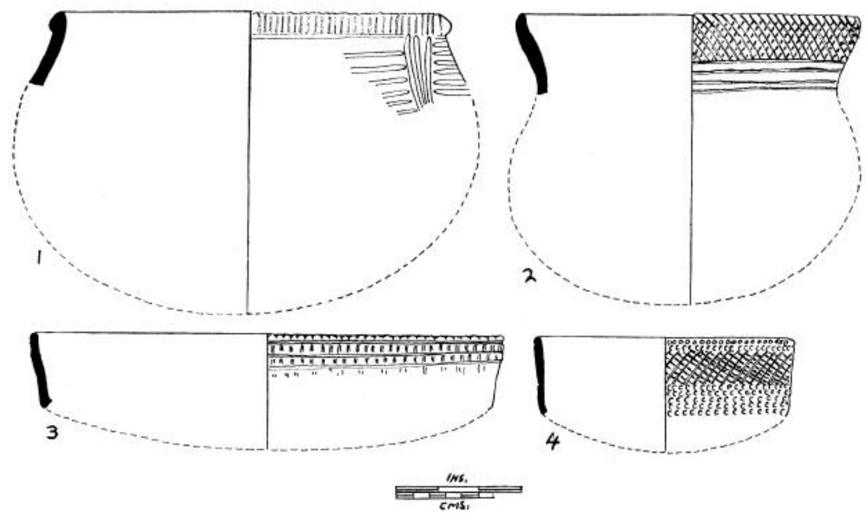

Figure 5.12 Examples of Bambata pottery (Robinson 1966: 82)

Early Iron Age Ceramics

The next broad group of eastern and southern African ceramics that form the background to ceramic developments around Mikindani is comprised of those ceramics commonly found in association with the first evidence of iron-working and iron artifacts in the area. While these Early Iron Age (EIA) ceramics often show similarities with one another, they contrast markedly with the LSA ceramics (Huffman 1970, 1982, Phillipson 1977a). As with LSA ceramics and "Neolithic" activities, EIA ceramics have often been associated with the introduction of farming and the spread of Bantu languages (e.g., Oliver 1966, Hiernaux 1968, Posnansky 1968, Phillipson 1976b). The fullest exposition of this association can be found in David Phillipson's work in the 1970s (e.g., 1976b, 1977a), which first suggested the existence of eastern and western facies or "streams" of a single EIA tradition spreading southward from the Lakes Region (see also Huffman 1989a, 1989b). However, more recently it has been recognized that the spread of these various cultural elements "although broadly concurrent … represent separate processes of cultural change" (Phillipson 2005:250, see Gramly 1978 for an early version of this position) rather than being linked together in a single cultural package (see also Karega-Munene 2002, Lane *et al*. 2007). In addition, the processes of cultural change involved

Figure 5.13 Map showing locations of the Early Iron Age ceramic types mentioned in the text

have been shown to be quite complex (e.g., Vansina 1995, Ehret 2001, Salas *et al*. 2002) with language, genetics, and material culture indicating interaction between groups in many areas rather than replacement by a homogenous group of Bantu-speaking migrants. Nonetheless, these ceramic types eventually were made and used predominately by groups possessing knowledge of iron technology, though this association implies neither an absolute date nor an ethnic attachment. The locally-produced ceramics of the Mikindani region from the Early Iron Age must be understood within the context of these complex social processes and should be compared with the coherent but internally varied ceramic types which existed elsewhere. The types discussed here will be those wares in closer geographical vicinity to Mikindani, which thus belong to Phillipson's "Eastern stream" or are thought to be intermediate between the two streams, though this is not meant to imply support for Bantu migration models.

EIA Ceramics from the Lakes Region

The earliest ceramics associated with iron-working are known as Urewe. These ceramics were from in the Lakes Region, with sites reported from a large area covering Rwanda, Burundi, southern Uganda, northwest Tanzania and western Kenya (Clist 1987), though some have questioned whether this broad range obscures too much variation (Van Noten 1979). The earliest instances of the ware produced west of Victoria Nyanza dated to the 6th century BCE, though the sites east of Victoria were as much as a thousand years younger (Schmidt 1980, 1997; Van Grunderbeek 1992). Urewe ware was first described in 1948 (Leakey *et al.* 1948) and was initially named 'dimple-based pottery' after the thumb-sized impressions often left on the vessels' bases. The most common vessel forms were open bowls and necked vessels, though globular vessels and carinated bowls were also occasionally found (Hiernaux and Maquet 1960, Posnansky 1961, Chapman 1967, Huffman 1970, Soper 1971b, Collett and Robertshaw 1980; Fig. 5.14). The necked vessels had a tendency for the rims to be out-turned or everted. One of the most distinguishing features of Urewe pottery was the rim form, as many rims from Urewe vessels were beveled, with as many as eight bevels recorded on a single rim (Chapman 1967). Fluting of the rims also occurred, but less frequently. Similarly, many Urewe vessels can be distinguished by their bases, which bear the characteristic dimples. Decoration was common on Urewe ceramics, with typically more than two-thirds of recovered sherds from Urewe contexts bearing decorations (Van Grunderbeek 1988). These decorations were most commonly grooved and incised motifs, such as horizontal grooving present along vessel shoulders, sometimes incorporating pendant loops, triangles and concentric circles, bands of incised crosshatching, or, less commonly, oblique incisions near or on the rim.

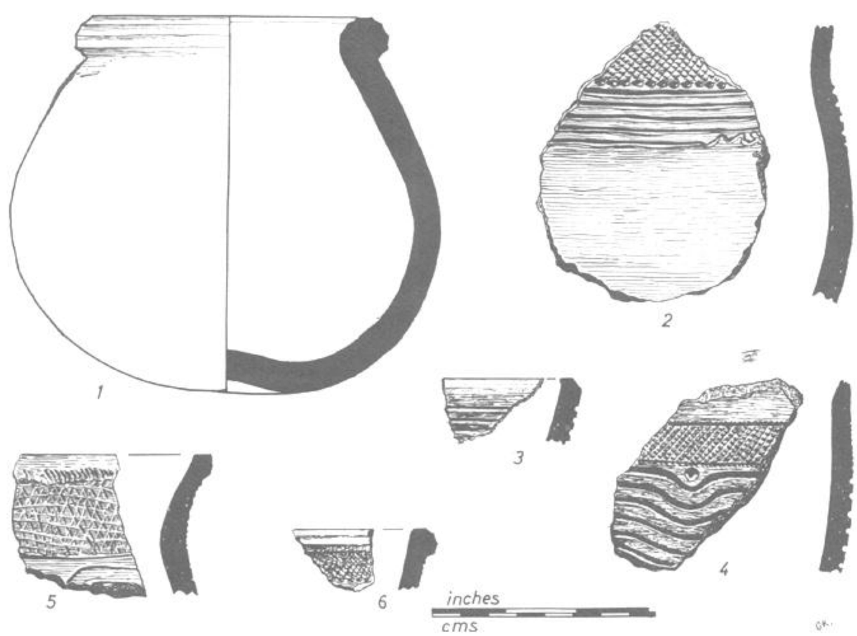

Figure 5.14 Examples of Urewe pottery (Posnansky 1961: 141)

EIA Ceramics from the East African Coast

Beginning in the first centuries CE, another Early Iron Age ceramic type, Kwale, is recognized from the coast and offshore islands of Tanzania, Kenya, Mozambique and Somalia and extending into the coastal hinterland in areas such as the Usambara Mountains and along the Tana and Sabaki river valleys in Kenya (Soper 1967b, 1979; Chittick 1969; Odner 1971a, 1971b; Thorp 1992; Sinclair *et al*. 1993b; Chami 1994, 1999a; Håland 1994-5; Håland and Msuya 2000). Named for the type site in southeastern Kenya (Soper 1967a, 1971b), Kwale ceramics have been suggested to have developed from Urewe predecessors, owing in no small part to the latter's greater age (Soper 1971a, Phillipson 1976b), as part of the general trend of the spread of ceramics, iron, and agriculture. However, as Kwale sites are geographically isolated from but contemporaneous with many Urewe sites, particularly those east of Lake Victoria (Soper 1971b, Stewart 1993), maintaining such a genetic relationship would seem to obscure both the considerable variability which exists within Urewe and Kwale assemblages (see Kiriama 1993, Chami 1998) and the different ways in which the makers of Urewe and Kwale might have interacted with one another.

Still, there are clear affinities between Kwale and Urewe ceramics. One of the most common Kwale forms was a necked vessel that showed a tendency towards being out-turned like Urewe necked vessels (Soper 1967a). The other most common Kwale vessel form was in-turned bowls (Soper 1967a, though he refers to them as bowls with up-turned rims), which were infrequent in Urewe assemblages (Fig. 5.15). Open bowls and globular vessels were also found. Like Urewe, most Kwale rims were beveled and fluted, and many were thickened. Kwale sherds were much more likely to be fluted than

Urewe vessels however (Soper 1971b). Kwale sherds also had a tendency towards decoration, relying on incised or grooved motifs, and dentate/comb-punctate designs (Soper 1967a). Common Kwale motifs includes oblique incisions, often between horizontal dentate lines, horizontal incisions, walked zigzag incisions, punctates or stamps, and cross-hatching, though pendant triangles were also used in lower numbers (Soper 1971b, Chami 1994: 69).

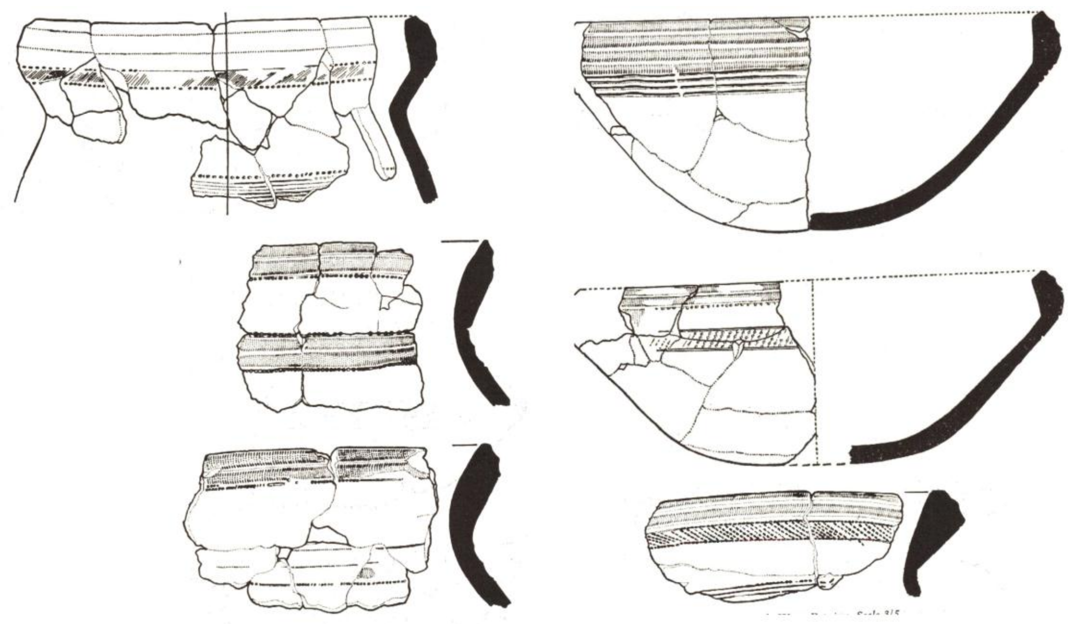

Figure 5.15 Examples of Kwale ceramics (Soper 1967a: 4-5)

Owing to increasing awareness of the spatial and temporal heterogeneity present in Kwale ceramics, particularly in the decorative motifs, and suggestions that it therefore did not warrant status as a discrete ware type (Kiriama 1993), Felix Chami (1998) identified three phases within Kwale based upon his work in the Rufiji region of Tanzania (Chami 1992, 1994). The first of these, the Limbo phase, dates from the last centuries BCE to the 3rd century CE (Fig. 5.16). The Kwale phase follows from the 3rd to the 5th centuries CE, and in turn is followed by the Mwangia phase to the 6th century CE

(Fig 5.17). Limbo in-turned bowls had curving lips, while in the Kwale phase the rim was at an obtuse angle to the body, and Mwangia vessels had less beveling (Chami 1998). Other distinctions are made on the basis of decorative motifs, with Kwale vessels alone bearing false-relief chevrons and zigzag incisions more common in the Kwale phase than in the preceding Limbo phase. The Kwale phase saw the introduction of a number of new decorative motifs and there is a tendency towards "bold" decorations in the Mwangia phase (Chami 1998: 209). Although these phases are an important acknowledgement of the temporal variability in Kwale ceramics, it is not yet clear the extent to which these phases also account for the geographic variability of Kwale ceramics and whether they can be usefully extended from the central Tanzanian coast (see Fleisher 2003).

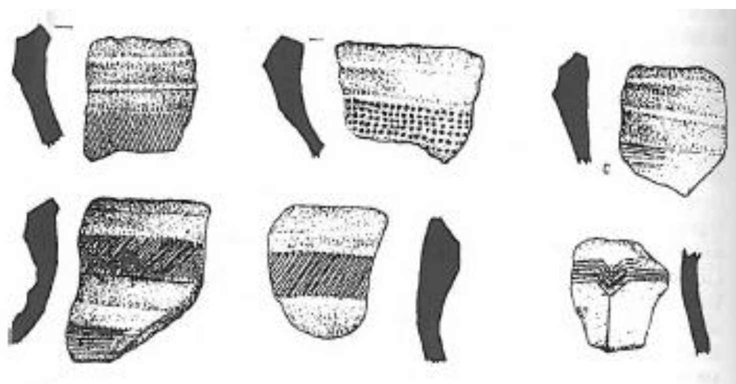

Figure 5.16 Examples of ceramics from the Limbo Phase of Kwale (Chami 2006: 120)

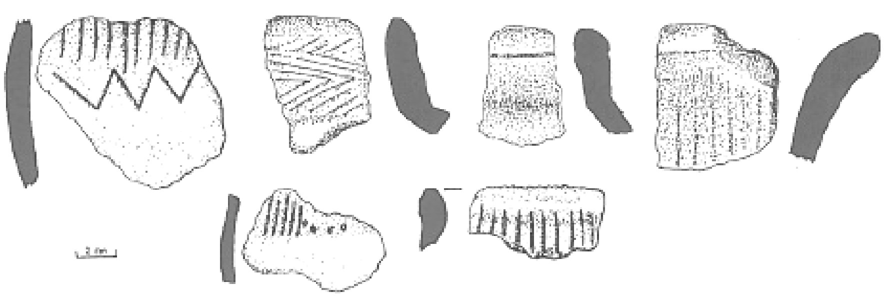

Figure 5.17 Examples of ceramics from the Mwangia phase of Kwale (Chami 2006: 121-22)

EIA Ceramics from Central Tanzania

A separate early first-millennium tradition has also been recognized in central Tanzania. This pottery was first recovered by Kohl-Larsen (1943) and was initially referred to as “Sandauweland-Typus” by Smolla, who studied the ceramics (1957). It was later renamed Lelesu after the type site in Usandwe (Soper 1971a, 1971b), which was the subject of further study by Sutton (1968). Lelesu ceramics bear affinities to both Kwale and Urewe ceramics, as might be expected given the geographic location of Lelesu sites, but tend to show closer relationships with the former (Sutton 1968). The characteristics of Lelesu ceramics suggested an intermediate placement between Phillipson’s eastern and western Iron Age “streams” and thus differentiation from Urewe and Kwale, each of which are members of the eastern stream (1976b). The most common Lelesu vessel form was the in-turned bowl, though open bowls were also common and globular vessels were produced (Soper 1971b; Fig. 5.18). Rim fluting and beveling was also common. Lelesu ceramics were often decorated, with 85% of the rims recovered by Sutton (1968) bearing decoration. The decorations were overwhelmingly bands of oblique/diagonal incisions or dentate/comb-stamps, though some parallel horizontal incisions/grooving occurred (Soper 1971b).

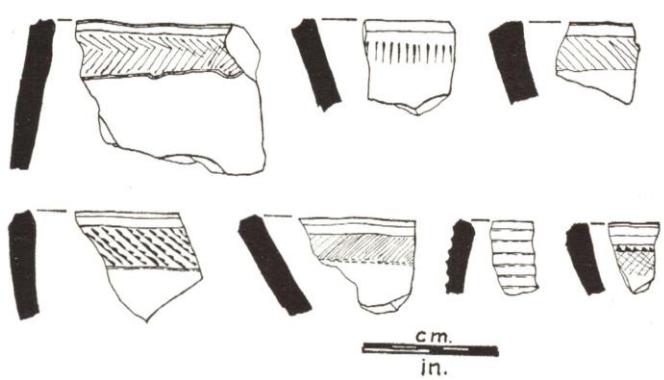

Figure 5.18 Examples of Lelesu ceramics (Sutton 1968: 170)

EIA Ceramics from Zambia

Another first-millennium ware deemed intermediate between the eastern and western streams is Kalambo (Phillipson 1976b). This ware type was found from western Tanzania near Lake Tanganyika extending southward into northeastern Zambia, and dates from the 4th century CE to the beginning of the second millennium (Phillipson 1968; Derricourt 1976, 1980; Mgomezulu 1981). The most common vessel form was the necked pot (Fagan and Van Noten 1964; Fagan 1967), though globular and open bowls were also used (Huffman 1970). Decorations were relatively frequent, except on open bowls, where undecorated forms were "unusually common" (Phillipson 1975:8). Typical decorative motifs included horizontal grooving at the shoulder reminiscent of Urewe ceramics and oblique or crosshatched incisions or comb-stamps at the rim (Fig. 5.19). False-relief chevrons were also common, and often occurred in conjunction with other motifs (Phillipson 1975). Many rims were thickened, and beveling was also used. Decoration of the flattened surface of the rim itself also occurred, particularly on necked vessels (Fagan 1967). Phases within the Kalambo type have been recognized around at the type site Kalambo Falls, which was occupied for several centuries (Phillipson 1968).

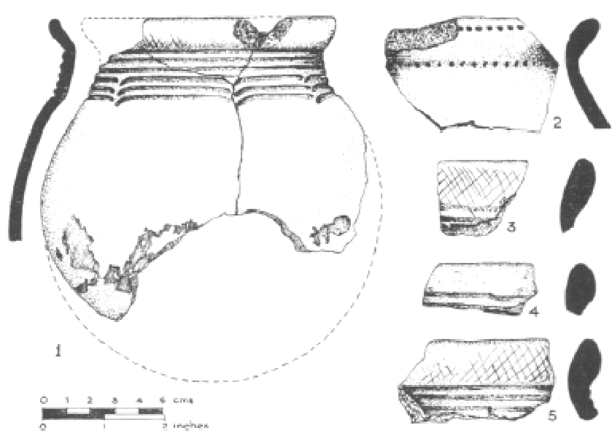

Figure 5.19 Examples of Kalambo pottery (Fagan and Van Noten 1964: 16)

Another ceramic type found in Zambia known as Dambwa (Daniels and Phillipson 1969, Phillipson 2005), but also sometimes referred to as Shongwe (e.g., Vogel 1972), is associated with the eastern stream. Dambwa group sites are found along the Zambezi river valley upstream from Victoria Falls and extending southwards into Zimbabwe. The best-known Dambwa sites date to the middle of the first millennium CE between the 5th and 8th centuries (Phillipson 1975) but there are both older and younger sites described as phases of the broader Dambwa pottery (Vogel 1971a, 1971b, 1973; Phillipson 1974). The earliest phase of Dambwa, likely dating to the first centuries CE, is best represented by the sites at Situmpa (Clark and Fagan 1965) and Gwisho Hotsprings (Fagan and Phillipson 1965). These sites were initially considered to define a separate "Situmpa Ware" (Inskeep 1962, Fagan 1963) characterized by globular necked pots, some bowls, and channeled and stamped decoration, but are now usually subsumed within Dambwa (e.g., Phillipson 1977a, *cf.* Huffman 1989a). During the later phases, Dambwa pottery was characterized by slightly necked vessels with flat, externally thickened rims (Vogel 1973, Phillipson 1975). Beakers and carinated vessels were also made and open bowls were present but rare. Decoration was common, as less than 5% of the vessels recovered from the type site were undecorated (Daniels and Phillipson 1969; Fig. 5.20). The most common decorative motif was one or more bands of diagonal incision or comb-stamping at the rim, often set within two horizontal comb-stamp bands, sometimes accompanied by a band of straight or wavy dragged lines on the body. Geometric designs, such as triangles, filled with either comb-stamping or horizontal incisions were also common. The false-relief chevron motif is present but rare (Vogel 1971b). Channeling, with its typical broad horizontal grooves, was rare in the later phases, though horizontal lines produced by dragging were present (Daniels and Phillipson 1969). Dambwa ceramics closest affinities were with the Gokomere pottery located to the south, which will be discussed below (Vogel 1971b), though some similarities with Kalundu ceramics of the Western Stream, located directly north of the Dambwa area, have also been noted.

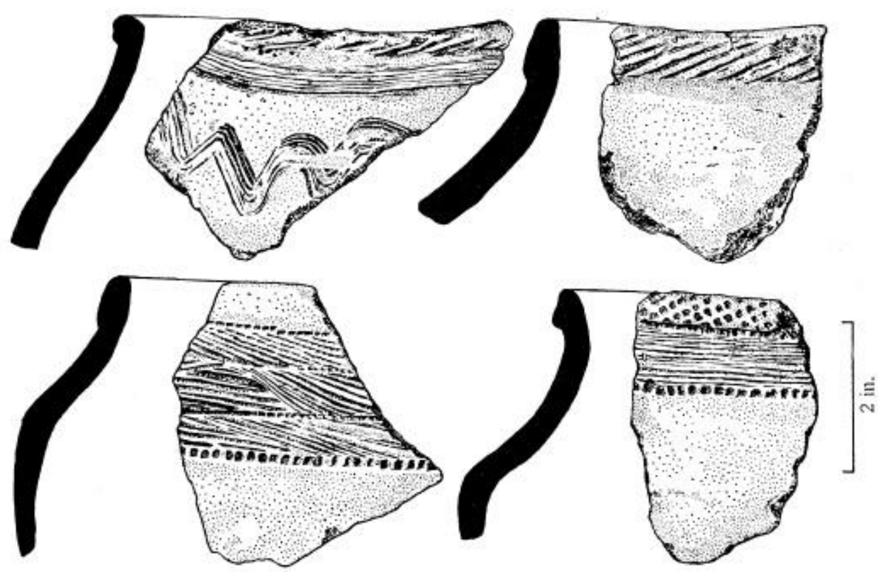

Figure 5.20 Examples of Dambwa pottery (Phillipson 1968: 203)

EIA Ceramics from Malawi

East of the Kalambo sites, on the western shore of Lake Malawi two additional Early Iron Age wares associated with the “Eastern stream” were manufactured during the first millennium CE. One of these, known as Mwabulambo, was restricted to the northwestern shore of the lake. This pottery was first described by K.R. Robinson (1966a) in his reports on survey in the Ngonde area and received further study by Robinson and Sandelowsky (1968). These ceramics bear affinities with both Urewe to the north and Gokomere ceramics to the south (Robinson and Sandelowsky 1968), but perhaps especially with the former (Robinson 1976). The most common vessel form was a necked pot, often with an out-turned rim, though open bowls and in-turned bowls were also made and used (Robinson 1982). Beveling and thickening of rims was also common (Fig. 5.21). Typical decorative motifs included horizontal grooving at the neck or shoulder, and some oblique or crosshatched incisions located near the rim (Robinson and Sandelowsky 1968), though undecorated wares were relatively more frequent than in other contemporaneous EIA ceramic types (Phillipson 1977a). However, some have questioned the definition of the Mwabulambo type, suggesting that it combines ceramics from the early and later first millennium uncritically (see Sinclair 1991: 204), and this may in part explain the type's relative frequency of undecorated vessels. Others have suggested different phases for Mwabulambo, one between 1-400 CE and the other between 400 and 1000, for the same reason (Davison and Mosely 1988). Mwabulambo ceramics have been securely dated to contexts dating to the 3rd, 5th and 6th centuries CE (Mgomezulu 1981).

Further south, from the southern tip of Lake Malawi stretching towards the Zambezi River, west into Zambia, and east into northwest Mozambique, Nkope ceramics were produced (Robinson 1970, 1973, Phillipson 1976a). Dates for this ware type stretch from the 4th century to around 1000 CE (Phillipson 1976a). The most common types were necked vessels, often with everted/out-turned rims, open bowls and in-turned bowls. Globular vessels and those with up-turned rims were rarer and carinated bowls were produced infrequently. Considerable variability in the vessel forms existed between Nkope sites. For instance, the type site at Nkope Bay had far more bowls than necked

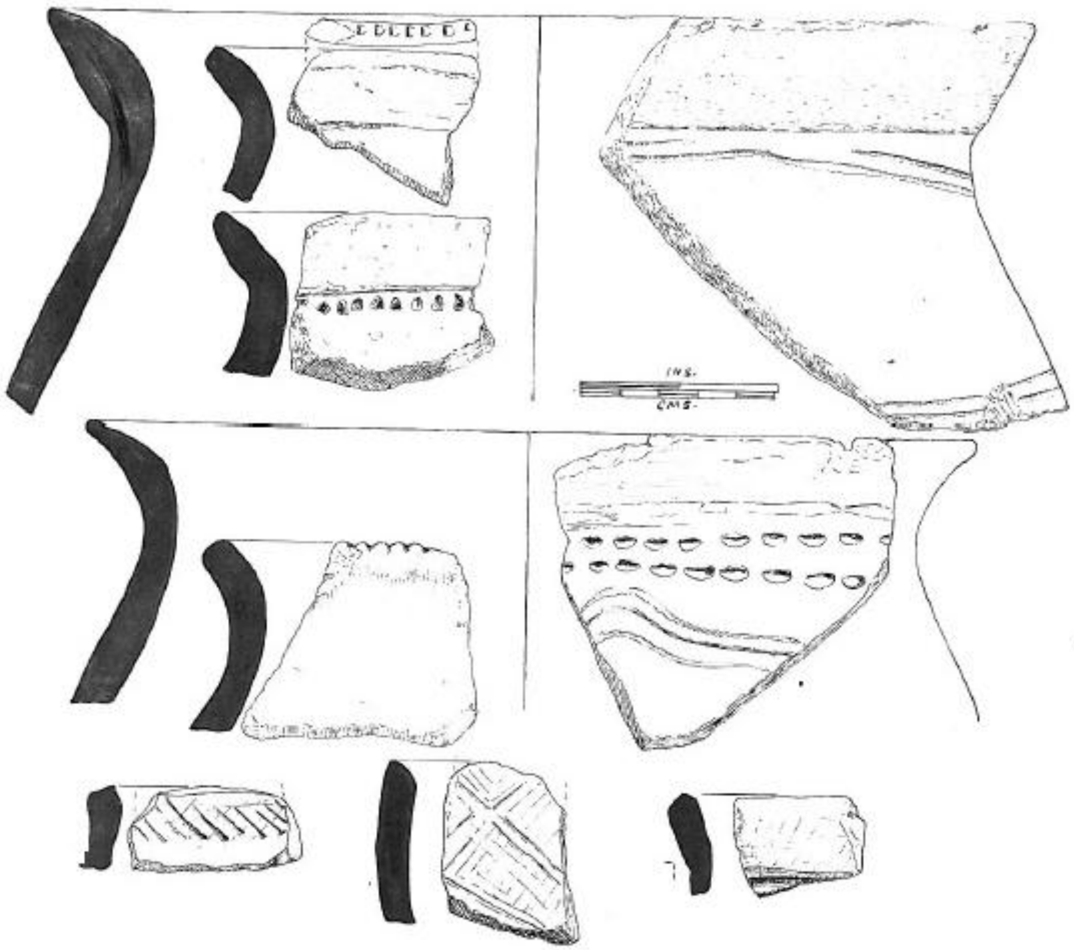

Figure 5.21 Examples of Mwabulambo ceramics (Robinson 1982: 53)

vessels, while at Phwadzi the ratio was nearly even and at Kamnama there were many more necked vessels (Phillipson 1976a). Such variation might have been expected given the ware’s long period of production. Nonetheless, Nkope sites generally shared the same decorative motifs (Fig. 5.22). The most common motifs were oblique incisions or dentate comb-stamping at the rim and horizontal grooving near the rim, which was especially prevalent on bowls. The tools used to achieve the dentate decoration varied across sites and at some sites the decorations were made with cords or glass beads, rather than a pronged tool (Robinson 1977). Graphite burnishing was also relatively common on

Nkope ceramics, particularly the bowls (Robinson 1970, Davison 1991). The majority of Nkope rims showed evidence of thickening, which was often used as a platform for decoration. Bevels occurred on 40% of the vessels at Kamnama: 27% with a single bevel and a further 13% with multiple bevels, and 3% of the vessels were fluted. Between the presence of in-turned bowls, higher rates of beveling, and the decorative motifs, Nkope vessels shared many more traits in common with Kwale ceramics than Mwabulambo vessels. Indeed, the two types from Malawi can be distinguished on a number of variables, with Nkope ceramics more likely to exhibit comb-stamping and horizontal grooving decorative motifs and beveled rims, and showing less rim notching and fewer curvilinear decorations (Robinson 1982).

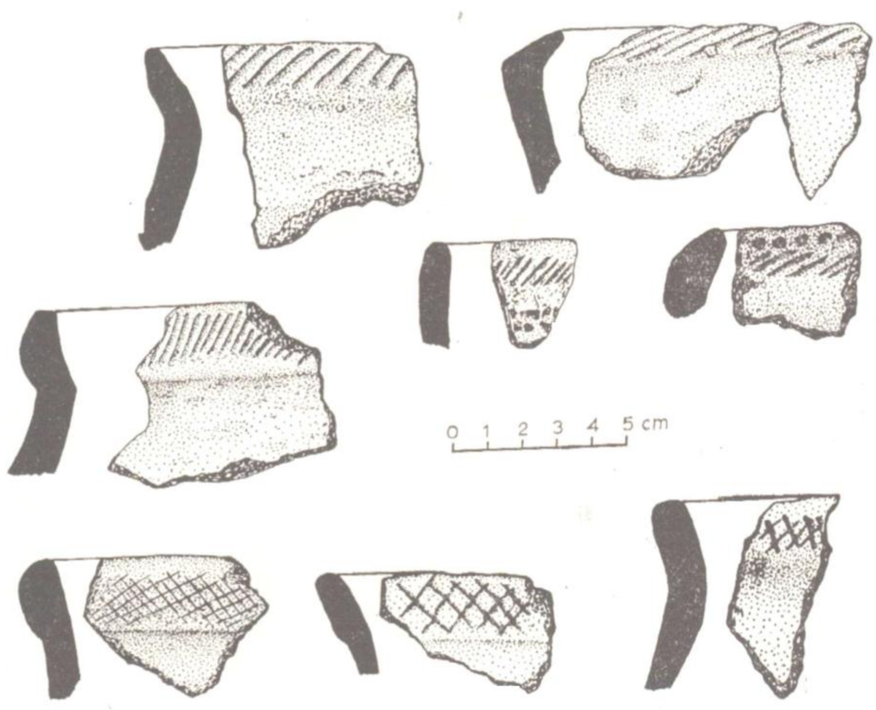

Figure 5.22 Examples of Nkope pottery (Phillipson 1976a: 43)

EIA Ceramics from Mozambique

Further east of the area in which Nkope ceramics are found, other first millennium CE Early Iron Age ceramic wares were produced in northern Mozambique. The earliest such ceramics from the first centuries CE had affinities to both Kwale and Nkope ceramics (Sinclair 1991), and have been referred to as Kwale (e.g., Sinclair *et al*. 1993b), though the association is not certain. The most common vessel forms were necked vessels and in-turned bowls, many decorated with oblique comb-stamps and others with single punctuate bands. These ceramics then developed into distinct coastal and inland types.

The interior ceramics, known as Nampula, were first described by Adamowicz (1985, 1987) following his survey of Nampula Province, and have since also been found in the Zambezi valley (Macamo and Madiquida 2004). Three phases of the Nampula type can be distinguished in the first millennium (Sinclair 1991). The first phase, dated to the 2nd-5th centuries CE, was characterized by necked jars with everted rims and other vessels with constricted necks and in-turned rims were also produced (Fig. 5.23). The ceramics had relatively little decoration compared to other Early Iron Age wares, but bands of incised lines, both oblique and vertical, were present. Nampula ceramics also exhibited some rim beveling in this first phase. In the second phase of Nampula, in the 6th and 7th centuries CE, the jars with constricted in-turned rims were the most common vessel type and in-turned bowls were also found. The most frequent decorations on these ceramics incorporated dentate/comb-stamped motifs. The third phase, from the 7th century stretching into the early second millennium, produced mostly necked jars with vertical or everted rims, rather than in-turned rims. Various bowl shapes were also found in this phase. Decoration typically consisted of a dentate band below the rim and multiple bands of punctates or vertical incisions.

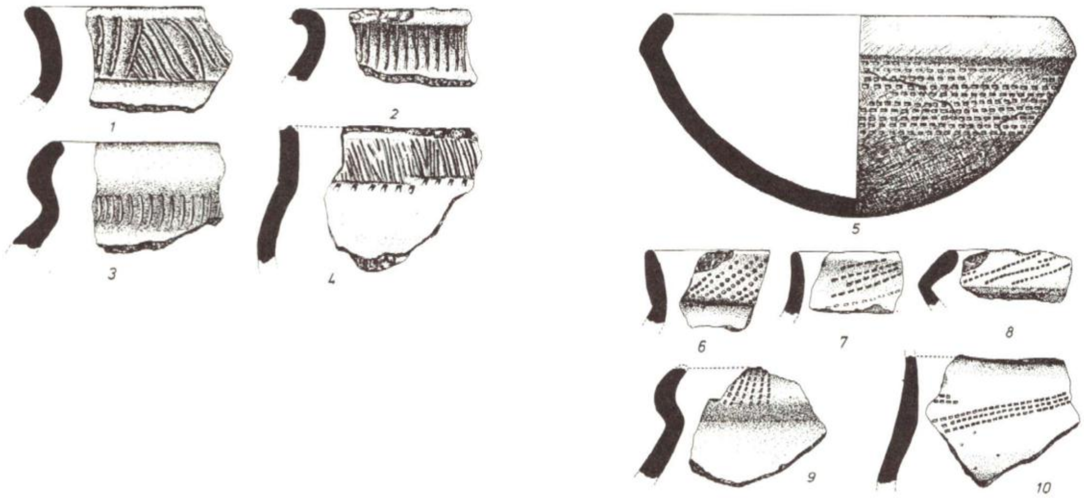

Figure 5.23 Examples of Nampula pottery, 1-4 are from the first phase, 5-10 from the second phase (Sinclair *et al*. 1993b: 422)

The other first-millennium ceramic tradition of northern Mozambique is known as Monapo. It was restricted to the coast, and, like Nampula, distinct phases have been recognized in the type (Sinclair 1991). Unfortunately this ware remains poorly known, but it seems to have been distinguished by necked vessels with shell-impressed decorations near the rim. Available dates for Monapo ceramics stretch between the 4th and 6th centuries CE (Sinclair 1991).

In southern Mozambique the Early Iron Age ceramics are known as the Matola type. The type site was first described by Cruz e Silva (1979) and then re-excavated in the 1980s (Morais 1988). It has been securely dated to the early to mid first millennium CE, and Matola ceramics have also been found in other contexts in Mozambique dating to the first millennium at the University Campus in Maputo (Sinclair *et al*. 1987) and Zitundo (Lindquist 1984, Morais 1988). As with the ceramics from northern

Mozambique, Matola ceramics showed affinities with Kwale ceramics from much further north (Sinclair 1987). There is also quite a bit of evidence to suggest that the Matola type extends south into South Africa. Matola ceramics show a high degree of similarity to the Silverleaves site in the eastern Transvaal dated to 250 CE (Klapwijk 1974, Klapwijk and Huffman 1996), and Silverleaves has sometimes been included in the Matola tradition (e.g., Sinclair *et al*. 1993b, *cf.* Klapwijk and Huffman 1996, who further debate the utility of the term Matola). The Matola sequence at Zitundo (Morais 1988) also corresponds well with that described by Maggs (1980, 1984) in the Natal (Sinclair 1987, 1991). However, the Natal material possessed neither rim-beveling nor in-turned bowls, each of which was characteristic of the Matola material (Huffman 1982, Klapwijk and Huffman 1996). Indeed, the most common vessel forms at Silverleaves and at the University Campus at Maputo were in-turned bowls and up-turned rim pots, the latter with beveled rims (Klapwijk 1974, Klapwijk and Huffman 1996, Sinclair *et al*. 1987; Fig. 5.24). Carinated bowls were also found and some illustrated vessel forms approximate necked vessels and open bowls, though they are not described as such in the relevant literature. Bowls often had fluting below the rim bordered by a single band of punctuates. The up-turned rim vessels typically possessed similarly simple decoration, with punctate bands or incised lines at shoulder and occasional dentate motifs or incisions on the bevels.

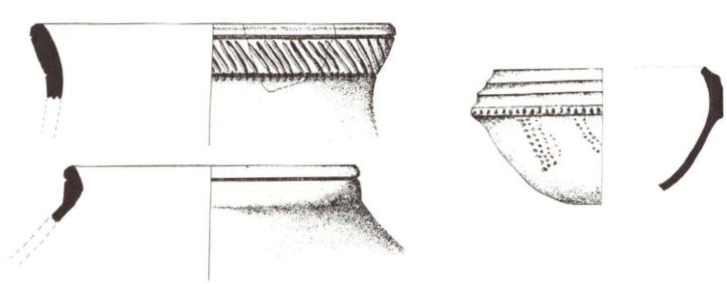

Figure 5.24 Examples of Matola ceramics (Sinclair *et al*. 1993b: 418)

EIA Ceramics from southern Africa

The last Early Iron Age ceramic types described here are Gokomere and Ziwa, which are mostly found in Zimbabwe but also extend into southern Mozambique and northern South Africa (Sinclair 1987, Madiquida 2006). Gokomere and Ziwa are two closely related types and often have been treated together in the literature (e.g., Phillipson 1977a, Pikirayi 2001, Chami 2006). Gokomere was first described following excavations at its type site in southwestern Zimbabwe (Gardner *et al*. 1940, Robinson 1963). However, the variations that existed between Gokomere sites have confounded simple descriptions of the type (see Vogel 1978) and caused Huffman (1974) to distinguish the presence of three unique phases of Gokomere between 200 CE and the early second millennium. Nonetheless, the basic vessel shapes of Gokomere ceramics throughout the first millennium were necked pots and open bowls, though in-turned bowls, carinated bowls and globular vessels were also present in lower numbers (Whitty 1958, Huffman 1970, 1974, 1976, Vogel 1971b; Fig. 5.25). Gokomere ceramics were usually decorated (Vogel 1978), often on the rim-band. Oblique or parallel dentate stamping was the most common decorative motif, though bands of oblique or horizontal incisions were also fairly common. The rims of Gokomere vessels were often thickened, especially those of the necked jars, but beveling was infrequent.

Ziwa pottery is found mostly in the eastern highlands of Zimbabwe (Huffman 1971, 1974) and extends from there into Mozambique. Like Gokomere, Ziwa sites date throughout the first millennium. The pottery was first described by Summers (1958) who described two phases of Ziwa ceramics. The first phase was characterized by necked vessels, shallow open bowls, and carinated vessels, though globular bowls and beakers also occurred rarely. These vessels typically had thickened rims to carry decoration. The common decorative motifs included oblique dentate or incised bands at the rim, sometimes with horizontal grooving continuing to the shoulder (Fig 5.26). The bowls often had burnished graphite interiors. In the second phase decoration was less lavish, though the motifs remained the same. Fewer vessels were decorated overall, with bowls often left undecorated, yet about half of the vessels exhibited decoration (Summers 1958: 318). The vessel forms remained largely the same during this phase, though the necked vessels had a more pronounced shoulder, and more beakers were produced. The second phase also witnessed the first appearance of vessels decorated with hematite.

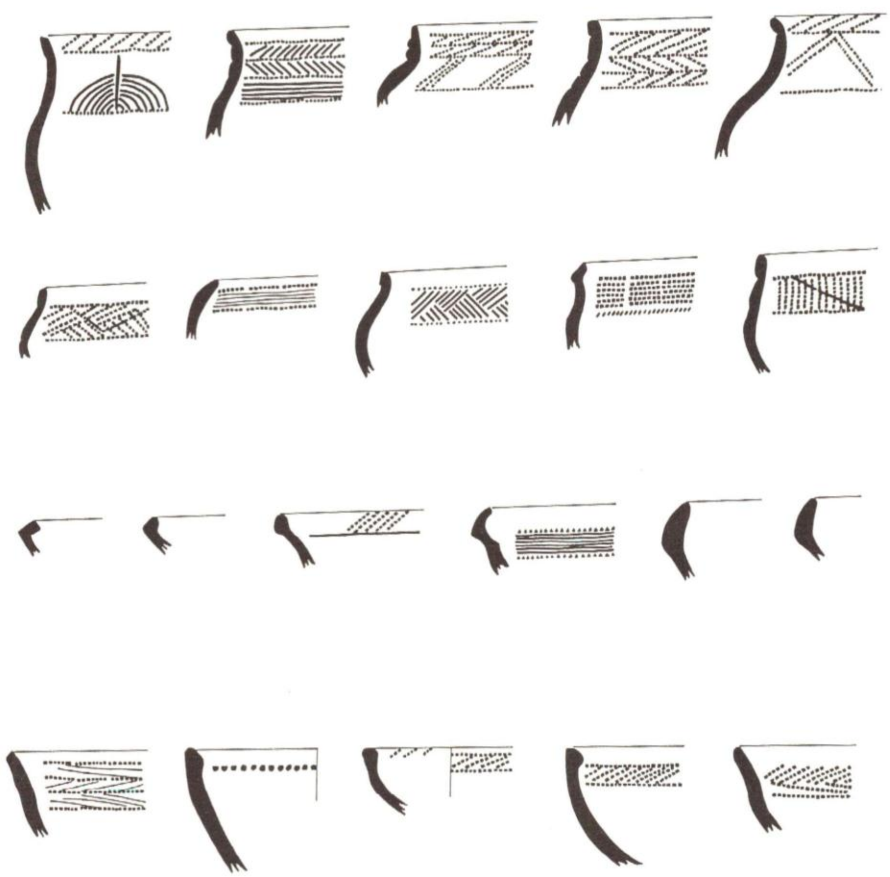

Figure 5.25. Examples of Gokomere pottery (Huffman 1989a: 69)

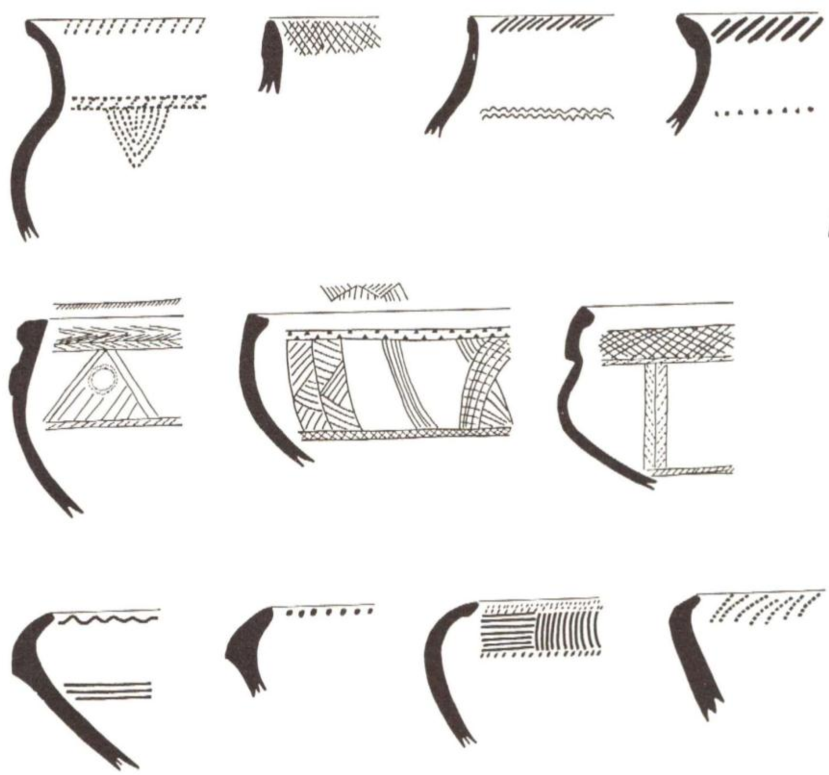

Figure 5.26 Examples of Ziwa pottery (Huffman 1989a: 60)

Later First-Millennium Ceramic Traditions

In the second half of the first millennium CE, notable shifts in the Early Iron Age ceramics described above occur in many regions. Already I have noted distinct phases described for the Kwale, Dambwa, Mwabulambo, Nampula, Monapo and Gokomere/Ziwa traditions. Elsewhere in the broader region changes in the character of locally-produced ceramics have caused archaeologists to designate new types. More generally, the prominence of separate phases and new types in the archaeology of the second half of the first millennium emphasizes the variability which existed within Iron Age ceramics. Explanations for the distribution of Iron Age ceramics in eastern Africa, and for the character of local pottery in the Mikindani region, must take that variability into account. Still, for our purposes here it is most important to describe the ceramic types produced during the late first millennium CE.

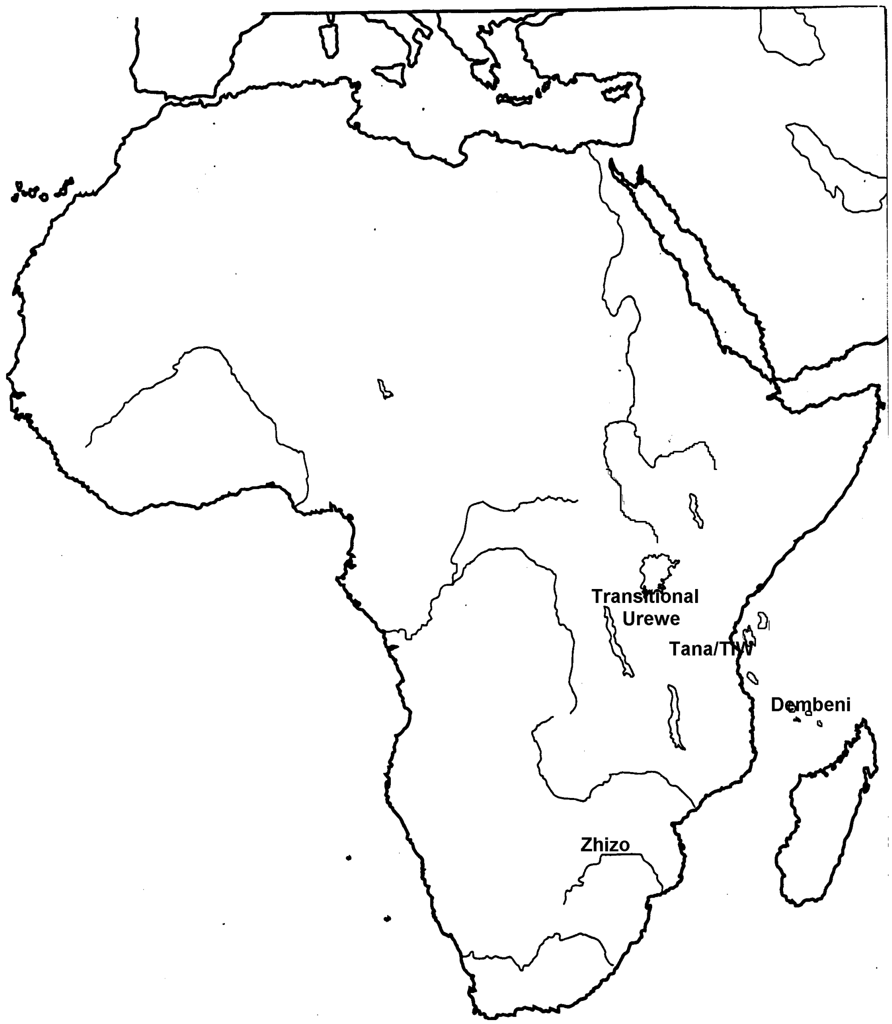

Figure 5.27 Map showing the locations of late first-millennium ceramic types mentioned in the text

Lakes Region

In the Lakes region Posnansky (1968) recognized a type which he called "Devolved Urewe" at Lolui Island (see also Posnansky *et al*. 2005), though more recently it has been referred to as "Transitional Urewe" (Ashley 2010). This type is distinguished from the earlier Urewe type by coarser fabrics, less beveling, and poorly executed decorations (Fig. 5.28). More recent research (e.g., Reid 2002, 2003, 2004) has demonstrated that the pattern of decreasing fabric quality and decorative care was replicated at other sites in the region. Bowls were the dominant vessel type and decorations tended to be widely-spaced versions of the earlier Urewe horizontal grooving and incised crosshatch, though the horizontal grooves were often not perfectly parallel. Many vessels continued to exhibit the characteristic dimple base, but the dimple itself tended to be less pronounced and the base flatter. These ceramics typically dated to the late first millennium CE (Posnansky *et al*. 2005). Transitional Urewe seems to have derived from Urewe predecessors, and in some cases the two wares appear to have been produced by the same groups.

Figure 5.28 Examples of Transitional Urewe ceramics (Ashley 2010: 151)

East African Coast

Along the coast the second half of the first millennium witnessed the development of a new ceramic style that has been variously known as Early Kitchen Ware (Chittick 1974), Wenje Ware (Phillipson 1979), Pare Group C (Soper 1967b) and, more commonly, Tana Tradition ceramics (Horton 1984, 1996, Abungu 1994/5) or Triangular-

Incised Ware (Chami 1994, 1998). These ceramics have been found along the coast from Somalia (Chittick 1969) to southern Mozambique (Sinclair 1982) and quite a ways inland (e.g., Soper 1967b, Håland 1994/5, Håland and Msuya 2000, Helm 2000a, Walz 2005). The most common vessel form was the necked pot, though in-turned bowls, carinated vessels and open bowls were also produced regularly. Occasionally the rims were beveled, especially with the in-turned bowls, but more often they were thickened, and the thickened rim frequently served as a platform for decoration. As indicated by the name "Triangular-Incised Ware," (TIW) many decorations on these ceramics were incised triangles, though bands of oblique or horizontal incisions near the rim were also common (Fig 5.29).

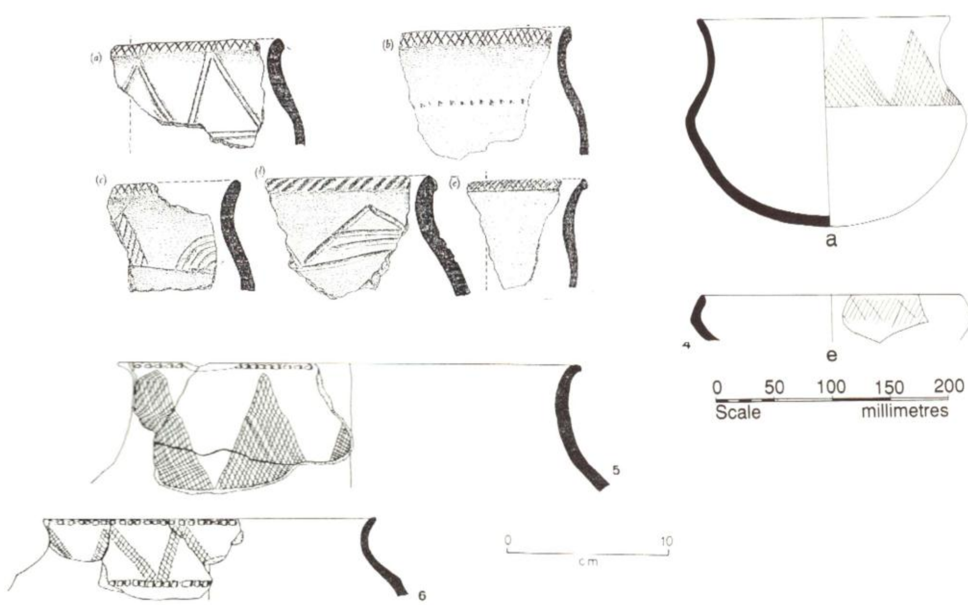

Figure 5.29 Examples of Tana/TIW ceramics from Kilwa (Chittick 1974, top left), Pate (Wilson and Lali Omar 1997, bottom left) and Shanga (Horton 1996, right)

Tana/TIW ceramics are often assumed to represent the earliest indications of Swahili settlement, so the debate surrounding the origins of this type has been particularly fierce. Initially connections were drawn between coastal Kenyan ceramics, named Tana, and those of the LSA Pastoral Neolithic described earlier (Horton 1984, Abungu 1994/5). This connection was based upon the similarity of the vessel forms and some of the incised decorations, though the types were not found in stratified contexts at any one site. Felix Chami (1994, 1998) suggested an alternate origin for the ceramics, which he called TIW, with the Iron Age Kwale wares. Working in the Rufiji Delta region of Tanzania he showed that TIW ceramics overlaid Kwale ceramics at some sites, suggesting internal development, which he also demonstrated though analysis of the two wares' decorative motifs (Chami 1994). Subsequent work in Tanzania at Dakawa (Håland and Msuya 2000) and around Mombasa (Helm 2000a, 2000b) has provided further support for origins with Kwale. Aside from these competing views of Tana/TIW origins, the debate over terminology persists. "Tana Tradition" has been rejected by Chami and others for its implicit association with LSA ceramics and because its use of a Kenyan place-name presents a "lopsided" view of the type's distribution (Chami 1994/1995: 235). "Triangular-Incised Ware" on the other hand suffers from the same limitations that have forced the rejection of "Chanel-Incised Ware" and "Dimple-based pottery;" it seeks to describe a broad, internally varied group of ceramics by a single trait, which while so frequent to be considered characteristic, was not ubiquitous. Rather than relying on either of these titles by itself, many coastal archaeologists now refer to this ceramic type using both terms, which is the practice used here.

What is generally missing in these debates is recognition of the variability which exists in the ceramics they are seeking to describe (one notable exception is Horton 1994b). The development of Tana/TIW ceramics in any region was the result of complex processes of interaction between different groups from different regions, and there is no reason to suggest that the ceramics did not bear influences from multiple different traditions. While the association of Tana/TIW with Kwale likely holds true over most if not all of the coast, the Kenyan ceramics in the Tana region may well have borne influences from the LSA wares being produced nearby as well. Given this potential for multiple influences in different regions, the variability which is now recognized in Tana/TIW ceramics is not surprising (e.g., Horton 1994b, Forslund 2003). Some evidence of this variability can be found in the decorative motifs used in different regions. Incised triangles were more common further away from the coast in Tanzania (Chami 1994). Tana/TIW from Zanzibar had more waist punctates than other regions, particularly the Lamu Archipelago (Horton 1994b). Ceramics from Pemba Island resembled those from the Rufiji Delta in this period, with incised zigzag decoration most common rather than incised hatching, crosshatching and horizontal lines as at Shanga (Fleisher 2003). Tana/TIW ceramics from Kilwa often had a short band of incised cross-hatch at the rim (Chittick 1974), which was not common further north where hatched bands, when they existed, often covered the whole neck (Chittick and Tolbert 1984, Forslund 2003). Kenyan Tana/TIW material also exhibited a greater tendency towards shell decoration than Tanzanian Tana/TIW (Abungu 1994/5).

In addition to these variations in decorative motifs, there were also distinctions in the Tana/TIW ceramics from different regions that incorporated multiple attributes. Rim beveling was not as common with Tana/TIW ceramics as with Kwale ceramics, but it distinguished the Tana/TIW ceramics of coastal regions from one another. Beveling at Pate was largely confined to in-turned bowls (Wilson and Lali Omar 1997), but at Kilwa also occurred on some necked pots (Chittick 1974). Beveling on necked pots also occurred on some ceramics found in Tana/TIW levels at Dakawa, and might be better thought of as Tana/TIW ceramics with "archaic stylistic elements" rather than providing evidence of the persistence of Kwale (*cf.* Håland and Msuya 2000). In-turned bowls on Pemba Island were covered in hematite and sometimes graphite and burnished (Fleisher 2003), very similar to the red-slipped Dembeni ware from the Comoros Islands described below. These red-slipped burnished in-turned bowls were also used at Kilwa, but non-burnished in-turned bowls were common at Kilwa, Pate and elsewhere (Chittick 1974, Wilson and Lali Omar 1997).

A ceramic type that developed in this period in the Comoros Islands known as Dembeni (Wright 1984) was similar to the Tana/TIW ceramics, and is sometimes described as a regional variant of that type (e.g., Forslund 2003). Dembeni ceramics were first described from six sites in the Comoros dating to the 9th and 10th centuries CE (Sinopoli 1984). The ceramics were split into two wares: one red-slipped and burnished, the other plain but with some decorations (Fig 5.30). Vessels of both types were made by press molding and hand building. The plain ceramics were usually fired in an oxygen-poor atmosphere, but the slipped ceramics needed to be oxidized, and when graphite decoration was added to them this required a two-step firing process. The plain ceramics were mostly necked and up-turned rim pots, but globular vessels and open bowls were also produced. The distinction between necked and up-turned rim pots was not always clear, though generally necked vessels had taller necks that were less abruptly done. The decorative motifs common on these "plain" vessels were shell-impressions and incised bands, usually of triangles or cross-hatching. The red-slipped burnished ware vessels were all bowls, with just more than half in-turned bowls and the rest open bowls. As mentioned above, each of these red-slipped forms is found at Kilwa, and the in-turned bowls are found on Pemba Island. Because there is clear evidence of the production of such vessels on the Comoros Islands, some have suggested that these ceramics may have been exported to the coast from the Comoros (Forslund 2003).

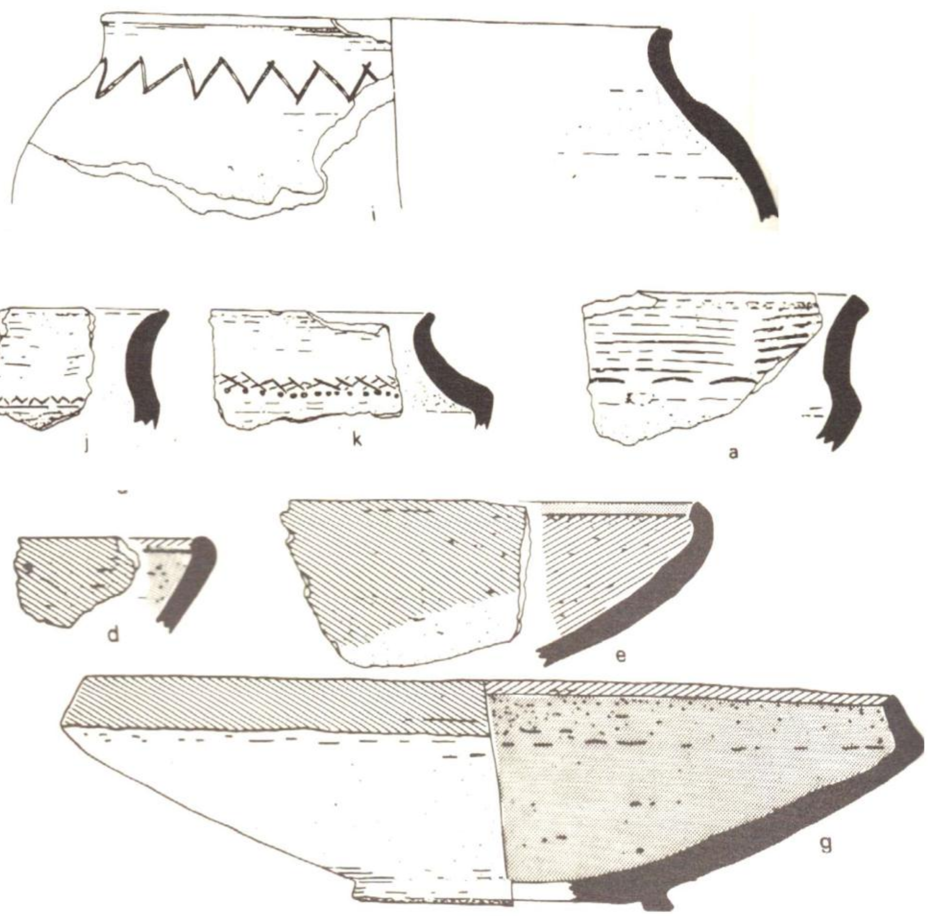

Figure 5.30 Examples of plain and red-slipped Debeni ceramics (Wright 1984: 32, 36)

Southern Africa

Though some mention has already been made of the phases existing for Gokomere and Ziwa ceramics, it is worth discussing the late second-millennium phase of those ceramics called Zhizo. The Zhizo phase began in the 7th century and is named for a site near Zhizo Hill in Zimbabwe (Robinson 1966c). It corresponds to Huffman's (1974) second phase of Gokomere and is similar in form to the second phase of Ziwa (Summers 1958). During this phase settlement expanded significantly, both in terms of the size of sites and the geographic extent of sites, which have been found to the east near the Mozambique coast at Hola Hola (Sinclair 1985) and northwest approaching the area of the Dambwa group in southern Zambia (Phillipson 1977a). The Zhizo site of Schroda in South Africa near the Limpopo River developed into a major regional center later in this phase around the 10th century (Hanisch 1981, Huffman 1986). At the same time as this expansion, there was increasing regional differentiation in the ceramics (Huffman 1974) and trade with the Indian Ocean coast evidenced by imported blue-green beads (Phillipson 1977a).

The ceramics of the Zhizo phase were distinguished from the earlier phases of Gokomere and Ziwa by a general modification of the more elaborate elements of earlier pottery and less decoration. The decorative motifs, particularly reliance on comb-stamping and placement in the rim-to-shoulder region, were retained however (Huffman 1974, Phillipson 1977a). This continued reliance on comb-stamping helped distinguish Zhizo from the subsequent Leopard's Kopje type described in the next section (Huffman 1982). Zhizo ceramics were mostly comprised of necked vessels, but open and spheroidal bowls were also common and carinated vessels were used. The Zhizo phase also introduced red hematite burnishing to complement the graphite burnishing of earlier periods.

Early Second-Millennium Ceramic Traditions

The early second millennium ceramics in many parts of eastern and southern Africa represented a discontinuity from what came before (Phillipson 1977a, Maggs 1980, Huffman 1982). Here, too, variation exists; not every region underwent significant changes in their local pottery production. In parts of the eastern Kenyan highlands pottery derived from the Kwale tradition continued to be made as late as the 13th or 14th centuries (Phillipson 2005: 293). Moreover, the origins of many of the second-millennium developments can be traced in the last centuries of the first millennium, as will be shown below.

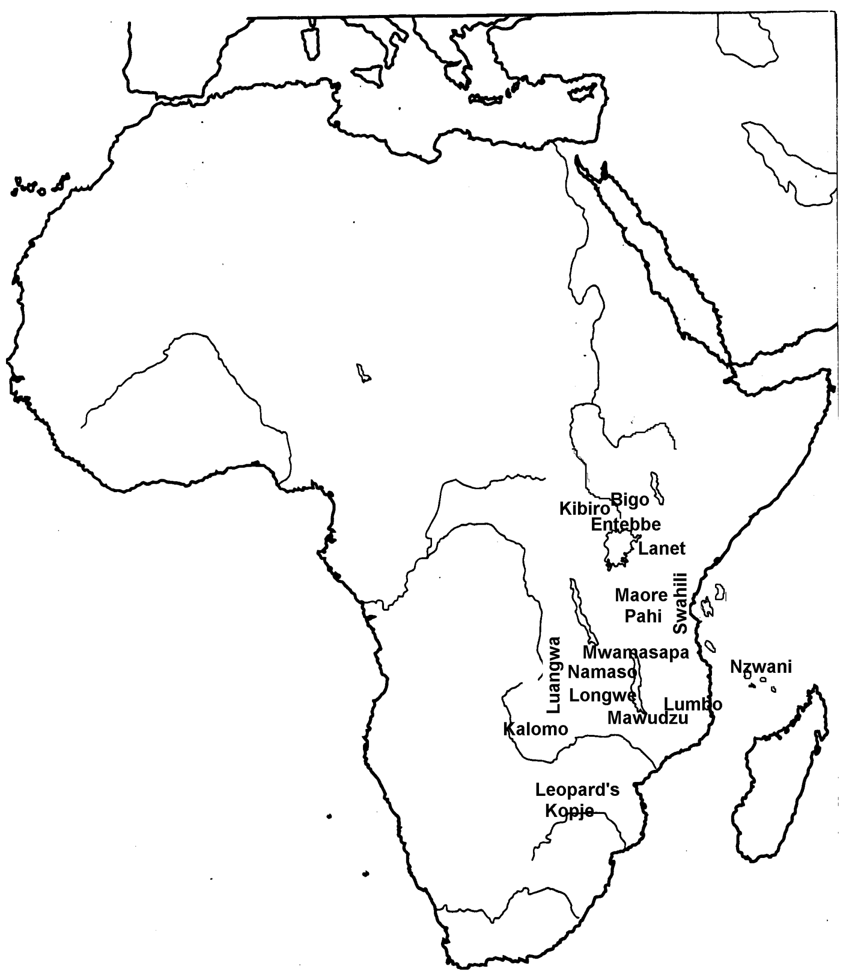

Figure 5.31 Map showing the locations of the early second-millennium ceramic types mentioned in the text

Lakes Region

In the Lakes Region, the first notable ceramic type thought to date to the early second millennium is known as Chobi Ware (Soper 1971c), originally called "*boudiné*" pottery (Hiernaux and Maquet 1960). Chobi vessels were primarily bowls and wide-mouthed necked pots with thickened rims. The most diagnostic characteristic of these ceramics is the textured upper body of the vessels resulting from a lack of post-construction smoothing. The most common decorations on these ceramics were fingernail impressions and finger impressions (Fig. 5.32).

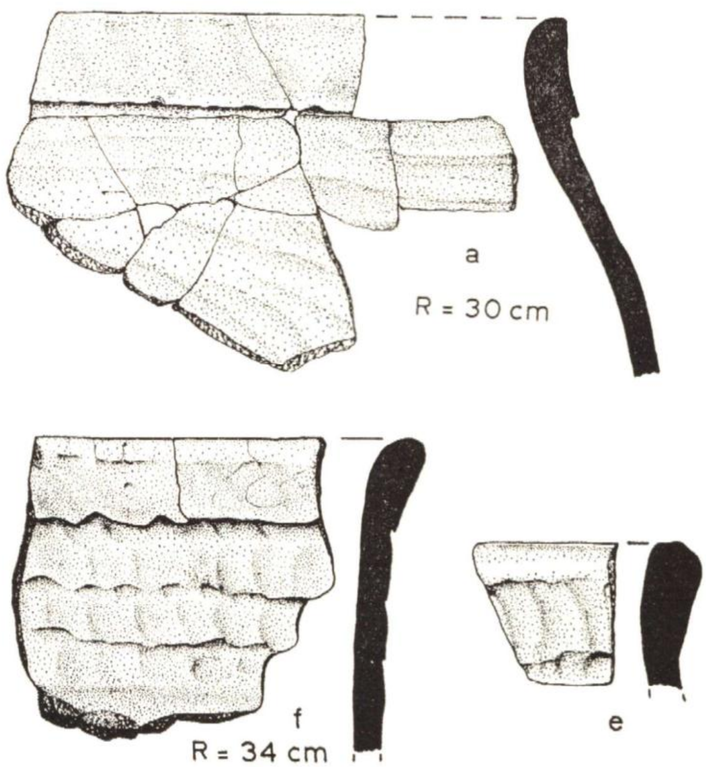

Figure 5.32 Examples of Chobi Ware ceramics (Soper 1971c: 60)

Most ceramics found in the Lakes Region during the early second millennium can be attributed to the "roulette-decorated pottery" tradition. Roulette-decorated ceramics typically postdated the Chobi type and they continued to be produced throughout the second millennium, but some roulette-decorated wares were made and used as early as the 8th century CE (McMaster 2005). However, as with the earlier "comb-punctate tradition" and "channel-decorated pottery," the term "roulette-decorated pottery" actually subsumes a number of different types into a single grouping on the basis of a common decorative motif. Not only does this obscure variation between those types, it also ignores the differences in the types of rouletting used, such as knotted-string roulettes and the multitude of carved roulettes (see Connah 1996, 1997). Some of the notable types of roulette-decorated pottery are described here to present a measure of that variation.

Several types of roulette-decorated ceramics have been described in Uganda. Throughout the first half of the second millennium Entebbe ware (Marshall 1954, Posnansky 1967, Ashley 2010) is found on the shore of Lake Victoria, but it has never been recorded more than 8 km from the shore. The most common Entebbe forms were large globular and open bowls, with diameters up to 40 cm (Ashley 2010). Entebbe ceramics were distinguished from many other roulette-decorated by their internally thickened rims (Fig. 5.33). Their interiors were also frequently scored using a comb.

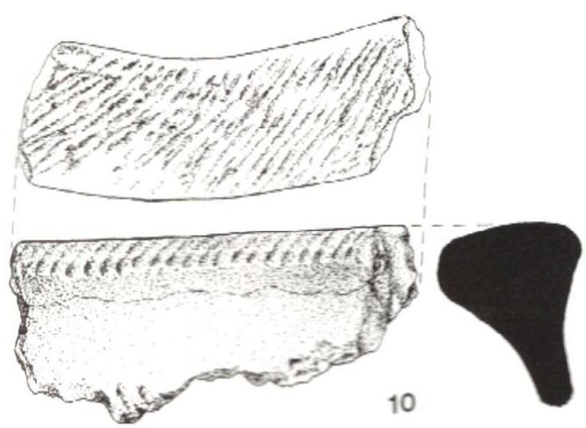

Figure 5.33 Example of Entebbe Ware (Posnansky *et al*. 2005: 88)

Further from Lake Victoria another roulette-decorated type known as Bigo developed in between the 13th and 15th centuries (Posnansky 1969, Robertshaw 1997). The most common Bigo vessel form was an up-turned rim pot with a globular body, though open bowls and necked vessels were also made. Most Bigo vessels were decorated, with 85% of reconstructed vessels at the type site bearing decoration. Decoration typically consisted of knotted-string roulette placed near the rim, which was often thickened by rolling (Posnansky 1969).

Also in Uganda along the shore of Lake Albert a pottery type associated with salt-works at Kibiro developed (Connah 1996) that was quite different from the material around Lake Victoria (Connah 1997). The most common vessel forms at Kibiro were open bowls and globular pots, though necked pots and bowls and up-turned rim pots were also used. Some Kibiro vessels possessed triangular bases, which were not used among other roulette-decorated types. Knotted-string and carved roulette are the most common decorative motifs, with the latter particularly well represented in earlier periods (Connah 1997). In later deposits incisions, punctates and fingernail impressions were employed (Fig. 5.34).

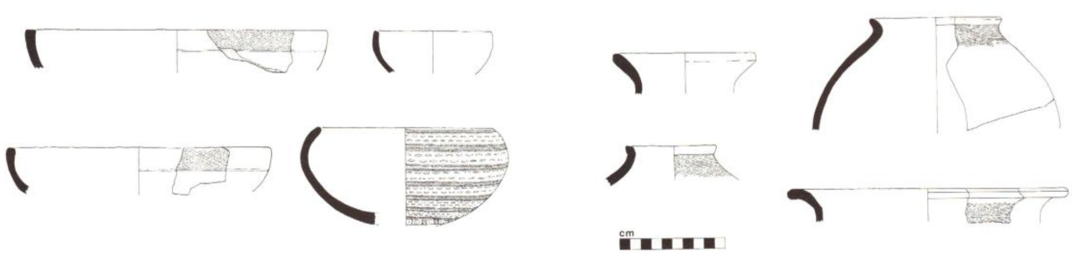

Figure 5.34 Examples of Kibiro pottery (Connah 1996: 108)

In Kenya and Tanzania the most notable roulette-decorated ceramic type is Lanet Ware, named after its type site in Kenya (Posnansky 1967). This type was first described at the site of Hyrax Hill (Leakey 1931) and has since been documented in Tanzania at Iramba (Odner 1971c) and the Uvinza salt pans near Lake Tanganyika (Sutton and Roberts 1968). It may date back to the 9th century and similar pottery continued to be made throughout the second millennium. The most common Lanet vessel form was a tall necked vessel with a rounded base, thought to be modeled on gourds (Fig. 5.35). Lugs were often used on these vessels. They were decorated with cord-impressed rouletting, most commonly around the rim. Many Lanet vessels had squared-off rims for decoration (Sutton 1987). Lanet ceramics were often found with lined, shallow depressions known as Sirikwa holes thought to relate to pastoral activity (Sutton 1987). Such pastoral associations with roulette-decorated ceramics are common, and some archaeologists have suggested that these wares may be evidence of either cattle-herders moving south from Sudan where similarly decorated wares were produced or of interaction between the Lakes Region and southern Sudan (Phillipson 1977b).

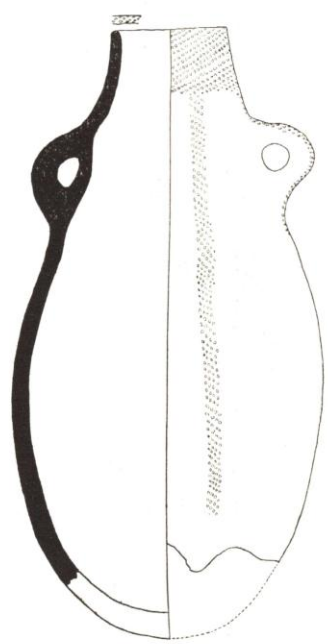

Figure 5.35 Example of a Lanet Ware vessel (Posnansky 1967: 99)

East African Coast

The regional variations observed in the ceramics of the East African coast in the first millennium continued to develop in the second millennium, when a broad distinction between the ceramics from the northern coast above the Kenya-Tanzania border and the southern coast below that border has been recognized. On the northern coast locally-produced ceramics mostly continued to develop from Tana/TIW precursors (Horton 1984, 1996, Chami 1994, Wilson and Lali Omar 1997). Felix Chami has attempted to unite the ceramics from the northern coast of this period under the category "Neck-Punctated Ware" or "NP" (1998), referring to a common decorative motif. Given the "distinct tendency towards regionalism in ceramic types" at this time (Horton 1996: 264; and see Kirkman 1966), the term's reliance on a single decorative motif masks considerable variability within and between northern coast assemblages. Moreover, limited examples of similarly decorated vessels can be found during the Tana/TIW phase in type 5 from Kilwa (Chittick 1974: 345), which is generally held not to have participated in the NP tradition. The full description of the proposed NP type (Chami 1998: 212) focused on novel but relatively uncommon vessel forms such as carinated vessels and those with a vestigial neck, neither of which comprised as much as 5% of coastal assemblages, over better represented forms such as open bowls and globular pots, thereby skewing the analysis towards relatively poorly represented but easily recognized attributes. Certain attributes were shared across space on the northern coast, but these need to be understood within the context of the larger assemblages of which they are a part and the differences that existed between those assemblages (Fig. 5.36).

At Shanga in the Lamu Archipelago, Horton described two ceramic phases which he refers to as “Mature Tana” and “Late Tana” (1996) during the first half of the second millennium. Mature Tana ceramics date from the last century of the first millennium CE and the first century of the second millennium. While necked vessels still occurred frequently in this phase, as in Tana/TIW, proportions of both open and in-turned bowls increased and globular vessels comprised the most common type. The pottery also tended to be thinner than with Tana/TIW. Incised cross-hatching and horizontal incised lines remained the most common decorative motifs, though this phase also witnessed the development of decorative incised bands on the rim itself. During the Late Tana phase between the 12th and 14th centuries, the most common vessel form was the open bowl. Decoration in this phase was less frequent and the most common decorative motifs were oblique and crosshatched incisions and bands of punctates near the rims of bowls or the carinations of carinated vessels, often occurring together, though other new decorative motifs like finger impressions also occurred on certain vessel types.

The ceramic material from the nearby site of Pate shared many of the trends seen at Shanga (Wilson and Lali Omar 1997). Beginning about 1000 CE, Pate shifted from necked vessels to globular pots which either had no neck or were very slightly necked. Carinated vessels and in-turned bowls were also produced, and some of the latter possessed beveled rims. Burnishing and interior graphite burnishing also occurred. By the mid 12th century, the ceramics found at Pate were mostly low-fired and friable, and only about 5% were decorated. Globular vessels remained common and some carinated vessels still occurred, but open bowls replaced in-turned bowls. Common decorative motifs were punctate bands, incised oblique lines above an incised horizontal band, and incised decorations on the rims of open bowls as at Shanga.

Further south at Mombasa, bowls and carinated vessels were the most common vessel types during the first half of the second millennium (Sassoon 1980). Virtually no globular vessels were found though, in sharp contrast with the assemblages at Pate and Shanga. Common decorative motifs included punctate bands both at the rim and at carinations, and oblique incisions placed on different parts of the vessel. The incised crosshatching motif common in the Lamu Archipelago was rare at Mombasa.

The ceramic material from Pemba Island began to resemble the Kenyan material during this period, rather than continuing to track the ceramics from the Rufiji area in Tanzania. On Pemba as well globular vessels became more common early in the second millennium and a few centuries later open bowls were the most common vessel form. However, Pemba did not produce the in-turned bowls found in Kenya, nor did it have similar proportions of carinated vessels. While the proportion of sherds that were decorated declined throughout the second millennium on Pemba, the common decorative motifs during this period shifted from incised triangles and zigzags to incised cross-hatching as was common at Shanga and Manda. Occasional examples of punctate bands also occurred, comprising less than 5% of the total assemblage.

The presence of the punctate band motif in all of these locations is clearly what Chami is referring to with NP. Ceramics bearing the motif that would be diagnostic for NP were present on Pemba as Type 10b (Fleisher 2003), at Shanga as Type 21 (Horton 1996), at Manda as Type 5 (Chittick and Tolbert 1984), at Kilwa as Type 5 (Chittick 1974), at Mombasa as Type 4 (Sasoon 1980) and at Pate (Wilson and Lali Omar 1997).

However, punctate bands were not used on a large percentage of the total assemblage of any site and were usually described as rare, implying that other identified types must also figure into any ceramic typology. The motif was also not the only characteristic decorative motif recorded at the sites in the early second millennium, but common decorations also included bands of oblique or crosshatched incisions depending on the region, as Chami discusses himself (1998: 212). Still, there are certain continuities that should be recognized for the northern coastal material. The overall percentage of decorated vessels declined at all sites, continuing the trend from Kwale to Tana/TIW in the first millennium, and the range of motifs used narrowed. Although distinctions in specific vessel forms and proportions existed between regions, generally there was a move away from necked pots and towards bowls, especially open bowls, perhaps indicative of shifts in patterns of food consumption (Fleisher 2003, 2010b). These trends indicate a broader coherency to coastal ceramics, and perhaps coastal society more generally, amidst evidence of local variation.

The East African Coast below the Tanzania-Kenya border is not thought to have participated in the early second-millennium ceramic developments which took place further north however. Instead, they are argued to have developed a separate tradition known as Plain Ware (PW) (Chami 1994, 1998). Befitting the name, PW is largely defined by a lack of decoration, except for rare punctate bands or lip notching, and common vessel forms included necked vessels with long, flared rims and open and globular bowls. Pottery associated with this tradition has been found in Tanzania at Kaole (Chami 1994), Kwale Island (Chami and Msemwa 1997) and, as discussed in Chapter 2, by Kwekason near Mikindani (2007).

However, it is not clear that Plain Ware is much more than an extension of the trend towards declining decorative motifs and decoration that occurred on the northern coast as well, and whether the sites attributed to PW provide large enough samples to describe a novel undecorated ceramic type given the tendency towards a lower frequency of decoration already developing in the late first millennium. Further, while NP motifs were shared across the northern sites, the PW description does not describe all of the southern sites. Notably, it does not fit the material at Kilwa well, for though Type 2 ceramics there are undecorated, they co-occur throughout the early second millennium with several types of incised and punctated ceramics that are described as being characteristic of the period (Types 3-5; Chittick 1974). These decorated types were necked pots and bowls, open bowls and, more rarely, waisted vessels. In some cases, as with Type 5, they bore close affinities to northern coastal material. The red-slipped burnished bowls that were common in the first millennium also remained common during this period at Kilwa. Unfortunately, quantified data from this part of the coast are rare, so detailed comparisons between sites and with material from the northern coast has not yet been possible. Despite such difficulties, the notion of a PW type clearly identifies an important trend towards lack of decoration that was shared in many southern coastal locations during the early second millennium and suggests a broad coherency to coastal ceramics at the time.

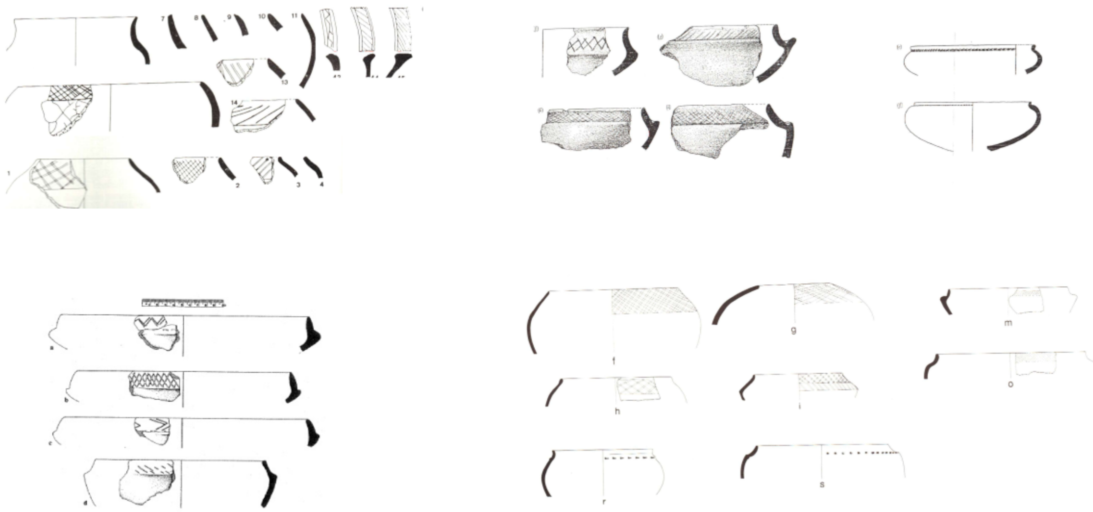

Figure 5.36 Examples of various early second millennium coastal ceramic types from (clockwise from upper left) Pate (Wilson and Lali Omar 1997), Kilwa (Chittick 1974), Shanga (Horton 1996) and Pemba Island (Fleisher 2003)

Local ceramics in the Comoros Islands also underwent a shift in the early second millennium (Wright 1992). Second-millennium pottery in the Comoros was typically finer than the first-millennium Dembeni Ware and possessed fewer inclusions. There was also a significant shift in vessel form, as the necked vessels that were common in the Comoros during the first millennium were quite rare during the second, being replaced by open bowls with flat rims, shallow bowls, globular pots and carinated vessels (Fig. 5.37). Decoration of these vessels was more restricted than in the first millennium. The most common motifs were shell impressions, zigzag incisions near the rim and some lip notching. Many vessels employed red slip and burnishing, in a likely continuation from the red-slipped ware of the Dembeni phase.

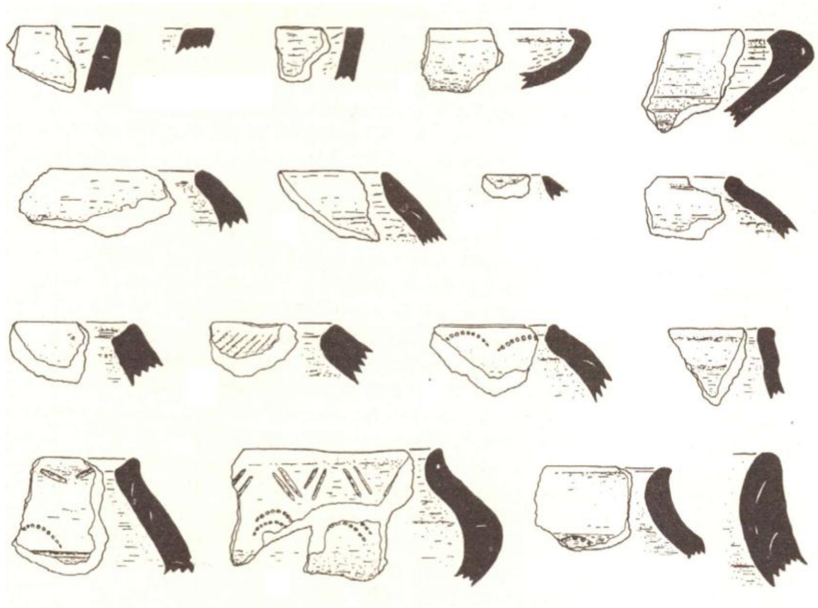

Figure 5.37 Examples of early second-millennium ceramics from the Comoros (Wright 1992: 102)

Coastal Hinterland of Kenya and Tanzania

New ceramics were also developed in areas off of the coast. In the coastal hinterland of southern Kenya and northern Tanzania Maore Ware developed in the late first to early second millennium (Odner 1971a, 1971b, Soper 1967b). This ceramic type is thought to have developed from Kwale (Odner 1971a, 1971b). It consisted of thick, short-necked pots, open bowls, and globular vessels. Burnishing occurred on some of the globular vessels and several had an added collar at the rim. Decoration occurred mostly on necked vessels and the most common decorative motif, occurring on more than half of the decorated vessels, was a double row of impressions made by walking a two-pronged instrument along the pot (Fig. 5.38). Other motifs included bands of vertical, oblique or horizontal incisions.

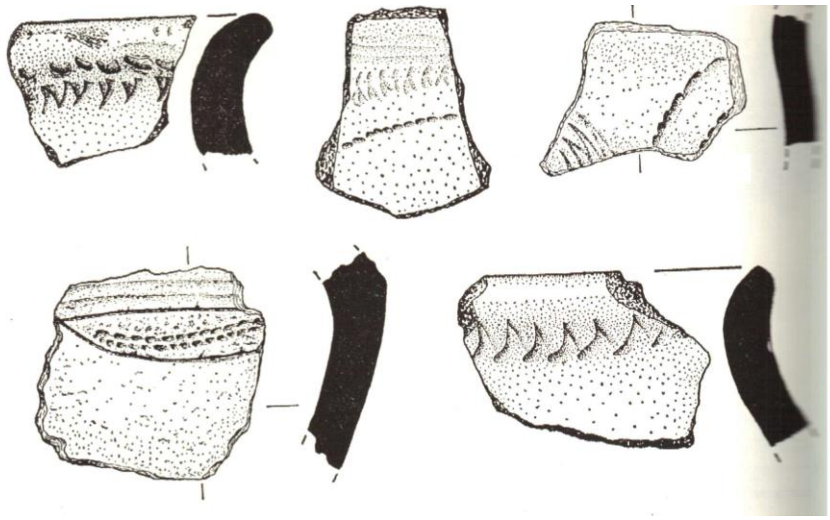

Figure 5.38 Examples of Maore Ware (Odner 1971b: 138)

In central Tanzania where Lelesu ceramics were common during the first millennium changes in the local ceramics also occurred, though relatively little archaeological work has taken place in the area and the analyzed ceramic assemblages are generally small and fragmentary. The early second millennium witnessed a shift away from the in-turned bowls of the Lelesu type to necked pots without beveled or fluted rims (Liesegang 1975; Fig. 5.39). These ceramics have recently been called the Pahi type (Kessey 2005). They were made of fine clay, and were often slipped and burnished. The most common decorative motif was comb-stamping, which occurred all over the body but was especially prevalent around the rim, and bands of walked, rocked, and fingernail impressions were also common. Incised decorations, such as zigzags, also occurred, but rarely.

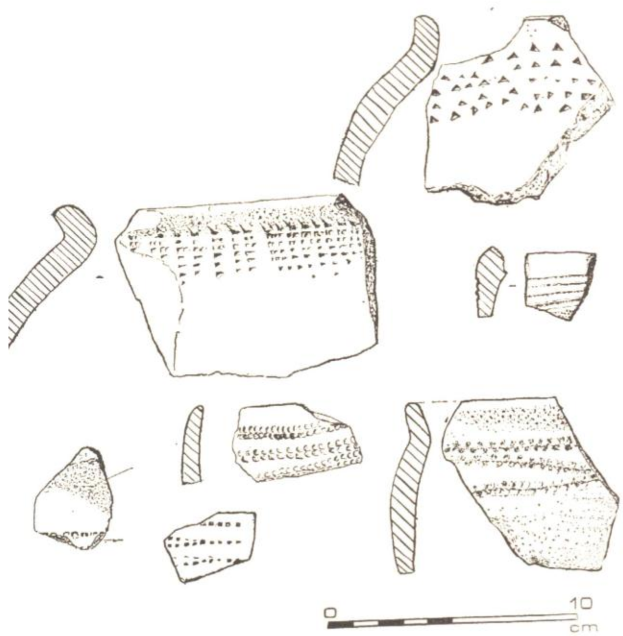

Figure 5.39 Examples of Pahi ceramics (Liesegang 1975: 99)

Mozambique

The first half of the second millennium also witnessed the development of a new ceramic type in northern Mozambique known as the Lumbo Tradition. These ceramics have been dated to the 13th and 14th centuries (Sinclair 1991, Duarte 1993, Madiquida 2005). Lumbo was characterized by unrestricted open bowls (Duarte 1993) and the proportions of necked vessels that were common in the first-millennium Nampula Tradition decreased notably, though some continued to be made. Common design motifs included areal stamping, where the stamped impressions fill delineated areas of the vessel, and shell impressions (Fig 5.40).

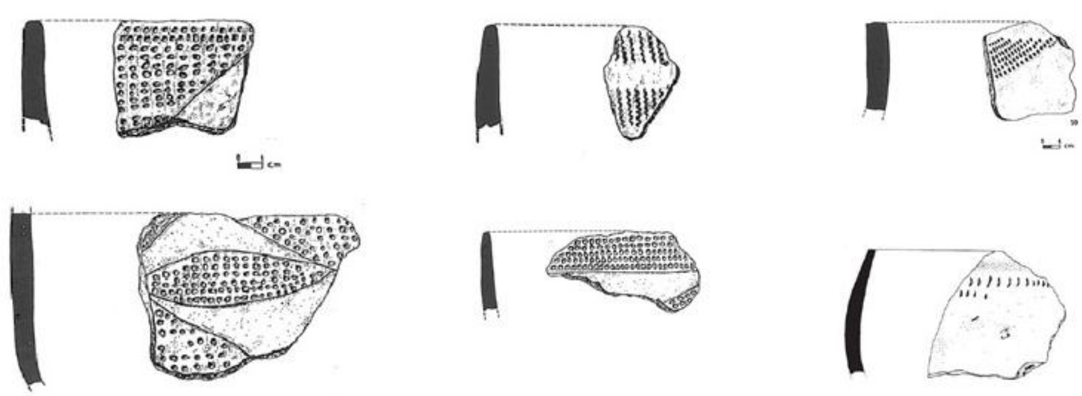

Figure 5.40 Examples of Lumbo Tradition ceramics (Duarte 1993)

Malawi

West of northern Mozambique around Lake Malawi, several different ceramic types developed in the early second millennium from Nkope and Mwabulambo predecessors. Near the northern part of the lake a type known as Mwamasapa was produced (Robinson 1966a, 1982; Robinson and Sandelowsky 1968). Mwamasapa vessels were predominantly gray to reddish-brown necked or open bowls, though some globular vessels were present as well. They were also thinner than the earlier Mwabulambo vessels, and some rims were tapered (Fig. 5.41). The most common decorative motif was bounded, comb-impressed areal stamping. These decorations were done using sorghum grains in some instances (Robinson 1982). Notched rims were also common. The Mwamasapa type was produced as early as the 11th century along the Rukuru River (Robinson and Sandelowsky 1968) and continued to be made until the middle of the second millennium (Robinson 1966a, Phillipson 1977a).

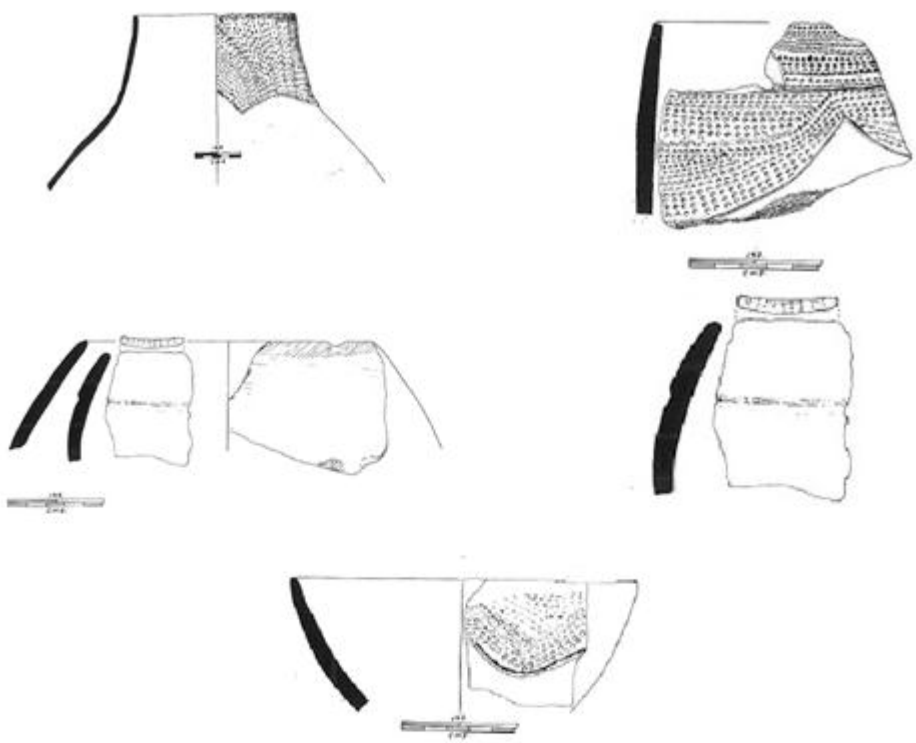

Figure 5.41 Examples of Mwamasapa ceramics (Robinson 1982: 57-61)

Several second-millennium ceramic types have been identified near the southern part of Lake Malawi. The earliest of these, dating between the 10th and 14th centuries CE (Robinson 1976) is known as Kapeni. Kapeni has been found associated with Nkope ceramics in the 10th century and expressed similarities to both Nkope and Mwabulambo in terms of vessel forms and decoration, so some have classed this as a terminal EIA type (Juwayeyi 1993) and it might even be thought to represent a final phase of Nkope. Typical Kapeni vessel forms included slightly flared necked pots, shallow bowls, and in-turned bowls (Robinson 1976). The in-turned bowls often employed polychrome burnish. Decoration, which was most prominent on the necked pots, consisted of modified EIA motifs, usually coarsely incised. Common motifs included bands of vertical incisions, horizontal grooving, incised zigzags and triangles, and punctate bands.

At about the same time that Kapeni ceramics began to be produced, another ceramic type known as Longwe emerged in southern Malawi. Longwe ceramics have been dated to the 11th century (Robinson 1977) and may have been made in the 10th (Juwayeyi 1981). Longwe vessels were mostly bowls, trending from open through hemispherical to globular depending on the level of rim restriction, and some carinated vessels also occurred (Robinson 1977). These bowls were typically heavily decorated with closely set point and comb-stamped impressions, but deep channeling occurred on some of the carinated vessels (Fig. 5.42). The Longwe ceramics have an uncertain relationship to a subsequent regional ceramic type, Mawudzu. The two types were originally grouped together on account of similarities in their vessel forms (Denbow 1973), but differences in decoration indicate that such a grouping may not be reliable (Robinson 1977) and the issue is further complicated by questions regarding the subsistence practices of Longwe users (Juwayeyi 1993).

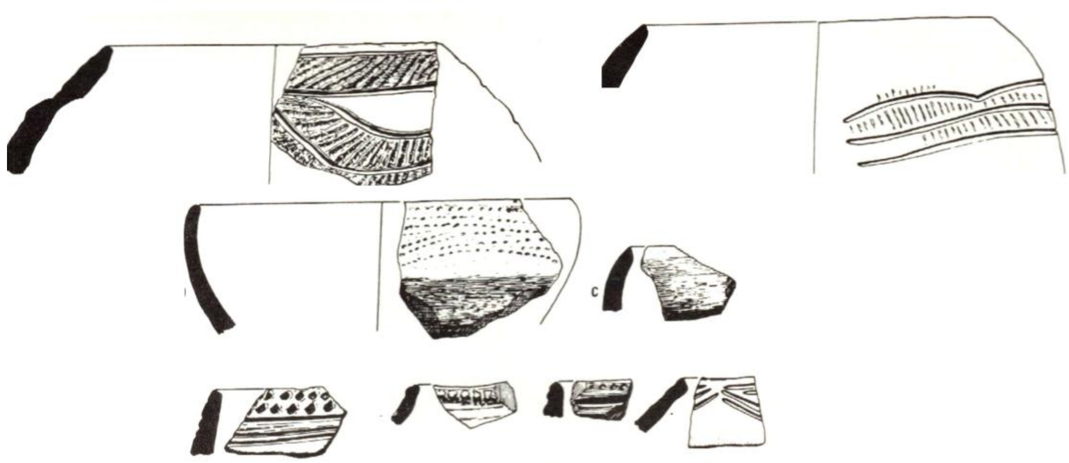

Figure 5.42 Examples of Longwe pottery (Robinson 1977: 65-69)

Mawudzu ceramics have been dated to the 12th and 13th centuries (Mgomezulu 1981) but were more common after the 15th. Their expansion in the middle of the second millennium may be associated with rising levels in Lake Malawi (Sinclair 1991). As mentioned above, Mawudzu ceramics showed affinities with the older Longwe type, but they have few associations with Kapeni and Nkope ceramics. The most common vessel forms were open bowls and globular bowls, though necked vessels and beakers were produced as well. Mawudzu ceramics had tapered rims and thin walls (Davison 1991). Graphite burnish and polychrome burnish occurred rarely (Robinson 1970). The most common decorative motifs were incised forms, including arcs, meanders, filled bands, and filled humps (Davison 1991; Fig 5.43). Other motifs such as incised areas, ribbons filled with dentate stamping, and nicked rims evidenced a degree of decorative similarity to the northern Mwamasapa ceramics (Robinson 1970).

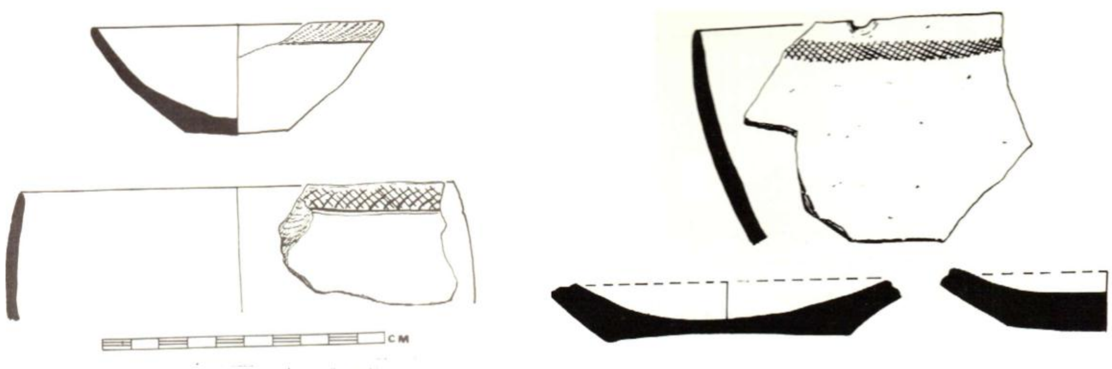

Figure 5.43 Examples of Mawudzu pottery (Robinson 1977: 79-81)

Another early second-millennium type from southern Malawi known as Namaso was restricted to the lakeshore (Davison 1991). It consisted of mostly globular and open bowls, but had quite a few necked and carinated forms. Decoration was common, occurring on more than 90% of vessels in some assemblages, which distinguished Namaso from the Mawudzu type. Decoration was usually placed near the rim but sometimes covered much of the body. The most prevalent decorative motif, occurring on

40% of vessels, was a band of crisscross incisions, though various other incised and comb-stamped bands were also common (Fig. 5.44).

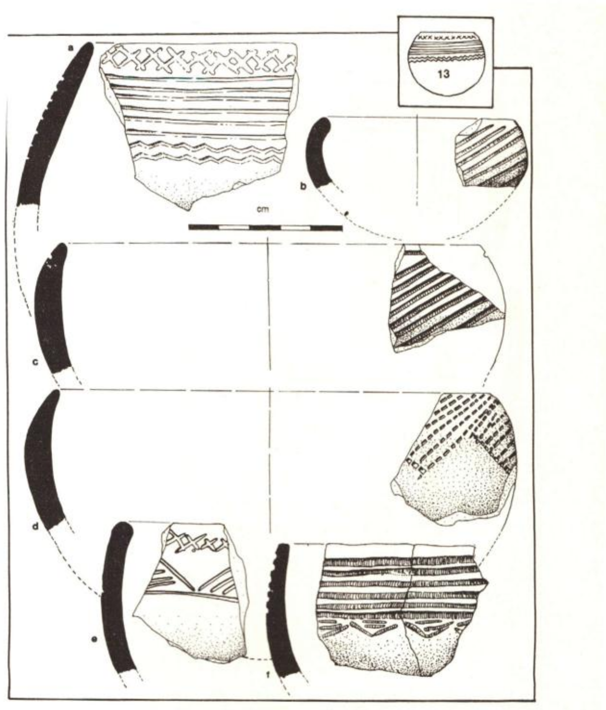

Figure 5.44 Examples of Namaso ceramics (Davison 1991: 31)

Zambia

West of southern Malawi in northeast Zambia a new ceramic type known as the Luangwa Tradition developed in the 11th century (Phillipson 1975). This type became widespread over northern and central Zambia, displacing both Eastern Stream and Western Stream predecessors, and variants continued to be made into the 20th century (Phillipson 1976a). Luangwa ceramics did not have a clear connection to any of the preceding first-millennium ceramic types, though its closest relationship was to Chondwe pottery of the Western Stream (Phillipson 1977a). Necked pots and shallow bowls were common and widespread; other forms were rare and spatially limited. The rims of

Luangwa vessels had a tendency towards being tapered. The most common decorative motifs were comb-stamped patterns, often arranged into bands but also into ribbons and triangles (Fig. 5.45). Incised motifs were less common and mostly consisted of cross-hatching (Huffman 1989b).

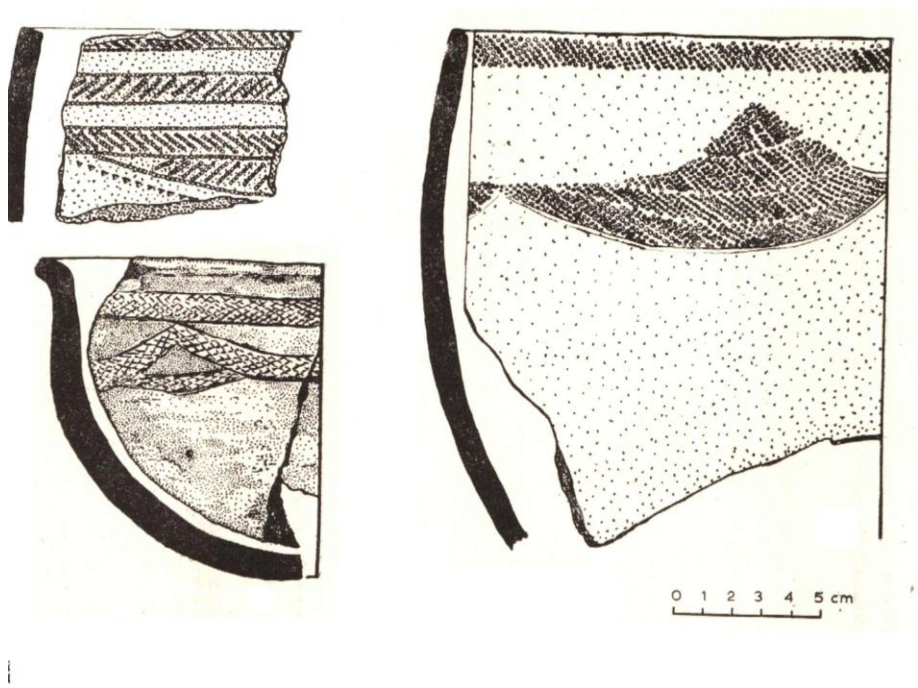

Figure 5.45 Examples of Luangwa Ceramics (Phillipson 1976a: 33-35)

In southern Zambia during the early second millennium Kalomo ceramics developed from the earlier Dambwa type. Three phases of a Kalomo Tradition have been identified, covering over 500 years (Fagan 1967, Vogel 1970, 1971b). The earliest Kalomo ceramics were pots and spherical bowls decorated with bands of oblique or hatched incisions, comb-stamping, or with alternating triangles of grooved decoration, made with a deeper and narrower stylus than used for the channel decorations common in the early Dambwa phases. These early spherical bowls and coarse pots gradually gave way to a poorly-defined middle phase where sub-spherical globular pots and necked vessels were prevalent (Vogel 1970, 1971b, Katenekwa 1978). Graphite burnishing and comb-stamped bands below the rim were both common in this phase. In the last phase open bowls and vessels with up-turned rims thought to have been used to hold liquids became the dominant forms, though necked vessels and globular vessels were also produced (Fagan 1967). These vessels were normally decorated with a narrow band of incision immediately below the rim and more than one-third were graphite burnished (Fig. 5.46).

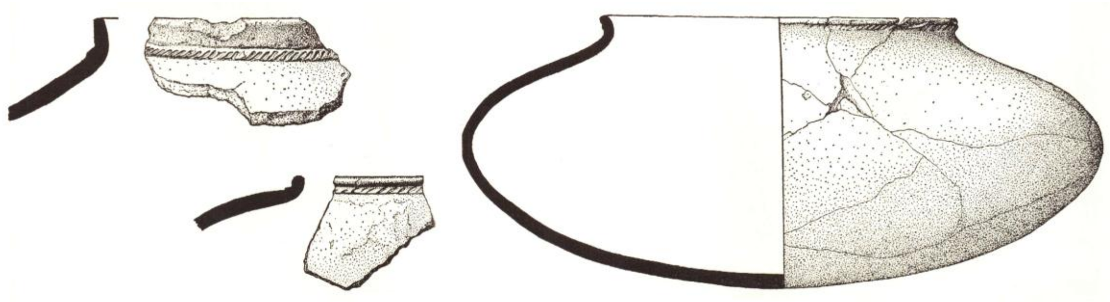

Figure 5.46 Examples of third phase Kalomo pottery (Fagan 1967: 97-109)

Southern Africa

Moving south from Zambia across the Zambezi River new ceramics were also produced during the second millennium in southern Africa. In the areas that had produced Zhizo, Ziwa, and Gokomere ceramics a new type usually called Leopard's Kopje developed in the early second millennium. Leopard's Kopje ceramics are named for the type site of Leopard's Kopje (Nthbazingwe), but have also been called Kutama (Huffman 1978). Though Zhizo ceramics have been found in the lower levels of several Leopard's Kopje sites, the latter are clearly distinct from Zhizo ceramics and do not show a continuation of earlier trends (Huffman 1971, 1974). Leopard's Kopje ceramics are typically associated with cattle-herding groups, on the basis of faunal remains and cattle figurines present at Leopard's Kopje sites, and the shift in pottery they represent should be placed in context of herding communities expanding into the Zimbabwean gold belt with its harder-to-till soils but ample pasturage. While initially existing alongside Zhizo-using groups, the communities using Leopard's Kopje ceramics displaced them in Zimbabwe during the first half of the second millennium, with Zhizo groups retreating towards Botswana (Huffman 1986, 1996, Pikirayi 2001). Recent research has shown that this process was much more complex than simple replacement however, and involved significant interactions between those using the two pottery types (e.g., Calabrese 2000, Vogel and Calabrese 2000)

Phases and regional clusters have been identified within the Leopard's Kopje type. The first phase is represented by the closely related but geographically distinct Mambo and Bambandyanalo clusters, which developed perhaps as early as the 10th century CE (Huffman 1978). These clusters then further differentiated into the Woolandale, Mapungubwe, Gumanye (Great Zimbabwe), Musengesi, and Harare clusters throughout the first half of the second millennium, with the transition usually complete by sometime in the 13th century (Robinson 1966c, Huffman 1974, 1978). For the purposes of this analysis the focus will remain on the features that unite these regional clusters. In the early phase of Leopard's Kopje ceramics the most common vessel form was the necked pot, often with tapered rims, though novel vessel forms for the region such as beakers, beaker bowls, and globular pots were also used (Robinson 1961, Huffman 1971, 1974). Incised decorative motifs were most common, sometimes including loops and triangles, and decorations became more restricted to the neck, in contrast to the comb-stamped decoration occurring over the whole rim-shoulder area found on Zhizo ceramics (Huffman 1974). Burnishing was commonly employed. In the later phase, incised decorative motifs became even more prevalent relative to comb-stamped motifs, with incised loop motifs especially common. Dragged incisions and incised geometric designs also became more common. The vessel forms remained mostly the same between the two phases, though the later material included fewer beakers.

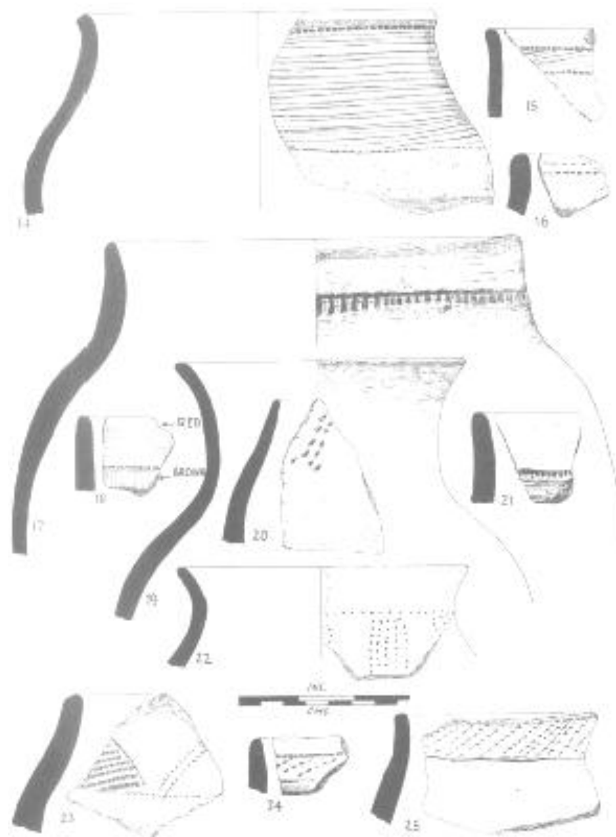

Figure 5.47 Examples of Leopard's Kopje ceramics (Robinson 1966c: 32)

The regional cluster which included Great Zimbabwe is worthy of additional discussion due to that site's regional importance and long-distance trade connections. As expected, the early material at Great Zimbabwe comprised mostly necked vessels with tapered rims and it was often undecorated (Robinson 1961). In the 13th and 14th centuries necked vessels remained the most common form, globular vessels and beakers were common, and bowls were rare. The necked vessels of this period were distinguished by their short upright necks and pronounced shoulders, and many of them possessed a graphite burnish finish (Phillipson 1977a). Decoration remained rare, though certain decorative motifs were prevalent including hatched incised triangles and incised crosshatching or herringbone patterns at the base of the neck on necked pots. In line with the greater influence of Great Zimbabwe, these ceramics also possessed a relatively large geographic range, extending east into Mozambique where they have been found at Manyikeni (Garlake 1976). The ceramics from this site were similar to those at Great Zimbabwe, but some of the bowls employed shell impressed decorative motifs, which were not present further inland.

Mid- to Late Second-Millennium Ceramic Traditions

Although variants of some of the regional types that developed during the early second millennium continued to be made into the 20th century, in other regions the local ceramics produced in the middle of the millennium were clearly different from those made a few centuries earlier. In addition to the later phases of the Kalomo and Leopard's Kopje ceramic traditions mentioned above, archaeologists have identified a number of distinct traditions for the middle of the second millennium.

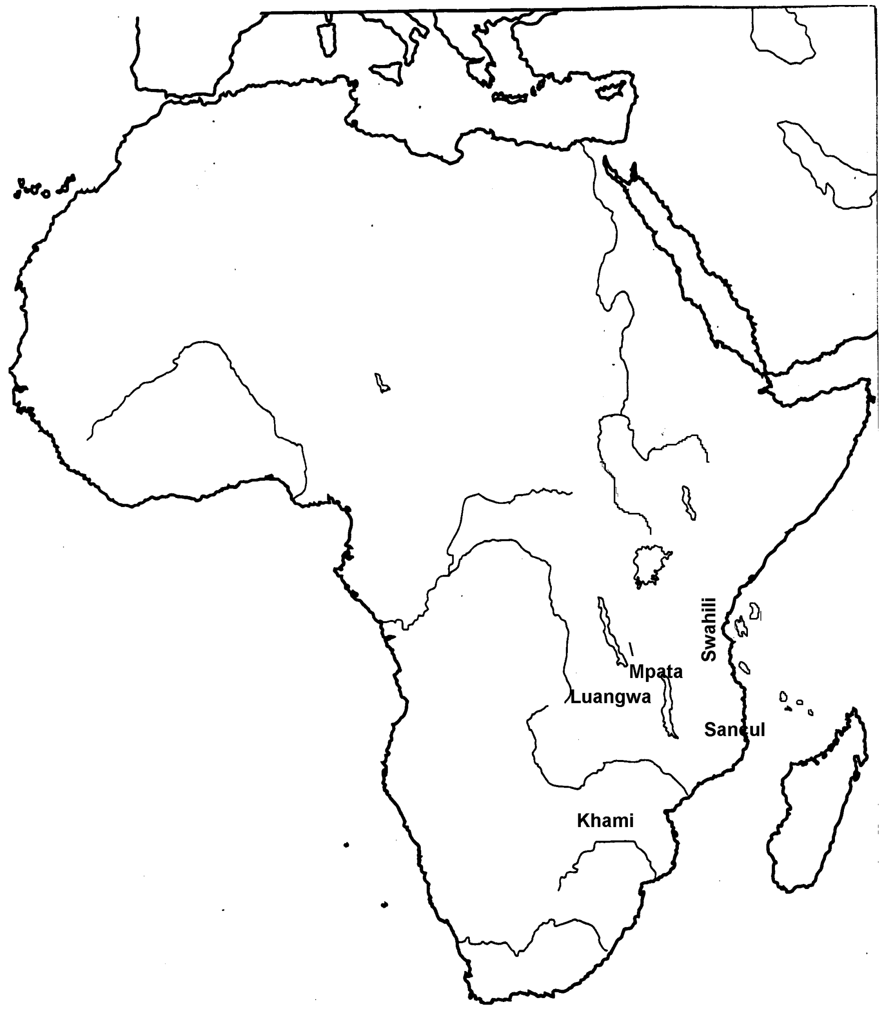

Figure 5.48 Map showing the location of mid-second-millennium ceramic types mentioned in the text

East African Coast

Along the East African Coast, a ceramic type known as Swahili Ware has been identified for the period between 1300 and 1500 CE (Chami 1998). Swahili Ware was characterized in part by the extension of the neck-punctated pottery from the northern coast to the southern coast. Characteristic ceramics appeared at certain Tanzanian sites such as Pangani, where the necked vessels and open bowls bearing punctate bands were the "most common form" (Gramly 1981: 20). The punctate motif remained one of the most common decorative motifs at Pate during this period, though only 2% of vessels bear any decoration at all and oblique and crosshatched incisions were also common (Wilson and Lali Omar 1997). That motif remained relatively prevalent in the ceramics from Shanga after 1300 CE, but, as before, other incised motifs were as popular (Horton 1996). However, at Kilwa the punctate motif was found mostly between the 9th and 13th centuries (Chittick 1974), and on Pemba Island it did not occur after 1300 CE (Fleisher 2003), so clear regional variations can be identified in the proposed "Swahili Ware" type.

After all, the tendency towards regionalism in coastal ceramics continued to expand into the middle of the second millennium (Fleisher 2004). In the 14th century Kilwa developed its unique Husuni Ware (Fig. 5.49), characterized by necked pots and bowls with applied ornament on the surface (Chittick 1974). Other vessels were mostly necked or carinated, but convergent mouth bowls were also made. When decorated these vessels usually bore incised arcs filled with comb and shell impressions, with punctate bands occurring only rarely. In the 15th century these forms continued, but the most common decorative motif shifted to thick bands of oblique and crosshatched incisions. On Pemba decorations were rare after 1300 CE, and mostly consisted of a few standardized incised motifs. The vessel forms were overwhelmingly open bowls (Fleisher 2003). These distinctions caused Fleisher to suggest that a "Pemban Tradition" might be identified (Fleisher 2003). Alongside this variability there were differences in the frequencies of decorative motifs even among the sites that yielded "neck-punctated" vessels. There were thus clear regional distinctions on the coast in terms of vessel form, decorative motifs, and motif frequency in the mid-second millennium, and at Kilwa at least the most notable local ceramic did not have a range that extended beyond the immediate hinterland of the site.

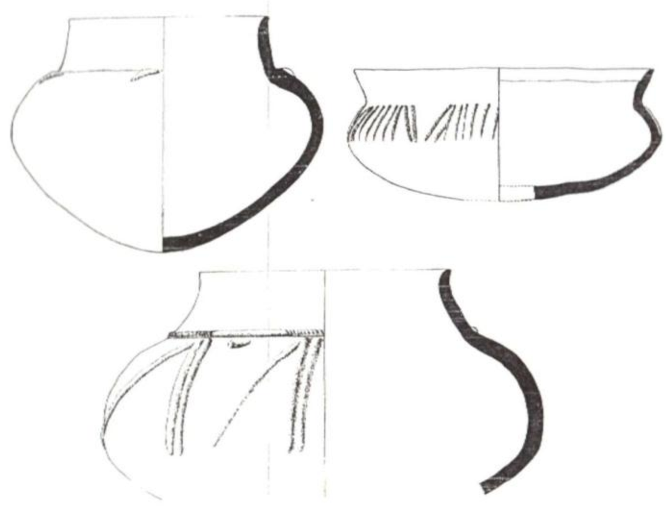

Figure 5.49 Examples of Husuni Ware (Chittick 1974: 365)

Although this regional variability frustrates attempts to define a comprehensive coastal ceramic type in the style of Swahili Ware, there were certain continuities in the ceramics of the coast that should be recognized. During the 14th and 15th centuries perhaps the most recognizable shared element at many coastal sites was the red-painted open bowl. These bowls, sometimes decorated with graphite, occurred at Pangani (Gramly 1981), Kilwa (Chittick 1974), Pate (Wilson and Lali Omar 1997), and on Pemba Island (Fleisher 2003). However, the dating and frequency of these bowls varies considerably. At Pate and Pangani they seem to date to the 15th century, but they are found as early as the 13th century at Kilwa. And while they comprised nearly every bowl at Pangani, on Pemba their frequencies varied considerably from site to site, and burnished ceramics made up less than 6% of the ceramics from Pate from the period. So, much as the case with punctate bands, the distribution of red-painted bowls demonstrates that certain continuities did exist between sites, but that focusing only on those continuities, particularly when they are defined by one or two attributes, ignores the wider variation that existed even between assemblages that share connections.

Mozambique

In coastal Mozambique the middle of the second millennium witnessed the development of the Sancul Tradition, dated to between the 15th and 18th centuries (Sinclair 1991). This pottery had a fairly broad distribution, found from the Quirimba Archipelago in the north to the Save River in the south (Sinclair 1985, 1986, Duarte 1993). The Sancul tradition included some of the red-painted open bowls noted further north along the coast, as well as wheel-thrown pottery (Sinclair 1991). It is described as being very fine and highly fired (Madiquida 2005). The characteristic decorative motif of these ceramics was a raised appliqué decoration (Mitchell 2002: 326) as well as a variety of incised and impressed motifs (Madiquida 2005; Fig. 5.50).

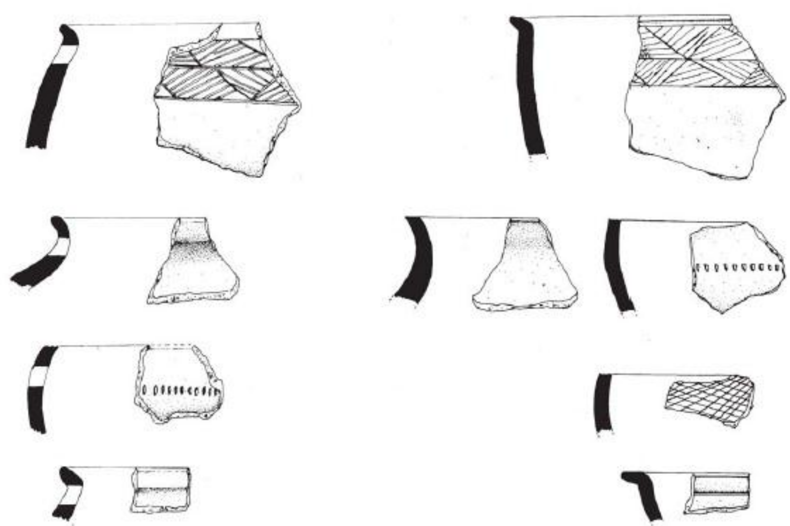

Figure 5.50 Examples of Sancul Tradition pottery (Madiquida 2005)

Malawi

In northern Malawi a ceramic type known as Mpata developed after 1500 CE (Robinson 1982). Known especially from the site of Mbande Hill (Robinson 1966a, 1982) this type was dominated by open bowls, many of which were burnished. The rims were mostly rounded and tapered. The most common decorative motifs were finely incised crosshatching, scoring, and sometimes mamilations (Fig. 5.51), forming a clear distinction with the areal stamping common in the preceding Mwamasapa type. The necked vessels common with Mwamasapa mostly disappeared with Mpata as well. Variants of Mpata pottery continued to be produced into the 20th century (Robinson 1966a).

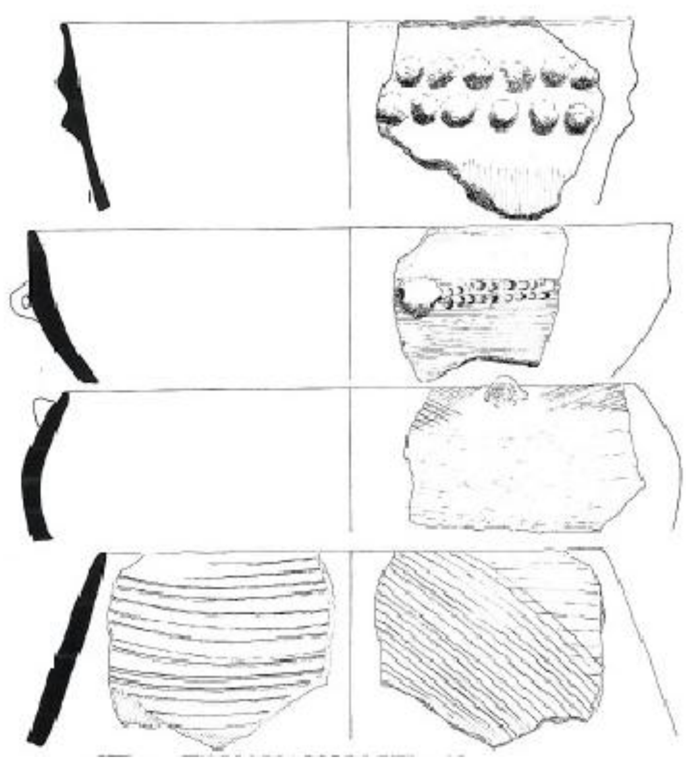

Figure 5.51 Examples of Mpata pottery (Robinson 1982: 63)

Southern Africa

Further south in Zimbabwe and southern Mozambique the Khami ceramic type occurs. These ceramics were associated with Rozvi kingdom of the 15^{th}-18^{th} centuries CE (Garlake 1974). Most of these vessels were undecorated. The most common vessel form was the necked pot, though there was significant variation in the neck height, and globular vessels also occurred (Robinson 1959, 1961, Garlake 1974). When decoration did occur it typically consisted of incised or stamped lines forming geometric patterns. These decorations were often colored with various substances to produce a polychrome effect. The undecorated pottery was often burnished or graphite burnished and thin, though a thicker untreated ware also existed (Robinson 1959).

Implications of the Distribution of Ceramic Types

The above discussion gives a sense of the range of pottery types which that been employed to describe the ceramic variation of eastern and southern Africa. The large number of types is indicative of the broad spatial and temporal scales under discussion. To understand how Mikindani fits into the broader context not just of the ceramic variation but also of other historical developments it is important to consider the cultural and social implications of the ceramic typologies in additional to the technical detail they provide. For each period, ceramic types provide evidence of the significant connections or the significant absences of connection between different regions, even if they do not of themselves explain why those connections might exist. Ceramic types are often associated with material evidence for major developments such as iron-working, agriculture, or new levels of social complexity, although the association was less straightforward and automatic than previously hypothesized –these developments are not linked with ceramics into a single cultural package – and the social processes involved were much more complex than previously thought. Ceramic types also carry important social and economic information when they are subject to functional analyses of the vessels themselves that illustrate the patterns surrounding their use (Henrickson and McDonald 1983, Sinopoli 1991, Ashley 2010). In this section these varieties of social and cultural insight will be discussed for the ceramic types identified during each period.

Overview of Late Stone Age Ceramics

The dating of many of the Late Stone Age ceramic traditions remains problematic (see Kusimba and Kusimba 2005, Phillipson 2005). For instance, while it is clear that Kansyore pottery is produced between the first and third millennia BCE, recent evidence has suggested that the earliest Kansyore sites might date back as far as the seventh millennium BCE (Dale *et al.* 2004), indicating that the type is rather improbably dated to a period covering around 6000 years. Moreover, establishing a chronology of ceramic types is made more difficult by the frequent finds of multiple types in the same deposits at the same sites, which has led some authors to reject the existing LSA typological framework altogether (e.g., Phillipson 2005). For instance, at Gogo Falls in Kenya near Lake Victoria, Kansyore ceramics are found in the same deposits with Elmenteitan, Akira, and Urewe ceramics (Robertshaw 1991, Karega-Munene 2002) and at Seronera in Tanzania they were found associated with Nderit and Akira ceramics (Bower 1973).

Despite the difficulties inherent in trying to establish a ceramic chronology for the relatively ill-defined and overlapping LSA types, those same difficulties are important to understanding the real significance of these ceramics in East African history. As previously described, they have often been associated with the advent of settled life and "Neolithic" subsistence patterns including domesticated foodstuffs. The archaeological record provides some evidence for such connections. The so-called "Pastoral Neolithic" ceramic types from Kenya and Tanzania such as Elmenteitan, Narosura, and Nderit are often found in association with significant quantities of domesticated animal bone (Robertshaw1990a) as is the Bambata pottery of southern Africa (Reid *et al.* 1998). Evidence of domestication has also been found with LSA pottery at cave sites on Zanzibar (Chami 2001a). Kansyore sites, which often are not clearly associated with domesticated crops or animals, still appear to represent long-term occupations, particularly around Lake Victoria.

However, the variability present in LSA ceramics, particularly in the last millennium BCE and the first millennium CE, suggests that these ceramic types should *not* be considered as bound up in a particular package of technology, language, and subsistence practices. They should especially not be considered as markers of any particular ethnic group spreading domestication. Bambata ceramics have often been found at hunter-gatherer sites (Robinson 1966b, Pikirayi 2001). Nderit ceramics have been found with the Eburran stone-tool industry at hunter-gatherer sites in Kenya (Ambrose 1998, Marshall and Hildebrand 2002). Some Akira ceramics may have been made by hunter-gatherers and traded as prestige items (Robertshaw 1990b: 294). Kansyore ceramics are most commonly found at sites with the remains of wild fauna (Sutton 1994/5; Phillipson 2005: 211) but occasionally also with domesticated ones

(Karega-Munene 2002, Lane *et al*. 2007). The spatial overlap of many of the "Pastoral Neolithic" types further complicates the picture.

Models stressing the mechanisms of interaction between groups that might have produced such a variable record based on the discontinuous spread of these various technologies and their associated social patterns have been explored (e.g., Gifford-Gonzalez 1998, Robertson and Bradley 2000, Karega-Munene 2002, Marshall and Hildebrand 2002, Lane 2004, Kusimba and Kusimba 2005, Lane *et al.* 2007). The most compelling of these models describe various degrees of cooperation and integration between groups practicing different strategies in closely spaced ecological zones (see Ambrose 1982), developments emerging from local patterns of group interaction, and larger degrees of cultural and demographic continuity than expressed in earlier migration models. While correlations between such LSA ceramic types and material found in the area around Mikindani are important for establishing and exploring connections between regions, they should not be considered proxy evidence for the arrival of an ethnic group or the adoption of a particular way of life – LSA ceramics have been found with multiple groups practicing multiple subsistence strategies.

Overview of Early Iron Age Ceramics

The spatial and temporal ranges of EIA ceramics are better known, in part because of the larger assemblages available for study both in terms of the number of sites and the number of ceramics found at each site. However, while the LSA ceramics have problematic associations with "Neolithic" activities, EIA ceramics have even more problematic associations with models of "Bantu migration." The reasoning behind those associations is fairly straightforward. The EIA ceramic traditions of eastern and southern Africa display a notable degree of similarity (Phillipson 1977a), such that they are sometimes referred to as a single complex, alternately referred to as Chifumbaze (Phillipson 2005) or Early-Iron-Working (Chami 2006). The Eastern Bantu languages evidence a high degree of inter-comprehensibility and are thus thought to have diverged within the past 3000 years (Ehret 1998). The area which Bantu languages are currently spoken also nearly matched that where EIA ceramics were found. Finally, EIA ceramics are often found together with the first evidence of ironworking activity in a region and, while the evidence is considerably patchier, with evidence of agriculture. Given these facts, it seemed straightforward to align the archaeological data with models of large-scale migration of iron-wielding, agriculturalist Bantu speakers that were current in African history (e.g., Oliver 1966) and many archaeologists did so (e.g., Hiernaux 1968; Huffman 1970, 1980; Phillipson 1977a).

The idea of a single, large-scale Bantu migration has been challenged by archaeologists, historians and linguists for some time now for a variety of reasons (e.g. Ehret 1982, 2001; Lane 1994/5; Vansina 1994/5, 1995, 2001; Schoenbrun 1998; Chami 2001b, 2007; Spear 2001; *cf*. Phillipson 2005: 265). The expansion of a language family does not need to be accompanied by an equivalent demographic expansion, but can rely on other social processes, such that the current geographic spread of Bantu speakers does not necessitate a migration (Vansina 1995, 2001). Historical linguistics also suggested more complex relationships existed between different Bantu languages and between Bantu languages and neighboring non-Bantu languages than replacement (e.g., Ehret 1998, Schoenbrun 1998). In particular the data suggest that there may have been many movements of Bantu-speaking populations and that some portions of the supposedly "Bantu" technological package such as iron-working may have been, at least in part, borrowings from non-Bantu groups (Ehret 1998). The idea of a large-scale Bantu migration also failed to explain the increasing archaeological evidence for cultural variability in eastern and southern Africa. Even proponents of "the physical movement of substantial numbers of people" note that agriculture, domesticated animals, iron-working and sedentary life "were not inseparably linked in a single 'package'" which would have provided Bantu speakers with a technological advantage (Phillipson 2005: 249-50). Instead, these various innovations occurred at different times in different combinations and, in the case of domestication, sometimes in association with LSA ceramics rather than EIA ones. Taken together with increasing awareness of variation within EIA ceramic types (e.g., Kiriama 1993, Lane *et al.* 2007, Ashley 2010) and criticism of the flawed, facile connection drawn between EIA ceramics and Bantu speakers (e.g., Hall 1984, Karega-Munene 2003), archaeological evidence has shown that, in the words of Vansina, "this once-persuasive migration hypothesis is totally discredited" (1995: 174).

Having mostly rejected the notion of a large-scale migration, archaeologists have developed other models to make sense of EIA society and explain the distribution of EIA ceramic types. The particular problem that still requires explanation is what combination of social processes would at once produce the similarities that exist between different EIA ceramic types and the internal variation that exists within each type. Recently Felix Chami (2001b, 2006, 2007) has moved in the opposite direction from migration theories and suggested a novel diffusionist position. Chami's position avoids the racism of earlier diffusion theories (see Sanders 1969) and focuses on many of the new archaeological finds of early LSA communities outside of the Rift Valley and evidence for early Indian Ocean trade connections at some of those sites. He describes Bantu-speaking people settled in place from LSA times, developing and then spreading agriculture, a continuous string of ceramic traditions, and the Bantu languages throughout eastern and southern Africa.

The attention to new archaeological evidence is commendable, but Chami's position is flawed in a number of ways. The most significant flaw is the continued unsupportable association of ceramic types with linguistic groups. Rather than continuing to suppose that EIA ceramics, and possibly their precursors, are made by Bantu speakers or that Bantu speakers are responsible for domesticated species as Chami does, we again need to decouple language, ceramics, and other material remains. The continuity in ceramics that Chami argues for thus need not imply strict demographic continuity in the EIA. The other significant flaw is the trait-matching approach to ceramics that underlies Chami's notion of a LSA "civilization" (2001: 651). This critique is not to deny the participation of some East African communities in interregional trade and stable, settled agricultural life from the LSA period of the last millennium BCE, nor the presence of pottery-making and domesticate-exploiting groups throughout eastern and southern Africa at the same time. However, Chami's linkage of disparate ceramic types on the basis of similar decorative motifs and non-problematized use of surface samples suggests a unity among LSA and EIA ceramics that did not exist. However much some of their decorative motifs may resemble one another and even if they belong to a single "complex," Nkope is not the same as Gokomere and neither is the same as Kwale (*cf.*

Chami 2006: 120-127). Ignoring the differences between them discounts the important variations that provide the detail of local EIA developments. Still, Chami's diffusionist position is an advance from migration models. It emphasizes the important LSA evidence for domestication that decouples herding and agriculture from iron-working, EIA ceramics, and Bantu languages. It also forces recognition of the fact that eastern and southern Africa was *not* only inhabited by sparsely populated forager groups before the Iron Age, but was already home to diverse communities.

Other theoretical approaches to EIA ceramics since the demise of Bantu Migration models have worked to incorporate this diversity into the social models they reconstruct (e.g., Vansina 1995, Robertson and Bradley 2000, Lane *et al*. 2007). Indeed, in the words of Thomas Spear (2001: 45), "a new historical consensus is emerging, one that envisions multiple overlapping diffusions of peoples, languages, agricultural economies, and iron metallurgy together with complex patterns of social interaction." Perhaps the most important development has been recognition of the diverse groups that contributed to EIA society in different regions, rather than imagining it as the province of Bantu migrants. Linguistically, the wider society of the Early Iron Age has been shown to be an amalgam of Bantu, Sudanic, and Cushitic speakers (Ehret 1998, 2001; Schoenbrun 1998; Posnansky *et al.* 2005). The spread of Bantu speech then occurred more by interaction and language shift – the adoption of Bantu languages by previously non-Bantu-speaking groups – than it did by population movements (Vansina 2001).

Archaeology plays an important role in determining the nature of such interactions. In parts of Zambia, a multi-stage development of sites from camps to settled villages has been chronicled, suggesting that interactions between hunter-gatherer groups and agriculturalists were significantly shaped by local conditions. Such multi-stage development exhibited high levels of continuity as foragers adopted some elements of EIA agricultural lifestyles while maintaining other aspects of their own (Robertson and Bradley 2000). Similar multi-ethnic, multi-economic patterns of interaction in “cultural mosaics” have also been described for portions of East Africa (Kusimba and Kusimba 2005: 393; Kusimba 2009; see also Lane *et al*. 2007). EIA ceramics, and ceramic types, are an important piece of evidence in the reconstruction of such interactions. The types themselves provide evidence of interactions across space.

More intriguingly, a careful analysis of a ceramic type across multiple characteristics when combined with understanding of the contexts of individual sites bearing such ceramics should allow ceramic analyses to move beyond purely typological endeavors to consider social questions (Pikirayi 2007, Ashley 2010). For instance, the relatively modest size of Urewe vessels and the predominance of necked vessels along with hemispherical and open bowls – interpreted as storage jars, cooking vessels and serving dishes respectively, following Henrickson and McDonald (1983) – is argued to relate to a household-oriented society with structured patterns of food preparation and serving (Ashley 2010: 157). At the same time, the relatively high quality of Urewe ceramics and finds of complete vessels in association with iron smelting and burials suggests an involvement in ritual activities as well. Perhaps most importantly, attention to functional ceramic variability between and within Urewe sites suggests “an eclectic food-system” (Schoenbrun 1993 quoted in Ashley 2010) where different communities pursued different subsistence objectives to varying degrees. Unfortunately, very few such analyses have so far been undertaken for EIA types.

Late First Millennium

The ceramics of the late first millennium described here have not been associated with any grand models such as the "Bantu migration." While these ceramics demonstrate clear typological connections and developmental continuities with preceding types, they were nonetheless distinct from what came before and offer some insight into changing social and economic relationships at the time. As with the preceding periods, it is important to be mindful of the variation within these types as well, and to recognize that the presence of a given type is not proof of a particular form of socio-economic organization nor, certainly, of a particular ethnic group.

In the Lakes Region, analyses of Transitional Urewe ceramics have suggested that the reduced repertoire of vessel forms and lesser attention to detail and quality in construction and decoration indicate a social shift in which the household became less important relative to supra-household groupings (Ashley 2010). Both Zhizo and Tana/TIW ceramics are associated with increased levels of social complexity at some sites, as well as involvement in interregional trade.

Along the East African coast Tana/TIW has often been associated with the origins of the Swahili. This association is problematic, much like the earlier association of Bantu-speakers with EIA ceramics. It presents an essentialized, falsely monolithic view of both the makers of Tana/TIW ceramics and Swahili people. Archaeological research has demonstrated that not everyone making Tana/TIW resided near the coast, much less participated directly in the Indian Ocean maritime world. The wide geographic range of the ceramics, and the fact that they were almost always made locally, suggests that they were not being made by a single ethnic group (Chami 1994). Swahili society of the second millennium developed from Tana/TIW-using precursors, but Tana/TIW users did not develop into Swahili everywhere. Similarly, while some Tana/TIW sites in the late first millennium show evidence of significant social complexity, not all Tana/TIW sites were of greater complexity than the settled villages of the preceding centuries. It is thus increasingly clear that the local contexts of Tana/TIW finds demand greater explication, before making any particular social or ethnic associations. Nonetheless, the presence of Tana/TIW ceramics at a site does indicate participation in a broader interaction sphere and thus exposure to some of these other developments, regardless of whether or not the inhabitants participated, or were able to participate, in them.

Early Second Millennium

In many regions, the second millennium is marked by an increase in the number of ceramic types that are found. Some of this proliferation of new types might simply result from a greater appreciation of ceramic variability. However, in many cases these new types also seem to reflect new social realities and correspond to settled regions that are dominated politically and economically by particular settlements or polities. In the Lakes Region several new types of roulette-decorated pottery develop at the same time that studies of the ceramics' form suggests new patterns of communal consumption, perhaps orchestrated in support of new levels of chiefly authority (Ashley 2010). On the East African coast ceramic variability is highly correlated with geography, as distinctions between the northern and southern coast are clear in decorative motifs (Chami 1998) and multidimensional analyses show notable differences between individual sites. The coastal ceramics also seem to reference shifts in food consumption, with the increased number of open bowls rather than necked vessels likely indicating an increase in feasting (Fleisher 2003, 2010b). In southern Africa there are several regional clusters within the broader Leopard's Kopje type, and several of those clusters are associated with emerging regional polities such as Mapungubwe and Great Zimbabwe.

While the emergence of new second-millennium ceramic types often reflected changing patterns of social organization, particularly when combined with social analyses of the pottery itself, they should not be seen as proxy indicators of a given polity or level of social organization. Ceramic types may have become more localized as Swahili cities competed with one another on the coast, or in support of particular chiefly ideologies in the Lakes Region, but that does not mean that every instance of a given type is evidence for the political or economic authority of a given city or chief. The increasing localization of ceramic types does however provide important information regarding patterns of interaction between regions. Finally, while certain second-millennium types have been associated with particular economic strategies, perhaps in particular the association of Leopard's Kopje with cattle-herding, uncritical acceptance of such associations bears the same weaknesses as connections between LSA ceramics and the Neolithic or EIA ceramics and Bantu-speakers. All ceramics must first be understood within their context before such linkages are made.

Mid- to Late Second Millennium

The ceramics of the mid- to late second millennium continue many of the trends from the preceding centuries. The local differentiation of ceramics continues on the coast and in southern Africa, reaching its apogee in the Swahili world with the development of

Husuni Ware at Kilwa. Nonetheless, elsewhere there are other indications that some ceramics are being used over larger areas, indicating new patterns of interaction. For instance, the Luangwa tradition spreads over much of Zambia and the Sancul type covers a large portion of the Mozambican coast. Even on the Swahili coast certain continuities can be identified, prompting the suggestion of a "Swahili Ware" (Chami 1998).

It is also significant that many of the types that develop around the middle of the second millennium continued to be made into the colonial period, such as Luangwa, Mpata and Sancul. Such persistence is at once enticing and problematic. The presence of similar ceramics at "modern" sites often complicates chronological understanding. Moreover, while the persistence of these ceramic types would seem to offer helpful ethnographic analogies between more recent users and those from the deeper past, such analogies must be used carefully and with full appreciation of a site's context.

Significance for the Mikindani Region

Broadly speaking, there are several lessons from ceramic studies in eastern and southern Africa that are applicable to the Mikindani region beyond the comparative details contained within the typology. As has been discussed in great detail, ceramic types are not indicators of particular ethnic groups, language groups, metallurgical abilities, or subsistence practices. The movement of ceramics is not coupled with the movement of any of these other things and each responds to complex patterns of interaction within and between diverse communities. Ceramic types do play a role in describing those patterns of interaction however, by serving as tangible markers of connections between peoples. Such connections do not imply shared practices, but they do suggest exposure to or removal from other developments and historical trends, ranging from farming to Islam, even if only indirectly or at the level of ideas. When placed within local contexts, those connections can provide clues to understanding why local communities made certain social and economic choices.

CHAPTER 6: ENVIRONMENT AND THE HISTORICAL ECOLOGY OF THE MIKINDANI REGION

Archaeologists have long recognized the importance of environment to the study of past societies, particularly at regional scales (e.g., Steward 1937, Braidwood 1974, MacNeish 1974, Vita-Finzi and Higgs 1970, Evans 1978). Environmental analyses have been especially prominent in settlement archaeology, as discussed in Chapter 4. The ways in which the environment has been approached archaeologically have tended to focus on the subsistence opportunities the environment afforded past societies. More problematically, the environment was often perceived by archaeologists as background to human society except in those instances when environmental catastrophes overwhelmed society. However, with Hodder's (1984) demonstration of the active role played by geographic space in social life and the subsequent developments in landscape archaeology (see Thomas 2001), archaeologists increasingly have come to understand that the relationship between humans and their environments was much more complex. Human interactions with their environments were driven by a variety of different concerns, including social and ideological systems as well as economic demands. People also changed aspects of their environments according to those concerns– clearing land, supporting certain species of plants and animals, exploiting particular natural resources, etc. – and these changes affected how they subsequently interacted with those landscapes. Societies and their environments were locked in a reciprocal relationship where each influenced the form of the other.

The emphasis on the relationship between people and environment came to typify a new approach to environment within archaeology known as historical ecology.

Historical ecology studies past ecosystems by charting changes in landscapes over time, where landscape is understood as the material manifestation of the human-environment relationship (Crumley 1994: 6). This approach moves the study of the environment in a more holistic direction, where environmental changes are not examined in a vacuum but within the context of other developments. The focus on the human-environment relationship as a reciprocal interaction has also produced more anthropologically oriented studies of past environments. Such studies have understood environmental problems as social problems, stressed linkages between the environment and social, political, and ideological organization, and ultimately understood that humans interact with the environment not as a set of externally defined conditions but as a perceived reality (e.g., McIntosh *et al*. 2000, Lucero 2002, Kirch 2004, McIntosh 2004).

The study of the environment of the Mikindani region in this chapter is rooted in historical ecology methodology. Emphasizing the dynamic nature of the environment, I show how Mikindani's residents interacted with it, and suggest how they might have perceived it. I employ several different types of evidence to document the human-environment relationship at Mikindani. First, I describe some of the systems structuring the environment, such as climate, geology and ecosystem biology, while paying close attention to the variability inherent in those systems. I then describe the evidence for direct human interactions with the environment from soil chemistry, archaeobotanical evidence, faunal remains, and historical documents. Finally I describe the implications of that evidence for understanding how humans shaped the Mikindani environment, how the environment influenced Mikindani's inhabitants over time, and what their perceptions of and interactions with the environment tell us about their place in coastal society.

Regional Environmental Overview

While the primary focus of this chapter is the interaction between humans and the environment around Mikindani, that environment is shaped in part by a number of natural systems that humans have limited or no capacity to influence. Mikindani's residents nonetheless would have needed to understand and respond to these systems because they were so important in shaping the regional environment. Despite the absence of significant human influence, these systems should not be seen as monolithic entities providing an environmental background because they varied across space and time. This section explores such variability as regards regional climate, geology, and flora and fauna, topics introduced in Chapter 2 but discussed in greater detail here.

Climate and the Indian Ocean Monsoon

The climate of the Mikindani region is significantly determined by the Indian Ocean monsoon. The monsoon operates according to an annual cycle tracking the migration of the Intercontinental Convergence Zone (Clemens *et al*. 1991). Over much of East Africa, the monsoon winds blow from the south and southwest from April to September, and from the northeast between November and March (see Table 7.1). The winds are especially strong during July, August and September, and again in January and February. Of additional importance to sailing, the wind directions are matched by ocean currents flowing in the same direction. Monsoon winds are also responsible for each of the coast's two rainy seasons. The northeast winds are characterized as hot and dry but bring the "short" or "small rains" to the coast in November and December. After the winds shift in April, both May and June experience heavy rainfall, but this rainy season is effectively over by July when the winds shift towards the Arabian Peninsula (Fleisher 2003: 9).

	J	F	M	A	M	J	J	A	S	O	N	D
winds blowing from N/NE	X	X	X							X	X	X
winds blowing from S/SW				X	X	X	X	X	X			
rainy seasons				X	X	X					X	X
esp. strong winds	X	X					X	X	X			

Table 6.1. Monthly schedule of the East African monsoon's basic features

Ethnographic evidence suggests that coastal communities in the past would have been well aware of this cycle and likely would have planned agricultural, sailing, and trade activities accordingly. Ethnographers described early 20th-century Swahili communities keeping two separate calendars: a lunar Islamic calendar which scheduled religious celebrations and a "local" solar calendar kept especially by sailors, fishermen and farmers and used primarily in country towns (Middleton 1992). Swahili people used the solar calendar to schedule productive activities and rites which had to do with fishing, shipbuilding, and especially farming. It was split into 36 "decades" of ten days and five supplementary days, with no correction made for leap years (Gray 1955).[1] The calendar, and the activities it scheduled, was tightly tied to the annual cycle of the monsoon as indicated by the yearly progression of the Pleiades in the night sky. The agricultural cycle commenced with the return of the Pleiades in November (Prins 1961), which the Swahili also marked as being connected to the "small rains" of November (Gray 1955). The solar calendar then provided a useful schedule for agricultural activities, compelling sowing after the Pleiades rose, which must be completed before 40 days pass, and whose

[1] The calendar is often claimed to have Persian origins, as New Year's Day (*siku ya mwaka)* is known as Nairuzi, akin to the Persian 365-day calendar starting with Neruz (Middleton 1992), yet the Persian calendar was not split into decades (Gray 1955), and some skepticism of Persian origins may be warranted given recent historical scholarship regarding Persian ancestry claims in Swahili oral histories (e.g., Pouwels 1984; Spear 1984).

crops could begin to be harvested after 70 days (Gray 1955: 2). Similar schedules began when the Pleiades were directly overhead in February and when they set in late March just before the wind shifts in April. The significance of the Pleiades for the agricultural cycle is a shared characteristic with other East African groups such as the Nandi and Kikuyu (Gray 1955). The importance of this constellation to East African calendars, which were overwhelmingly concerned with the scheduling of subsistence activities (see Baker 1952), is undoubtedly the result of the correlation between its annual progression across the night sky and the annual cycle of East African precipitation.

Nonetheless, a significant degree of variability existed within the carefully monitored monsoon cycle. There is often "very high fluctuation in annual rainfall in a region as well as considerable local variation even in neighboring regions" (Pandey 2004: 161). Spatial variation in the monsoon system is particularly important for understanding the climate of the Mikindani region at the southern limit of the monsoon zone. This location had two major effects on Mikindani's experience of the monsoon. As discussed in Chapter 2, it decreased the reliability of the April-June monsoon rains, contributing to the area's slightly lower average precipitation (see Darwall and Guard 2001). The location also skewed the timing of the monsoon cycle (see WMO 2010). The winds from the northeast and their attendant "small rains" did not arrive at Mikindani until December and stretched into January. The April monsoon often started in late March and was usually finished by the end of May, rather than stretching into June. The delay in the arrival of the small rains increased their magnitude over areas located further north, making up for some of the weakness of the April-June monsoon. But this compressed schedule also meant that the region effectively had one long rainy season from December to early May and was dry the rest of the year, although two discrete precipitation peaks could still be identified.

While this schedule of rainfall and monsoon winds presented unique challenges to the inhabitants of the Mikindani region, the monsoon's interannual variability was also a significant influence on their climatic experience. Because monsoon rainfall over the Ethiopian Highlands drains into the Nile River, records of Nile floods provide a reliable measure of the historical strength of the monsoon. The earliest records date to the time of the Pharaohs (ca. 3050 BCE), and there are extant annual records from 622 CE (Quinn 1992). Unfortunately, monsoon rainfall over Ethiopia has been shown to be off-phase with coastal East Africa, with heavy rains over Ethiopia typically, but not always, associated with weak monsoons along the East African coast. As a result the annul record from the Nile is not sufficient as a proxy annul record for East Africa (see *MWR* 1907). Nonetheless, records of weak and strong Nile floods can indicate broader patterns of disturbances in monsoon circulation and thereby identify periods of greater interannual variability and greater risk of weak or failed monsoons (Quinn 1992, Dhavalikar 2004; see Table 6.2). Between 300 BCE and 400 CE monsoon circulation was well-developed and typically produced high precipitation levels over Ethiopia and South Asia (Dhavalikar 2004). Between 622 and 999 CE the Nile flood record shows that 28% of the years possessed weak floods and weak monsoons. During the Medieval Warm Period/Climactic Optimum between 1000 and 1290 only 8% of years witnessed weak monsoons. From 1290 to 1522 the percentage of years with weak monsoons rose to 22%, and during the latter part of the Little Ice Age from 1694 to 1899 the weak monsoons increase to 35% (Quinn 1992). These climatic periods have been correlated with famines and other historical events in India (Dhavalikar 2004), and the shifting reliability of the monsoon over Mikindani's history certainly would have impacted the way in which its people would have interacted with their environments and with the rest of the coast.

Date	Percentage Weak Monsoon
300 BCE- 400 CE	unknown, generally strong
622- 999 CE	28%
1000- 1290 CE	8%
1290- 1522 CE	22%
1694- 1899 CE	35%

Table 6.2. Trends in weak Indian Ocean monsoons (from Quinn 1992)

Geology and Soil Chemistry

Another major factor shaping the Mikindani environment that people have had relatively little influence over has been the region's geology. As discussed in Chapter 2, there are three major geologic forms in the area around Mikindani: (1) the late Oligocene/early Miocene sandstones of the Mikindani Formation, (2) the exposed Pleistocene fossilized coral limestone, and (3) the alluvial sediments along the Rovuma, Mbuo, Likonde and Mtumnadi waterways. These distinct geologic forms have provided a mosaic of soil characteristics across the Mikindani region. (1) The sandstones produce deep (>4m), red (Munsell 10 R 4/8 or 2.5 YR 4/8), well-drained sandy soils of low fertility and low moisture holding capacity (Hartemink and Bridges 1995, Wegner *et al*. 2009: 169). These soils are often strongly leached and highly acid, with low levels of available soil nutrients. (2) The soils derived from limestone are of variable depth even over short distances due to the irregular surface of the bedrock limestone (Hartemink and Bridges 1995). They are also relatively neutral because the limestone bedrock is mainly composed of calcium. These soils have low levels of the major plant nutrients nitrogen and phosphorus, but yield average to high levels of potassium. Like the sandstone-derived soils, they are red in color, though commonly more reddish brown (Munsell 2.5 YR 4/4). Ethnographic evidence (Middleton 1961) has suggested that similar limestone-derived soils on Zanzibar supported agriculture for 1-3 years at a time after which they needed to be left fallow for 3-5 years. (3) The alluvial soils of the Mikindani region have not been studied in great depth, but basic soil chemistry test of samples collected during the project indicate that these soils are quite variable. In certain flat, poorly drained locations often near the deltas of rivers and streams very dark clayey “black cotton” vertisols develop. These soils are either black or very dark brown in color and tend to be fairly neutral, with pH readings around 7, relatively low in soil nutrients such as nitrogen, but with average levels of other nutrients like phosphorus. They typically support grassy vegetation rather than forests or woodlands, which is reflected in their stable-carbon-isotope data. A range of other alluvial soils exist along more swiftly moving rivers and watercourses. These soils are various shades of brown (e.g., brown, brownish gray, yellowish brown, strong brown, dark brown) and have higher sand content, typically ranging between sandy clay loam and loamy sand. They are neutral or only mildly acidic, with pH readings between 7.5 and 6. They also have highly variable levels of soil nutrients like nitrogen, phosphorus and potassium; sometimes yielding high nutrient levels and other times only trace amounts.

The three geologic units of the Mikindani region have complicated spatial intersections, especially along watercourses. Each also has significant internal spatial variation. Such variation is most clear with the alluvial soils, as multiple soils types have been identified. The limestone-derived soils also have significant internal variation, especially in regards to soil depth. In some instances bedrock protrudes or there is very little soil cover, while only a hundred meters away the soil profile may be more than two meters deep. Such variations have important implications for the soil's water retention and nutrient quality. While the bedrock variation is not quite so obvious for the Mikindani Formation sandstones, similar differences in the quality of sandstone-derived soils emerge through the study of soil chemistry, as will be discussed below.

Vegetation and Local Fauna

As discussed in Chapter 2, the Mikindani area is classified ecologically as part of the Zanzibar-Inhambane floral mosaic of broadleaf forests (White 1983), more recently termed the "Swahilian regional center of endemism" and known generally as the East African coastal forests (Clarke 2000). The East African coastal forests have recently been recognized as a globally important conservation area on account of their rich biodiversity (Conservation International 2010) and the study region contained two coastal forest reserves. Broadly speaking, coastal forests typically combine fragmented patches of dry forest, lowland rain forest, *Brachystegia* forest, scrub forest, and swamp/riverine/groundwater forest (Clarke and Robertson 2000). Because coastal forests are highly fragmented, many portions of the coast are regarded as moist savanna regions rather than forested ones, though the high levels of endemism in forest patches suggests that they were forested previously (Rodgers 2000). Forest fragmentation is thought to have been the result of human activity, particularly over the past two millennia, coupled with a gradual, long-term climatic desiccation (Clarke and Karoma 2000) that has transformed considerable portions of the area once occupied by coastal forests into cultivated savannah and woodland. However, recent studies have indicated that some of the savanna areas thought to be degraded land from forests were actually longstanding elements of a mixture of vegetation types that has existed for millennia and that humans have actively promoted the maintenance of forests to ensure a broad subsistence base in some regions (Ekblom 2004).

The mixture of vegetation communities demands attention up and down the East African coast. Coastal forests, woodlands,[2] and savannas existed together in many areas, including the Mikindani region. There is also significant local variation within these broad categories, particularly amongst the forests where a "bewildering variety of vegetation communities" exist even over short distances owing to differences in soil, topography, water availability, prevailing wind directions, and human disturbance (Clarke and Robertson 2000: 84). The most common forest type is the dry forest, which is often dominated by trees of the legume (Fabaceae/Leguminosae) family, with genera from the sub-family Caesalpinioideae such as *Julbernardia* and *Hymenaea* particularly well represented. Scrub forests are also common, particularly in areas that have been disturbed and on soils derived from coral rag such as the limestone-derived soils in the Mikindani region. Scrub forests and thicket develop on coral rag owing to their ability to withstand soil desiccation in the relatively shallow soils. Common trees in such forests include baobab (*Adansonia digitata*), ebony (*Diospyros consulate*), and those from the *Combretum* and *Euphorbia* genera.

A third type of coastal forest is dominated by either *Brachystegia spiciformis* or *Brachystegia microphylla*, trees commonly known as miombo. These forests are

[2] A woodland is distinguished from a forest by a lower tree density such that tree crowns do not touch and grasses are well developed (Clarke 2000: 9). In East Africa many woodland areas are maintained through regular burning (Clarke and Karoma 2000), which prevents the development of true forests.

common in southern Tanzania and develop on well-drained, nutrient-poor soils. These forests are similar to the dry forests, in that the *Brachystegia* trees are themselves legumes and *Julbernardia* and *Hymenaea* are also commonly found in them, but they are distinct on the basis of vegetation physiognomy because the tree crowns do not interlock. Forests with tall, deciduous trees that have large leaves, such as those of the Moraceae family, can also be found along rivers and where groundwater is abundant. The other main type of coastal forest, lowland rain forest, is not found in the Mikindani region. Different parts of the Mikindani region likely featured all of the other major forest types in different periods however, interspersed with areas of grassland and woodland savanna. This mixture of ecosystems was also significant for the fauna in the region. While several forest-dependent species were present around Mikindani, including some endemic to the coastal forests, the majority of species likely would have had a broader habitat tolerance and included open country savanna-woodland species (see Burgess *et al*. 2000). Some of these generalist species such as members of the antelope family provided fruitful hunting opportunities, though, as today, the most common hunting activity was probably laying snares designed to catch smaller mammals and birds. The region's appeal to generalist species also meant that Mikindani's inhabitants periodically had to deal with dangerous large mammals including elephant, rhinoceros, lion, and leopard.

The other major vegetation community of significance in the Mikindani region is the mangrove forest located along the coast. Eight different types of mangrove trees are found in Tanzania (Taylor *et al*. 2003), and all were likely present in the mangrove forests in the study region, which remain extensive around the major bays in the region and in the estuaries where rivers and streams run into the ocean. Mangroves have several highly specialized adaptations to such intertidal conditions, including exposed breathing roots, support roots and buttresses, and leaves able to excrete salt. Mangroves provide ecological services such as nursery areas for fish and prawns, roosting areas for birds, and coastal protection. They are also home to a wide variety of crab species and larger forests are sometimes inhabited by hippopotami, monkeys, and dugong (Taylor *et al*. 2003).

Of course, relative to climate and geology the ecosystems in the Mikindani region have been subject to human manipulation to a much greater degree. Coastal forests and mangrove forests have each been exploited for timber used in construction and for charcoal production. Timber from these forests also played an important role in shipbuilding. British colonial administrators recorded that the looking-glass mangrove, *Heritiera littoralis*, was used for making boat keels, trees from miombo forests, *Pterocarpus chrysothrix* and *angolenis*, provided masts and deck planks, the Asiatic mangrove, *Rhizophora mucronate*, was also used for masts, and prow and stem posts came from coastal forest trees in the *Pteleopsis* genus like the bushwillow (*Tanzania National Archives* 1954). These ecosystems also provided humans with plant and animal food resources and *Hymenaea* forests yielded gum copal, a valuable trade commodity. The most significant human impact on these ecosystems was the repeated clearing of forested land and natural savanna for agriculture, often through the use of fire.

These human interventions were significant and will be discussed in greater detail in the following section, but it must be emphasized that Mikindani's inhabitants were interacting with a dynamic system with substantial spatial and temporal variability. Humans had the capacity to alter their environments, but those environments changed without human intervention as well. Different types of coastal forest and savanna with different proportions of grasses versus woody plants developed at specific locations within the Mikindani region in response to water availability, soil conditions, topography, and ecosystem dynamics. These different vegetation communities and their attendant fauna changed as conditions shifted and the ecosystem moved through succession stages. The same was true of disturbed areas; cleared areas left fallow for one year had different plants and animals from areas cleared and left fallow for three years, or five, or those never cleared at all.

Correlations with Identified Microenvironments

Spatial variation within the Mikindani region is a common characteristic of the region's climate, geology and vegetation. Different parts of the region supported different ecosystems, whether types of forest or savanna grasslands or woodlands. These differences were caused, in part, by the variable bedrock geology across the region and its influence on soil characteristics, along with other factors such as water availability and topography. While climate is less variable across the whole region, the region's topography would have produced some microclimate differences. Moreover, differential moisture retention in the soil would have meant that even areas receiving the same amount of precipitation would have different levels of water availability.

In light of this variability, the identification of five different microenvironments within the Mikindani region was necessary to structure the project's archaeological work (see Chapter 2). The identified microenvironments are the highland plateau, the lowland plains, the coast, valleys where permanent and seasonal streams ran, and the ridge where the highland and lowland microenvironments meet. The identified microenvironments did capture the distinct geological, floral and topographic units present in the region. The highland microenvironment contained exclusively the deep, Oligocene/Miocene-sandstone-derived soils with their low nutrients and poor water retention. These soils proved compatible with the growth of dry and *Brachystegia* forests. The valley microenvironment possessed mostly alluvial soils, including both the very dark clay vertisols and the sandier brown soils near faster moving water. Only grasslands would have grown on the vertisols, but the sandier soils would have supported forest growth and easy water availability would have permitted the growth of riverine/groundwater forest. The lowland and coast microenvironments combine two geologic types. In the western and central portions of the study area they consist of limestone-derived soils that supported scrub forest and grasslands. In the east towards the Rovuma Delta the lowlands were comprised of alluvial soils but lacked the valley microenvironment's water availability and mostly supported savanna grassland and woodland with occasional patches of dry forest. The coastal microenvironments are distinguished from the lowlands due to their access to the ocean and the presence of mangrove forests in many areas. The ridge microenvironment is distinguished by its topography, which would have given inhabitants access to the unique ecosystems of the lowland and highland microenvironments.

Human Interaction with the Mikindani Environment

Human activity has been a significant influence on the character of the Mikindani region's environment over at least the past two millennia. The region's inhabitants interacted with the variable conditions of the region as they perceived them and those interactions helped shape some of the environmental conditions that faced subsequent generations. In this section I discuss the evidence for three specific human activities: agriculture and other plant exploitation from historical records and archaeobotanical remains, the exploitation of local fauna from bone and shell remains, and changes in ecosystems brought about through land clearance and other activities from changes in the chemical and isotope concentration of soils.

Historical Evidence for the Indian Ocean Transfer of Plant Foods

Archaeological and documentary sources indicate that the inhabitants of the Mikindani region had a wealth of crops and other plant-food options to exploit. Many crops were shared among the societies which participated in Indian Ocean trade. The African grains pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana* ssp. *coracana*), and sorghum (*Sorghum bicolor*) have all been found in domesticated form in India by the 2nd millennium BCE (Fuller 2003), indicating that their domestication in Africa likely occurred sometime earlier, though no definitive evidence has yet been found. Similarly, the Asian domesticates rice (*Oryza sativa*) and coconut (*Cocos nucifera*) were present on the Red Sea coast by the end of the first century CE (Casson 1989, Cappers 2003, Van der Veen 2003). The Southeast Asian plant Banana (*Musa* ssp.) is also thought to have become important in eastern Africa by at least the first millennium CE (Wigboldus 1994/5, Reid 2001) and potentially well before that (see De Langhe *et al*. 1994/5, Mbida *et al.* 2000).

The historical records of visitors to the coast provide indications that Swahili communities were indeed drawing on these various sources of plant food. In their reports, 'millet' is used to refer to any of the primary African grains of sorghum, pearl millet, and finger millet (Walshaw 2010). Al-Masudi, writing in 915 CE, uses the term in this fashion when describing the agriculture of the coast (Freeman-Grenville 1975: 16). He also provides "the earliest unambiguous written notice of banana on the East African coast" (Wigboldus 1994/5: 124). Al-Idrisi gives notice of bananas and sorghum in the 12th century as well, and describes rice cultivation on Zanzibar (Freeman-Grenville 1975: 19). Ibn Battuta, writing of his visit to the coast in 1331, provides perhaps the fullest description of East African foodstuffs (Freeman-Grenville 1975: 27-32). In Mogadishu he is served rice, but also bananas and mangoes. In Mombasa he notes the presence of banana, lemon, and orange trees, and says that the city imports its grain, perhaps from Pemba Island (see Kirkman 1964: 179). Portuguese accounts throughout the 16th century also refer to rice, millet, and a variety of other cultivated fruits and nuts (see Walshaw 2005: 76).

These historical accounts illustrate the diversity of cultivation and plant exploitation on the Swahili coast. Nonetheless, the picture they provide is clearly incomplete. The information provided in the accounts is limited to a relatively narrow temporal window – the 10th to 16th centuries – and even then does not offer complete coverage of any locality. Beyond that, legitimate concerns exist regarding the ability of these visitors to correctly identify plants rare or unknown in their homelands and whether their reports were skewed towards recording the diets of the privileged, with whom they mingled most (Walshaw 2005). Archaeological studies are thus essential in providing additional evidence for the history of agriculture and plant exploitation on the coast.

Archaeobotanical Evidence

One way in which this project explored the relationships between the inhabitants of the Mikindani area and their environments was to obtain archaeobotanical samples from well-defined archaeological contexts through the flotation of soil samples. Flotation allows for the recovery of charred seeds which can then be identified to species. These identified seeds document the crops which people were growing and other plants they were exploiting, as well as environmental changes they may have wrought. Because samples were obtained from multiple levels at all of the sites excavated during Phase III, I am able to determine which plants the people of the Mikindani region were using at different moments in time and across the five identified microenvironments. Such data not only provide important environmental information, but also contribute to an improved understanding of the social relationships that existed within the Mikindani region and between this region and other parts of the coast.

Previous Archaeobotanical Work on the Swahili Coast

Some archaeobotanical studies have already taken place on the Swahili coast, revealing trends in plant exploitation which can be compared to the historical accounts and to the Mikindani material. However, direct evidence of plant use in eastern Africa from macrobotanical remains is still rare. Part of the lack of such remains can be attributed to poor preservation (Sutton 1987, Robertshaw and Wetterstrom 1989, Wetterstrom 1991). The preparation and discard methods used in East African cuisine, such as brewing beer and grinding grain to make porridge, may also play a role (Young and Thompson 1999, Walshaw 2010). Still, some studies have been able to acquire macrobotanical remains.

The majority of such studies relied on small-scale sampling and flotation. The information they provide is thus somewhat limited, but still capable of suggesting certain trends in the historical exploitation of plant foodstuffs. At Kilwa a concentration of sorghum grains was found on a house floor (Chittick 1974: 52). Limited flotation was undertaken at Sima in the Comoros Islands (Wright 1984, 1992). That work recovered mostly rice, but also millet, coconut and bean from Dembeni phase contexts of the 9th-10th centuries (Hoffman 1984), and small amounts of rice and coconut from 13th-century deposits (Johnson 1992: 111-4). Flotation samples from central Madagascar provide evidence of domesticates – rice and cowpea (*Vigna unguiculata*) – only in contexts from the late 15th century onwards, while earlier samples are dominated by rush and sedge species (Wetterstrom and Wright 2007).

Sarah Walshaw's work on Pemba Island in Tanzania (2005, 2010) provides an important advance from these efforts by employing intensive systematic sampling. Her study of the archaeobotanical remains from two towns, Tumbe (7th-10th centuries CE) and Chwaka (11th-15th centuries), and several surrounding villages is thus able to describe the agricultural and plant-exploitation practices of a particular region over many centuries. The archaeobotanical remains indicate that Pemban agriculture before 1000 CE was focused on pearl millet, though rice, legumes, coconut, and other fruits were also present. In the early second millennium the economy shifted away from millet and focused on rice, cotton, and coconut instead. Pearl millet then resumed some importance in the 13th to 15th centuries, but did not displace rice as the local staple. Some of those shifts may represent responses to variations in the Indian Ocean monsoon (see Hassan 1981, Quinn 1992, Chami 2003) a subject addressed in greater detail at the end of the chapter.

Archaeobotanical Methodology of the Mikindani Archaeological Project

Following Walshaw (1995), the archaeobotanical work of the Mikindani Archaeological Project incorporated systematic sampling for the recovery of archaeobotanical remains. Sediment samples for flotation were collected from each of the sediment layers below the topsoil at every site excavated during Phase III. The uppermost topsoil layers were excluded owing to clear evidence of modern disturbance of those layers at many sites, often from agricultural activities, in an attempt to avoid contamination from modern seeds. Composite samples were taken from each sampled context, meaning that sediment was collected from across the entire excavation unit. Initially the samples collected were 10 liters (L), but owing to logistical concerns that size was reduced to 5L for most contexts. Where multiple excavation units were placed in different locations at one site, each unit was sampled, but additional units opened adjacent to sampled units to explore features were not sampled. In contrast to the sampling regime for general sediment layers, all of the sediment from features was collected for flotation, with samples ranging in size from 1L to 15L.

In total, 81 different sediment samples were collected representing 78 distinct contexts (2 features produced multiple samples). These samples were processed using the bucket method of flotation (see Fig. 6.1). This method of flotation was selected because of its simplicity and because it largely avoids the risk of cross-sample contamination (Walshaw 1995). The samples were poured into a large bucket or multiple buckets for large samples. Water was then added to the buckets with a hose, and the samples were agitated by hand. The water and floating material were then poured through fine mosquito netting with an aperture below 0.5 mm and collected as the light fraction. When the water ran clear and no charred fragments could be observed in the sediment the rest of the sediment was wet-screened through a fine sieve of about 4 mm and the resulting material was collected as the heavy fraction. Both the light and heavy fractions were then dried in pouches made from the fine mosquito netting and finally placed in labeled plastic bags for transport back to United States for laboratory analysis.

Figure 6.1. Jack Stoetzel during bucket flotation using mosquito netting to collect the floating light fraction

I conducted the laboratory analysis according to practices suggested by Walshaw (Walshaw, personal communication 2009) following the Paleoethnobotany Laboratory Guide of Washington University in Saint Louis. The dried samples were sieved using geological screens, with distinctions made between materials above 2.00 mm, above 0.50

mm and below 0.50 mm. All the materials above 2.00 mm were completely sorted, and the materials below 2.00 mm were scanned for seeds. The samples were examined during sorting using a stereoscopic light microscope with up to 45x magnification. Identifications were made using several seed and nut reference guides (e.g., Martin and Barkley 2000[1961], Holm *et al*. 1977, Menninger 1977, Zohary and Hopf 1988), comparative modern and archaeological samples provided by the Archaeobotany Laboratory of the University of Simon Fraser, and, in certain difficult cases, relying on the expertise of Dr. Sarah Walshaw. Any errors in identification are my own.

Results of Archaeobotanical Analysis at Mikindani

The archaeobotanical analysis was able to identify a number of seeds and other carbonized plant materials from archaeological contexts in the Mikindani region. The most common recovered material was wood charcoal, which was found in nearly every context, and whose recovered weight dwarfed that of all other carbonized plant materials combined. As the species of the trees were not identified, the amount of information that the wood charcoal provided was fairly limited. However, several of the most charcoal-rich contexts were from features such as hearths or pits. Burning wood for fuel was thus clearly implicated in these results, and the near-ubiquity of charcoal in the samples suggests that firewood existed in abundance across the region.

Seeds from plants that could be used for food or otherwise exploited economically were also recovered. Generally speaking, the preservation of such remains was adequate. The total number of recovered seeds is by no means extraordinary, and in fact lags behind the number of seeds found in the most productive single contexts studied by Walshaw on

Pemba Island (2005), but does present a large enough sample to suggest certain trends in crop and plant exploitation in the Mikindani region. For clarity I have broken down these results into grains and non-grain plants (Table 6.3).

Plant	Seeds Identified
Grains	
Pearl Millet	45
Finger Millet	3
Millet Chaff	8
Sorghum	11
Rice	1
Wheat	2
Corn	4
UNID Chaff	10
Bulrush/Immature Millet	13
Total	97
Other Plants	
Baobab	4
Bean	4
Brassicacae	4
Cotton	8
Cucurbit	18
Fruit/Nut	46
possible *deinbollia*	1
possible *brachystegia*	2
Fruit/Nut stem	10
Pea	29
Portulaca	1
Wild Fig	6
Total	133
UNID seeds	46
Total	276

Table 6.3. Archaeobotanical results by identified plant

- Grains

The most notable result regarding the grain plants was the prevalence of African grains, particularly pearl millet. Pearl millet (see Fig. 6.2) is the species with the most identified seeds of all plants. That total is not the result of a single millet-rich context. Rather, millet was present in all microenvironments (see Table 6.4) and at all the sites excavated during Phase III save one (see Table 6.5) – North Imekuwa, which possessed no seeds identified to species. Millet was also grown during all time periods (see Table

6.6), and seems to have remained the staple grain of this region over the past two millennia.

Region	Volume	Corn	P Millet	F Millet	Bulrush	Millet Chf	Rice	Sorghum	Wheat	UNID Chf
Coast	98	0	9	1	0	1	0	1	0	1
Valley	74.5	0	6	1	3	2	0	0	0	1
Ridge	49	1	2	0	1	1	0	2	0	3
Highland	83.5	3	11	1	9	3	0	5	0	1
Lowland	115	0	17	0	0	1	1	3	2	4

Table 6.4. Grain counts by microenvironment

Site	volume	Corn	P Millet	F Millet	Bulrush	Millet Chf	Rice	Sorghum	Wheat	UNID Chf
Ufukoni Mibuyu	20	0	2	0	0	0	0	0	0	0
Stella Maris Hills	59.5	0	4	1	0	1	0	0	0	0
Pemba	20	0	1	0	0	1	0	0	0	0
North Imekuwa	15	0	0	0	0	0	0	0	0	0
Mkangala Ridgetop 2	20	0	1	0	0	0	0	2	0	2
Mkangala Ridgetop 1	29	1	1	0	1	1	0	0	0	1
Mji Mwema I:2	36	0	3	0	8	0	0	2	0	1
Mji Mwema I:1	37.5	3	7	0	0	3	0	2	0	0
Miseti Hilltop	63	0	5	0	0	0	0	1	0	1
Mgao North	15	0	3	1	0	0	0	0	0	0
Mbuo Hilltop	15	0	2	0	3	1	0	0	0	1
Lisoho	30	0	3	0	0	0	1	2	0	4
Likonde	10	0	1	1	1	0	0	1	0	0
Kisiwa Forests	10	0	1	0	0	0	0	0	0	0
Kisiwa Fields	20	0	10	0	0	0	0	1	2	0
Imekuwa Mibuyu	20	0	1	0	0	1	0	0	0	0

Table 6.5. Grain counts by site

Period	volume	Corn	P Millet	F Millet	Bulrush	Millet Chf	Rice	Sorghum	Wheat	UNID Chf
1st Millennium	181	0	15	0	0	2	0	2	2	2
Transition 1st to 2nd	50	0	7	0	2	0	1	0	0	0
1st Half of 2nd Mill.	68	0	6	2	1	1	0	2	0	2
Mid 2nd Millennium	10	0	3	1	2	0	0	1	0	1
Recent	35	4	13	0	7	4	0	4	0	3
Below 2nd Mill.	20	0	0	0	1	1	0	0	0	0
Below 1st Mill.	56	0	1	0	0	0	0	2	0	2

Table 6.6. Grain counts by time period

The occurrence of sorghum is patterned similarly to pearl millet, though the counts are quite a bit smaller. Sorghum was also present across regions and time periods, though if the recent specimens are excluded no coastal examples remain. As there were many fewer total identified sorghum seeds than pearl millet seeds, the smaller number of sites yielding sorghum is not surprising, though such sites' greater likelihood to produce multiple seeds rather than single specimens may be indicative of the crop's importance. The likelihood that many sorghum grains may have been crushed in processing should also be recognized, particularly given the fragmented nature of many of the recovered seeds.

Figure 6.2. Pearl millet grain

The other grains were significantly rarer even than sorghum, and the contexts in which they were found are thus readily distinguishable. Only three grains that were likely finger millet were found, indicating that this crop was used infrequently. All three are found in contexts dating to the early second millennium. Similarly, two possible wheat (*Triticum* spp.) grains were found in a first-millennium context (see Fig. 6.3). The identification is described only as possible, owing to the small size of the grains relative to sizes described for wheat elsewhere (see Zohary and Hopf 1988), but such a find is not improbable given the region's cultural and economic connections across the Indian Ocean in the first millennium. Maize (*Zea mays*) was also found in the region, but only from recent contexts well stratified above the ancient layers.

The last of the categories that requires comment here is bulrush. These seeds, one of which is shown in Fig. 6.4, show some notable similarities to the rushes and sedges, particularly to bulrush (*Scirpus* ssp.; see Martin and Barkley 1961:90-91). However, these specimens are quite small, with no dimension as great as 2 mm, which suggests that these might be immature seeds. If that were the case, these might represent millet, but such an assignation cannot be defended with the available evidence. Further, given the presence of rushes and sedges in archaeobotanical materials elsewhere on the coast (e.g., Wetterstrom and Wright 2007), these may indeed represent bulrush.

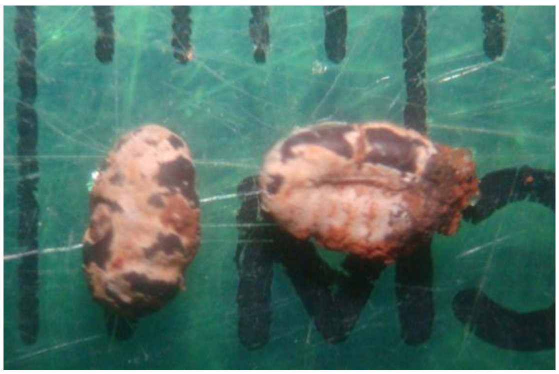

Figure 6.3. Possible wheat grains

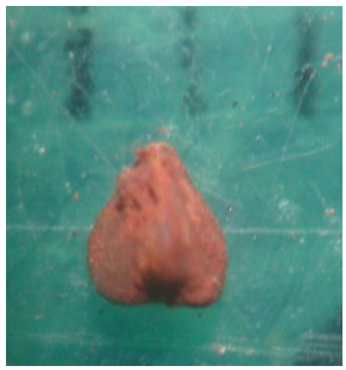

Figure 6.4. Possible bulrush

- Non-Grain Plants

The non-grain plants (see Tables 6.7, 6.8 and 6.9) also provide some notable results. Peas and possible peas (*Pisum sativum*) represent the second most numerous type of identified plant in the region behind pearl millet. They were found across time and microenvironment, though they were relatively more common in the coast microenvironment. Peas have been found elsewhere on the coast (see Walshaw 2005). However, they are rare in charred archaeobotanical assemblages, likely resulting from the circumstances of their preparation that do not typically expose peas to direct heat (Walshaw 2005: 161) and do not typically thrive in the warm temperatures of the tropics (Zohary and Hopf 1988). Although the archaeological remains of peas are not large to begin with (see Zohary and Hopf 1988, Walshaw 2005), several of the identified specimens from Mikindani were even smaller than peas found in archaeological contexts elsewhere, being 1-2 mm in diameter (see Fig. 6.5). However, the recovery of a few of these seeds within smooth pods indicative of domestication (Fig. 6.6) helped to suggest that they were indeed peas, potentially discarded because of their small size, which moreover might serve as an explanation for their preservation.

Figure 6.5. Pea (*Pisum sativum*)

Figure 6.6. Pea within smooth pod

Another notable aspect of the non-grain data is the prevalence of fruit and nut remains. Such remains are notoriously difficult to identify to species (see Walshaw 2005), though attempts were made here. Possible identifications of *Deinbollia* and *Brachystegia* seeds were suggested owing to the specimens' similarities to illustrated samples in the reference texts (Menniger 1977), but such identifications are not certain.

Similarly, there is some coconut in the fruit and nut count, but this was not separated into its own category owing to inconsistency in its identification. Wild fig (*Ficus* ssp.) is a rare but relatively more numerous type of fruit and nut present in the region. It was found in three different microenvironments, but was present at only three sites. The identification of wild fig is not wholly assured however, owing to the large discrepancy between the archaeological specimen and the modern seed from the comparative collection (see Fig. 6.7). The identification of baobab (*Adansonia digitata*) was more assured, but baobab seeds were rare, found at only three sites as well. Intriguingly, they were not found in the coast and lowland microenvironments where baobabs are especially prevalent today and where they might have comprised part of the expected scrub forest.

Region	Volume	Baobab	Bean	Pea	Peapod	Cotton	Wild Fig	Fr/Nut	Brachy.	deinbollia	FN stem	cucurbit	brass.	potulaca	UNID
Coast	98	0	0	7	2	2	2	4	0	0	0	7	0	1	8
Valley	74.5	1	3	3	1	4	3	10	2	0	3	4	0	0	12
Ridge	49	2	0	2	2	2	0	3	0	1	1	1	4	0	0
Highland	83.5	1	1	5	3	0	1	21	0	0	6	6	0	0	20
Lowland	115	0	0	4	0	0	0	8	0	0	0	0	0	0	6

Table 6.7. Non-grain plant counts by microenvironment

Site	volume	Baobab	Bean	Pea	Peapod	Cotton	Wild Fig	Fr/Nut	Brachy.	deinbollia	FN stem	cucurbit	brass.	potulaca	UNID
Ufukoni Mibuyu	20	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Stella Maris Hills	59.5	1	0	2	1	2	0	5	2	0	3	3	0	0	10
Pemba	20	0	0	1	1	0	0	0	0	0	0	1	0	0	1
North Imekuwa	15	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mkangala Ridgetop 2	20	2	0	1	0	0	0	1	0	1	0	0	0	0	0
Mkangala Ridgetop 1	29	0	0	1	2	2	0	2	0	0	1	1	4	0	0
Mji Mwema I:2	36	0	0	3	1	0	1	12	0	0	4	2	0	0	8
Mji Mwema I:1	37.5	0	1	2	2	0	0	9	0	0	2	4	0	0	9
Miseti Hilltop	63	0	0	6	1	2	2	3	0	0	0	6	0	1	6
Mgao North	15	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Mbuo Hilltop	15	0	3	1	0	2	3	5	0	0	0	1	0	0	2
Lisoho	30	0	0	2	0	0	0	5	0	0	0	0	0	0	3
Likonde	10	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Kisiwa Forests	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kisiwa Fields	20	0	0	0	0	0	0	2	0	0	0	0	0	0	1
Imekuwa Mibuyu	20	0	0	2	0	0	0	0	0	0	0	0	0	0	0

Table 6.8. Non-grain plant counts by site

Period	volume	Baobab	Bean	Pea	Peapod	Cotton	Wild Fig	Fr/Nut	Brachy.	deinbollia	FN stem	cucurbit	brass.	potulaca	UNID
1st Millennium	181	1	0	4	3	1	2	8	0	0	2	3	0	1	17
Transition 1st to 2nd	50	0	0	3	0	0	1	6	0	0	4	5	0	0	9
1st Half of 2nd Mill.	68	2	0	7	0	2	0	6	2	0	1	3	0	0	2
Mid 2nd Millennium	10	1	3	1	0	2	3	3	0	0	0	1	0	0	5
Recent	35	0	1	6	5	3	0	22	0	0	3	6	4	0	12
Below 2nd Mill.	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below 1st Mill.	56	0	0	0	0	0	0	1	0	1	0	0	0	0	1

Table 6.9. Non-grain plant counts by time period

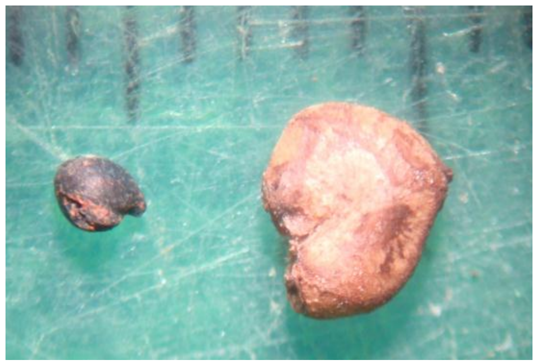

Figure 6.7. Possible wild fig specimen (left) alongside modern comparative

Also deserving comment are cotton (*Gossypium* spp.) and cucurbit. Cucurbit is a category which refers to specimens of melon and gourd. While multiple species were represented in the Mikindani sample, perhaps most notably potential examples of watermelon (*Citrullus lanatus*) and bottle gourd (*Lagenaria ciceraria*), I was not able to identify the specimens to species with certainty, and thus grouped them together. Cucurbits were present across microenvironments, and in all time periods, indicating that they comprised an important portion of the region’s agricultural pursuits.[3] Cotton, on the other hand, shows a clear tendency towards sites with easy access to water and is mostly found in the second millennium CE. It is possible that some production of local cloth

3 It should be noted that cucurbits likely included plants grown for use as containers as well as food.

was taking place during the first half of the second millennium, as spindle whorls have also been found from contexts of this period (see Chapter 9).

Archaeobotanical Spatial Trends

Given the concerns of this project, the spatial trends in agriculture and plant exploitation are of great importance. Sorghum and millet were found across microenvironments, so their production was clearly not monopolized in any particular area. But there are certain indications that the lowlands were a more important center of millet production than other regions. The lowlands produce the most pearl millet grains per volume of sediment floated, and are the only group above 0.1 grains per liter of sediment when the recent contexts are removed. This despite the fact that the lowlands as a whole produce the fewest seeds per liter floated of all the microenvironments. Indeed, grain specimens make up fully 60% of the recovered specimens in the lowlands, and less than 40% in all other microenvironments. It would thus seem that the lowlands were an area of more intensive grain consumption, and likely more intensive cultivation.

Another noteworthy spatial trend can be observed with the fruit and nut data. Fruit and nut remains were found across time and microenvironment, though certain microenvironments were better represented than others. To wit, 67% of the fruit and nut specimens were found in the highland and valley environments, despite these microenvironments ranking third and fourth in terms of the total volume of sediment floated. To a certain degree this result is influenced by the presence of large numbers of fruit and nut remains in the sediments from recent contexts from these microenvironments, but even so the relatively low number of fruit and nut remains at coastal and lowland sites, despite the presence of coconut in the region, suggests distinctions in the activities taking place in different microenvironments. Some caution should be exercised owing to the difficulty identifying these remains to species, and likely not all fruit/nut specimens were from plants used by humans, but it appears that fruit and nut resources, whether wild, encouraged, or cultivated, were more likely to be exploited by inhabitants of settlements at higher elevations.

Faunal Evidence

The inhabitants of the Mikindani region also exploited a variety of domesticated and wild animal resources. All three phases of excavation recovered material evidence of such exploitation in the form of shell and bone remains. The shell outnumbers the animal bone by a significant degree, 149.79 kg to 0.68 kg and is found in more locations. The acidity of the soil inhibited preservation of many of these remains, in particular the bone. Those remains that did survive provide insight into kinds of animals that would have been included in the Mikindani diet.

Shell

Studying the shellfish remains from the project’s three phases provides insight into the availability of marine resources throughout the Mikindani region, as well as the types of shellfish that were being exploited. Of the nearly 150 kg of shell recovered during the project, 98.3 kg were recovered during Phase I, 48.9 kg during Phase III, and 2.6 kg during Phase II. Part of the reason for the large amount of shell from Phase I and III is the recovery of shell middens that produced large quantities of a wide variety of shellfish. Indeed, these midden contexts are among the richest shell deposits reported from the coast. These middens also provided a sort of collective protection from the acidic soils, as the shells themselves made the soil more basic as they broke down.

The distribution of shells is important to understanding the nature of shellfish exploitation. Shell remains were found throughout the region, but were concentrated at the coast. Middens were found in all three coastal sites excavated during Phase III (Pemba, Miseti Hilltop and Mgao North) and at several coastal locations around Mikindani Bay excavated during Phase I. They were not found at sites more than 1 km away from the coast. In the Phase III excavations 10 of the 16 excavated sites produced shell. However, while the three coastal sites produced 5.7, 9.3, and 33.4 kg of shell respectively, no site from any of the other microenvironments yielded more than 150 g of shell. The Phase I results also show the general intensity of shellfish exploitation in coastal areas. Almost all of the units excavated during Phase I (31 of 34, or 91%) produced some shell, and half (17 of 34) produced more than 1 kg of shell.

The Phase II results emphasize the widespread low-intensity availability of shellfish resources throughout the region. Fifty-six STPs yielded some shell, most often under 20 g and sometimes just a single shell. These STPs represent all five microenvironments, but 40 of them (71%) are not affiliated with an archaeological site. In some instances this unaffiliated shell can be associated with modern occupations, though this is not always the case. However, the association of shell with coastal sites is reproduced in the locations of the 16 site-affiliated STPs, as 10 (62.5%) are from coastal sites.

While I have not yet conducted a detailed zooarchaeological analysis on the shell remains it is possible to identify some of the species exploited in the Mikindani region (see Table 6.10). A few species were especially common, particularly in the shell middens. The most common shellfish exploited by the region's inhabitants were the ark clams or cockles of the *Anadara* genus. The largest of these measured about 10 cm at its broadest point though more commonly they measured around 4 cm. These clams were present in every shell-midden deposit and in other contexts from across the region.

Genus	Species	Common Name
Anadara	sp.	ark clams, cockles
Pinctada	*margaritifera*	black-lip pearl oyster
Pinctada	*imbricata*	Atlantic pearl oyster
Strombus	*gibberulus*	humpbacked conch
Strombus	*tricornis*	three-cornered conch
Pleuroploca	*trapezium*	horse conch
Terebralia	*palustris*	mangrove whelk
Cerithium	sp.	sea snail
Nerita	*lineata*	mangrove snail
Cyprae	*tigris*	tiger cowry
Cyprae/Monetaria	*annulus*	ring cowry

Table 6.10 Species of shellfish recovered in the Mikindani region.

Oysters were also commonly exploited in the area, and oyster shell was abundant in some middens, but not others. Multiple varieties of oyster shells were present in the middens and, as several species of oyster are known to exist along the East African coast, it is clear that multiple species of oyster were present at Mikindani. Two types of pearl oyster were reported from the Mikindani area in the early 20th century (*TNA* 1925), likely representing the black-lip pearl oyster, *Pinctada margaritifera*, found throughout the Indian Ocean, and perhaps the Atlantic pearl oyster, *Pinctada imbricata*, which has been reported from Shanga (Horton and Mudida 1993, Mudida 1996). Other edible non-pearl oysters common on the coast, such as the rock oysters, *Saccostrea* ssp., and mangrove oyster, *Crassostrea cucullata*, were also likely exploited, though positive identification in the Mikindani archaeological record has yet to take place.

Three types of conch shells were relatively common in the shell middens, though not as frequent as oyster or ark clams. The first is the humpbacked conch, *Strombus gibberulus*. The other two types were the horse conch, *Pleuroploca trapezium*, and the three-cornered conch, *Strombus tricornis* or *Tricornis tricornis*. Although some species of conch can grow over 25 cm, most in the Mikindani middens were below 5 cm. That size is small for the horse conch and three-corned conch, each of which can grow to above 10 cm, but it is about the maximum size of the humpbacked conch.

Sea snails were the other common shellfish found in the Mikindani region middens. The most common sea snails were the horned snails of the Potamididae family such as the mangrove whelk, *Terebralia palustris*. These species were found in the majority of middens and were quite numerous in some. Also widespread but not quite as common were the snails of the *Cerithium* genus. Numerous shells of the small herbivorous mangrove snail *Nerita lineata* were also observed.

Less common but worthy of note were the cowries. Cowries, *Cyprae tigris* and *Cyprae/Monetaria annulus*, were typically found in small numbers in shell middens, but caches were observed from units around Mikindani Bay. The unit near the old mosque at Pemba produced 279 cowries and another beach unit at Pemba had 49. The unit from the prison/customs house in Mikindani town provided 70 cowries. These concentrations of cowries likely indicate the development of cowries as a trade commodity for this area during the late second millennium CE.

It seems likely that most of the shellfish exploited in the Mikindani region were harvested to be eaten, but some species also provided secondary products. The *Anadara* shells were the most commonly used shell for making shell beads on the East African coast (Horton 1996: 323). However, there is little evidence of shell bead-making in the Mikindani region, with no blanks or bead-grinders and only a few shell beads recovered (see Chapter 9). Pearl oysters would have produced pearls of course, though in the 20th century the pearls obtained from the region were not deemed to have been of high quality (*TNA* 1925). Perhaps a more important commodity from the pearl oysters was the mother-of-pearl which could be obtained from the shell. A mother-of-pearl inlay was found at Manda (Chittick 1984: 200) and in the late 19th century tons of oyster shells were exported from southern Tanzania each year (*TNA* 1925). Several of the various species of sea snails could also be used as bait for fishing (see Kirkman 1954: 154; Radimilahy 1998: 195).

One final note of interest regarding shellfish exploitation regards speculation on the gender of those collecting and processing the shellfish. Most, if not all, of the species found in archaeological middens are still present along the southern coast and several are still collected. Today the collection of shellfish is done at low tide by women and children (Figure 6.8; see Msemwa 1994, Mudida 1996), who are also responsible for their preparation and cooking. We cannot assume that similar gendered divisions of labor operated in the past, especially as there is historical evidence of male-only shellfish collection among Bajuni fishermen in coastal Somalia (Grottanelli 1955), but such a possibility should be considered (see Kleppe 1995). If women did collect most of the shellfish found at archaeological sites that would have important implications for gender dynamics regarding diet and subsistence, as well as the significance of the movement of shellfish resources away from the coast in the region.

Figure 6.8 Women and children collecting shellfish at low tide in Mikindani Bay

Bone

As mentioned above, less than a kilogram of bone was recovered during the entire project. The small amount recovered was highly fragmentary, resulting in a limited faunal collection. Although detailed zooarchaeological analysis has not taken place with the bone, the number of potentially identifiable bones from the Mikindani region is probably not more than 20. The non-shellfish faunal record at Mikindani is thus substantially smaller than that recovered during similar survey-based projects on the coast (e.g., Fleisher 2003) as well as during sustained excavations at single sites (e.g., Chittick 1984, Mudida 1996). The poor condition of most bones demonstrated that the acidic soils of the region decomposed bone over time. The resulting bone counts are not very different from those at sites with poor preservation in Fleisher's (2003: 364) survey of northern Pemba Island, though they are clearly dwarfed by sites with better preservation that produced thousands of fish bones and hundreds of other animal bones in similarly sized excavations, such as Mduuni (Fleisher 2003: 371, 381). Still, the shellfish middens demonstrated that faunal material could survive in the region in some contexts, in part by altering the chemical composition of the soil. The smaller amount of bone is thus not wholly attributable to poor preservation but also reflects different patterns of faunal exploitation and bone deposition.[4]

The majority of the recovered bone was from Phase I, totaling 594.1 g. Only 28.5 grams were recovered during the Phase III excavations that yielded nearly a metric ton of local ceramic sherds. Just 57.2 g were recovered from the Phase II survey. Despite their small numbers, the results from Phases II and III indicate that bone remains were widespread. In these two phases bones were recovered from every microenvironment except for the ridges. Bone was also more likely to be associated with archaeological sites than shell, as 62.5% (5 of 8) of the STPs that produced bone were associated with archaeological sites (against 29% of shell STPs) and bone in Phase III was most often found in the richest levels of the densest sites.

The recovery of more bone during Phase I was largely related to the more recent dates of the deposits excavated. Nearly half of the Phase I bone material, 284.6 g, was from the very top levels of sites and relates to the modern occupation around the bay. The rest of the bone is from earlier deposits, but even these deposits mostly date to the second half of the 2nd millennium CE, especially in the Mnaida and Mtonya wards. Only

[4] It is also worth noting that scholars have raised concerns regarding tsetse infestation in southern Tanzania preventing the keeping of livestock (e.g., Clark 1980, Kwekason 2007), though to my knowledge this subject has not yet been effectively investigated.

about 15 g of bone material were found in association with 1st- or early 2nd-millennium ceramics.

The non-shellfish faunal record from Mikindani is not a complete sample because of the paucity of bone remains, and a truly representative sample may not be obtainable given preservation concerns. Nonetheless, it is possible to make some preliminary statements about the faunal material from Mikindani that can be compared with trends elsewhere on the coast. Despite difficulties in the field recovery of fish bones, which were often small, such bones were identified relatively frequently.[5] Importantly, fish bones were recovered not only at coastal sites, but also at sites in the lowland plains and highland plateau, indicating the movement of fish throughout the region. The small size of the fish also suggests that most fishing activities took place in near-shore situations, including along the region's extensive coral reefs (see Fleisher 2003: 366). This suggests that fishing activities around Mikindani mirrored those from elsewhere on the coast (Mudida 1996, Fleisher 2003).

Again preservation must be considered an issue, but the largest bones recovered during the project belonged to animals the size of sheep or goats. Four individuals were preliminarily identified as sheep/goat (*Ovis aries* and *Capra hircus*) from separate contexts around Mikindani Bay dating from the mid-second millennium to the present. The lack of any larger bones would suggest that Mikindani's inhabitants were not consistently exploiting larger mammals, whether domesticated such as cattle (*Bos* ssp.) or wild such as dugong (*Dugon dugon*) or the larger antelopes. The absence of such larger animals stands in sharp contrast to many other coastal communities such as Shanga,

[5] To illustrate the difficulties surrounding recovery, evidence for the exploitation of fish during Phase III was often recovered in the heavy fraction of soil samples during flotation for archaeobotanical remains.

Manda, Kua in the Mafia Archipelago and the stonetowns on Pemba Island (Chittick 1984, Mudida 1996, Fleisher 2003, Christie 2011).

Human Impact on Soil Chemistry

In addition to their direct exploitation of plants and animals, Mikindani's inhabitants also influenced regional ecosystems broadly. The chemical signatures of the sediments at sites in the region provide evidence of people transforming the environments where they lived: clearing land, fertilizing soil, and promoting new floral regimes. They also provide evidence of some of the negative consequences of their actions by recording changes in soil chemistry that indicate the loss of nutrients and the impoverishment of soil. During the Mikindani project two aspects of soil chemistry were studied: stable isotope compositions, and the fertility of the soil as measured by the level of acidity and presence of major soil nutrients.

<u>Stable Isotope Evidence</u>

The carbon and nitrogen stable isotopes from a group of soil samples from three archaeological sites in the Mikindani region and a set of background samples were analyzed (see Fig. 6.9). These sites – Mgao North, Kisiwa Fields, and Mji Mwema I:2 – represent the coastal, lowland and highland microenvironments and occupations from the first and second millennia CE. The proportions of the stable isotopes of carbon and nitrogen were measured for each sample to produce isotopic signatures. This was done using a Carlo Erba elemental analyzer interfaced to a Micromass Optima isotope ratio mass spectrometer. Further details regarding the methodology have been published elsewhere (e.g., Macko *et al*. 1997). The percentage of the total sample comprised of carbon or nitrogen was also recorded. The proportions of stable isotopes in the sampled sediments are significant because the different isotopes are utilized preferentially in certain natural processes and preferentially contained in certain types of plants and animals, whose presence is then recorded in the sediment.

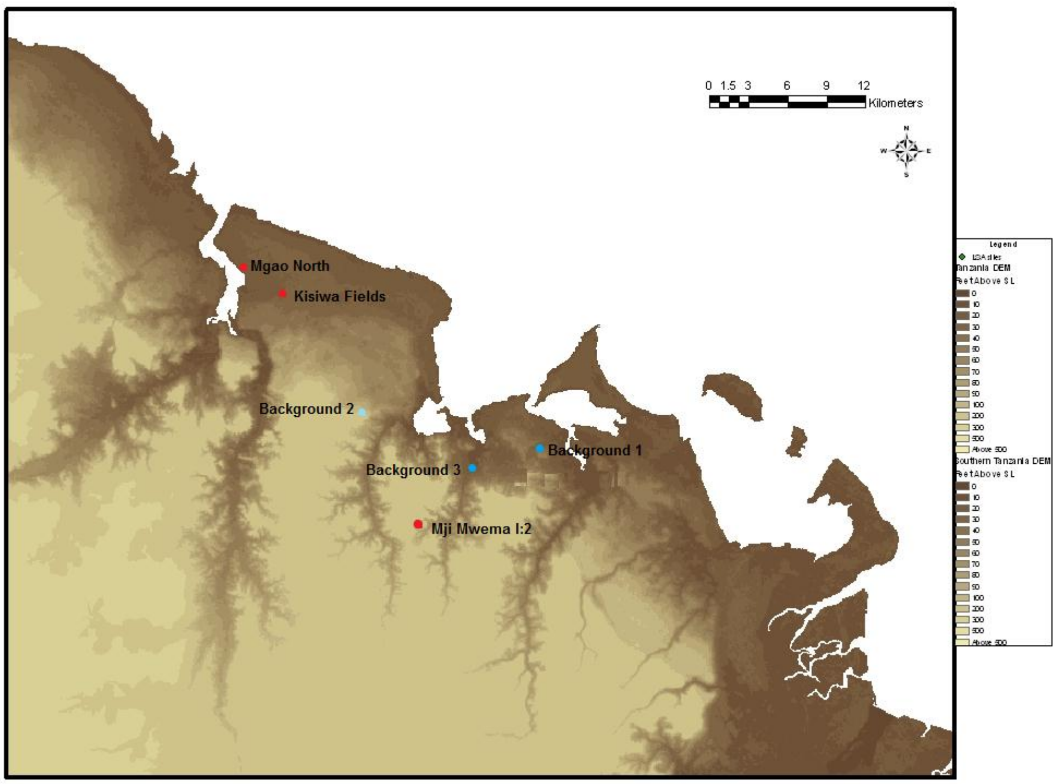

Figure 6.9 Locations of sites and background samples for stable isotope analysis

There are three naturally occurring carbon isotopes: carbon-12 (^{12}C), carbon-13 (^{13}C), and carbon-14 (^{14}C). Carbon-14, which is radioactive, is familiar to archaeologists because of its use in radiocarbon dating, but the other two are important for stable-isotope analysis. Carbon-12 is much more common than carbon-13 but, because each isotope is stable, the ratio of the two can be calculated in a sample to obtain an isotopic signature, referred to as $\delta^{13}C$, when compared to a known reference[6]. This signature is obtained using the following formula:

$$\delta^{13}C\% = [((^{13}C/^{12}C)_{sample} / (^{13}C/^{12}C)_{standard}) - 1] \times 1000$$

Values produced have a standard deviation of 0.2%. Because plants use the lighter ^{12}C more easily during photosynthesis, there is less ^{13}C in terrestrial organic matter (O'Leary 1988). In both vegetation and soils, the $\delta^{13}C$ of such matter has a mean value of -26‰, while the $\delta^{13}C$ of atmospheric CO_2 is close to -6‰ (Cantolla 2003). More importantly, it is possible to distinguish the carbon-isotope signatures between different types of plants. Most plants, such as trees, follow the C3 photosynthesis pathway and have values of δ^{13} between -22 and -30‰. But some plants, especially tropical grasses including sorghum and millet, follow the more elaborate C4 photosynthesis pathway, which avoids the loss of photosynthetic carbon through photorespiration, and have higher values of $\delta^{13}C$, typically between -10 and -14 ‰ (Ambrose and Norr 1993, Cantolla 2003). The $\delta^{13}C$ carbon value of archaeological sediments depends largely on the type of plant, C3 or C4, which grew on them.

Nitrogen has two naturally occurring stable isotopes: nitrogen-14 (^{14}N) and nitrogen-15 (^{15}N). The formula for $\delta^{15}N$ is provided by the following formula:

$$\delta^{15}N\ \% = [((^{15}N/^{14}N)_{sample} / (^{15}N/^{14}N)_{standard}) - 1] \times 1000$$

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[6] For $\delta^{13}C$ the reference is a Cretaceous marine fossil, *Belemnitella americana*, from the PeeDee formation in South Carolina. The fossil has a higher 13C/12C ratio than nearly all other carbon-based substances and thus gives almost all other samples negative values (University of Georgia Institute of Ecology 1997).

The standard used to measure the nitrogen isotopic signature is air. Values produced have a standard deviation of 0.2%. The proportion of ^{15}N is enriched moving up the food chain, as the lighter ^{14}N is more easily excreted as waste. The heavy ^{15}N is also concentrated in soils as the nitrogen in waste organic matter is hydrolyzed to ammonia and then converted to nitrate (see SAHRA 2005). The isotopic signature of a sample ($\delta^{15}N$) can thus distinguish between various sources including plant organic matter and animal waste (see Hoefs 1997). Such applications are common in hydrology and other environmental sciences to identify the sources of nitrate pollution, but have archaeological applicability as well (see Macko *et al*. 1999).

- Carbon Stable Isotope Results

The carbon stable-isotope signature was obtained from samples at the three sites (see Fig. 6.9). Mgao North provides data from an early second-millennium site with a small first-millennium component. Kisiwa Fields and Mji Mwema I:2 are each first-millennium sites. The sites also provide evidence from different microenvironments: the coastal, lowland and highland microenvironments respectively. In addition to the samples from the sites, three background samples from non-site locations in the region were also tested. The results are presented in Table 6.11.

The background samples provided useful indications of regional vegetation communities associated with particular isotopic signatures. The black clay vertisol, which is covered exclusively in grasses, had a $\delta^{13}C$ strongly indicative of C4 plants. The topsoil of the millet field recently cleared out of the surrounding dry forest in the highlands towards Misijute produced a $\delta^{13}C$ indicative of C3 vegetation. Perhaps the most interesting background result comes from the sample taken from a cultivated field within the boundaries of the city of Mtwara, which had been cleared for an extended period of time. That sample yielded a $\delta^{13}C$ of -18.8, between the values common for C3 and C4 plants. This result indicates that cleared fields might not express the vertisol's extremely strong $\delta^{13}C$ even if they are growing C4 crops. Such results are not wholly surprising given the presence of trees and woody vegetation around and occasionally within modern fields, the lower density of C4 plants on agricultural land relative to grasslands, and the recurrent input of C3 carbon when woody brush grows on fallow fields or when such brush is brought to fields to be burned. The suggestion that cleared fields growing C4 crops might have $\delta^{13}C$ values between the C3 and C4 ranges also seems to hold for the topsoil layers of Mgao North and Kisiwa Fields at -18.4 and -17.7 respectively. The latter case seems to provide a good scenario for how this could happen, as the excavation was located at the margins of a clearing in a millet field around a large mango tree.

Site	Bag	Layer	Depth (cm)	%C	δ13C (%)	Sherds	Notes
Background 1	n/a	n/a	n/a	1.21	-18.8	0	Mtwara topsoil
Background 2	n/a	n/a	n/a	0.56	-21.1	0	Misijute recently cleared millet field topsoil
Background 3	n/a	n/a	n/a	0.68	-9.9	0	black vertisol sediment in Likonde salt pans
Kisiwa Fields	1135	1	0-23	1.1	-17.7	11	topsoil, modern fields
	1137	2	42-50	0.59	-15.5	71	emergence of coral feature
	1125	3	50-57	0.52	-18.9	350	level with most artifacts
	1127	3	67-82	0.62	-13.3	119	bottom-most level with dense artifacts
	1130	4	103-118	0.55	-15.3	8	near bottom of site
	1132	4	128-140	0.51	-15.3	0	below site, no artifacts
Mji Mwema I:2	1505	2	51-61	0.45	-13.9	16	beginning of first-millennium materials
	1506	2	61-71	0.29	-13.5	136	level with most artifacts
	1510	2	101-113	0.17	-19.6	1	last artifact-bearing level
	1497	3	136-155	0.13	-14.2	0	below site, no artifacts
Mgao North	1146	1	0-15	1.28	-18.4	66	topsoil, modern fields
	1148	2	24-33	0.7	-16.7	568	level with most artifacts
	1150	3	43-50	0.51	-15.8	30	near bottom of site
	1153	4	70-80	0.39	-16.4	0	below site, no artifacts
	1154	4	80-100	0.2	-16.7	0	below site, no artifacts

Table 6.11 Carbon stable isotope results

Given these examples, the $\delta^{13}C$ results from the three sites proved quite intriguing, though they must be considered preliminary given that only 18 samples were analyzed. There is evidence from all three sites indicating that the inhabitants of the Mikindani region were altering the environments immediately around their settlements to include more C4 plants. The two richest artifact-bearing levels at Mji Mwema I:2 each have a C4 signature, with $\delta^{13}C$ values of -13. In contrast, the bottom of the site has a value of -19, which shows a stronger C3 influence and is less than the topsoil in modern agricultural fields. Similarly, at Kisiwa Fields the earliest dense layer produces the highest $\delta^{13}C$ with a C4 signature at the site, with mixed isotopic signatures, but ones close to C4, below. The isotope signatures at Mgao North have mixed $\delta^{13}C$ values tending towards C4, but there as well the earliest dense layer has the highest value, -15.8. All these results suggest that human activity is limiting the presence of C3 plants, and hence trees and forests, at the expense of grasses, likely including grain crops. Other carbon inputs from humans and livestock may also have contributed to these values, but their input would have mirrored the isotopic composition of the plants they were eating (Macko and Engel 1991, Macko *et al*. 1999), suggesting the ready availability of millet and sorghum for human consumption and other grasses for grazing.

Not all levels bearing artifacts at these sites showed this strong C4 influence however. As mentioned above, the lowest levels with artifacts at Kisiwa Fields and Mji Mwema each show mixed isotopic signatures. The latter site's $\delta^{13}C$ value of -19 shows a greater C3 influence, and illustrates a second interesting result, that some levels of first-millennium sites exhibit mixed signatures close to the C3 range. Although these $\delta^{13}C$ values indicated increased C3 inputs, the background samples demonstrate that such results can be produced within cleared agricultural fields. Also of importance are the differences between the two sites. At Mji Mwema the mixed signature with a stronger c4 input occurs with the earliest levels of the site, whereas at Kisiwa Fields that signature comes from the densest level in the middle of the site's occupation – after a level with a strong C4 signature. The C3-rich levels thus have different implications within the two sites' histories, but it is nonetheless important to realize that even as Mikindani's inhabitants often increased the C4 signature around their sites they maintained C3-rich plant communities at various points in time.

One final note regards the $\delta^{13}C$ signature for the non-site levels beneath each of the three sites. While these sites represent three different microenvironments, the levels beneath the sites each produced mixed results relatively close to the C4 range. These results indicate that both the increased $\delta^{13}C$ values associated with C4 plants and the lower mixed signatures closer to the C3 range from habitation levels diverge from background isotopic signatures.

- Nitrogen Stable Isotope Results

The samples analyzed for carbon stable isotopes were also tested for the nitrogen isotopic signature and nitrogen percentage. The percentage of nitrogen in each sample was much lower. Nonetheless, the $\delta^{15}N$ results provide several useful pieces of information. The results are presented in Table 6.12.

Site	Bag	Layer	Depth (cm)	%N	δ15N (%)	Sherds	Notes
Background	n/a	n/a	n/a	0.16	10.8	0	Mtwara topsoil
Background	n/a	n/a	n/a	0.058	5.6	0	Misijute recently cleared millet field topsoil
Background	n/a	n/a	n/a	0.17	3.1	0	black vertisol sediment in Likonde salt pans
Kisiwa Fields	1135	1	0-23	0.05	7.7	11	topsoil, modern fields
	1137	2	42-50	0.03	8.7	71	emergence of coral feature
	1125	3	50-57	0.06	7.5	350	level with most artifacts
	1127	3	67-82	0.01	9.5	119	bottom-most level with dense artifacts
	1130	4	103-118	0.035	11	8	near bottom of site
	1132	4	128-140	0.04	10	0	below site, no artifacts
Mji Mwema I:2	1505	2	51-61	0.03	9.1	16	beginning of first-millennium materials
	1506	2	61-71	0.02	9.3	136	level with most artifacts
	1510	2	101-113	0.02	6.1	1	last artifact-bearing level
	1497	3	136-155	0.01	9.1	0	below site, no artifacts
Mgao North	1146	1	0-15	0	7.6	66	topsoil, modern fields
	1148	2	24-33	0.06	9.5	568	level with most artifacts
	1150	3	43-50	0.03	7.5	30	near bottom of site
	1153	4	70-80	0.035	6.3	0	below site, no artifacts
	1154	4	80-100	0.03	8.1	0	below site, no artifacts

Table 6.12 Nitrogen stable isotope results

The first general point is that the ^{15}N isotope signatures at all three sites are notably larger than the background samples from Mkangala and the Likonde vertisol. They are still within the range for organic nitrogen in soils, but given the comparison with the background samples the influence of human and animal waste and chemical processes in soil each likely also influenced the isotopic signature (see SAHRA 2005). The chemical processes taking place should perhaps be considered especially influential in the larger results produced at the bottoms of the sites' stratigraphies (see Buzek *et al.* 1998). Again, the results should be considered preliminary, but the larger δ^{15}N values that occur higher in the stratigraphies are one possible indication of stock-keeping at sites in the Mikindani region, because animal waste yields higher δ^{15}N values.

However, perhaps the most important result from the nitrogen signatures was the correlation of lower δ^{15}N values with the site levels that produced the lowest δ^{13}C values as well as the opposite, higher δ^{15}N values with higher δ^{13}C values. The level at Kisiwa

Fields with dense artifacts and a $\delta^{13}C$ value indicative of greater C3 inputs also had the lowest nitrogen isotopic signature. The level from Mji Mwema I:2 with the low $\delta^{13}C$ value of -19.6 had a $\delta^{15}N$ value which was significantly below any of the other values from the rest of the site. The Mji Mwema levels with higher $\delta^{13}C$ values indicative of C4 plants also had $\delta^{15}N$ values around 9, as did the similar level at Kisiwa Fields. The lower nitrogen isotopic signature at Kisiwa Fields is actually associated with a greater total percentage of nitrogen. This relationship is worthy of additional study, but at this early stage suggests that when land around sites contained more C3 plants it may have also experienced greater build-up of floral organic sediments and increased nitrogen inputs. That description seems apt for an extended fallow period.

The nitrogen-isotope results at Mgao North are also noteworthy because they present a different pattern. The $\delta^{15}N$ values are quite a bit lower than those from the other two sites throughout the sequence, except for the level with the heaviest artifact load, which also has a relatively high value of 9. This high isotope signature is not associated with a high $\delta^{13}C$ value, but a mixed one as with much of the rest of the site's stratigraphy. Nonetheless, the intensity of human activity at that time, perhaps including stock-keeping activities, produced a high $\delta^{15}N$ value. The relatively low isotope signatures obtained throughout the rest of Mgao North's stratigraphy may relate to its location on the ocean, but additional study is necessary to fully explore that relationship.

Basic Soil Characteristics: Acidity and Nutrients

In addition to the stable-isotope analysis, a series of chemical tests were run on soil samples from every site excavated during Phase III as well as samples collected during the other two phases of the project. The chemical tests provide important information regarding the suitability of the soil for agriculture by measuring its acidity and the levels of the key soil macro-nutrients nitrogen, potassium, and phosphorus. Testing samples over the entire stratigraphy of sites also provided insight into the influence that human activity had on soil chemistry.

The site-specific pH tests largely confirmed expectations based upon the regional geology. Most of the sites on soils derived from fossilized coral limestone, such as those near Kisiwa, Imekuwa and Miseti, had neutral or nearly neutral pH values. These sites were found exclusively in the lowland and coastal microenvironments. Most of the sites on the sandstone-derived soils of the Mikindani formation, including those near Mji Mwema, Mkangala, and Stella Maris, possessed acidic soils with pH below 5.5. The alluvial soils, as expected, were more variable, with some mostly neutral and others slightly acidic, such as the Mbuo Hilltop site, which had a pH of 6.

Within this broad picture there was also evidence of significant small-scale pH variation within microenvironments. The Lisoho Fields site, situated on soils from the fossilized coral bedrock, had slightly acidic pH values, in contrast to the other sites on those soils. Similarly, some STPs on and around the site of North Imekuwa were also acidic, despite being from the mostly neutral coral-limestone area. Variability was also evident at the Ufukoni Mibuyu site. The site itself possessed acidic soils, but tests of STPs from the area around the site were neutral or even slightly basic. The implications of this variability are significant. Despite the pH variability within the fossilized-coral area, the region’s inhabitants appear to have selected almost unerringly more neutral areas for settlement and cultivation. Human activity may have contributed to the more basic pH values as well. Such was the case at Pemba and Mgao North, where the accumulation of shellfish in middens accomplished that feat. Yet the Ufukoni Mibuyu site provides evidence that some loci of human activity were also associated with more acidic pH values than their surroundings. Similarly depressed pH values relative to surroundings were also documented at Stella Maris Hills.

	Nitrogen		Phosphorus		Potassium
Below Trace	<5 ppm	Below Trace	<10 ppm	Very Low	<60 ppm
Trace	5 ppm	Trace	10 ppm	Low	60 ppm
Trace to Low	10 ppm	Trace to Low	18 ppm	Med. Low	70 ppm
Low	15 ppm	Low	25 ppm	Medium	80 ppm
Med. Low	20 ppm	Med. Low	32 ppm	Med. High	90 ppm
Medium	25 ppm	Medium	38 ppm	High	100 ppm
Med. High	30 ppm	Med. High	44 ppm	Very High	>100 ppm
High	>30 ppm	High	>50 ppm		

Table 6.13 Approximate concentrations of macronutrient test results in ppm (LaMotte Co. 2010)

The macronutrient tests also provided evidence that human activities were influencing their environments. Nitrogen levels were depressed at nearly every site, only trace or below trace at most sites and never higher than low. These low scores compare unfavorably to off-site STPs with medium to high scores from across the region covering lowland, coastal, and valley microenvironments. However, off-site nitrogen levels from STPs were not always high and while the nitrogen levels were depressed on site, the layers with dense artifacts had slightly richer nitrogen levels than layers above and beneath the human settlement (i.e., trace or trace to low vs. below trace) at several sites across all microenvironments, including Mji Mwema I:2, Mkangala Ridge-top 1, Miseti Hilltop, Stella Maris Hills, and Ufukoni Mibuyu.

The phosphorous levels are also trace or low at most sites. The off-site phosphorous readings from STPs are often low as well however, indicating that phosphorous levels may not be great in soils from around the region. An exception to these low levels of phosphorous occurs at the densely occupied early to mid-second-millennium sites. The two most densely occupied such sites, Imekuwa Mibuyu and Mgao North, each have high to medium-high phosphorous levels. Medium-high levels were also recorded for mid-second millennium levels in the Mnaida ward of Mikindani. Human settlements are known to add large amounts of phosphorus to the soil (Herz and Garrison 1998: 182), so inputs from human activity are the likely cause of the elevated levels at these sites. Slightly elevated levels of phosphorus in the occupation layers of the two Kisiwa sites suggest a similar trend occurring at some sites in the first millennium, but where greater age would have allowed for more phosphorus to have leached out of the soil. However, several sites such as Mkangala Ridgetop 1, Miseti Hilltop, and Stella Maris Hills unexpectedly exhibit the opposite trend, with site levels producing lower phosphorus scores.

The tests for potassium produced mixed results. The results covered the entire range from very low to high. There was not a close relationship between the results and any of the microenvironments or the underlying geology. Similarly, while 8 sites (50%) showed increased levels of potassium in occupation levels, 3 (19%) showed decreased levels. Human activities seemed to clearly influence potassium levels, but the mixed results suggest that different activities produced different effects.

Overview of Mikindani's Historical Ecology

The Mikindani region's recovered archaeobotanical and faunal remains and anthropogenic sediments yield important information for understanding the relationship between its inhabitants and their environment. They provide insight into the region's agriculture, exploitation of tree and animal resources, and the changes human activities wrought on the local environment. This section outlines the most significant implications of those results before exploring how they describe a set of practical orientations to the environment.

Implications of Results Regarding Agriculture

The most important result of the archaeobotanical study is the continued importance of African grains, especially pearl millet and sorghum, in the Mikindani region over the past two millennia. This continuity is compelling because elsewhere on the Swahili coast communities switched to rice as the staple grain in the second millennium, as is documented archaeologically on Pemba Island (Walshaw 2005, 2010) and recorded by visitors to the coast at Mogadishu, Mombasa, Malindi, Zanzibar, and Kilwa (Freeman-Grenville 1975, Walshaw 2005). The persistence of pearl millet and sorghum agriculture at Mikindani thus requires some explanation, in terms of both its environmental and social significance.

Part of the explanation for the continued cultivation of millet surely lies in the environmental characteristics of the region and the characteristics of the grains themselves. Under optimal conditions, millet has the lowest yield of all grains, though it is high in protein (Norman *et al*. 1995). However, millet is well adapted to high temperatures, and does not possess exorbitant water demands, thriving when it receives between 400 and 600 mm of precipitation. Millet can also withstand drought due to its rapid and deep root penetration. Rice on the other hand is much more difficult to cultivate, with shallow roots and water demands of 1000-1500 mm to support rain-fed agriculture (de Datta 1981: 11-19). While Pemba Island's annual rainfall of 1900 mm is well above this demand, the average rainfall for Mikindani's portion of the coast is between 500 and 1000 mm. If notable "risks" are involved in rice cultivation on Pemba Island (Walshaw 2010: 150), how much greater must those risks have been around Mikindani? Surely one important reason for the persistence of millet agriculture at Mikindani is the fact that pearl millet is eminently suited for the typical rainfall received in the region. Although precipitation could have been augmented by planting in areas that retain moisture such as natural depressions (Walshaw 2010) and river valley areas where irrigation might have been possible (see Stoezel 2011), rice bore a high risk of failure and would likely only have been successful in the rainiest years.

Still, these risks might have been managed effectively at certain points in the past. The risk derives from the interannual variability of the monsoon, whose winds bring the majority of the Swahili Coast's precipitation. High interannual variability detracts from coastal farmers' ability to predict to a reasonable degree of accuracy whether or not monsoon rains would be sufficient for a rice crop. During certain periods in the past the monsoon was quite reliable however. For instance, during the Medieval Warm Period/Climactic Optimum between CE 1000 and 1290 only 8% of years witnessed weak monsoons (Quinn 1992). It is thus little surprise that Pemban farmers adopted rice agriculture during this stable period, and only reincorporated millet into their cultivation strategies when more variable monsoons returned in the 14th century (Walshaw 2005). There is some evidence to suggest that farmers in the Mikindani region were similarly expanding their crop packages during the climatic optimum, experimenting with finger millet and cotton, but such expansion did not apparently extend to rice.

Beyond the clear environmental difficulties involved in a shift away from millet agriculture at Mikindani, there is also an important social component to its persistence. On Pemba Island, the move to rice agriculture is thought to have brought "rich social rewards" due to the crop's association with Islam and the Indian Ocean trade, and its possible role in feasting (Fleisher 2010b, Walshaw 2010). This agricultural shift on Pemba was accompanied by the emergence of coastal stonetowns and a concomitant depopulation of the rural countryside and abandonment of many villages (see Fleisher 2003). No such settlement shift occurred around Mikindani during the first half of the second millennium. Instead, several first- millennium sites remained occupied, the number of sites in the area away from the coast expanded, and there is no clear evidence of stone construction, though it is possible that some such construction might have taken place around Mikindani Bay. While rice is associated with the Indian Ocean trade on Pemba Island, the first half of the second millennium is a period when the Mikindani region was mostly cut off from such trade. Thus, the persistence of millet agriculture and absence of rice agriculture should be seen not only in terms of the challenges of growing rice in a relatively dry area. It should also be seen in the light of the centuries-long period when Mikindani was cut off from Indian Ocean trade and the attendant cultural shifts that characterized the coast further north, as discussed in Chapters 7 and 8. That period of disconnect stands in contrast with the region's experience in the second half of the first millennium CE, when local communities obtained Sasanian-Islamic sherds from

Persia and may have been familiar with exotic grains such as wheat from elsewhere along the Indian Ocean rim.

The absence of rice agriculture also likely carried significant demographic consequences for the Mikindani region. The communities of the East African coast did not engage in the intensive irrigation projects that have linked rice agriculture and the emergence of high levels of social complexity elsewhere in the world (Wittfogel 1957). Nonetheless, as the highest yielding of all grain crops, rice agriculture likely helped enable the growth of coastal cities during the second millennium, much as it seems to have done on Pemba Island (Walshaw 2005, 2010), and population growth on the coast more broadly. In contrast, the absence of rice agriculture in the Mikindani region may have contributed to the relatively late emergence of urbanism in the region (see Chapter 10), though of course it would not have been the only factor.

Implications of Results Regarding Tree/Forest Resources

The concentration of fruit and nut remains at higher elevations suggests two non-exclusive explanations. First, the concentration is an indication of greater availability of those resources in higher-elevation environments, and perhaps on the highland plateau more generally. The relative paucity of such resources in the lowlands might be due to both environmental conditions and anthropogenic forces such as farmers clearing land for grain cultivation. Second, the greater numbers of fruit and nut remains at highland and valley sites suggests a greater emphasis was placed on such resources at those sites. Such emphasis is not unlikely, given that these sites were often located too far away from the coast to have had easy access to marine resources as well as away from the best agricultural land. It may have caused the inhabitants to protect certain wild forest resources, thus ensuring their greater availability in the microenvironment.

Implications of Results Regarding Faunal Resources

The most striking result from the faunal remains is the abundance of shell found at coastal sites in the Mikindani region. This wealth of shellfish covers sites from across the two millennia of regional occupation. The 33.4 kg of shell recovered from the Pemba excavation seems to be the greatest amount recovered at any single excavation on the East African coast, surpassing other sites such as Mpiji (Chami 1994:68), Kizimkazi (Kleppe 1995), and Kaliwa (Fleisher 2003: 364).

Beyond the simple volume of shell, the continued exploitation of shellfish resources in the second millennium at Mgao North and other sites is also significant. Levels of recovered shell decrease after 1000 CE at Shanga (Mudida 1994) and at stonetowns on Pemba Island (Fleisher 2003). At those locations the decrease in shellfish resources is accompanied by increased levels of domesticated animals and it is suggested that this shift is evidence of these communities getting richer and being better able to acquire cattle for consumption (Mudida 1994). Second-millennium sites that continued to produce relatively large quantities of shell, such as Kaliwa, also appear to have been poorer based upon imported goods (Fleisher 2003). The Mikindani region fits this pattern. Shellfish continue to be an important protein source in the early second millennium and relative to the rest of the coast the region lacks access to imported Indian Ocean goods (see Chapter 9).

Unfortunately, the paucity of recovered bone makes the identification of trends in non-shellfish animal resources very difficult. The fish bone again emphasizes that near-shore marine resources were significant components of the regional diet. The distribution of both fishbone and shell shows that these resources were moving throughout the region. Whether such resources were traded between settlements in different microenvironments or people living away from the coast had opportunities to exploit marine resources, the presence of marine animals in the diets of people living more than ten kilometers from the ocean suggests a degree of economic cooperation existing in the region between the mid-first and mid-second millennia CE.

Implications of Soil Chemistry Results

The changes in soil chemistry at sites in the Mikindani region demonstrated how humans were influencing their environments. The carbon stable-isotope signatures show that humans either favored, or created conditions favoring, C4 vegetation at the expense of C3 vegetation. The prominence of C4 vegetation is almost surely the result of maintaining cleared lands around the settlement for grain agriculture. However, these cleared areas were not pure grasslands, nor did they support only grain crops. Their C4 signatures were not as strong as the vertisols with their grassy vegetation, and the stable-isotope signatures of some first-millennium levels show evidence of the presence of C3 flora on these soils. Multiple explanations can be offered for these signatures: they could result from mature trees left amid agricultural land, woody plants growing on fallow fields, or burning woody material for fertilizer. The latter two explanations seem the most likely given more overall nitrogen and lower nitrogen-isotope signatures in these levels, both of which are indicative of greater inputs of plant material.

The soil-nutrient tests show that nitrogen levels were depressed at most sites in the region and phosphorus levels were only high for densely occupied second-millennium sites. The clear implication is that human activities related to agricultural pursuits were depleting soil nutrients. Nitrogen, which promotes above-ground growth and is an important component of chlorophyll, is removed from soil in relatively large amounts by the major African grains sorghum and millet (Foth 1970). The phosphorus demands of these crops are more modest, but other crops such as peas use large quantities of phosphorus (Tucker 1994). Low phosphorus values at several sites can be attributed partially to natural processes, as phosphorus is known to leach out of slightly acidic soils such as those found at many Mikindani-region sites (McCawley and McKerrell 1972). Still, when compared with background tests from off-site STPs, the lower phosphorus levels of several sites clearly suggest human agriculture was responsible at some level. The anthropogenic depletion of nitrogen and phosphorus provides insight into the agricultural practices of the region, suggesting relatively intense use of land near human settlements where fallowing and fertilizing were often not able to counteract the depletion of soil nutrients.

Despite this general trend towards depressed nutrient levels, it appears that some human activities were contributing nutrients to the soil and in some cases that process outweighed nutrient depletion. Phosphorus levels are high at second-millennium sites, and elevated at densely occupied portions of first-millennium sites. Nitrogen levels are also slightly richer in the artifact-rich layers of many sites than they are elsewhere in the sites' stratigraphies. One-hundred humans living in a one hectare area can add up to 125 kg of phosphorus and 850 kg of nitrogen to the soil annually (Herz and Garrison 1998: 182). These additions come from human urine and feces, food refuse, animal dung, and buried skeletal remains (McCawley and McKerrell 1972). In the Mikindani region, the most significant additions seem to have come from human and animal waste, as the higher nitrogen-isotope signatures for the densest artifact-bearing layers at Mgao North and Mji Mwema are indicative of animal contributions, rather than plant ones. Despite the absence of much animal bone, the chemistry tests are thus indicative of the presence of domesticated animals, and suggest that animal dung might have been used as a fertilizer. Further, the fact that phosphorus levels were elevated at only some of the first-millennium sites provides information about the intensity of those sites' occupations – and potentially their relative populations – giving further support to the picture suggested by spatial analysis of smaller, less intensely occupied sites in the highland and ridge microenvironments.

Orientations to the Environment

This overview suggests important practical orientations that the Mikindani region's inhabitants had towards the regional environment. First, there was a tendency towards intensive – sometimes too intensive – agriculture, especially in the lowland plains. The macrobotanical evidence suggests that the lowland area between Mikindani Bay and Sudi Bay was the locus for significant grain cultivation. While this undoubtedly helped support the larger settlements of this region, it also frequently placed stress on the soils nearby those settlements. Carbon-isotope signatures suggest significant land clearance and point to soil nutrient depletion throughout the region, but again particularly in the lowland plains. Increased woody-plant isotope signatures at Kisiwa Fields suggest that fallowing and ash fertilizer may each have been attempted to reverse such losses, but continued heavy use of soils meant that some losses were irrevocable. Despite nutrient depletion, several sites were able to persist for several centuries, but the agricultural limitations imposed by soil exhaustion seem to have placed an upper limit on the size they could obtain.

Another major orientation towards the environment is the tendency for Mikindani residents to engage in environmental practices that suited their conditions but were uncommon on the coast further north. Experiments with water-intensive crops such as cotton were relatively fleeting and rice agriculture was ignored until recently, whereas crops such as millet better suited to the region's average annual precipitation were grown continually. Similarly, shell resources continued to be exploited throughout the second millennium in the Mikindani region, rather than being dropped in favor of domesticated meat. The exploitation of wild forest resources shown by the fruit and nut macrobotanical distribution is a third example. This orientation provides further evidence for the separation of the Mikindani region from standard Swahili practices, particularly during the early second millennium.

CHAPTER 7: LOCAL CERAMICS FROM THE MIKINDANI REGION

This chapter describes the local earthenware ceramics found during the project. Locally-produced ceramics were found at every site recovered during this project, and were far and away the most numerous artifact class recovered. Because of their ubiquity, as well as their prevalence across sites in coastal East Africa (see Chapter 5), they are a good class of artifacts to use in order to make associations and draw distinctions between sites. Local ceramics serve as important indicators of the connections that existed between regions because of their capacity to demonstrate shared patterns of style, production, and daily use, and are thus useful in clarifying Mikindani's place within Swahili networks in different periods. They also provide important information regarding site functions within regional and interregional networks. These ceramics were important household objects that were both produced and used within the Mikindani region, and they thus provide information regarding activities that were taking place at each site and during each time period, ranging from the social organization of production to cooking and food consumption practices. Understanding the characteristics of the locally-produced ceramics of the Mikindani region is thus clearly important to understanding how regional society was organized and interacted with other coastal areas.

In this chapter I document those characteristics. I describe the methodologies of ceramic collection and analysis used throughout the project. Then I report the results of the quantitative analysis of the project's ceramics. Next I provide a ceramic typology for the Mikindani region that can be compared with similar typologies produced at other coastal sites and regions. I then develop a detailed chronology of the region's ceramics and discuss some of the implications of the ceramics analyses.

Methodology of Ceramic Analysis

In documenting the Mikindani area ceramics, I have sought to provide data that allow for comparisons to be made with the ceramics known elsewhere in East Africa described in Chapter 5 and enable me to describe characteristics of the pottery itself such as vessel function and production techniques (see Henrickson and McDonald 1983, Sinopoli 1991). In this fashion I constructed a typology for the ceramics of the region that could be weighed against similar typologies recorded in other coastal regions, as well as address questions regarding the activities which may have been taking place at each site (see Pikirayi 2007, Ashley 2010). Throughout the project an explicit methodology was used to produce the necessary quantitative information to accomplish this goal, in terms of ceramic metrics such as thickness and counts of other attributes such as decorative motifs.

In the three phases of the project all of the excavated soil was screened using quarter-inch mesh and all ceramics were collected for processing and analysis. After sherds were washed and dried, the locally-produced ceramics were sorted into the following groups:

1. Undecorated body sherds, surface area less than 1 cm^2
2. Undecorated body sherds, surface area greater than 1 cm^2
3. Undecorated rim sherds
4. Decorated body sherds
5. Decorated rim sherds
6. Body sherds with graphite burnishing
7. Rim sherds with graphite burnishing
8. Body sherds with red paint or burnished red slip

9. Rim sherds with red paint or burnished red slip
10. Base sherds

The first group, consisting of small pottery fragments, was weighed and then discarded, as they are typically not found to provide useful data and the presence of large samples of the second group made them redundant (Sinopoli 1991: 61, Fleisher 2003). All of the other groups were counted and weighed. In addition, their paste, exterior color(s), and additional surface treatments such as smoothing or burnishing were noted. In this fashion basic data for the 20,310 sherds recovered from the 55 sites recovered in the survey and the 10 areas[1] investigated in Phase I were compiled.

Following these initial steps, further analysis took place on the rims and decorated sherds. For the latter each decorative motif was noted and each sherd photographed. Employing these two sources of data I was able to identify the decorative motifs employed on over 90% of the decorated ceramics recovered during the project. In addition, every rim sherd bearing decoration was drawn and the location of the decoration on the vessel (e.g., rim, neck, shoulder, body) was noted, except for sherds whose rim alignment could not be determined due to their small size or fragmentary nature. As described below, these data on decoration allowed me to trace chronological variation in the Mikindani ceramics.

The most detailed analysis took place on the rim sherds. In addition to the data classes already mentioned, the thickness of rims was measured. Because rim thickness sometimes varied from that of the body owing to thickening or tapering, additional measurements of body thickness were also recorded. The rim form was recorded, following Phillipson's (1976a) schema. Most importantly, whenever possible the rim

[1] Because it was designated a distinct site Pemba Mbuyu Pwani is studied as a separate area from Modern Pemba.

sherds were used to determine the vessel forms present in each context, as body sherds only rarely provided adequate evidence to make such designations and rim sherds provide good estimates of vessel size and shape (Rice 1987, Sinopoli 1991). Those rim sherds which were too small and fragmentary to provide evidence of rim and vessel form, or even thickness in some cases, were documented but have been excluded from the formal analysis. As the rim sherds only rarely included or could be reconstructed with a substantial portion of the body and as no complete vessels were reconstructed, a few cautions regarding these vessel form designations should be observed. First, because the rims are not always tied to the body sherds the number of carinated vessels may be underrepresented, though relatively few body sherds indicative of carination were recovered. Similarly, if only the rims were available from necked vessels with out-turned rims, they could possibly be misidentified as open bowls.

Beyond recording all of these attributes, the ceramic analysis studied the extent to which attributes co-varied. It was important to determine whether certain decorations or surface treatments or thicknesses were associated with particular rim and vessel forms or with one another. Such relationships provide a better foundation for comparison between the ceramics of different sites and different regions than combinations of percentage scores within the aggregate of an entire assemblage. Each method, both of which are employed here, is stronger than isolated trait matching, where the existence of single traits such as rim beveling, and sometimes single examples of such traits, are thought to stand in for entire ceramic types. The importance of moving beyond trait matching to quantify ceramic groupings and study how attributes co-vary as has been advocated in East Africa for some time now (e.g., Vogel 1978, Huffman 1982, Sinopoli 1984).

However, the study of attribute covariance should also be quantified to avoid the same pitfalls as isolated trait matching, so that the mere occurrence of a set of linked attributes does not overshadow the full diversity of the given assemblage nor the variation between assemblages.

Unfortunately, logistical constraints prevented the analysis of the entire body of recovered rims. In particular, due to lack of time I was unable to fully examine the rims from Phase I and the undecorated rims from Phase III. Nevertheless, full coverage of the latter was achieved for some of the sites with large assemblages (Mgao North, Stella Maris Hills, unit 114 at Kisiwa Fields) allowing for a comparison between the decorated rims from Phase III, which have full coverage at all sites, and the undecorated rims from Phase III at those sites. Samples of the undecorated rims from other Phase III excavations were also analyzed. The data presented here are robust and compelling and are the product of analyzing more than half of the recovered rim sherds, but the aforementioned limitations of this dataset and the poor knowledge of the archaeology of this part of the coast more generally should be kept in mind.

For All Sherds	For Decorated Sherds	For Rim Sherds
‣ part of vessel	‣ decorative motif	‣ rim form
‣ temper	‣ placement of decoration (for rims)	‣ rim thickness
‣ paste color/consistency		‣ body thickness (when different)
‣ exterior color		‣ vessel form
‣ surface treatment		

Table 7.1 Attributes recorded in ceramic analysis

Results of Quantitative Analysis

Overview of the Assemblages

This analysis draws on two overlapping datasets: the decorated sherds recovered during the project (n=1846), including the rim sherds with decoration, and the rim sherds (n=1506), also including the rim-sherds with decoration. Each dataset is the product of the ceramics recovered from all phases of the project. Table 7.2 provides an overview of the assemblages recovered from each site. The data for the 55 sites recovered during the Phase II survey consist of the sherds recovered at each site from surface collections and shovel-test pits, as well as the sherds from excavations at 16 of these sites in Phase III. The data for the 10 locations around Mikindani Bay consist of the sherds from the test excavations of Phase I, except for Pemba Mbuyu Pwani, which also includes some shovel-tests excavated during the survey. Of the 1846 locally-produced decorated sherds recovered during the project, particular decorative motifs could be recognized on 1710 of them (92.6%) (see Table 7.3). Of the 1506 rim sherds recovered, 772 were fully analyzed (51.3%) (see Table 7.4).

Because these datasets were derived from the material remains of so many sites the analysis was able to organize the data along several different axes. First, the unique data from each site was studied on its own. Such site-specific analysis provides the finest-grained study of ceramic variation. However, there are certain limitations in the data set at this scale. Many of the sites recovered during the survey, especially the smaller sites, are represented by very small ceramic assemblages. With small assemblages, the dangers inherent in sample sizes were present and several sites produced no diagnostic sherds – rim sherds or decorated sherds – for study. Sites not excavated in Phase III or tested in Phase I also did not have stratigraphic control. These problems were addressed by grouping sites together spatially and temporally and studying the aggregates of their assemblages. Sites were grouped according to time period using the data from the decorated sherds. They were also grouped based on the

Site	Total Sherds	Decorated Bodies	Graphited Bodies	Red Paint/Slip Bodies	Total Rims	Decorated Rims	Graphited Rims	Red Paint/Slip Rims	Undecorated Bodies
Recovered Sites From Phase II									
Imekuwa Fields	16	1	0	0	0	0	0	0	15
Imekuwa Mibuyu	1324	134	29	7	85	24	4	1	1069
Kisiwa Fields	2321	199	26	0	178	77	6	0	1918
Kisiwa Forests	1621	106	25	1	124	61	3	0	1365
Kisiwa Small	72	22	0	0	6	5	1	0	44
Kisiwa South	10	3	1	0	0	0	0	0	6
Likonde	211	1	0	0	17	12	0	0	193
Likonde Forest	17	5	15	0	2	2	2	0	0
Lisoho Fields	306	22	1	0	14	2	0	0	269
Lisoho North	34	0	0	0	4	2	0	0	30
Litingi	54	1	1	3	2	0	1	0	47
Litingi Channel Site	41	4	0	0	4	3	0	0	33
Liwelu	40	0	0	0	2	0	0	0	38
Mangamba	63	3	0	0	1	0	0	0	59
Mangamba Low	14	0	1	0	4	0	0	0	9
Mbuo Hilltop	241	36	3	41	23	15	0	10	138
Mbuo Mbuyu	70	11	0	0	9	6	1	0	50
Mbuo Ridge Low	30	3	0	0	1	0	0	0	26
Mbuo Ridge Top	23	0	0	0	0	0	0	0	23
Mgao North	1347	213	21	0	140	45	7	1	973
Mgao South	43	1	1	0	6	0	1	0	35
Miseti Hilltop	1727	86	3	1	138	34	1	0	1499
Misijute	26	3	0	0	1	0	0	0	22
Misijute Fields	8	3	0	0	0	0	0	0	5
Misijute Post Swahili	7	1	0	1	0	0	0	0	5
Misijute Recent	21	0	0	0	2	0	0	0	19
Misn'gombe	10	0	0	0	2	0	0	0	8
Mji Mwema I One	161	6	1	2	16	2	0	0	136
Mji Mwema I Two	262	10	2	0	27	10	0	0	223
Mji Mwema II	13	0	0	0	3	2	0	0	10
Mkangala Highland I	4	0	0	0	0	0	0	0	4
Mkangala Highland II	13	1	0	0	0	0	0	0	12
Mkangala Ridge-top I	375	35	2	0	39	17	0	0	299
Mkangala Ridge-top II	44	7	13	3	7	4	0	0	14
Mkangala Streambed	70	7	0	0	11	2	0	0	52
Modern Ziwani	11	1	0	0	3	0	0	0	7
Naliendeli	5	1	0	0	0	0	0	0	4
Naumbu	25	1	0	0	0	0	0	0	24
Naumbu Hills	28	3	0	0	0	0	0	0	25
Naumbu Upupu	35	2	0	0	2	2	0	0	31
North Imekuwa	796	61	26	0	74	23	8	0	635
North Imekuwa West	48	1	0	0	0	0	0	0	47
Old Liwelu	18	3	0	0	1	0	0	0	14
Old Ziwani	8	1	0	0	1	1	0	0	6
Past Naliendeli	8	0	0	0	1	1	0	0	7
Pemba	864	73	2	5	103	58	0	2	681
Pemba Bomani	35	0	0	0	2	0	0	0	33
Pemba Mbuyu Pwani	265	8	12	0	17	0	2	0	228
South Mikindani	41	3	0	0	1	0	0	0	37
Stella Maris Hills	2883	67	4	3	156	30	4	1	2653
Stella Maris Mission	70	5	0	0	7	3	0	0	58
Ufukoni Fields	36	2	0	0	4	0	0	0	30
Ufukoni Mibuyu	429	28	1	0	23	5	2	0	377
Ufukoni Sea-View Hill	34	1	0	0	0	0	0	0	33
Ziwani Cashew Grove	7	3	0	0	1	0	0	0	3
Areas Tested in Phase I									
Jangwani	172	6	0	1	5	1	0	0	160
Magangeni	299	10	2	0	12	0	0	0	275
Mikindani Boma	557	25	2	0	40	7	2	1	490
Mirumba	518	31	1	4	27	3	1	0	455
Mitengo	145	6	0	0	8	0	0	0	131
Mnaida	707	28	1	7	50	4	0	4	621
Modern Pemba	1019	51	4	7	61	7	0	0	896
Mtonya	244	17	0	1	17	1	1	4	209
Mvita	105	5	0	0	5	0	0	1	95
Pemba Mbuyu Pwani	259	8	11	0	17	0	2	0	223
Total	20310	1375	211	87	1506	471	49	25	17136

Table 7.2 Site assemblages after initial sorting

Site	Dec Sherds	Studied	% Studied
Recovered Sites From Phase II			
Imekuwa Fields	1	1	100.0%
Imekuwa Mibuyu	158	143	90.5%
Kisiwa Fields	276	276	100.0%
Kisiwa Forests	167	146	87.4%
Kisiwa Small	27	27	100.0%
Kisiwa South	3	3	100.0%
Likonde	13	12	92.3%
Likonde Forest	7	7	100.0%
Lisoho Fields	24	22	91.7%
Lisoho North	2	2	100.0%
Litingi	1	1	100.0%
Litingi Channel Site	7	6	85.7%
Liwelu	0	0	NA
Mangamba	3	3	100.0%
Mangamba Low	0	0	NA
Mbuo Hilltop	51	48	94.1%
Mbuo Mbuyu	17	17	100.0%
Mbuo Ridge Low	3	3	100.0%
Mbuo Ridge Top	0	0	NA
Mgao North	258	251	97.3%
Mgao South	1	1	100.0%
Miseti Hilltop	120	89	74.2%
Misijute	3	3	100.0%
Misijute Fields	3	3	100.0%
Misijute Post Swahili	1	1	100.0%
Misijute Recent	0	0	NA
Misn'gombe	0	0	NA
Mji Mwema I One	8	8	100.0%
Mji Mwema I Two	20	20	100.0%
Mji Mwema II	2	2	100.0%
Mkangala Highland I	0	0	NA
Mkangala Highland II	1	1	100.0%
Mkangala Ridge-top I	52	41	78.8%
Mkangala Ridge-top II	11	11	100.0%
Mkangala Streambed	9	9	100.0%
Modern Ziwani	1	1	100.0%
Naliendeli	1	1	100.0%
Naumbu	1	1	100.0%
Naumbu Hills	3	3	100.0%
Naumbu Upupu	4	4	100.0%
North Imekuwa	84	79	94.0%
North Imekuwa West	1	4	400.0%
Old Liwelu	3	2	66.7%
Old Ziwani	2	1	50.0%
Past Naliendeli	1	1	100.0%
Pemba	131	126	96.2%
Pemba Bomani	0	0	NA
Pemba Mbuyu Pwani	8	7	87.5%
South Mikindani	3	4	133.3%
Stella Maris Hills	97	97	100.0%
Stella Maris Mission	8	8	100.0%
Ufukoni Fields	2	2	100.0%
Ufukoni Mibuyu	33	33	100.0%
Ufukoni Sea-View Hill	1	1	100.0%
Ziwani Cashew Grove	3	3	100.0%
Areas Tested in Phase I			
Jangwani	7	7	100.0%
Magangeni	10	4	40.0%
Mikindani Boma	32	30	93.8%
Mirumba	34	33	97.1%
Mitengo	6	6	100.0%
Mnaida	32	22	68.8%
Modern Pemba	58	48	82.8%
Mtonya	18	16	88.9%
Mvita	5	4	80.0%
Pemba Mbuyu Pwani	8	5	62.5%
Total	1846	1710	92.6%

Table 7.3 Studied decorated sherds by site

Name	Total Rims	Studied Rims	% Studied
Imekuwa Fields	0	0	NA
Imekuwa Mibuyu	85	50	58.8%
Kisiwa Fields	178	101	56.7%
Kisiwa Forests	124	70	56.5%
Kisiwa Small	6	6	100.0%
Kisiwa South	0	0	NA
Likonde	17	12	70.6%
Likonde Forest	2	2	100.0%
Lisoho Fields	14	3	21.4%
Lisoho North	4	3	75.0%
Litingi	2	2	100.0%
Litingi Channel Site	4	0	0.0%
Liwelu	2	1	50.0%
Mangamba	1	1	100.0%
Mangamba Low	4	0	0.0%
Mbuo Hilltop	23	20	87.0%
Mbuo Mbuyu	9	6	66.7%
Mbuo Ridge Low	1	1	100.0%
Mbuo Ridge Top	0	0	NA
Mgao North	140	114	81.4%
Mgao South	6	6	100.0%
Miseti Hilltop	138	45	32.6%
Misijute	1	0	0.0%
Misijute Fields	0	0	NA
Misijute Post Swahili	0	0	NA
Misijute Recent	2	1	50.0%
Misn'gombe	2	1	50.0%
Mji Mwema I One	16	15	93.8%
Mji Mwema I Two	27	26	96.3%
Mji Mwema II	3	0	0.0%
Mkangala Highland I	0	0	NA
Mkangala Highland II	0	0	NA
Mkangala Ridge-top I	39	28	71.8%
Mkangala Ridge-top II	7	6	85.7%
Mkangala Streambed	11	7	63.6%
Modern Ziwani	3	2	66.7%
Naliendeli	0	0	NA
Naumbu	0	0	NA
Naumbu Hills	0	0	NA
Naumbu Upupu	2	0	0.0%
North Imekuwa	74	54	73.0%
North Imekuwa West	0	0	NA
Old Liwelu	1	0	0.0%
Old Ziwani	1	1	100.0%
Past Naliendeli	1	1	100.0%
Pemba	103	63	61.2%
Pemba Bomani	2	1	50.0%
Pemba Mbuyu Pwani	17	9	52.9%
South Mikindani	1	1	100.0%
Stella Maris Hills	156	67	42.9%
Stella Maris Mission	7	7	100.0%
Ufukoni Fields	4	3	75.0%
Ufukoni Mibuyu	23	16	69.6%
Ufukoni Sea-View Hill	0	0	NA
Ziwani Cashew Grove	1	0	0.0%
Areas Tested in Phase I			
Jangwani	5	0	0.0%
Magangeni	12	0	0.0%
Mikindani Boma	40	0	0.0%
Mirumba	27	11	40.7%
Mitengo	8	0	0.0%
Mnaida	50	0	0.0%
Modern Pemba	61	8	13.1%
Mtonya	17	1	5.9%
Mvita	5	0	0.0%
Pemba Mbuyu Pwani	17	9	52.9%
Total	1506	772	51.3%

Table 7.4 Studied rim sherds by site

microenvironments in which they were found, providing five large aggregates differentiated by meaningful geographic data. These spatial and temporal groupings were then combined to explore spatial variation within synchronous groups by identifying temporal sets within each microenvironment.

Results Organized by Site

The finest scale of ceramic analysis was produced by studying the diagnostic ceramics present at each site. The most common identified vessel forms, thicknesses, colors, finishes, rim forms and decorations could be identified for each site, as well as the total proportions of all identified attributes. Nonetheless, a good deal of the site-specific data was problematic owing to the sample size issues mentioned above, so the bulk of the analysis treated the larger spatial and temporal aggregate groupings.

Still, the site-specific data amply illustrated the variability of the pottery production over time, as indicated by the attributes of the local ceramics. At several excavated sites the characteristics of the ceramics shift significantly between different stratigraphic layers. The distinctions are especially dramatic for those sites where the recovered decorated sherds suggest multiple phases of occupation. As a case in point I provide data from one of the Phase III excavations (Unit 104, see Chapter 2) at the multi-component site of Miseti Hilltop (Table 7.5). In this excavation the transition between the third and fourth layers is marked not only by loamier sediment, but also by a substantial shift in the nature of the recovered ceramics. The typical decorative motifs shift between these two layers and the rim attributes also change substantially. The excavated rims from layer four and below in this unit are from Bags 1035, 1036 and 1037 (each bag number corresponds to a particular excavated context). The younger rims are from Bags 1031, 1032 and 1033. The table shows the distinctions between these two sets of rims. The older rims were thicker, and included every example of a rim with a thickness above 10mm. They were more likely to be rounded, less likely to be flat or tapered, and included the only beveled rim. They were also more likely to have a smoothed finish. The vessel forms associated with the older rims showed a greater likelihood of being necked and also showed a form, the in-turned bowl, not found among the younger rims. This exact pattern of changes should not be expected to be replicated everywhere across the Mikindani region, but this unit, in concert with similar results from other excavations, provides clear evidence that the locally-produced ceramics in the region were changing over time.

Miseti Hilltop Excavation Unit A															
	Thickness						Vessel Form								
Sherd	Thickness	Th > 12mm	Th >10	Th>7.5	Th<7.5		Un. Shal. Bowl	U. Open Bowl	U. Beaker	Rest. ITB	Rest. Neck	Rest.Glob	Rest. Car.	Rest. UTR	Ind.
Bag 1031/a	3.3				1			1							
Bag 1032/a	6.3				1							1			
Bag 1032/b	9.5			1							1				
Bag 1032/c	9			1				1							
Bag 1033/a	5.9				1						1				
Bag 1035/a	10.2		1								1				
Bag 1035/b	9.3			1						1					
Bag 1036/a	11.4		1								1				
Bag 1036/b	8.7			1							1				
Bag 1036/c	13.3	1									1				
Bag 1036/d	9.9			1							1				
Bag 1036/e	13.8	1						1							
Bag 1036/f	8			1				1							
Bag 1037/a	11.4		1								1				
	Rim Form								Surface Finish						
Sherd	Rounded	Flat	Beveled	In Thick	Ex Thick	Fluted	Tapered		Slipped	Painted	Graphited	Smoothed	Burnished	None	
Bag 1031/a	1													1	
Bag 1032/a	1										1				
Bag 1032/b							1					1			
Bag 1032/c		1												1	
Bag 1033/a		1			1							1			
Bag 1035/a		1												1	
Bag 1035/b	1										1				
Bag 1036/a	1											1			
Bag 1036/b	1											1			
Bag 1036/c	1											1			
Bag 1036/d	1											1			
Bag 1036/e	1											1			
Bag 1036/f	1											1			
Bag 1037/a			1											1	

Table 7.5 Rim attributes from Unit 104 (Miseti Hilltop A)

It is also important to consider the relationship between the decorated and undecorated sherds from Phase III, as full analysis was possible on the former while study of only a sample from most sites was possible for the latter. The extent to which the decorated sherds gave an accurate representation of the entire assemblage's characteristics could be studied at those sites where large numbers of undecorated sherds were also studied. The assemblages from the sites of Kisiwa Fields and Mgao North each provided such data, with the added advantage that they represented mostly first-millennium and mostly second-millennium occupations respectively. For these assemblages chi-squared tests were used to test the extent to which the differences in the proportions of each attribute class (e.g., thickness, vessel form, rim form, surface treatment) between the undecorated rims and the decorated rims were the result of random variation or some underlying, non-random distinction(s). With the relatively small sample sizes and frequent low and zero counts for attributes, even with these larger assemblages, the chi-squared tests were subject to Yates' correction. The results of these tests are presented in Table 7.6.

	Mgao North		**Kisiwa Fields**	
	Chisquare	*Yate's*	*Chisquare*	*Yate's*
Thickness	21.9%	60.0%	86.4%	99.3%
Vessel Form	21.6%	41.7%	6.8%	38.1%
Rim Form	0.0%	0.0%	22.3%	60.2%
Surface Finish	0.0%	0.0%	5.3%	13.2%
Exterior Color	39.8%	95.7%	4.2%	41.4%
Interior Color	4.3%	58.4%	0.8%	62.2%

Table 7.6 Results of chi-squared tests of for decorated and undecorated rims at Mgao North and Kisiwa Fields

These results indicate that the differences between the decorated and undecorated rims for certain categories, notably thickness, were likely the product of random variation with little to no underlying difference in proportions, but that in other categories there are clear non-random differences between the decorated and undecorated rims. It is worth discussing the tests in more detail given this mixed result. Thickness was similar between the decorated and undecorated sherds. The score for Mgao North is slightly lower than that for Kisiwa Fields mostly on account of a few thick decorated sherds associated with the low-density first-millennium occupation in the bottom level of the site, which only produced thick, decorated rims. Similarly, the scores for color are indicative of mostly random variation between the decorated and undecorated sherds, particularly given that the distributions include many colors with low counts, which explains the distinction between the Yates' and chi-squared scores. The sharp discrepancy between the Yates' chi-squared results should caution us not to make too much of the result however. Differences between decorated and undecorated rim forms were mostly from random variation at Kisiwa Fields but from non-random causes at Mgao North. At the latter site, the differences in rim form were a result of a higher proportion of undecorated rounded rims and a much lower proportion of tapered rims. Given the similarity between decorated and undecorated thicknesses, it may well be that some instances of tapering were simply unrecorded, but there was a higher proportion of rounded, untapered rims among the undecorated rims. At Kisiwa Fields the distribution of rim forms was quite similar, although there were slightly more undecorated rounded rims and fewer beveled and thickened rims.

The other attribute categories have more dissimilar results for the undecorated and decorated rims, where the differences are the product of non-random differences. Surface finish showed dissimilar distributions for decorated and undecorated sherds. At Mgao North many more decorated sherds were recorded as lacking finish, rather than being smoothed. It is possible that this may in part represent an artifact of the recording process however, given that so much of the surface area of decorated rims was in fact covered by decoration. Although Kisiwa Fields actually shows a better Yates' score for surface treatment, at this site there was a real distinction. The undecorated rims were much more likely to be burnished than expected under an equal distribution, indicating the existence of an undecorated burnished type without a decorated counterpart. The vessel form scores also indicated a distinct undecorated type at Kisiwa Fields. While many of the vessel form proportions for decorated and undecorated rims at that site are quite close, there are higher proportions of in-turned bowls for the undecorated sherds, and also a shallow bowl, which has no decorated counterpart. Notably, these forms were often burnished, as will be shown in the typology. At Mgao North the differences in vessel form were driven by a larger proportion of undecorated shallow bowls as well.

These results suggest that there were real, non-random differences between the decorated and undecorated rims at each of these sites. Those differences were often restricted to particular attributes and seem to have largely been the result of a limited number of distinct and relatively common undecorated types. Those types, if they can be identified in the analysis of co-varying attributes, are likely to be found in the samples of undecorated rims studied at other sites as well, but to have been relatively undercounted at those sites. The comparison of the attribute proportions between time periods at Mikindani and between Mikindani and other regions in eastern and southern Africa will need to take such underreporting into account. Still, because these discrepancies between the decorated and undecorated rim attributes have been identified, corrections can be built into the analyses.

Results Sorted by Period

As described above, excavations at multicomponent sites during Phase III demonstrated that the characteristics of local ceramics at those sites changed over time. It was thus necessary to establish a measure of temporal control over the whole body of analyzed ceramics. The decorations on the local ceramics provided a useful way to establish such control and to group sites and components of sites by time period. I was able to identify 54 distinct decorative motifs from the 1710 analyzed decorated sherds. Paying close attention to the observed stratigraphic relationships and referring to published ceramic analyses, especially Kwekason's (2007) work, I was able to group these motifs into sets that were characteristic of different time periods. Because imported ceramics with known date ranges were rare in the Mikindani region—an important issue to be discussed in greater detail in Chapter 8—these decoration-based periods initially were kept quite broad of necessity. When statistical attempts to obtain a finer temporal seriation of these motifs proved inconclusive, these groupings relied on an "index fossil" approach where motifs were indicative of time periods. This approach clearly identified sets of motifs that were temporally distinct: for instance, second-millennium decorative motifs were always found in layers above first-millennium motifs at multi-component sites. However, it had trouble appreciating the continuities between the local ceramics from the different periods – a point emphasized by some of the indeterminate motifs – as well as temporal variation within periods. Finer resolution within the periods was pursued at a later stage using additional attributes, as will be discussed later in the chapter. Ultimately, two motifs were characteristic of pre-iron-working ceramics in the region, 18 were characteristic of Iron Age ceramics during the first millennium, 16 were characteristic of Iron Age ceramics in the second millennium, 6 were from the 19th and 20th centuries, and the remaining 13 motifs were of indeterminate age.

Dr. Amandus Kwekason (2007) recovered a distinct set of ceramics which he dated to the 3rd century BCE and compared with LSA ceramics from the Kenyan Rift Valley at Mnaida Hill near Mikindani. Similar ceramics were recovered from one site at the coast during the survey, Litingi Channel, which was being heavily eroded by waves. The unique motifs present at this site comprise the pre-iron working group. The two motifs were:

1. Wavy-line impressed bands
2. Appliqué decoration

The first of these decorative motifs clearly mirrors some of Kwekason's illustrated examples (see Fig. 7.1). The second does not, but is only found at this site. However, given the erosion activity at the site, and the fact that two-thirds of its decorated sherds bore motifs of indeterminate age, the attribution of the appliqué decorative motif to the pre-iron working period should be considered provisional.

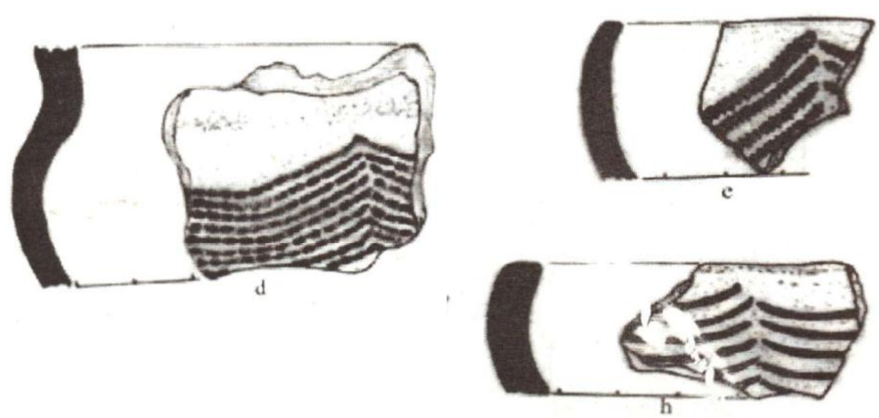

Figure 7.1 Examples of LSA ceramics from the Mikindani region (Kwekason 2007: 30-31)

In contrast to the poorly represented pre-iron-working period, Iron Age ceramics from the first millennium were found at many sites. Within this larger sample more decorative motifs were identified. The 18 motifs recorded for Iron Age ceramics from the first millennium are listed below (and see Fig. 7.2). Motifs 4-8, 11 and 13 represent variations of the dot-bounded incised band motif defined by Chami (1994) as being characteristic of the EIA in the Rufiji region. The diagonal version of this motif was particularly common in the Mikindani region. Also of interest is the prevalence of dentate decoration in many of these motifs, particularly in association with the triangular motifs. Triangular motifs at Mikindani did not take the typical Tana/TIW form of an incised triangle filled with incisions (Chami 1994, Fleisher 2003: 282; see Chapter 5). Rather, as with the incised bands, the triangular area to be filled with incisions was often bounded by dot impressions likely produced by a dentate comb, as occurs in the illustrated example of Motif 15. The first-millennium motifs are most commonly found on the vessel in the space between the rim and the shoulder of necked vessels, or near the rim on vessels without necks.

1. diagonal/oblique incised band
2. band of horizontal incised lines
3. band of multidirectional incisions
4. oblique incised band bounded by dot impressions
5. same as # 4 but includes oblique dentate in band
6. horizontal incised band bounded by dot impressions
7. same as #6 but includes oblique dentate in band
8. band of multidirectional incisions bounded by dot impressions
9. band of oblique incisions from a line of impressed dots at rim
10. band of oblique incisions from rim to line of impressed dots at shoulder
11. sideways chevron
12. sideways chevron above line of dot impressions
13. band of oblique incisions bounded by dot impressions arranged into triangles
14. incised triangles

15. dentate triangles
16. band of oblique dentate
17. band of crosshatched incisions associated with impressed dot line
18. ribs (may be a feature of potting technique)

Instances of the first-millennium motifs were recorded at 18 sites. Those sites, and the percentages of their decorated sherds which possessed first-millennium motifs, are presented in Table 7.7

Name	%1st Millennium Motifs
Likonde Forest	
Mji Mwema I Two	85.0%
Kisiwa Fields	72.1%
Pemba	70.6%
Kisiwa Forests	69.2%
Mkangala Ridge-top I	65.9%
North Imekuwa	59.5%
Stella Maris Hills	58.8%
Ufukoni Mibuyu	57.6%
Lisoho North	50.0%
Mji Mwema I One	50.0%
Miseti Hilltop	49.4%
Mkangala Ridge-top II	45.5%
Lisoho Fields	22.7%
Pemba Mbuyu Pwani	14.3%
Mirumba	6.7%
Mbuo Hilltop	2.1%
Mgao North	0.8%

Table 7.7 Sites bearing first-millennium CE decorative motifs

Iron Age ceramics of the second millennium were also found at many sites. Again, the larger sample of such sites allowed for the identification of a greater number of decorative motifs. The 16 motifs identified for this period were (and see Fig 7.3):

1. bounded areal impressions/stamping
2. incised ribbon with dentate fill
3. notched rim
4. “stitched” incised line
5. shell-edge impressions
6. stamped areal fill
7. prong stab columns
8. incised band on both sides
9. humped line

10. fingernail impressions
11. bands of triangle impressions (mid-to-late 2nd millennium)
12. lone incised arc
13. false relief design
14. wavy line incisions
15. vertical incisions over impressed band
16. impressed figure

Instances of these motifs were recorded at 31 sites. The sites and the percentages of their decorated sherds with the 2nd millennium motifs are presented in Table 7.8.

Site	%2nd Millennium Motifs
Kisiwa Small	100.0%
Mbuo Mbuyu	100.0%
Misijute	100.0%
Mji Mwema II	100.0%
Ufukoni Sea-View Hill	100.0%
Mgao North	84.9%
Imekuwa Mibuyu	79.7%
Mbuo Hilltop	72.9%
Mbuo Ridge Low	66.7%
Ziwani Cashew Grove	66.7%
Mtonya	60.0%
Mikindani Boma	53.3%
Lisoho North	50.0%
Mnaida	45.5%
Mkangala Streambed	44.4%
Stella Maris Mission	37.5%
Magangeni	25.0%
Mvita	25.0%
North Imekuwa West	25.0%
South Mikindani	25.0%
North Imekuwa	21.5%
Mkangala Ridge-top II	18.2%
Stella Maris Hills	17.5%
Miseti Hilltop	16.9%
Mirumba	16.7%
Mitengo	16.7%
Pemba Mbuyu Pwani	14.3%
Lisoho Fields	13.6%
Ufukoni Mibuyu	6.1%
Modern Pemba	2.2%
Pemba	0.8%

Table 7.8 Sites bearing second-millennium CE decorative motifs

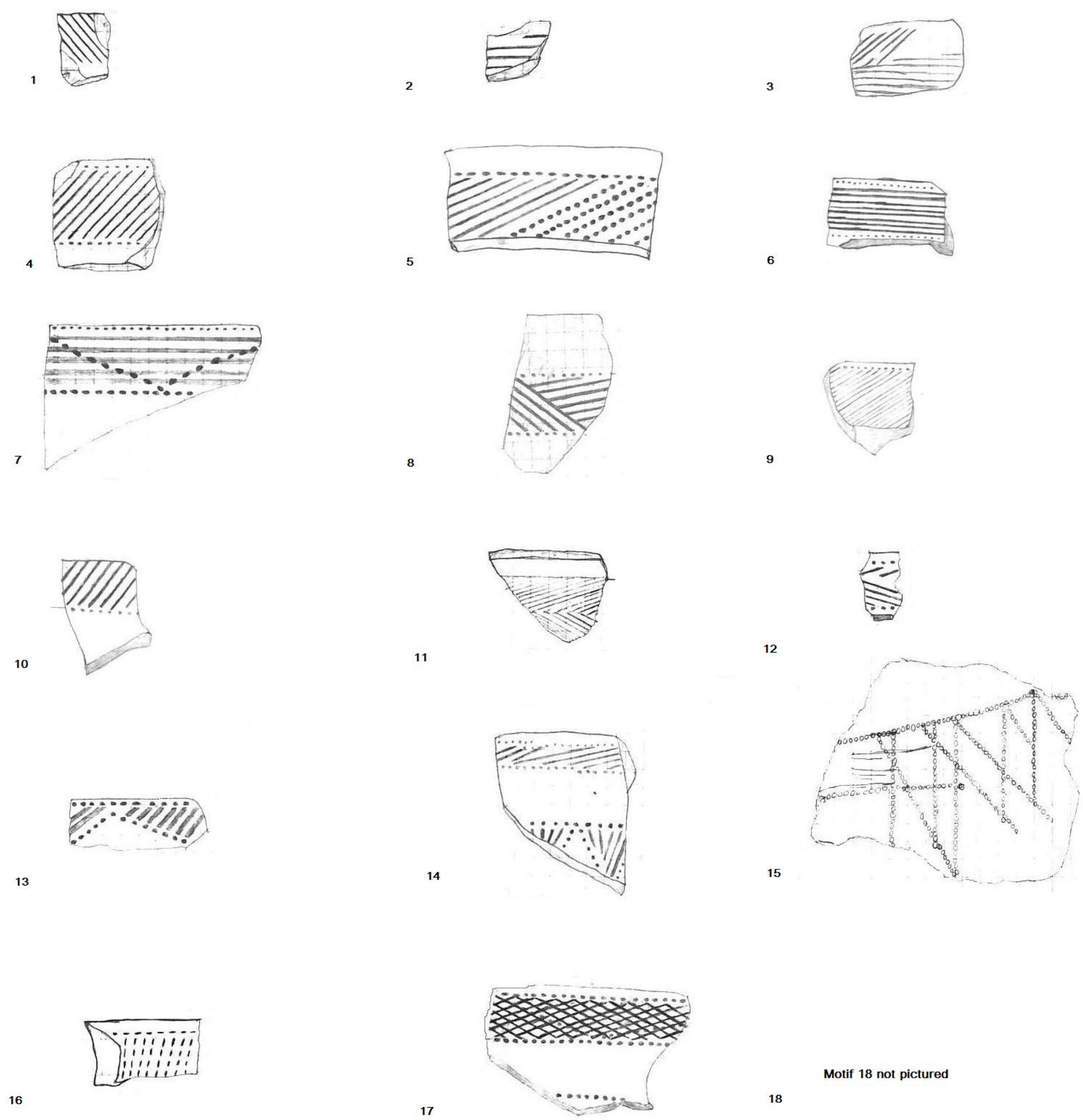

Figure 7.2 Iron Age decorative motifs from the first millennium

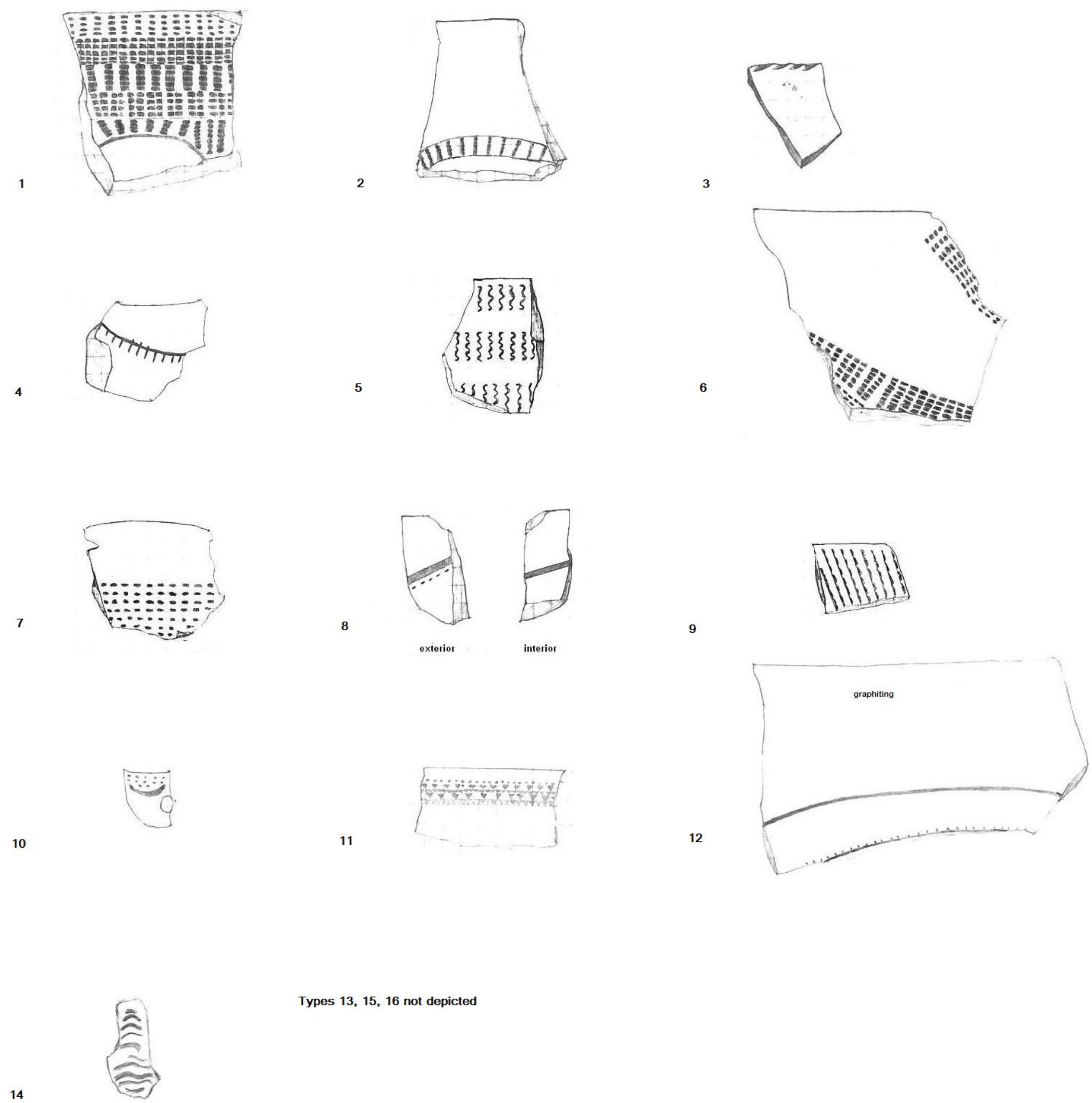

Figure 7.3 Second-millennium decorative motifs found at Mikindani

Because the Mikindani region has been densely populated over the past few centuries, a number of decorative motifs which appear to be specific to the 19th and 20th centuries were also identified. The six such motifs are:

1. coarsely incised triangles
2. incised areal fill
3. hexagon impression band
4. dot impression semicircles
5. false relief areal fill
6. incised lines and ticks

Several of these motifs are similar to decorative motifs from earlier periods, but were distinguished by distinctions in the performance of the decorative patterns. Their dating with the last few centuries was also often suggested by their association with imported European refined earthenware ceramics.

The recent motifs were found at 12 sites, listed in Table 7.9. Several of these sites were locations tested in Phase I, and are clearly related to the occupation of Mikindani over the past few centuries. At some of the other of these sites such as Mangamba no indications of earlier material was found. At the sites which had extensive earlier deposits, such as Mbuo Hilltop and Mgao North, the recent material makes up a small percentage of the total assemblage mixed into the uppermost layer and is indicative of minor disturbance of the upper levels by modern activity. The number of studied rims deemed to be from recent periods is quite small, only 14.

The remaining decorative motifs were deemed to be of indeterminate age. Many of the indeterminate motifs were derived from fragmentary samples so that no idea of the larger decorative pattern could be obtained. This was the case for the dot band(s), lone incisions, dashes, shell-edged line, and vague decorations off incised lines. Other motifs were put into this group because the contexts in which they were found covered multiple

Name	% Recent Motifs
Mangamba	66.7%
Mvita	50.0%
Mtonya	40.0%
Mitengo	33.3%
Mirumba	23.3%
Jangwani	14.3%
Modern Pemba	13.0%
Stella Maris Mission	12.5%
Mkangala Streambed	11.1%
Ufukoni Mibuyu	6.1%
Mbuo Hilltop	2.1%
Mgao North	1.2%

Table 7.9 Sites Bearing Recent Motifs

stratigraphic periods. For instance, the crosshatching motif was found in first- and second-millennium contexts, though examples from more recent stratigraphic positions suggest that the younger crosshatching was often finer. The punctate motifs were also present in both first- and second-millennium contexts. They seem to have been a transitional motif between the two millennia in this region so, as with the crosshatching motif, it was not possible to assign them into a temporal grouping. However, in some instances the punctate motifs bear clear resemblance to the neck-punctating motifs found further north along the coast (Fig. 7.4; see discussion in Chapter 5). The 13 indeterminate motifs were:

1. incised crosshatching
2. punctates
3. punctates with incisions
4. single dot band
5. multiple dot bands
6. single incision
7. oblique incisions (not comprising a band)
8. horizontal incisions (not comprising a band)
9. incised geometric figure
10. dashes
11. indeterminate decoration (stamp or incision) perpendicular to incised line
12. dots off of incised line
13. shell-edge line

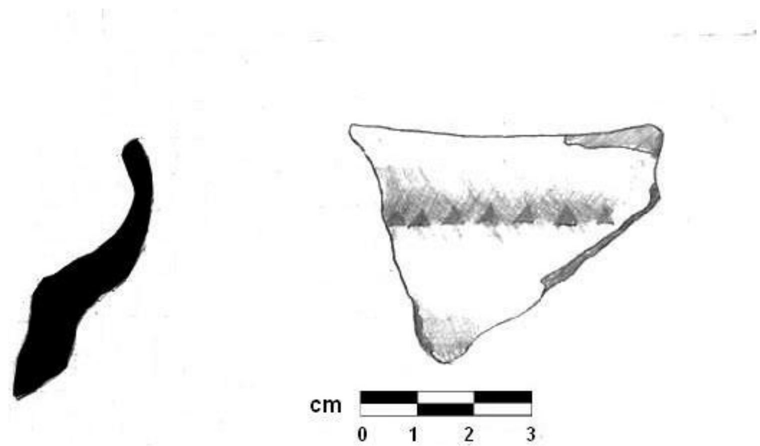

Figure 7.4 Carinated vessel with NP decorative motif from site of Modern Pemba

Many sites (18) bore evidence of decorative motifs from multiple periods. However, only four had more than 10% of their decorated ceramics bearing motifs from both the first and second millennia: North Imekuwa, Miseti Hilltop, Stella Maris Hills and Pemba Mbuyu Pwani. In most other cases one period clearly dominated among the recovered decorated sherds. Still, the multi-component sites provide a useful stratigraphic control on the decorative temporal groupings, and enable the typological analysis to achieve finer temporal resolution.

The groupings of the first- and second-millennium contexts provide large aggregate samples of ceramics. The following attribute analysis is focused on those two groups, bearing in mind the earlier caution that some undecorated types may be underrepresented. Their attribute counts are presented in Table 7.10[2]. There are a number of clear differences between the two groups of ceramics that reflect some of the distinctions observed in the excavation at the multicomponent Miseti Hilltop site. The

[2] The counts in the table do not always match for different attribute categories. For lower counts, as with the colors, this is the result of the attribute not being recorded. For high counts, as with the rim forms, this is the result of multiple forms (e.g., flat and tapered) existing on the same sherd.

	1st Millennium		2nd Millennium	
Studied Vessels	442		259	
Avg Thickness	10.6		7.0	
Th > 12	98	22.2%	4	1.6%
Th >10mm	164	37.2%	14	5.5%
Th>7.5	131	29.7%	82	32.0%
Th<7.5	49	11.1%	159	62.1%
Vessel Form				
Un. Shal. Bowl	8	2.0%	45	17.4%
Un. Open Bowl	137	29.9%	77	29.7%
Un. Beaker	21	3.2%	3	1.2%
Rest. ITB	36	7.0%	0	0.0%
Rest. Necked	182	45.1%	80	30.9%
Rest. Globular	16	3.4%	18	6.9%
Rest. Carinated	1	0.2%	1	0.4%
Rest. UTR	4	0.9%	4	1.5%
Indeterminate	37	8.4%	31	12.0%
Rim Form				
Everted	7	1.6%	2	0.8%
Rounded	293	66.3%	109	42.6%
Flat	89	20.1%	117	45.7%
Beveled	16	3.6%	0	0.0%
In Thick	15	3.4%	3	1.2%
Ex Thick	80	18.1%	10	3.9%
Fluted	0	0.0%	0	0.0%
Tapered	0	0.0%	30	11.7%
IND.	37	8.4%	31	12.1%
Surface Treatment				
Slipped	11	2.5%	8	3.1%
Painted	0	0.0%	2	0.8%
Graphited	27	6.1%	18	7.0%
Smoothed	138	31.2%	126	49.2%
Burnished	55	12.4%	31	12.1%
None	211	47.7%	74	28.9%
Exterior Color				
Red	34	7.7%	18	7.0%
Yel. Red	110	24.9%	29	11.3%
Yel. Gray	2	0.5%	1	0.4%
Gray. Red	5	1.1%	7	2.7%
Red. Brown	45	10.2%	39	15.2%
Yel. Brown	26	5.9%	10	3.9%
Gr. Brown	35	7.9%	5	2.0%
Brown	44	10.0%	39	15.2%
Pale Brown	30	6.8%	12	4.7%
Dk. Brown	20	4.5%	17	6.6%
Gray	19	4.3%	6	2.3%
DK Gray	20	4.5%	10	3.9%
V Dk Brn	6	1.4%	15	5.9%
V Dk Gry Brown	12	2.7%	2	0.8%
Black	23	5.2%	41	16.0%
yellow	8	1.8%	3	1.2%
Interior Color				
Graph	20	4.5%	7	2.7%
Red	17	3.9%	16	6.3%
Gray Red	2	0.5%	7	2.7%
Yel. Red	67	15.2%	23	9.0%
Red. Brown	36	8.2%	30	11.7%
Yel. Brown	28	6.3%	8	3.1%
Gray	22	5.0%	10	3.9%
Gr. Brown	37	8.4%	3	1.2%
Brown	81	18.4%	35	13.7%
Pale Brown	38	8.6%	17	6.6%
Dk. Brown	32	7.3%	35	13.7%
Dk Gray	10	2.3%	11	4.3%
V DK Gray	7	1.6%	7	2.7%
V Dk Gry Brown	5	1.1%	3	1.2%
Black	29	6.6%	42	16.4%
Gr. Yellow	3	0.7%	1	0.4%
Yellow	8	1.8%	2	0.8%
Str. Brown	0	0.0%	1	0.4%

Table 7.10 Rim attributes sorted by time period

second-millennium ceramics were much thinner, with less than 7.5% of the rim sherds thicker than 10mm, as opposed to nearly 60% of the first-millennium sherds. They were also more likely to be smoothed or burnished, and were typically of darker colors, while light reds and browns predominated in the earlier ceramics. But perhaps the most interesting data come from the vessel forms. The second-millennium ceramics lacked in-turned bowls and had a greater proportion of shallow bowls.

Yet there were also a number of similarities between the two groups. Each group had necked vessels as the most common form, though the likely undercounting of undecorated bowls means that bowls were likely as common in the second millennium. The two periods also shared roughly similar proportions of bowls, especially open bowls. These similarities suggest a certain degree of continuity existed in the pottery-making and pottery consumption of the region, with an emphasis on similar vessel forms even as many other aspects of the ceramics such as thickness, surface finish and, most clearly, decoration were changing substantially. To some degree the similarities may be a function of the breadth of the groups, with relatively more similar late-first and early-second millennium assemblages bringing out two groups closer together. But to the extent that continuities existed in the Mikindani region, they are important for understanding Mikindani society and its relationship to the rest of the coast, where ceramic production was marked by significant shifts signaling important shifts in food consumption and social relationships (Fleisher 2003, Ashley 2010).

Connections to other Eastern African assemblages

Having established these temporal groupings for the Mikindani region's locally produced ceramics, their connections to the ceramics from other regions in Eastern Africa can be explored. As much as is possible, the connections suggested here are drawn from similarities in multiple attribute categories; not just decorative motifs, but also vessel and rim form and other attributes when the published data allow. The connections will initially be made to the broad temporal groupings of Mikindani ceramics because they provide the largest assemblages for comparison, though that breadth inspires some difficulties in comparisons with more tightly defined types.

The first-millennium ceramics from Mikindani clearly fit in with the ceramic types of the Early Iron Age. Such connections inspired efforts to define broad first-millennium traditions such as the Chifumbaze (Phillipson 1977a, 2005) or Early Iron Worker (e.g., Chami 2006), but these constructions subsumed an extraordinary amount of variation. Indeed, because many of these types possessed affinities with one another and a great deal of internal variability, some difficulty exists distinguishing which of the types may have the strongest association with the Mikindani ceramics. Still, some compelling relationships are suggested by the various artifact categories.

To begin, the decorative motifs present at Mikindani and those described for Kwale ceramics exhibit similarities. The incised bands bounded by dentate lines common at Mikindani were also a characteristic motif in Kwale ceramics (Soper 1967a, Chami 1994; see illustrated examples in Chapter 5). However, this motif was also common with Dambwa ceramics from Zambia (Daniels and Phillipson 1969). Other first-millennium types such as Lelesu from Tanzania, Nkope from Malawi, and Nampula from northen Mozambique employed similar incised and dentate motifs as well. The decorative-motif proportions from Mikindani showed variation from Tana/TIW ceramics though. While Tana/TIW assemblages used the incised bands common at Mikindani, they did so in much smaller proportions. Mikindani likewise bore much smaller proportions of incised triangles. Though the mixing of first-millennium motifs and contexts from different centuries in the Mikindani sample contributed to these differences, no single site bears proportions of incised triangles characteristic of Tana/TIW assemblages, which is unexpected for any late-first millennium coastal context. Instead, the proportions of Mikindani triangle decorations more closely match those from Kwale assemblages, though similar triangular motifs can be found on Dambwa and Nkope (Robinson 1970) vessels as well.

The vessel and rim forms of these various ceramic types provide additional information to study the affinities of the Mikindani material. On the basis of rim and vessel form the Mikindani ceramics of the first millennium do not fit into any existing ceramic types from the Early Iron Age, though it remains possible that they remain a variant of a type. Some of the difficulty associating the Mikindani material with existing ceramic types might relate to the averaging of spatial and temporal variations within that material. Still, the Mikindani ceramics are clearly distinguished from other ceramic types, including those with which it shared decorative motifs (see Table 7.11). The Mikindani ceramics had a higher proportion of necked vessels than the Kwale and Nkope ceramics, and a much smaller proportion of in-turned bowls. The Matola ceramics from southern Mozambique and Lelesu ceramics from central Tanzania were similarly distinguished from the Mikindani material by a much higher proportion of in-turned bowls. Although the proportions of such vessels at Mikindani might be depressed by the underreporting of undecorated types, the evidence from Kisiwa Fields suggests that would not make up the entire gap. In contrast, the Mikindani ceramics had much lower proportions of necked vessels than Tana/TIW and Dambwa ceramics, which had smaller proportions of bowls, both open and in-turned. Dambwa, which was completely lacking in-turned bowls, would seem to be particularly off. Of course, given evidence for significant variation within many of these types (Phillipson 1976a, 1977a; and see Chapter 5) it is perhaps little surprise that the Mikindani material was distinct.

	Mikindani 1st Millennium		Kwale		Tana		Tana (w/out Shanga)	
Studied Vessels	405		369		2288		1312	
Un. Shal. Bowl	8	2.0%	0	0.0%	103	4.5%	103	7.9%
Un. Open Bowl	137	33.8%	87	23.6%	166	7.3%	145	11.1%
Un. Beaker	21	5.2%	0	0.0%	0	0.0%	0	0.0%
Rest. ITB	36	8.9%	188	50.9%	109	4.8%	63	4.8%
Rest. Necked	182	44.9%	75	20.3%	1682	73.5%	844	64.3%
Rest. Globular	16	4.0%	18	4.9%	165	7.2%	105	8.0%
Rest. Carinated	1	0.2%	0	0.0%	21	0.9%	10	0.8%
Rest. UTR	4	1.0%	0	0.0%	0	0.0%	0	0.0%
Rest. Convergent	0	0.0%	1	0.3%	42	1.8%	42	3.2%

	Nkope		Mwabulambo		Matola	
Studied Vessels	864		149		236	
Un. Shal. Bowl	0	0.00%	0	0.0%	0	0.0%
Un. Open Bowl	295	34.14%	9	6.0%	0	0.0%
Un. Beaker	0	0.00%	0	0.0%	0	0.0%
Rest. ITB	224	25.93%	18	12.1%	96	40.7%
Rest. Necked	252	29.17%	94	63.1%	0	0.0%
Rest. Globular	13	1.50%	2	1.3%	0	0.0%
Rest. Carinated	8	0.93%	0	0.0%	1	0.4%
Rest. UTR	73	8.45%	26	17.4%	139	58.9%
Rest. Convergent	0	0.00%	0	0.0%	0	0.0%

	Gokomere		Dambwa	
Studied Vessels	145		878	
Un. Shal. Bowl	0	0.0%	0	0.0%
Un. Open Bowl	48	33.1%	46	5.2%
Un. Beaker	0	0.0%	24	2.7%
Rest. ITB	0	0.0%	0	0.0%
Rest. Necked	87	60.0%	704	80.2%
Rest. Globular	4	2.8%	16	1.8%
Rest. Carinated	6	4.1%	86	9.8%
Rest. UTR	0	0.0%	0	0.0%
Rest. Convergent	0	0.0%	0	0.0%

Table 7.11 Vessel form proportions for first millennium types discussed (following Soper 1967a, 1971b; Håland and Msuya 2000; Horton 1996; Fleisher 2003; Robinson 1970, 1982; Phillipson 1976a; Klapwijk and Huffman 1996; Sinclair *et al*. 1987; Huffman 1976; Daniels and Phillipson 1969; Vogel 1971)

Based on these attribute comparisons, the Mikindani ceramics seem to occupy an intermediate position between the early first-millennium ceramic types such as Kwale and the later first-millennium ceramics such as Tana/TIW. Given the known date for some of this material from the 5th century CE (Kwekason 2007) and the likelihood that this broad grouping includes ceramics produced both before and after that date, this intermediate position is not unexpected. Although dating still needs to be addressed, the Mikindani ceramics seem to have exhibited the change from in-turned bowls towards necked pots that characterized the transition from Kwale to Tana/TIW. Still, the Mikindani material retained more bowls, both open and in-turned, than was common in Tana/TIW assemblages and the proportion of open bowls was more in line with EIA types such as Kwale and Nkope.[3] The proportion of beveled rims with Mikindani ceramics was also more similar to the proportions from the last Mwangia phase of Kwale or from Tana/TIW than from earlier phases of Kwale. The beveled proportions were also fairly close to those from Nkope, but Nkope ceramics show external thickening to a much greater degree. Taking this rim and vessel form data together with that from the decorative motifs, the Mikindani ceramics seem to be best associated with the coastal types Kwale and Tana/TIW. The Mikindani ceramics were distinct from either of those types, but this is at least partially the result of the lack of finer chronological resolution at Mikindani which has caused us to combine ceramics across time periods covering a potential transition from Kwale to Tana/TIW. However, this still leaves an interesting problem, insofar as the decorative motifs were best aligned with Kwale, in particular the earlier phases of Kwale (see Chami 1998), and the common Tana/TIW motifs were less

[3] The relative closeness to Nkope might also relate to that type's long use and similar combination of ceramics from contexts covering several centuries of the first millennium.

common, but the vessel and rim forms fit best with the last Mwangia phase of Kwale and Tana/TIW. Nor is this only a result of Mikindani's poor temporal resolution; individual sites are characterized by both trends and produced sherds that marry Kwale decorative motifs and Tana/TIW forms. This would seem to provide evidence for unusually high conservatism in the decorative motifs. Of course, given the relatively high proportions of open bowls, particularly at highland and ridge sites as discussed earlier, additional influence from interior traditions like Nkope cannot be entirely ruled out. Nonetheless, those types were not as similar to Mikindani's ceramics as Kwale on the basis of decoration and had much higher proportions of in-turned bowls than Mikindani.

Because such a significant shift occurs in the character of Mikindani's ceramics between the first and second millennia, it is important to determine if the affinities between the local ceramics and those from elsewhere also shifted. Similarities between decorative motifs are again a useful starting point, especially because the Mikindani region produced a particularly distinctive type of decorated ceramics in the first half of the second millennium. The Mikindani ceramics, with their emphasis on large areas of the vessel being covered with stamped or impressed motifs, often bounded by incised arcs, were clearly distinct from the early second-millennium decorative traditions found elsewhere along the Swahili Coast, which were mostly distinguished by punctate bands and incised motifs. Moreover, a far greater percentage of the sherds from the Mikindani region were decorated. Decorated proportions at Mikindani were often in excess of 20% of recovered sherds, while further north along the coast trends towards decreasing decoration accelerated and decorated proportions often fell below 5%, to the extent that the southern coast is described as producing a "plain ware" (Chami 1998). The one exception to this decorative disjuncture is Kilwa, which shares certain decorative motifs such as shell impressions and notched rims with the Mikindani material, although not in similar proportions and amidst other unshared motifs (Chittick 1974).

Although the Mikindani ceramics were clearly unlike material from much of the coast further north, their decorations bore striking similarities to ceramics from Malawi and northern Mozambique (Fig 7.5). Like the Mikindani material, the most common decorative motifs of the Lumbo Tradition in northern Mozambique are areal impressions and shell impressions (Sinclair 1991, Duarte 1993). Mwamasapa ceramics from northern Malawi are similarly distinguished by comb-impressed, and perhaps seed impressed, areal stamping, though they do not exhibit shell impressions (Robinson 1982). There is also some similarity between the Mikindani material and the most widespread ceramic type form southern Malawi in this period, Mawudzu. While the most common Mawudzu decorative motifs are incised forms, and several motifs show similarities to ceramics from southern Africa, other motifs parallel those from Mikindani. While many of those motifs such as comb-stamped areal fill and nicked rims are also shared with Mwamasapa ceramics, as has been noted (Robinson 1970), a number of motifs including ribbons filled with dentate stamping and fingernail impressions have not been described in the Mwamasapa assemblages (see Robinson 1982). The relative proportions of the Mikindani, Mozambique and Malawi decorative motifs are shown in Table 7.12, though relying on published data prevents direct comparison of the motifs as combinations of decorative elements, such as areal impressions bounded by incised arcs, were not always recognized.

Mikindani Second Millennium Motifs (n= 532)				Mwamasapa (n=263)				Mawudzu (n=291)				Lumbo (n=122)		
1. bounded areal impressions/stamping	122	22.9%		stylus impressed area	60	22.8%		areal imp	13	4.5%		areal imp	80	65.6%
2. incised ribbon with dentate fill	43	8.1%						incised ribbon	24	8.2%				
3. notched rim	17	3.2%		"nicked" rims	17	6.5%		"nicked" rims	1	0.3%				
4. "stitched" incised line	24	4.5%												
5. shell-edge impressions	56	10.5%						diag incisions w/ wavy lines	4	1.4%		shell impressions	1	0.8%
6. stamped areal fill	106	19.9%		comb impressed	88	33.5%		comb stamped area	17	5.8%		comb stamped area	4	3.3%
7. prong stab columns	88	16.5%		stabbed	4	1.5%		cord impressions	35	12.0%				
8. incised band on both sides	5	0.9%						areal incisions	24	8.2%				
9. humped line	21	3.9%						hatched arc/festoon	18	6.2%				
10. fingernail impressions	8	1.5%						fingernail imp	3	1.0%				
11. bands of triangle impressions	15	2.8%												
12. lone incised arc	10	1.9%		grooved	73	27.8%		inc arc	34	11.7%		inc arc	16	13.1%
13. false relief design	4	0.8%						grooved	9	3.1%				
14. wavy line incisions	1	0.2%		dragged incisions	6	2.3%		wavy incised lines	2	0.7%				
15. vertical incisions over impressed band	3	0.6%		ribbed	5	1.9%		band of vertical inc.	13	4.5%				
16. impressed figure	9	1.7%		crosshatched incisions	10	3.8%		crosshatched incisions	41	14.1%		crosshatched incisions	11	9.0%
								simple imp	6	2.1%		punctate	10	8.2%
								geometric patterns	13	4.5%				
								polychrome	5	1.7%				
								chevron inc	20	6.9%				
								herringbone	9	3.1%				

Table 7.12 Second-millennium decorative motif proportions for Mikindani, Mwamasapa (Robinson 1982), Mawudzu (Robinson 1970) and Lumbo (Duarte 1993)

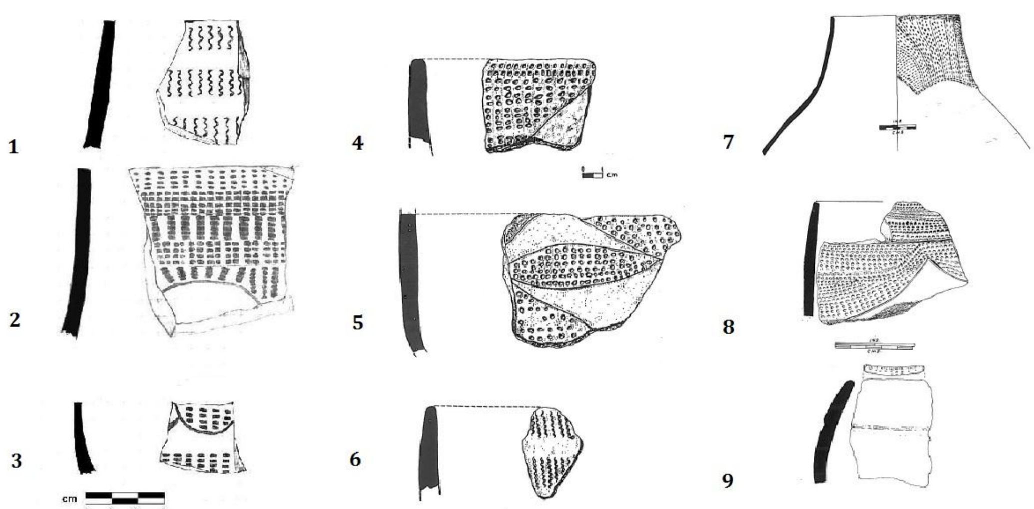

Figure 7.5 Early second-millennium ceramics from Mikindani (1-3), Lumbo ceramics from northern Mozambique (4-6, Duarte 1993), and Mwamasapa ceramics from northern Malawi (7-9, Robinson 1982)

While these decorative similarities present intriguing possibilities of interregional connections, those possibilities need to be corroborated with data from other ceramic attributes to avoid spurious inferences of interaction. For example, the stamped/impressed areal motif is also shared by the Kansyore and Lokambulo ceramics of the Late Stone Age from the Lakes Region and southern Sudan, but there is no connection between those BCE-dated types and the second-millennium CE Mikindani material beyond the coincidence of one shared decorative motif. A lack of published data regarding most of the ceramic attribute categories used to analyze the Mikindani material makes these comparisons more difficult, but certain categories such as vessel form are usually available. The vessel form proportions from Mikindani, northern Mozambique and Malawi, and the northern coast are presented in Table 7.13. These proportions demonstrate that there were differences between the Mikindani ceramics and those from other regions, but the Mikindani material possessed affinities with some of these types. The vessel form proportions at Mikindani were quite close to those for Lumbo ceramics from northern Mozambique, particularly if Mikindani's open and shallow bowls are combined. The Mikindani material is also relatively similar to that from Malawi, though the Mikindani ceramics have more necked vessels and fewer open bowls. Of course, it bears remembering that undecorated open bowls were likely undercounted in the Mikindani sample. Of the types whose proportions Mikindani resembles, Mikindani was also the only region with shallow bowls, although this may relate more to how certain types of bowls were described than a clear distinction between regions. The Mikindani and Mwamasapa rim forms were also relatively close, but show proportional differences in the number of rounded versus flat rims and in the number of thickened rims. Despite these differences with the Lumbo and Mwamasapa types, the differences in vessel forms between the Mikindani material and second-millennium coastal ceramic types are even greater (see Table 7.13).

Chi-squared tests for association emphasize that the different proportions for these assemblages are the result of real differences between them, and could not have been produced through chance variation, but the tests between the Mikindani ceramics and those from northern Mozambique and Malawi show closer relations than the tests between Mikindani and other coastal types. Given the amount of variability subsumed within ceramic types in eastern Africa, the chi-squared results do not necessarily mean that the Mikindani material needs to be considered a new type, though they provide very little support for connecting the Mikindani material with known coastal types. Instead, the most significant interregional connections Mikindani possessed during the first half of the second millennium CE were south and west, to Malawi and northern Mozambique, and perhaps in particular to groups making Lumbo and Mwamasapa ceramics.

	Mikindani 2nd Millennium		Lumbo		Mawudzu		Mwamasapa		Mature Tana		Other Coast First Half of 2nd	
Studied Vessels	228		89		75		232		6139		5132	
Un. Shal. Bowl	45	19.7%	0	0.0%	0	0.0%	0	0.0%	147	2.4%	127	2.5%
Un. Open Bowl	77	33.8%	47	52.8%	42	56.0%	117	50.4%	507	8.3%	2313	45.1%
Un. Beaker	3	1.3%	0	0.0%	9	12.0%	13	5.6%	168	2.7%	0	0.0%
Rest. ITB	0	0.0%	0	0.0%	0	0.0%	0	0.0%	835	13.6%	879	17.1%
Rest. Necked	80	35.1%	28	31.5%	11	14.7%	21	9.1%	1325	21.6%	516	10.1%
Rest. Globular	18	7.9%	4	4.5%	12	16.0%	81	34.9%	2224	36.2%	1079	21.0%
Rest. Carinated	1	0.4%	10	11.2%	0	0.0%	0	0.0%	933	15.2%	218	4.2%
Rest. UTR	4	1.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Table 7.13 Vessel form proportions for second millennium types discussed,
(following Robinson 1970, 1982; Duarte 1993; Sasoon 1980; Horton 1996; Fleisher 2003)

Local Ceramic Typology

The preceding study of ceramic attributes provided several compelling insights into the character of the local ceramics from the Mikindani region, ranging from the affinities of second-millennium ceramics to types from Malawi and northern Mozambique, to first-millennium connections with Kwale and Tana/TIW assemblages, to a level of continuity in vessel form between first- and second-millennium ceramics. But additional analysis is necessary to better understand some of the variations within the Mikindani region and between the region and other parts of eastern and southern Africa. While the Mikindani ceramics could not be definitively aligned with any existing East African ceramic tradition through statistical analysis, despite compelling affinities in certain attributes, comparison of the types present at Mikindani with those that distinguish those traditions offers another means to test the interregional associations of Mikindani's ceramics.

The initial definition of ceramic types from Mikindani was based upon four factors: vessel form, rim form, thickness and date. Each unique combination of rim and vessel form was designated as a separate type. Because average thickness distinguished first- and second-millennium ceramics it was also used to separate types, as were decorative motifs. Different surface treatments were then used to describe variants of each type. Although decoration was useful to distinguish types' relative dates, individual decorative motifs were not found to co-vary significantly with types. Twenty-two first-millennium types, 19 second-millennium types, and 3 recent types were identified using this methodology. The types and the number of their instances are listed in Tables 7.14 and 7.15.[4]

Some of the implications of these types are worthy of additional comment, especially as they begin to allow us to disentangle the ceramic phases within the broad first-millennium and second-millennium groupings. The beveled types from the first millennium are one such instance. Of the types of early necked vessels, the beveled type was the least common. It was found only in lowland and coastal sites, and was typically found in the lowest levels of those sites. Care was exercised in the finishing of the vessels, which were more likely to be smoothed or burnished than their non-beveled counterparts. These trends were shared with the beveled in-turned bowl and beveled open bowl types, which were also relatively few in number, found in the lowest levels of only coastal and lowland sites, and finished with care. This suggests that the beveled-rim types are some of the earliest Iron Age ceramics in the Mikindani region, pre-dating the rounded and flat types. Given what we know of trends in coastal ceramics elsewhere, they likely represent a first half of the first millennium occupation of the Mikindani region, likely connected with the Kwale tradition. This occupation was perhaps fairly limited, given the relatively few sites where beveled ceramics were found, namely Kisiwa Fields, Kisiwa Forests, Miseti Hilltop and North Imekuwa. The bulk of the first-millennium ceramics, which were not beveled, may then represent occupations associated with the 6th-century Mwangia phase of Kwale or with Tana/TIW ceramics.

[4] One note should be made regarding the instances of each type recorded in these figures. Because the undecorated sherds were sampled during Phase III, the undecorated proportions recorded here a likely smaller than the true proportions in the sites' assemblages, though differences in the proportions between types are still important.

Type 1: restricted; necked vessels; flat rims with thickened area between rim and shoulder; thickness above 7.5 mm, and typically above 10 mm (n= 15)
- 1a: burnished (3)
- 1b: smoothed (5)
- 1c: no surface treatment (7, 1 undecorated)

Type 2: restricted; necked vessels; flat rims, no thickening; thickness above 7.5 mm, and typically above 10 mm (30)
- 2a: burnished (6, 2 undecorated)
- 2b: smoothed (9, 4 undecorated)
- 2c: no surface treatment (15, 4 undecorated)

Type 3: restricted; necked vessels; rounded rims with thickened area between rim and shoulder; thickness above 7.5mm, and typically above 10 mm (41)
- 3a: graphite burnished (1)
- 3b: burnished (3)
- 3c: smoothed (19, 2 undecorated)
- 3d: no surface treatment (18, 3 undecorated)

Type 4: restricted; necked vessels; rounded rims, no thickening; thickness above 7.5 mm, and typically above 10mm (88)
- 4a: graphite burnish (1)
- 4b: burnished (1)
- 4c: smoothed (33, 9 undecorated)
- 4d: no surface treatment (53, 20 undecorated)

Type 5: restricted; necked vessels; beveled rims; thickness above 10 mm (8)
- 5a: burnished (4)
- 5b: smoothed (3)
- 5c: no surface treatment (1)

Type 6: restricted; globular vessels; rounded rims; thickening at rim; thickness above 10 mm
- 6a: smoothed (2 undecorated)

Type 7: restricted; globular vessels; rounded rims; no thickening at rim; thickness 7.5 to 10 mm (14)
- 7a: graphite burnished (1)
- 7b: burnished (5)
- 7c: smoothed (2)
- 7d: no surface treatment (6, 4 undecorated)

Type 8: restricted; up-turned rim vessels; rounded rims; no thickening at rim; thickness above 10 mm (4)
- 8a: burnished (2)
- 8b: smoothed (1)
- 8c: no surface treatment (1 undecorated)

Type 9: restricted; carinated vessels; rounded rim; no thickening at rim; thickness above 10 mm
- 9a: no surface treatment (1 undecorated)

Type 10: restricted; in-turned bowls; flat rim; thickness above 10 mm (8)
- 10a: graphite burnished (2)
- 10b: burnished (5, 3 undecorated)
- 10c: smoothed (1)

Type 11: restricted; in-turned bowls; rounded rim; thickness above 10 mm (26)
- 11a: graphite burnished (10, 4 undecorated)
- 11b: burnished (10, 7 undecorated)
- 11c: smoothed (4, 2 undecorated)
- 11d: no surface treatment (2)

Type 12: restricted; in-turned bowls; beveled rim; thickness above 10 mm (2)
- 12a: graphite burnished (1)
- 12b: burnished (1)

Type 13: unrestricted; open bowls; flat rims; thickened at rim; thickness above 9 mm (12)
- 13a: graphite burnished (1)
- 13b: burnished (3, 2 undecorated)
- 13c: smoothed (4, 1 undecorated)
- 13d: no surface treatment (4, 1 undecorated)

Type 14: unrestricted; open bowls; flat rims; no thickening at rim; thickness above 9 mm (10)
- 14a: burnished (1)
- 14b: smoothed (5)
- 14c: no surface treatment (4)

Type 15: unrestricted; open bowls; rounded rims; thickened at rim; thickness above 8 mm (25)
- 15a: graphite burnished (1)
- 15b: burnished (2, 1 undecorated)
- 15c: smoothed (13, 3 undecorated)
- 15d: no surface treatment (9, 4 undecorated)

Type 16: unrestricted; open bowls; rounded rims; no thickening at rim; thickness above 8 mm (77)
- 16a: graphite burnished (1)
- 16b: burnished (9, 6 undecorated)
- 16c: smoothed (29, 13 undecorated)
- 16d: no surface treatment (38, 21 undecorated)

Type 17: unrestricted; open bowls; beveled rim; thickness above 10 mm (6)
- 17a: graphite burnished (1 undecorated)
- 17b: burnished (1)
- 17c: smoothed (2)
- 17d: no surface treatment (2)

Type 18: unrestricted, open bowl, everted rim, 6 to 7.5 mm thick
- 18a: no surface treatment (7 undecoratedorated)

Type 19: unrestricted; beaker; flat rim; no thickening at rim; 8-12 mm thick
- 19a: smoothed (5)
- 19b: no surface treatment (3)

Type 20: unrestricted; beaker; rounded rim; no thickening at rim; 8-12 mm thick
- 20a: smoothed (1)
- 20b: no surface treatment (12, 1 undecorated)

Type 21: unrestricted; shallow bowl; flat rim; 9 to 13 mm thick
- 21a: graphite burnished (6 undecorated)

Type 22: unrestricted; shallow bowl; rounded rim, 7.5 to 9 mm thick
- 22a: graphite burnished (1)
- 22b: no surface treatment (1 undecorated)

Table 7.14 First-millennium types at Mikindani

Type 23: restricted; necked vessels; flat, externally thickened rim (note just at rim); 8 to 10 mm thick
- 23a: smoothed (6)

Type 24: restricted; necked vessels; flat, tapered rim; 5 to 8 mm thick (7)
- 24a: smoothed (4)
- 24b: no surface treatment (3)

Type 25: restricted; necked vessels; flat rim; 5 to 8 mm thick (31)
- 25a: burnished (5, 4 undecorated)
- 25b: smoothed (23, 16 undecorated)
- 25c: no surface treatment (3)

Type 26: restricted; necked vessels; rounded, tapered rim; 4 to 10 mm thick (10)
- 26a: smoothed (6, 4 undecorated)
- 26b: no surface treatment (4, 2 undecorated)

Type 27: restricted; necked vessels; rounded rim; 4 to 10 mm thick (26)
- 27a: burnished (3, 2 undecorated)
- 27b: smoothed (12, 10 undecorated)
- 27c: no surface treatment (11, 6 undecorated)

Type 28: restricted; globular vessels; flat, externally thickened rim; 4 to 6 mm thick
- 28a: smoothed (4)

Type 29: restricted; globular vessels; rounded rim; 5 to 8 mm thick
- 29a: graphite burnish (7, 1 undecorated)
- 29b: burnished (1)
- 29c: smoothed (2)
- 29d: no surface treatment (4, 3 undecorated)

Type 30: restricted; up-turned rim vessels; flat rim; 4 to 8 mm thick
- 30a: no surface treatment (4, 2 undecorated)

Type 31: restricted; carinated vessel; rounded rim; 9 mm thick
- 31a: smoothed (1)

Type 32: unrestricted; open bowls; flat, tapered rim; 6 to 10 mm thick (6)
- 32a: burnished (1)
- 32b: smoothed (3, 2 undecorated)
- 32c: no surface treatment (2)

Type 33: unrestricted; open bowls; flat rim; 6 to 10 mm thick (27)
- 33a: burnished (8, 5 undecorated)
- 33b: smoothed (7, 2 undecorated)
- 33c: no surface treatment (12, 4 undecorated)

Type 34: unrestricted; open bowls; rounded, tapered rim; 5 to 7 mm thick (7)
- 34a: smoothed (4, 3 undecorated)
- 34b: no surface treatment (3 undecorated)

Type 35: unrestricted; open bowls; rounded rim; 5 to 7 mm thick (35)
- 35a: burnished (5 undecorated)
- 35b: smoothed (23, 16 undecorated)
- 35c: no surface treatment (7, 6 undecorated)

Type 36: unrestricted; open bowls; heavily everted flattened rim; 5 to 7 mm thick
- 36a: smoothed (2)

Type 37: unrestricted; beaker; flat rim; 5 to 8 mm thick
- 37a: no surface treatment (3, 1 undecorated)

Type 38: unrestricted; shallow bowl; flat, externally thickened rim; 5 mm thick
- 38a: burnished (1)

Type 39: unrestricted; shallow bowl; flat rim; 5 to 8 mm thick (28)
- 39a: graphite burnish (5, 4 undecorated)
- 39b: burnish (8, 7 undecorated)
- 39c: smoothed (8, 7 undecorated)
- 39d: no surface treatment (7)

Type 40: unrestricted; shallow bowl; rounded rim; 5 to 8 mm thick (14)
- 40a: graphite burnished (5 undecorated)
- 40b: burnished (3, 2 undecorated)
- 40c: smoothed (1 undecorated)
- 40d: no surface treatment (5, 2 undecorated)

Type 41: unrestricted; plate/shallow bowl; rounded, thickened rim; 5 mm thick (2)
- 41a: graphite burnished (1)
- 41b: burnished (1)

Table 7.15 Second-Millennium Types at Mikindani

These expectations regarding an early Kwale-period occupation of the region are largely corroborated by in-turned bowl types, which are also characteristic of the early phases of Kwale. Like the beveled types, the in-turned bowls were found primarily in the lower levels of sites and were found at a relatively low number of sites: the four which also produced beveled types, the coastal site of Pemba, and the valley site Stella Maris Hills. At this last site the in-turned bowls were mostly recovered from a single pit context. Within these contexts the in-turned bowls were relatively well represented, comprising about half of the total vessels in the lowest levels of Stella Maris Hills and North Imekuwa. A high percentage of the in-turned bowls were either graphite burnished or plain burnished, indicating that they were likely used to hold liquid or semi-liquid materials. These in-turned-bowl types also indicate a relatively limited early first-millennium occupation of the Mikindani region that matches the vessel and rim form proportions expected for Kwale ceramics quite well.

Having identified elements of a type-signature for an early first-millennium occupation of the Mikindani region, the ceramics of the later first millennium are also worth comment. The most salient point regarding most of the remaining types is that their spatial distribution is much broader, both in terms of the total number of sites producing instances of the type and their extension into all five microenvironments. There is also evidence that several of the remaining types, including all four of the non-beveled necked-vessel types and all types of rounded-rim open bowls, were resilient across the first millennium, as they are found throughout the stratigraphy of several sites, including Pemba and Kisiwa Fields.

However, just as it was possible to identify certain early first-millennium types that were found predominately in the lower levels of such sites, it is also possible to identify types which are found overwhelmingly in the upper levels. The types of beakers and globular vessels are four examples of such types. The presence of these types mostly in later first-millennium contexts matches trends observed elsewhere on the coast. Globular vessels become more common in Tana/TIW assemblages than in any early first-millennium ware, and beakers appear in late first-millennium to early second-millennium Mature Tana assemblages for the first time (see Horton 1996).

There were also a few types of open bowls that occurred predominantly in the upper levels of first-millennium sites. Both types of open bowls with flat rims are only found in such levels. These types occur infrequently compared to open bowls with rounded rims and do not occur throughout the stratigraphy of any site. The flat-rim open-bowl types provide the only clear instance of Tana/TIW-like ceramics from bottom levels of the site of Mgao North, whose ceramics are primarily of the new style produced in the region during the early second millennium. The type of undecorated open bowls with everted rims is also restricted to the upper levels of first-millennium sites. That type has a clear counterpart with similarly everted-rim open bowls found in later contexts.

There was an early type with a later counterpart that does not appear to be restricted to upper first-millennium levels however. Shallow bowls with flat rims and graphite burnish are found in both first-millennium and second-millennium contexts, though the earlier examples are thicker. However, in this case it is not the result of a late first-millennium type continuing into the second millennium, as the early examples occur throughout the stratigraphies of several long-occupied first-millennium sites.

Variations among the second-millennium types are less pronounced than in the first millennium. Still, it is possible to identify certain types which occurred early in the second millennium most commonly based upon the contexts in which they are found. The beaker type is one such type, found in the lower levels of Mgao North. In this instance, the beakers may represent a continuation of the production of beakers from the late first millennium that is then abandoned, though we are dealing with a very small sample. The necked vessels with flat, exterior thickened rims also seem to occur mostly in the lower to middle layers of later sites. This type is clearly distinct from the first-millennium material, as the thickening occurs at the rim only, rather than over the entire area between the rim and shoulder.

Other types occur mostly in the upper levels of these sites and seem to date from the middle of the second millennium at the earliest. The up-turned rim vessels occurred mostly in the upper levels of sites or beneath recent layers at sites around Mikindani Bay. The globular vessels with exterior thickened rims bearing decoration similarly were found in the upper levels of the two sites where they occurred. This contrasts with the non-thickened globular vessels which occur throughout the stratigraphy of later sites. A similar distinction can be made for the shallow bowls with flat rims. The graphite burnished variant of that type occurred throughout stratigraphic levels of later sites, but the other variants occurred most frequently in upper levels. This sort of within-type temporal differentiation among variants did not occur with first- millennium types.

Finally, two types common in mid-second millennium coastal assemblages were recovered from the lowest levels of sites around Mikindani Bay excavated during Phase I. The first of these is the red-painted open bowl, which as discussed in Chapter 5 is characteristic of Swahili ceramics during the period. The red-painted open bowls also characterized the Sancul ceramics of the Mozambique coast in the mid-second millennium, but other Sancul types are not shared. The second is a carinated form that bore punctates along the carination.

Comparisons to Other Coastal Typologies

The Mikindani typology provides an important means by which to compare the ceramics from the region with those from other regions. It allows us to move beyond attribute proportions to consider how attributes were combined into particular forms at Mikindani and elsewhere, revealing which forms were shared across space. For first-millennium types this comparison again demonstrates the Mikindani ceramics' affinities to other coastal assemblages and many Early Iron Age ceramic traditions, but also shows that distinctions exist between these EIA traditions and the ceramics from Mikindani. In the second millennium, the types from Mikindani are clearly distinct from those found in other coastal typologies, but affinities with northern Mozambique and Malawi types are strong.

A brief note on the source material used to make these comparisons is worthwhile here. A number of detailed typologies exist for coastal sites and regions, including those from Kilwa (Chittick 1974), Manda (Chittick and Tolbert 1984), Shanga (Horton 1996) and northern Pemba Island (Fleisher 2003). These typologies provide detailed comparative material from the Tana/TIW period onward. Unfortunately, they do not provide much, if any, material for the Kwale period, and other descriptions of Kwale ceramics (e.g., Soper 1967a) are generally based on fairly small assemblages providing a less extensive range of types. The same limitations are present for ceramic traditions from Mozambique and Malawi. Nonetheless, even with these smaller assemblages, certain predominant types were identified and can be compared to the Mikindani ceramics.

During the first millennium, the closest comparisons for the Mikindani ceramic types can be found in other coastal typologies. As discussed above, several types found in the lowest levels of first-millennium sites in the Mikindani region are characteristic of Kwale ceramics. In truth, almost all of the types documented at the Kwale type-site (Soper 1967a) are present in the Mikindani region. While certain differences exist in the decorative motifs, beveled necked vessels, open bowls, and in-turned bowls are all present, as are open and in-turned bowls with thickened areas near the rim, and open bowls with flat rims, though at Mikindani these last seem to come in much later. The only Kwale type not found at Mikindani is the open bowl with a tapered rim. Such strong associations carry over into the Tana/TIW period, when many of the Mikindani first millennium types are also reported in the documented coastal assemblages. These early assemblages are dominated by the variations of necked vessels described at Mikindani, but also include other shared forms including burnished in-turned bowls, beaker bowls, shallow open bowls, and plain-rimmed globular vessels. Not every type is shared, and the Mikindani material in particular seems to lack the red-burnished forms common elsewhere on the coast, but some degree of spatial variation should be expected amongst large assemblages, and the shared primary type from the period, the necked vessel, is of some significance.

Still, because the attribute data also suggested potential connections to Nkope ceramics, it is worth considering the connections between the Mikindani typology and that first-millennium ceramic type from Malawi. Kwale ceramics also shared many types with the Mikindani ceramics, such as beakers, globular vessels, open bowls with thickened and flattened rims, and necked vessels. However, one distinguishing characteristic of Nkope ceramics is a significant proportion of up-turned rim vessels whose rims are strongly out-turned. The Mikindani ceramics of the first millennium have fairly low counts of up-turned rim vessels, but the rims of these vessels were not out-turned. The same discrepancy also distinguishes the Mikindani material from the Matola ceramics of southern Mozambique and the Mwabulambo ceramics of northern Malawi. Because Mikindani thus lacks this major Nkope type, in addition to deviations in vessel form proportions, the Mikindani ceramics should not be ascribed to Nkope. They carried more Nkope traits than Kwale assemblages further north however, such as relatively low proportions of beveled rims and low numbers of bevels on those rims. As might be expected given the Mikindani region's geographic location, its ceramics seem to occupy an intermediate position between Kwale and Nkope, though one closest to Kwale.

The vessel-form proportions indicated that the Mikindani ceramics became distinct from other coastal assemblages during the second millennium, and the type comparison provides compelling corroboration. While 86% of the Period I Tana/TIW types at Kilwa had correlates in the Mikindani material, less than half of the Period II types from the 12th century did (Chittick 1974). Similar decreases existed when comparing Mikindani's ceramics with other Swahili coastal regions. Several of the Mikindani types which do have correlates were rare, such as the up-turned rim vessels decorated with a punctate band. For some other second-millennium types the association existed for the vessel and rim form, but the decorative motifs were different. Still, a certain degree of similarity between the Mikindani region and other parts of the coast should be expected given the features held in common during the first millennium and their shared EIA ancestry. More significant are the differences that existed between the Mikindani types and forms shared in the other coastal typologies. There are a number of different types that were produced at multiple coastal locations but not at any site in the Mikindani region, including bowls with an exaggerated carination, necked bowls with concave profiles, globular vessels with thickened shoulders, and open bowls with flattened "bulbous" rims that served as a platform for decoration. The Mikindani region simply did not share in those stylistic developments common elsewhere on the coast during the early second millennium. Nor did it share in any of the unique developments of the nearest large site, Kilwa, when regional styles became increasingly prevalent after the 14th century (Fleisher 2004), as Husuni Ware and Wealed Ware were not present at Mikindani. A few type associations occurred in the middle of the millennium though, as sites on Mikindani Bay produced red-painted bowls typical of Swahili Ware from around the 15th century.

In contrast to the distinctions that existed between the Mikindani ceramics and other coastal assemblages, the second-millennium types from the region match well with the types described from the Lumbo, Mawudzu and Mwamasapa traditions. Though described from relatively small assemblages, the most common Lumbo type was an open bowl stamped below the rim with areal motifs. Other similarly decorated necked vessels are suggested by the illustrated rim profiles (Duarte 1993), and carinated and globular forms were known to exist. Mwamasapa types also include areal-stamped and impressed open bowls and necked vessels, some of which possessed tapered rims, as well as globular vessels with notched rims, and beaker bowls. Mawudzu types include areal decorated necked and shouldered pots with tapered rims and thin walls, as well as open bowls with decoration on both sides. However, several Mawudzu types are distinguished by incised decorations. The Mikindani ceramics thus appear to be quite closely related to the Mwamasapa and Lumbo traditions, but perhaps only indirectly tied to Mawudzu. The similarities between the Mwamasapa and Lumbo types and the Mikindani material present a strong contrast with the comparison between Mikidani's ceramics and those from coastal sites further north.

Results Sorted by Microenvironment

It is also important to understand the spatial variability of ceramics within the Mikindani region. Fortunately, the five microenvironments identified within the region provide a built-in format with which to analyze spatial variability. The results of the non-decorative ceramic attributes are presented in Table 7.16. There are clear variations in these results. The highland and ridge microenvironments have much higher proportions of open bowls, and correspondingly lower proportions of necked vessels. The coast and the ridge microenvironments have higher proportions of flat rims and smoothed surface finishes.

Still, because temporal variations exist within the Mikindani region's ceramics, some of this spatial variation may be the result of the temporal differences. Chronological control over each microenvironment's ceramic data needs to be established so that potential spatial variation in the microenvironments can be determined, beyond that caused by temporal differences in settlement. These microenvironmental attribute proportions organized by the decoration-based temporal groupings are presented in Tables 7.17 and 7.18. Again, variations existed between the microenvironments in each millennium. During the first millennium, there was a clear difference in vessel forms between the highland and ridge environments and the other microenvironments. There were distinctions between the proportions of flat rims, thickened rims and beveled rims for the different microenvironments as well, with flat rims and interior thickening most common in the ridge microenvironment, beveling nearly wholly limited to the lowland plains, and exterior thickening most common in coastal areas.

	Lowland		Highland		Coast		Valley		Ridge	
Studied Vessels	273		44		223		68		25	
Avg Thickness	9.906874		9.295053		8.712943		9.07816		9.890323	
MC Vessel Form										
Un. Shal. Bowl	10	*3.7%*	2	*4.5%*	27	*12.1%*	10	*14.7%*	4	*16.0%*
Unres. OB	95	*34.8%*	24	*54.5%*	66	*29.6%*	16	*23.5%*	13	*52.0%*
Unrest. Beaker	5	*1.8%*	2	*4.5%*	10	*4.5%*	3	*4.4%*	4	*16.0%*
Rest. ITB	26	*9.5%*	0	*0.0%*	4	*1.8%*	6	*8.8%*	0	*0.0%*
Rest. Neck	118	*43.2%*	9	*20.5%*	103	*46.2%*	28	*41.2%*	4	*16.0%*
Rest.Glob	15	*5.5%*	6	*13.6%*	8	*3.6%*	5	*7.4%*	0	*0.0%*
Rest. Car.	0	*0.0%*	1	*2.3%*	1	*0.4%*	0	*0.0%*	0	*0.0%*
Rest. UTR	3	*1.1%*	0	*0.0%*	4	*1.8%*	1	*1.5%*	0	*0.0%*
MC Rim Form										
Everted	4	*1.5%*	2	*4.5%*	2	*0.9%*	0	*0.0%*	1	*4.0%*
Rounded	197	*72.2%*	31	*70.5%*	116	*52.0%*	49	*72.1%*	9	*36.0%*
Flat	57	*20.9%*	11	*25.0%*	104	*46.6%*	19	*27.9%*	15	*60.0%*
Beveled	15	*5.5%*	0	*0.0%*	1	*0.4%*	0	*0.0%*	0	*0.0%*
Thickened	45	*16.5%*	11	*25.0%*	38	*17.0%*	10	*14.7%*	4	*16.0%*
Tapered	10	*3.7%*	0	*0.0%*	15	*6.7%*	5	*7.4%*	0	*0.0%*
MC Surface Treatment										
Red Slipped/Burnished	8	*2.9%*	0	*0.0%*	9	*4.0%*	2	*2.9%*	0	*0.0%*
Painted	1	*0.4%*	0	*0.0%*	1	*0.4%*	0	*0.0%*	0	*0.0%*
Graphited	23	*8.4%*	3	*6.8%*	14	*6.3%*	5	*7.4%*	1	*4.0%*
Smoothed	79	*28.9%*	19	*43.2%*	104	*46.6%*	27	*39.7%*	15	*60.0%*
Burnished	47	*17.2%*	0	*0.0%*	27	*12.1%*	10	*14.7%*	3	*12.0%*
None	121	*44.3%*	22	*50.0%*	76	*34.1%*	26	*38.2%*	6	*24.0%*

Table 7.16 Rim attributes sorted by microenvironment

Taken as a whole, a dichotomy does emerge in the data from the first millennium. Not only are the vessels from the highland and ridge microenvironments more likely to be open bowls, but they are also thinner. Chi squared tests further demonstrate the association between the two microenvironments, suggesting that the proportions underlying the two assemblages were the same, while the probability of either sharing a similar association with the sherds from one of the other three microenvironments is negligible. Further insight can be gained if one examines the undecorated sherds from each microenvironment in more detail. For the highland and ridge microenvironments, the decorated and undecorated rim sherds shared similar proportions of most vessel forms, most notably with open bowl fractions around one half, though the undecorated rims were thinner and also comprised all examples of shallow bowls. The lowland and valley microenvironments also shared mostly similar attribute proportions for the decorated and undecorated sherds, though the undecorated proportions of in-turned bowls and burnished vessels were higher. However, in the coastal environment, drawing mostly on samples of sherds from Pemba and Miseti Hilltop, the undecorated sherds' attributes did not match the decorated sherds, as the undecorated sherds were in fact much more similar to the highland and ridge sherds, being both relatively thin and showing a high proportion of open bowls. This result indicates that the spatial dichotomy still most reasonably represents variants within a single ceramic ware, likely brought on by temporal variation. As already discussed, several open bowl types were restricted to the upper levels of first millennium sites, and early first millennium beveled and in-turned bowl types were mostly restricted to coastal and lowland areas.

	1st Millennium									
	Lowland		Highland		Coast		Valley		Ridge	
Studied Vessels	209		39		91		48		18	
Avg Thickness	10.9		9.8		10.5		10.2		9.9	
Vessel Form										
Un. Shal. Bowl	2	1.0%	2	5.1%	1	1.1%	2	4.2%	1	5.6%
Unres. OB	63	30.1%	23	59.0%	30	33.0%	12	25.0%	9	50.0%
Unrest. Beaker	5	2.4%	2	5.1%	7	7.7%	2	4.2%	4	22.2%
Rest. ITB	26	12.4%	0	0.0%	4	4.4%	6	12.5%	0	0.0%
Rest. Neck	101	48.3%	8	20.5%	46	50.5%	23	47.9%	4	22.2%
Rest.Glob	8	3.8%	3	7.7%	2	2.2%	3	6.3%	0	0.0%
Rest. Car.	0	0.0%	1	2.6%	0	0.0%	0	0.0%	0	0.0%
Rest. UTR	3	1.4%	0	0.0%	1	1.1%	0	0.0%	0	0.0%
Rim Form										
Everted	3	1.4%	2	5.1%	2	2.2%	0	0.0%	0	0.0%
Rounded	154	73.7%	30	76.9%	64	70.3%	37	77.1%	8	44.4%
Flat	37	17.7%	7	17.9%	24	26.4%	11	22.9%	10	55.6%
Beveled	15	7.2%	0	0.0%	1	1.1%	0	0.0%	0	0.0%
Thickened	42	20.1%	8	20.5%	33	36.3%	9	18.8%	3	16.7%
Tapered	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Surface Treatment										
Red Slipped/Burnished	7	3.3%	0	0.0%	3	3.3%	1	2.1%	0	0.0%
Painted	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Graphited	19	9.1%	3	7.7%	3	3.3%	2	4.2%	1	5.6%
Smoothed	52	24.9%	14	35.9%	38	41.8%	22	45.8%	12	66.7%
Burnished	40	19.1%	0	0.0%	10	11.0%	6	12.5%	0	0.0%
None	98	46.9%	22	56.4%	40	44.0%	18	37.5%	5	27.8%

Table 7.17 First-millennium rim attributes sorted by microenvironment

Other variations between microenvironments were present in the second-millennium material. One clear trend in that period was the low numbers of sherds from the highland and ridge microenvironments. There are second-millennium sites in these microenvironments, though they are fewer in number than such sites in the first millennium, so part of this result may reflect the selections of sites for excavation during the project's third phase. Still, these results do indicate a less-dense occupation of the highland and ridge microenvironments during the second millennium. These low-density occupations make comparisons to the other microenvironments difficult. Some notable differences existed between the three microenvironments with larger samples of second-millennium rims however. The vessel proportions between the microenvironments were mixed, with the coast having more necked vessels but fewer globular ones, the valley having more open bowls but fewer necked vessels, and the lowlands generally falling in between. The valley microenvironment matched the coastal proportion of shallow bowls but the lowland proportion of globular vessels. There are similar differences in the proportions of surface treatments and rim forms, such as the valley microenvironment rims being most likely to be thickened. The coastal rims are also a bit thicker on average. In contrast to the first millennium, these spatial variations did not occur in a systematic way. One microenvironment was not always different from the other two, but instead the associations varied depending on the attribute. So while there is clear evidence of spatial variation during the second millennium, there is not evidence of a spatial dichotomy of ceramic form as in the first millennium.

	2nd Millennium									
	Lowland		Highland		Coast		Valley		Ridge	
Studied Vessels	64		5		132		20		7	
Avg Thickness	6.5		5.2		7.5		6.5		9.9	
Vessel Form										
Un. Shal. Bowl	8	*12.5%*	0	*0.0%*	26	*19.7%*	8	*40.0%*	3	*42.9%*
Unres. OB	32	*50.0%*	1	*20.0%*	36	*27.3%*	4	*20.0%*	4	*57.1%*
Unrest. Beaker	0	*0.0%*	0	*0.0%*	3	*2.3%*	1	*5.0%*	0	*0.0%*
Rest. ITB	0	*0.0%*	0	*0.0%*	0	*0.0%*	0	*0.0%*	0	*0.0%*
Rest. Neck	17	*26.6%*	1	*20.0%*	57	*43.2%*	5	*25.0%*	0	*0.0%*
Rest.Glob	7	*10.9%*	3	*60.0%*	6	*4.5%*	2	*10.0%*	0	*0.0%*
Rest. Car.	0	*0.0%*	0	*0.0%*	1	*0.8%*	0	*0.0%*	0	*0.0%*
Rest. UTR	0	*0.0%*	0	*0.0%*	3	*2.3%*	1	*5.0%*	0	*0.0%*
Rim Form										
Everted	1	*1.6%*	0	*0.0%*	0	*0.0%*	0	*0.0%*	1	*14.3%*
Rounded	43	*67.2%*	1	*20.0%*	52	*39.4%*	12	*60.0%*	1	*14.3%*
Flat	20	*31.3%*	4	*80.0%*	80	*60.6%*	8	*40.0%*	5	*71.4%*
Beveled	0	*0.0%*	0	*0.0%*	0	*0.0%*	0	*0.0%*	0	*0.0%*
Ex Thick	3	*4.7%*	3	*60.0%*	5	*3.8%*	1	*5.0%*	1	*14.3%*
Tapered	10	*15.6%*	0	*0.0%*	15	*11.4%*	5	*25.0%*	0	*0.0%*
Surface Treatment										
Red Slipped/Burnished	1	*1.6%*	0	*0.0%*	6	*4.5%*	1	*5.0%*	0	*0.0%*
Painted	1	*1.6%*	0	*0.0%*	1	*0.8%*	0	*0.0%*	0	*0.0%*
Graphited	4	*6.3%*	0	*0.0%*	11	*8.3%*	3	*15.0%*	0	*0.0%*
Smoothed	27	*42.2%*	5	*100.0%*	66	*50.0%*	5	*25.0%*	3	*42.9%*
Burnished	7	*10.9%*	0	*0.0%*	17	*12.9%*	4	*20.0%*	3	*42.9%*
None	23	*35.9%*	0	*0.0%*	36	*27.3%*	8	*40.0%*	1	*14.3%*

Table 7.18 Second-millennium rim attributes sorted by microenvironment

Refined Ceramic Periodization of Mikindani Region

The analysis of the Mikindani region's ceramics from this project allows us to reexamine and refine the periodization for the southern Tanzanian coast suggested by Kwekason (2007). The first period, representing LSA ceramics in the region dating to the last centuries BCE, is retained, but this project provides additional information to characterize the period. In contrast to Kwekason's suggestion that settlement during this period was limited to the highland plateau, the LSA ceramics found during my project at the Litingi Channel site occurred in the coastal environment and most of the sherds were found right on the beach. While erosion is clearly implicated in the spatial distribution at Litingi Channel, LSA settlement in the Mikindani region took place across microenvironments, likely documenting the movement of hunter-gatherer populations as they exploited different local resources. Indeed, stone and bone tools were also recovered at the Mbuo Hilltop site in the valley microenvironment, as will be discussed in more detail in Chapter 9. It is also important to note that the evidence for LSA occupation in the Mikindani region is limited compared to subsequent phases, indicating that LSA settlement in the region was both less dense and more ephemeral and thus less likely to be recovered archaeologically.

The second period of Kwekason's typology clearly needs to be broadened to account for the phases of EIA settlement which existed in the Mikindani region throughout the first millennium. Two additional periods need to be added to the existing mid-millennium period whose ceramics bear affinities to the final Mwangia phase of Kwale ceramics. The first additional period needs to account for the earlier ceramics that show affinities to earlier phases of Kwale and to Nkope ceramics and possess higher proportions of beveled rims and in-turned bowls. Sites from this period are few in number and restricted to the coastal and lowland microenvironments. This early period is succeeded by the mid-millennium period where necked vessels become dominant. In many respects this period appears to combine elements of the late-Kwale Mwangia Phase and Tana Tradition/TIW ceramics, with vessel and rim forms especially resembling the latter, but without large proportions of the incised triangle motif. The third and final first-millennium period in the Mikindani region also shows connections to late-first-millennium Tana/TIW assemblages elsewhere, with the development of new beaker and globular vessel forms, as well as new types of open bowls. In contrast to the first EIA period at Mikindani, sites for both the second and third periods are quite numerous and occur across all microenvironments.

In contrast, the evidence for the Plain Ware (PW) period described by Kwekason is much more limited, both in terms of the number of sites and the geographic extent of those sites. Indeed, the Plain Ware (see Chami 1998) phase seems to have existed only at sites quite close to Mikindani Bay. The best example of a PW context comes from Stella Maris Hills, located about a kilometer west of Mikindani Town, which had a 2m-x-4m-x-10cm level between the topsoil and Tana/TIW-age deposits that produced only three decorated sherds out of 694 total sherds, but included the neck-punctating motif that is widespread on the coast at that time. Given the evidence of the subsequent periods, this PW phase may well represent late first- and early second-millennium occupations at sites comprising the center of the Mikindani region’s interactions with the Indian Ocean world, and which retained those connections for a longer period of time.

The PW phase occurred either just before or at the same time as another period of early second-millennium ceramics that was much more widespread in the Mikindani region. This period was characterized by ceramics commonly bearing stamped and impressed areal-fill decorations and with strong affinities to Lumbo and Mwamasapa tradition ceramics. This period has been dated to the 12th century (Kwekason 2007) but on the basis of its broad distribution in the region the actual time range represented by these ceramics was much more extensive. Some indications of that wider range might be suggested by the development of new types in the upper levels of sites from this period, such as burnished and smoothed flat shallow bowls and globular vessels with externally thickened rims, that existed alongside older types.

The Mikindani region also produced evidence of a Swahili Ware phase, characterized by bowls with red painted interiors or bands of neck punctates. However, these ceramics were again mostly restricted in their spatial distributions, occurring primarily in sites around Mikindani Bay. They did occur in the lower levels of many of those sites however, and thus do seem to predate the dense 19th-century occupation of the Mikindani region. This period thus likely dates to the middle of the second millennium, when similar ceramics are found further north on the coast. It should be emphasized however, that the contexts which bear ceramics from this period also often bear ceramics with the decorative motifs of the preceding period, indicating that those ceramics were likely still produced alongside Swahili Ware, and may have been preferred to Swahili Ware away from the coast.

The final phase of local ceramics from the Mikindani region consists of those types that were commonly produced in recent periods. These types are often found in association with European refined earthenware ceramics from the 19th and 20th centuries. They include sherds bearing examples of the recent decorative motifs such as coarsely incised triangles and incised areal fill, as well as some new vessel forms such as necked pots with flat, heavily everted rims. Nonetheless, the ceramic assemblages from this phase are characterized by imported ceramics to a much greater extent than in the preceding phases.

Implications of the Typology and Ceramic Analyses

The local ceramics of the Mikindani region thus provide a wealth of important information regarding this region's interactions with other parts of East Africa at different moments in time. They show the region to have experienced many of the same developments which occurred elsewhere on the East African coast during the first millennium. For instance, the spatial extent of mid-first-millennium ceramic types was greater than that for earlier types, as settlement in the region became more numerous and more dense from the middle of the first millennium. The form of those types indicated that Mikindani settlements' strongest cultural connections were to other coastal settlements, perhaps owing to contact along a nascent "Swahili corridor" (Horton 1987). Similarities also exist with other EIA ceramic types – not wholly surprising given the commonalities which exist among EIA ceramics in much of eastern and southern Africa – but important typological differences existed with those types as well. In many respects then, the Mikindani region appears to have been a fairly typical coastal region in the middle of the millennium, with expanding Iron Age settlement and consistent contact with other parts of the coast.

As the millennium progressed Mikindani's ceramics became more distinct, indicating that it was perhaps not sharing as completely in new coastal developments. Mikindani did not use certain decorative motifs like incised triangles as frequently as was common elsewhere on the coast, and by the early second millennium Mikindani's potters were simply not making certain ceramic types that were present at multiple other coastal locations. Instead, from the early part of the second millennium Mikindani adopted a ceramic style that was is strongly associated with the ceramics produced in northern Mozambique and the northern shores of Lake Malawi. These ceramics have also been found many kilometers away from the coast in southern Tanzania (Chami and Kwekason 2003), so they clearly indicate links between the Mikindani coast and the interior. Even when limited connections to other coastal settlements resumed towards the middle of the second millennium these interior linkages remained important, as evidenced by the enduring prevalence of this ceramic style.

These second-millennium differences from other parts of the Swahili coast to the north and associations with southern and interior communities have strong implications for understanding the relationship of the Mikindani region to the rest of the coast, and also the sorts of social, economic, religious, and political structures that existed in the region. Because the ceramics of the Mikindani region did not show connections to those of any other coastal region to the north during the first part of the second millennium, we must consider the possibility that no significant relationship existed between this part of the coast and the broader Islamic Indian Ocean world in which Swahili cities existed at that time. That lack of connection has significant implications not just for the regional economy but also for forms of local social organization. Regarding the ceramic evidence, the smaller proportions of bowls versus necked vessels at Mikindani relative to sites further north where they are abundant suggests that the Mikindani region did not share in new social relationships revolving around Islam and feasting (Fleisher 2003, 2010b; Wynne-Jones 2005a) but instead maintained a dietary focus on consumption within the domestic unit, emphasizing the household as the most important social unit (see Ashley 2010).

Beyond such implications, the origins of this absence of connection also need explanation, especially given the existence of connections during the first millennium. Several potential factors might be suggested, ranging from the structure of interregional economic connections on this part of the coast, to the role of Kilwa, to a consideration of the region's environment and the advantages and disadvantages it provided across the coast's climate history. There is also an intriguing demographic consideration, because the oral history of the Mikindani region's major ethnic group, the Makonde, records their having migrated from an area towards Lake Malawi in northern Mozambique (Weule 1907, Liebenow 1971, Saetersdal 1999). Assuming that the ceramic developments which took place in the second millennium were the result of such a migration would be overly simplistic at this point and ignore the more complicated ethnic interactions in the Mikindani region recorded in local oral histories (Berg 1901). Still, the sorts of enduring connections between these two regions which are suggested by the oral history do seem to be reflected in the second-millennium ceramics (see also Pawlowicz and LaViolette, *forthcoming*). Such connections between the Mikindani coast and the interior, which likely included some degree of population movement, could have precipitated the formation of a distinct group identity from the Islamic Swahili identities taking root further north, with material consequences for Mikindani within Swahili systems.

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CHAPTER 8: IMPORTED GOODS AND INTERREGIONAL TRADE IN THE MIKINDANI REGION

Imported goods have long been held to be important to Swahili identity and society. Coastal communities acquired such goods through their participation in interregional trade since at least the first centuries CE (Freeman-Grenville 1975; Chami 2006: 129-47). The wealth of Swahili towns in the second millennium was founded on their management of Indian Ocean commerce. They derived wealth from their role as middlemen in the export of natural resources from the African continent, with Kilwa estimated to have shipped as much as ten tons of gold a year from the Zimbabwe Plateau (Pearson 1998). In return coastal merchants received luxury items which formed an important material component of the cosmopolitan urban identities they created to distinguish themselves from the inhabitants of nearby communities and from non-elites (LaViolette 2008). In this context, the quantities of imported goods around Mikindani have clear implications not only for the economic standing of the region, but also for the social and cultural relationships between Mikindani and other Swahili communities and the ability of Mikindani's inhabitants to participate in the idealized patterns of behavior marking urban Swahili elites.

And so, in this chapter I describe the imported goods commonly found at archaeological sites on the Swahili coast. I then document the imported goods found in the Mikindani region and compare those results to the imports recovered from other regions of the coast. Finally I discuss the implications of that comparison for the social and economic position of the inhabitants of the Mikindani region, giving special attention to what those results mean for our understanding of Mikindani's inhabitants' participation in Indian Ocean trade as well as their relationships with the nearest regional center, Kilwa, and the Middle East.

Imported Goods Commonly Found on the Swahili Coast

Ceramics

Much as with locally produced ceramics, the durability and resulting relative frequency of imported ceramics has made them the most important class of imported artifacts for archaeological interpretation. Imported ceramics provide evidence for connections with three broad areas of the Indian Ocean world: the Arabian Peninsula, South Asia, and the Far East (Horton 1996). They are important for establishing chronologies for many coastal sites, as their dates of production are often better known and more tightly restricted than those for local ware types. While differences in the relative frequencies of imported ceramic types form an important component of regional variation along the Swahili Coast, it is possible to identify a number of imported ceramic types that were often present at Swahili sites, some of the most common of which are described here.[1] The different types of imported ceramics can be usefully distinguished by their fabrics, glazes, and decorations, as well as the regions in which they were produced and the time periods in which they were made and brought to the coast.

The earliest imported ceramics to the East African Coast with a wide distribution date to the first half of the first millennium CE. Felix Chami has recovered ceramics that bear resemblance to either Roman Red Ware or Indian copies of that ware at sites on Zanzibar, in the Rufiji Delta, and at Kilwa (Chami 2002, 2006). Befitting the name, the

[1] For a more comprehensive discussion see chapters on imported ceramics in Chittick 1974, 1984 and Horton 1996

ceramics were red in color, unglazed and, in the case of the Kilwa ceramics, coarse with notable inclusions. These finds support the documentary evidence of trade links between the Roman World and East Africa recorded in the *Periplus* and Ptolemy's *Geography* (Freeman-Grenville 1975). However, it is unclear how easily such pottery could be distinguished from the locally produced ceramics made with the readily available red clay in the Mikindani region.

The most common glazed ware imported to the coast during the first millennium was the Sasanian-Islamic type. This pottery type had a soft, creamy white fabric with few inclusions but small amounts of sand temper. The glaze that occurred on either side of the vessel was most commonly a greenish-blue color, although in some cases this color decayed to a light blue. Sometimes the ware bore incised decorations beneath the glaze, and appliqué strips and stamps also occurred. Sasanian-Islamic vessels were most commonly jars, though small bowls existed as well. These vessels were distributed throughout the Indian Ocean world and have been found at many coastal sites such as Kilwa, Shanga, Manda, Unguja Ukuu, and Tumbe on Pemba Island (Chittick 1974, 1984, Horton 1996, Juma 2004, LaViolette and Fleisher 2009). The origin of Sasanian-Islamic pottery was with the Parthian blue-glazed tradition and it has been found in Tanzanian contexts as early as the 5th century (Chami 1994, Juma 2004), though instances on the coast more commonly have a post-Islamic date and the appliqué decorations in particular dated to after the 8th century CE (Horton 1996). This pottery was not generally found in deposits dating after the 10th century.

The other common late first-millennium ceramic imports from the Near East were the White-Glazed wares. These ceramics were often described as tin-glazed in early accounts (e.g., Chittick 1974) but it has been shown that tin was only rarely a component of the glaze (Whitehouse 1979). The paste of these ceramics was again a soft, white-to-yellow fabric with very fine sand inclusions. The most common vessel form of these ceramics was a relatively small footed bowl. The glaze was an opaque white color, though it was sometimes splashed with patches of blue, green-brown or yellow, particularly on larger dishes (Chittick 1984). The glaze itself was prone to crazing and flaking, such that many excavated examples of these ceramics from the coast were found without much of their original glaze. This type of imported ceramic dates to the 9^{th} and 10^{th} centuries (Horton 1996). It is thought to imitate white Chinese stoneware (Chittick 1984).

A number of unglazed wares were also imported from the Near East in the later centuries of the first millennium CE. Fine Creamwares, also known as "eggshell wares," in the form of small jars or flasks were popular at some sites in the period preceding the White-Glazed ceramics (Horton 1996). However, the distinction between the two ceramics is complicated because they used nearly identical fabrics and the white glaze flaked off easily. Also common were Siraf storage jars, large vessels with pink or pale-green paste with significant inclusions. These vessels were so-named because they were identical to examples found at the site of Siraf, a bustling first-millennium port along the Iranian shore of the Persian Gulf, and were likely produced in the vicinity of that site during the 9^{th} and 10^{th} centuries. These jars were distinguished from East African ceramics of the period by clearly being wheel-thrown.

During the late first millennium, imported varieties of stoneware from China were also present on the East African coast. One such variety was a type of painted stoneware with a gray to buff paste. These ceramics were fired very hard. The inside was covered in white slip with a transparent yellow glaze that can fire to gray or green (Horton 1996). The painted decorations on the interior of these vessels were usually abstract floral designs, though occasionally monochrome painted stoneware has been found. The vessel types found at coastal sites were thickly-potted bowls. The glaze on these bowls extended over the whole body down to the ring base. As Horton has noted (1996: 303), these ceramics were produced at Changsha in Hunan, some distance from the Chinese coast, but were found throughout the Indian Ocean world, such that they are an indicator of the first phase of Chinese trade with the West (Whitehouse and Williamson 1973).

There was also a class of Olive-Green Jars, which Chittick refers to as "Dusun stoneware" (1984: 66). The bodies of these jars were gray, though sometimes fired to orange, covered with an olive-green glaze. Common with other stonewares, they were fired very hard. The glaze on these vessels was relatively poor: often crazed, and with a flaky, splotchy surface. The jars often had lug handles. These jars were common throughout the Indian Ocean world between the 8th and 10th centuries, but continued to be traded into the early second millennium.

A very common early second-millennium ceramic import to the East African coast was the sgraffiato wares, so-called because of the designs scratched onto the pots through their slip before firing. These ceramics probably originated in Iran, where they have been well described at the site of Siraf, though they were also found throughout the Indian Ocean world (Horton 1996). Nearly all of the sgraffiato vessels found in East Africa were bowls, though jars and beakers were also known. Sgraffiato pottery was produced and traded to the coast from the 9th or 10th century through to the 13th, though it is possible to distinguish distinct phases within this broad time-period. The earliest sgraffiato ceramics from the 9th and 10th centuries had a soft pink fabric and a white slip, which is then glazed in opaque yellow or apple-green colors using lead (Horton 1996: 279). They were very rare on the coast, with the only documented examples coming from Shanga. The 'late sgraffiato' types that were imported to the coast after the mid-11th century were much more widespread. They shared a consistent orange-pink to red paste with fine sand temper and few air-holes. Neville Chittick (1974, 1984) described four basic varieties of late sgraffiato from his work at Kilwa and Manda: hatched, champlevé, simple, and green. The first three categories were common in the 11th and 12th centuries, while the last is common in the 13th. Hatched sgraffiato typically had floral or "Kufic" incised decorations surrounded by parallel incised lines into the slip. Champlevé sgraffiato had areas of the slip scraped away to reveal the reddish fabric as part of the design. Simple sgraffiato was ornamented with plain curvilinear lines. The later green sgraffiato had few or no incisions, and is often described as being poorer in quality (e.g., Chittick 1984). Mark Horton (1996) extended this typology through his excavations at Shanga to 19 varieties. This was primarily accomplished by distinguishing the range of glaze colors and firing conditions possible with simple sgraffiato. However, he also identified additional types including yellow scribble sgraffiato, common to the 13th century, where the incised decorations had very little regularity, and a green sgraffiato with incised floral decorations from the 11th century. Horton also categorized a variety of imports with carved exteriors as a type of sgraffiato.

Following later sgraffiato, a different import from the Near East known as Black-on-Yellow was frequently found on Swahili sites in contexts dating to the 13th and 14th centuries. Horton notes that "it occurs at virtually every later 13th- and 14th-century site excavated" (1996: 291). Black-on-Yellow ceramics were mostly bowls, and had a dark red to pink fabric with notable mica inclusions. The yellow glaze on the ceramic was applied to the interior extending over the rim, and there were linear decorations applied to the glaze in black or very dark green. The glaze was of a poor quality however, and on most excavated examples it has degraded so that the shiny surface has disappeared. In addition to its widespread presence along the coast, this imported type is also significant because it was produced in southern Arabia near Aden, rather than near the Persian Gulf as with earlier wares. It has thus been used as evidence of shifting trade patterns in the mid-second millennium (e.g., Horton 1996: 291, Fleisher 2003: 270).

Beginning in the mid-14th century monochrome pottery was also imported to the coast from the Near East in large numbers and such pottery has been found at many mid-second-millennium coastal sites (e.g., Kirkman 1954, Chittick 1974, Horton 1996, Wilson and Omar 1997, Radhimilahy 1998, Fleisher 2003). Examples of monochrome pottery continued to be imported to the coast into the 18th century. The monochrome pottery was entirely comprised of bowls in its early phases, though by the 16th and 17th centuries some jars and bottles were also found. The earliest monochromes had a buff to pinkish-gray paste with fine sand temper and mostly green glazes. In the mid-15th century the paste was red and the glaze color was more commonly blue. In both cases the glaze was on the interior of the vessel extending over the rim and exhibited heavy crazing. While the temporal distinction between the blue and green glaze colors has been complicated by each being found in 14th century levels at Shanga (Horton 1996), in general green-glazed vessels seem to be older. The later monochromes of the 16th and

17th centuries were distinguished not only by the additional vessel forms, but also by purple and gray-green glazes, which tended to be of poorer quality as evidenced by frequent bubbles. The paste of these monochromes was often of the original buff color.

Another purple imported ceramic type was also imported from the Near East beginning in the 16th century. This type is known as Manganese Purple, as that metal is thought to produce the purple color that predominates in the glaze. The purple glaze was used in conjunction with a white glaze that often acquired a purple tinge. The fabric of these vessels was pink to pinkish buff in color. Because this vessel did not occur before the 16th century, it was rare or absent at several of the most famous Swahili sites whose political and economic apogees were reached in the first half of the second millennium, including Kilwa, Manda and Shanga. However, it was a characteristic import from the 16th to 18th centuries at Pate (Wilson and Lali Omar 1997).

During the first half of the second millennium, the majority of the imported ceramics from the Far East were the greenwares (Horton 1996, Fleisher 2003), also known as celadons (Chittick 1974, 1984), though properly celadons refer to a specific class of greenware types only. These greenwares can be divided into a number of readily distinguished subtypes. The earliest of these was Yue stoneware, which is considered ancestral to most of the celadon types. The typical Yue vessel form was a wheel-made bowl with a ring foot, and characteristic spur-marks on the inside of the bowl. The paste was gray, and the body was covered by a gray-green glaze that had usually oxidized to a matte surface on excavated examples. Yue vessels seem to have been introduced into the Indian Ocean system by the mid-9th century, but continued to be used at coastal sites until the end of the 12th century (Horton 1996).

Nonetheless, the number of Far Eastern ceramic imports did not match that of the Near Eastern ones until the advent of the celadon greenwares. The most prominent of these types were the Longquan greenwares. The vessel forms of this type were most commonly bowls, though small jars were also found. They had a pale gray to white paste with a variety of green glazes. Decoration with incised lotus leaf and floral interior decorations and external fluting was common. However, a group of these ceramics had internal unglazed "bare-circles" for stacking in the kiln. Production of Longquan greenwares took off during the Yuan dynasty, and the vessels were common on the East African coast from the late 13th century to the 16th century (Horton 1996, Fleisher 2003).

The other common celadon greenware was the Light-Brown Greenware, which has been described at Shanga and on Pemba Island (Horton 1996, Fleisher 2003). This type had a grey to pale creamy-gray paste with frequent small air-holes. The glaze was dark green to brown in color, often crazed or with visible bubble marks. Incised decoration with lotus-petal designs was also common with this type. The chronology of this type is complicated because it can be difficult to distinguish from the Yue stoneware, though it had a poorer glaze and grainier, more "sugary" fabric (Horton 1996: 309). The stratigraphy of clearly identified examples suggests a 14th-century date.

In the 14th century blue-and-white porcelain was also introduced to the Swahili Coast from the Far East. Porcelain remained rare at most sites until after the 15th century (Sassoon 1978) as less-costly white stonewares were initially the more common Chinese import. However, in the 16th and 17th centuries porcelain was the dominant import at coastal sites such as Kilwa (Chittick 1974: 311). This ceramic type had a hard vitrified white paste. The decorations were painted on in cobalt blue glaze, which Horton (1996: 310) described as “speckled” for the early periods.

In the late 18th and 19th centuries, the East African coast also imported large quantities of ceramics from Europe, particularly England and Holland. These ceramics were primarily glazed refined earthenwares. Most were large bowls with multicolored floral decorations on a white background (Kirkman 1974, Wilson and Lali Omar 1997). Archaeologists have had some difficulty distinguishing these from modern refined earthenwares still in use though possibly curated from earlier periods, but they nonetheless must be understood as an important component of the coastal economy during Omani and European colonial rule.

Beads

Beads, whether made of glass, shell, metal or stone, formed an important component of the intercontinental Indian Ocean trade from its inception. They have been found in abundance at several coastal sites such as Kilwa, Manda and Shanga (Chittick 1974, Morrison 1984a, Horton 1996). Beads were not simply imported to coastal sites; they were also produced at and traded away from coastal sites as part of the coast’s interregional trade. Certain classes of beads were definitely produced at some coastal sites, while others seem only to have been imported. Some of the various classes of beads also provide useful chronological and geographic indications from their known times and locations of production, trade, and use at other coastal sites.

Metal beads have been found at coastal sites, though they were rare. Despite their rarity, metal beads are particularly significant because they provided some of the clearest evidence of trade between East Africa and the Roman world in the first half of the first millennium CE. The site of Kibiti in the Rufiji Delta produced a segmented gold/silver-in-glass bead (Chami 1999c). Such beads were first produced on the island of Rhodes in the last centuries BCE and were common throughout the Roman Empire and along Roman trade routes during the first half of the first millennium CE when they had other loci of production (Boon 1977). Less diagnostic beads of copper and silver have been found at other coastal sites. At Shanga a small number of such beads were found at the main Friday Mosque in levels dating to the 9th and 10th centuries (Horton 1996: 334).

Shell beads were more common at coastal sites. More than 500 shell beads were found from the earliest phase of Manda (Morrison 1984a) and shell beads were "characteristic" of Phase I at Kilwa (Chittick 1974: 473). They were most commonly disc-shaped, with cylindrical piercings in the center and then the edges ground smooth (see Figure 8.1). More rarely, cylindrical or tubular shell beads were also found, with longer piercings. The shell used for the beads seems to have mostly been from a marine gastropod, *Anadara* (Horton 1996: 323), though cowrie shells may have been used in some instances (Morrison 1984a). Shell beads were predominately found in the late first millennium and early second millennium, for example from the mid-9th to 11th centuries at Manda (Morrison 1984a) and from the mid-8th to 12th at Shanga (Horton 1996). The most notable characteristic of shell beads was that they were produced at coastal sites themselves. In a clear indication of local production, blank shell discs have been found with shell beads at both Manda and Shanga (Morrison 1984a, Horton 1996). Artifacts known as "bead grinders" – broken sherds of local or imported pottery with sets of grooves – are also recovered from many coastal sites during this time period, as well as some sites located well in the interior (Flexner *et al*. 2008). While it has not been convincingly demonstrated that bead grinding was the only use for these artifacts, coupled with the shell disc blanks they provide convincing evidence for production in excess of local needs, and thus an important role in exchange relationships (Chittick 1974, Chami 1994, Flexner *et al*. 2008). However, shell beads were largely absent from the coastal archaeological record after 1200 CE, and even earlier at several locations, which has led some to suggest that they were no longer a suitable trade material after the early second millennium (Morrison 1984a: 185).

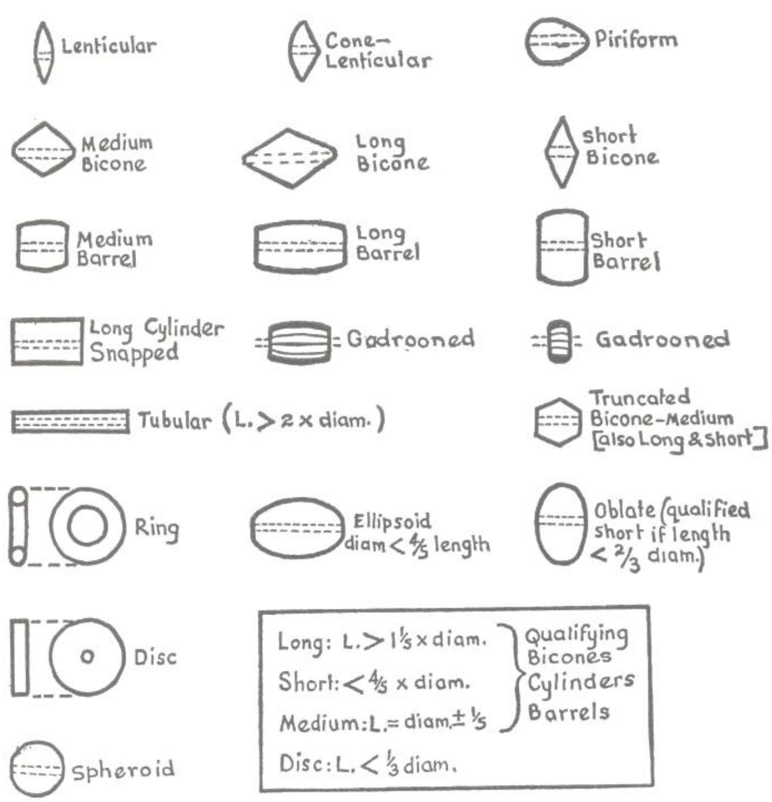

Figure 8.1 Bead Shapes from East Africa (from Chittick 1974)

The other common material for beads recovered at coastal sites was glass. Glass beads are differentiated on the basis of their color and method of manufacture. Drawn beads were made by drawing out a long tube of glass around a metal rod while hot, and then breaking the tube into cylindrical segments after cooling. This method produced cylindrical or tubular beads. The other method of producing glass beads wound a thread of glass around a thin rod and then smoothed it as it cooled. This method allowed multiple colors to be used and other forms of decoration, as well as providing for a greater range of shapes, including lenticular, disc, spheroid, biconical and oblate (see Fig. 8.1). The total range of colors of glass beads did not vary significantly between coastal sites (Morrison 1984a: 185), but the frequencies of particular colors between sites often varied quite considerably, likely reflecting the different trade relationships of each region. Common colors of glass beads on the coast included yellow, blue, green, blue-green, red, black, and 'Indian red' – an opaque dark brick-red color (see Chittick 1974: 464-6). While there was some reheating and processing of glass at Shanga and at Mkokotoni on Zanzibar (Horton 1996: 332), many other sites with large numbers of glass beads such as Manda did not possess similar evidence (Morrison 1984a), and the origins of the glass beads has been traced to the west coast of India, where evidence of substantial production has been recovered (Davison and Clark 1974).

Examples of glass beads from first-millennium contexts were rare but notable when they did occur. Some dark-blue glass beads were recovered associated with the gold/silver-in-glass bead of possible Roman origin at Kibiti (Chami 1999) and other monochrome glass beads of Indian origin were found with Early Iron Age ceramics at Machaga Cave on Zanzibar (Chami 2002). The likely Indian origin of those beads points to the diversity of the coast's early first-millennium trade contacts. At the same time, this variety complicates the idea of direct interaction with the Roman Empire, because coastal communities may have acquired Roman beads second-hand. Glass beads remained rare in the second half of the first millennium. For example, none were found at Kilwa from contexts dating before 1000 CE (Chittick 1974). Some blue and yellow glass beads, usually wound oblates, were found in late-first-millennium CE contexts at Manda, Shanga and Unguja Ukuu (Chittick 1974, Morrison 1984a, Horton 1996, Juma 2004). Glass beads became especially common after 1000 CE or so, with thousands found from contexts at Kilwa and hundreds found at other coastal sites (Chittick 1974, Horton 1996), and in the second millennium they replaced shell beads at most locations (Morrison 1984a, Horton 1996). Most of the glass beads found in the second millennium were monochrome and lacked decoration. In part this may relate to an increasing prevalence of drawn beads, which could be easily mass-produced and outnumbered wound beads at sites such as Kilwa by the 14th century (Chittick 1974). While bead color was a time-sensitive variable at individual sites, variations in color between sites preclude the creation of a broader drawn-bead chronology.

Beads made of semi-precious stone were also found at several coastal sites, though notably not in the same numbers as shell or glass beads. Such beads were often faceted spheroids. Quartz crystal was the most common stone. Carnelian, a yellow quartz chalcedony, was another common stone material, and carnelian beads have been found at sites in Kenya and Tanzania (e.g., Morrison 1984a, Horton 1996, Fleisher 2003). Other stone raw material for beads included agate, onyx, and, rarely, non-precious limestone and shale. The extent to which stone beads may have been produced on the East African coast is unclear. Horton found a number of waste beads of rock crystal that had been ruined during production at Shanga, and the export of rock crystal from East Africa has been noted in Muslim documents (Lamm 1941). It has been suggested that some of the carnelian beads may have been produced locally as well because several of them have been inexpertly finished (Horton 1996, and see Morrison 1984a: 184), though evidence in the form of waste beads is lacking and Chittick suggested these beads may have been imported to the coast as an accident (1974: 473). Carnelian-bead production is most commonly traced to the Indian city of Cambay (Arkell 1936). Ultimately, as with the glass beads, some of the inconclusive aspects regarding production locales are undoubtedly the product of the multidirectional flow of beads in trading networks: finished beads would have been traded to and from coastal cities, and the raw materials for bead-making would also have been traded to various centers of production, both small and large.

A variety of other materials were also employed to make beads, though only very rarely. These include bone, ivory, terracotta, fish vertebrae, and coral. With the exception of coral, the beads from all of these materials were produced locally, though the raw material for the ivory beads found at Shanga may have been obtained elsewhere. The origin of the coral beads is less clear, because the beads are often made from pink coral. Pink coral was a valuable export from the Mediterranean, and thus the pink coral beads found at Manda were described as confirming trade links with that region (Morrison 1984a: 184). However, as Horton notes (1996: 334), pink coral is also common on the East African coast, so there is no reason to expect pink coral beads necessarily originated elsewhere.

Glass Vessels

Glass vessels were another important import to the coast throughout Swahili history, extending back into the first millennium CE, though they were not traded to the coast in the same numbers as were ceramics (Horton 1996). While there is some evidence of glass-working on the coast (Horton 1996: 312), much of the glass found on the coast before 1500 CE is clearly associated with that produced in the Middle East (Morrison 1984b). Glass artifacts can be classified according to their shape, type of manufacture (blown or molded), and the presence of any decorations. For instance, at Manda imported glass vessels were divided into bowls and beakers, flasks, phials, and deep-blue flasklets with a variety of miscellaneous fragments also recorded (Morrison 1984b). Horton (1996) described similar categories at Shanga with beakers, bowls, flasks and lamps, as well as separate categories for moulded and decorated glass.

Other Common Imports

While archaeologists justifiably concentrate on those items for which there are abundant material remains, other perishable imported goods were also traded to the East African coast in significant numbers. Perhaps most significant among these was cloth. By the first centuries of the second millennium many of the admitedly fragmentary historical records for the coast mentioned cloth as the significant trade good acquired by coastal residents (see Freeman-Grenville 1975). This desire for cloth in East Africa continued through the middle of the second millennium, when the Portuguese recorded sending 280,000 pieces up the Zambezi in a single year, though such records also indicate that cloth was used by coastal merchants to acquire interior goods in addition to being consumed on the coast (Pearson 1998). Wines and other foodstuffs were also traded since the earliest interregional interactions (Freeman-Grenville 1975). All of this is not to criticize the evidence which imported ceramics and beads provide, but rather to stress the scale and complexity of the interactions between the East African coast and other regions that the evidence of no single product can capture.

Imported Goods Found in the Mikindani Region

Ceramics

Four-hundred forty-six sherds of imported ceramics were recovered during the three phases of the project. The vast majority of these, 417, were recovered during the first phase of excavations. Twenty imported sherds were recovered during the survey phase. Only nine sherds of imported ceramics were recovered during the Phase III excavations, out of more than 13,000 total sherds. As will be shown, the disparity between the phases largely reflects the large number of 19th- and 20th-century European ceramics that were found within Mikindani town. Many of the sites recovered during the survey were abandoned by the time such ceramics became available.

A small number of late first-millennium imported sherds were found from all three phases. Two sherds of Sasanian-Islamic pottery were found. One rim-sherd with blue-green glaze on a soft cream fabric was recovered from the Pemba Mbuyu Pwani site (Figure 8.2).[2] The other body sherd from the Stella Maris Hills site possessed identical fabric but a pale glaze reminiscent of the Sasanian-Islamic variety with "pale cream internal glaze" (Horton 1996: 274). Pemba Mbuyu Pwani also provided a Glazed-

[2] As discussed in Chapter 10, it is possible that this site is merely a locus of the larger contemporaneous Pemba site nearby.

Whiteware sherd, with soft cream paste and a white glazed exterior. There are also two imported sherds whose identification amongst three common first- millennium imports cannot be determined. These sherds also have a soft white paste, but no glaze. It is possible that these sherds come from Sasanian-Islamic or White-Glazed vessels. The latter is more likely because its glaze flakes off more frequently, and White-Glazed ceramics are more likely to be found without any glaze. The other possibility for these sherds is that they represent Near Eastern fine creamware (also known as eggshell ware), which Horton notes may easily be confused with the White-Glazed ceramics. These ceramics are found in the bottom levels of Mgao North and Imekuwa Mibuyu, whose mostly second-millennium dates suggest the White-Glazed option. Finally, there are three red-painted earthenware sherds of a unique pink-orange paste from the first-millennium site Kisiwa Fields that may be imported. These ceramics are small body sherds from unstratified contexts, which complicates positive identification, but they seem to represent non-local production. Red-painted ceramics are known from several other spots on the coast such as Kilwa and the Comoros Islands, and red paint occurs on certain Siraf storage jars with pink fabric (Horton 1996: 297).

Figure 8.2 Sasanian Islamic rimsherd from Pemba Mbuyu Pwani

While only eight imported ceramics from the first millennium were found in the Mikindani region, this still compared favorably with the absence of imported ceramics in the region from the first half of the second millennium. While multiple varieties of first-millennium imported ceramics were found at five different sites, none of which was excavated particularly extensively, not a single imported sherd representing one of the types common during the first half of the second millennium was found – no Sgraffiato, no Black-on-Yellow, no Greenware/Celadon, no Monochrome, etc. This absence of imported ceramics occurred during the same period when such ceramics were becoming more common at Swahili coastal sites.

Certain sites in the Mikindani region acquired imported ceramics during the second half of the second millennium. Four sherds of blue-and-white porcelain were found near Mikindani Bay. These sherds came from four Phase I test excavations, two in the village of Pemba, one in the Mnaida ward of Mikindani town, and the other from Jangwani ward. The sherds were thin and vitreous, with cobalt blue decoration in what appear to be floral patterns, although the sherds were small and no full decoration was observed. The fragmentary nature of the recovered porcelains has made dating difficult, because blue-and-white porcelains are known to have been produced throughout the second half of the second millennium, and indeed were the most common Far Eastern import to Kilwa over the entire span between the 15th and 19th centuries (see Chittick 1974). It is notable however that the porcelain sherds recovered in Mikindani came from stratified contexts below levels that produce 19th- and 20th-century European imports.

A more common group of imported ceramics from the second half of the second millennium was Indian Earthenware. These ceramics were found at eight different sites:

Mgao North, Litingi, Pemba, Mvita, Mnaida, Mtonya, Mirumba, and Mitengo. There are 178 sherds of these earthenwares spread between the sites. Some sites, such as Mgao North and Litingi have only one or two sherds of these earthenwares, while within Mikindani several stratigraphic levels in different test excavations produced more than ten sherds. Most of the Indian Earthenwares found in Mikindani were thin with orange-pink paste featuring moderate inclusions ranging from sand to mica to quartz. Often they had remnants of red slip on their exterior surfaces, though this was often in the process of eroding off, and in some cases seems to have degraded to produce a brown color. Additionally, many of the sherds had decorations painted on in an additional dark-brown slip. In only two instances out of the 178 sherds have the Indian Earthenwares been glazed, though these examples provide the clearest evidence of what the dual-slip decoration would have looked like. Such ceramics are common on the western coast of India, though there remains some question as to whether the examples on the East African coast were imported or were local imitations, perhaps made by resident Indian potters. Such earthenwares were produced over long periods of time however, so that their contribution to dating in the Mikindani region is limited. They were found mixed with European refined earthenwares in several locations within Mikindani town. However, at Mitengo they are associated with local ceramics bearing areal-impressed decorations similar to those common during the first half of the second millennium and in general the Indian earthenwares are most prevalent in the lower and bottommost layers of units around Mikindani Bay, so it seems likely that at least some such ceramics were available towards the middle of the second millennium.

The other common type of imported ceramic found in the Mikindani Region was European refined earthenware. Across all three phases 206 such ceramics were found from 13 different sites or surveyed areas. The bulk of these ceramics bore underglaze polychrome floral decorations on a white background, with blue, green, yellow, and maroon serving as popular colors. In those cases where vessel form could be reconstructed the vessel was always a large open bowl. These sherds are examples of the European ceramics known to have been imported in large numbers during the 19th century (Kirkman 1974, Wilson and Lali Omar 1997). One base with a potter's mark used during the 19th century by the French factory "Opaque du Sarreguemines" (Decker and Thevenin 1998) was recovered, which makes such origins quite certain. Pottery from this French factory has also been found in 19th century contexts in northern Mozambique (Duarte 1993), emphasizing the French dependence on this part of the coast for slaves to supply their plantations on Mauritius and Réunion (see Alpers 1975: 190). European refined earthenwares occurred most commonly in the upper layers of excavations, but in certain tests around Mikindani Bay could be found at depths greater than a meter.

It is also important to note the presence of a smaller class of European refined earthenwares around Mikindani Bay. Sixteen sherds of refined earthenware were found that sought to reproduce the decoration of Chinese blue-and-white porcelain. Such sherds are characteristic of the different varieties of "Pearlware" produced during the late 18th and early 19th centuries in England, though sadly no potter's marks were found which might allow the identification of a particular factory. In such instances underglaze blue-and-white decoration was used, using the same cobalt blue color, but the paste of the sherd clearly reveals that it is not porcelain. These ceramics were very likely cheaper options for coastal residents trying to acquire some of the social capital associated with the more expensive porcelain pieces.

A small number of imported stonewares were also recovered in association with the refined earthenwares in units around Mikindani Bay. These ceramics were high-fired and glazed in colors such as yellow and brown. The glaze was distinguished from that of the refined earthenwares by its dimpled texture. Five different sherds were found in five of the Phase I test excavations within Mikindani town – four from Mnaida ward and one from Mtonya. The sherds were most likely European in origin, although the porcelaneous blue stone-ware decorated in dark blue floral pattern with red-painted cherries may be Chinese.

In addition to these imported ceramics, 54 modern imports were found. These ceramics are all vitrified white vessels similar to those which can be found in many local shops at the present day, although most examples recovered archaeologically probably date to the 20th century. In fact, some examples are clearly pieces of broken ceramic teacups and saucers. These sherds were uniformly recovered from the top layers of excavation units or found on the surface.

Beads

A total of 22 beads were recovered from all phases of the project. The majority of these were glass beads, with 4 wound glass beads and 13 drawn glass beads. Three shell beads were recovered. Two plastic beads were also found from a modern context. This total represents quite a small number of beads when compared to the hundreds found at sites like Kilwa and Manda, but it is fairly consistent with the total numbers of beads found in similar coastal surveys such as Fleisher's (2003) survey of northern Pemba Island. The low total number of beads is in part the product of the project's recovery methods, as soil was screened through wire mesh with an aperture of 6.35 mm, large enough for many beads to go through. However, only one of the wet-screened soil samples from Phase III produced any beads, despite the smaller screen aperture and greater likelihood of recovery, so recovery methods alone cannot account for the low numbers of beads found during the project. Instead, these results suggest that the region simply may have possessed fewer beads than regions surrounding major Swahili centers.

All 13 of the beads recovered during Phase III excavations were of glass, and all but two were drawn cylinders. These drawn cylinders came from contexts in the early second millennium with the unique style of locally-produced ceramics with affinities to ceramics produced in Malawi and northern Mozambique (see Chapter 7). They were found at two sites: Mgao North and Imekuwa Mibuyu. Nine of these cylindrical beads were Indian red in color and all were around 4 mm in diameter and 2 mm thick. These seem to be the same type of bead recovered by Kwekason (2007) from a second-millennium context in the Mikindani region at Kabisela Hill, but there in association with Plain Ware ceramics, and a type which was common at Kilwa during the first half of the second millennium (Chittick 1974). The other two drawn cylinders recovered during Phase III were of a similar size but blue in color, and were from levels producing red beads at Imekuwa Mibuyu. The other two glass beads from Phase III were wound spheroid beads that were recovered from the upper levels of Mgao North and Mji Mwema I:1. Each of the wound beads was broken in half and about 6 mm in diameter. The Mgao North bead was opaque pale blue in color and found in the uppermost level along with some refined earthenware. The Mji Mwema I:1 bead was red and found in the upper levels above first-millennium contexts. Rock crystal was also found in a pit context at the Stella Maris Hills site, though there was no indication that the stone had been worked.

A single bead was found during the survey phase, at the Naumbu Upupu site. This bead was blue, wound glass and spheroid, approximately 11 mm in diameter and 14 mm long, and broken in half. It was found in association with deeply incised cross-hatched sherds, but the dating of this site and this context remains indeterminate.

Eight beads were found during the Phase I test excavations around Mikindani Bay. These beads were much more diverse than those recovered during Phase III. They include two plastic beads recovered from recent modern contexts. Three white-purple shell beads with a disc shape between 3-5 mm in diameter and 1-2 mm thick were also found. One of these shell beads was found in association with the local ceramics developed in the early second-millennium, while the other two were found in association with more recent artifacts including refined earthenwares and dark-green bottle glass. Two of the shell beads were found near mosques. Three glass beads were also recovered. A black wound-glass bead 5 mm in diameter was found in association with refined earthenware ceramics. Two drawn-glass beads were found in a separate context with more refined earthenwares: one was a green tubular glass bead and the other was a cylindrical bead.

Recovered Beads					
Site	Glass, wound	Glass, drawn	Shell	Plastic	Total
Imekuwa Mibuyu	0	9	0	0	9
Mgao North	1	2	0	0	3
Mirumba	0	0	1	0	1
Mitengo	0	0	1	0	1
Mji Mwema I: 1	1	0	0	0	1
Mnaida	0	2	0	2	4
Naumbu Upupu	1	0	0	0	1
Pemba	0	0	1	0	1

Table 8.1 Beads recovered from the Mikindani region

The beads found during the project thus matched some of the larger bead trends observed on the Swahili coast. The bulk of the recovered beads found during the project were glass beads found in contexts dating to the first half of the second millennium, especially including the red and blue drawn cylindrical beads. One of the shell beads is found in a similar context, but this find illustrates the rarity of shell beads relative to glass beads in the early second millennium (1: 11). This ratio suggests that the Mikindani region acquired the glass beads that were increasingly available on the coast in the early second millennium, and perhaps doing so at the expense of shell beads. There were also a number of glass and shell beads that occurred in later contexts, often in association with refined earthenwares. Interestingly, the glass beads from such contexts include different forms and colors, such as black and pale-blue spheroids and green tubular beads. The large blue spheroid bead found during Phase II is a further complication, as it stands out in both color and size from the other beads found in the Mikindani region. While further investigation of the site is necessary to determine the dating, similar-sized spheroid beads existed at coastal sites elsewhere. Based upon the contexts in which the similar beads were recovered, it is possible that this was an early glass bead of the late first millennium.

Glass Artifacts

A total of 621 pieces of glass were recovered from all phases of occupations. The vast majority of these artifacts (599 or 96%) were recovered from the Phase I tests, and generally the glass in the region seems to represent mostly 20th century occurrences. Only four pieces of glass were recovered from the Phase III excavations: all from uppermost topsoil layers, including 2 pieces of modern brown bottle-glass. Similarly, of the 18 glass pieces recovered during the survey only three were found in association with an archaeological site, Naumbu Hills, whose dating is uncertain, and the majority was recovered from modern contexts. In contrast to the near-absence of glass artifacts from the other two phases, 27 of the 34 Phase I tests (80%) recovered at least one piece of glass. The prominence of modern glass holds for these occurrences as well, as nearly half of the tests with glass (12 of 27) have glass in their top levels only. Several tests in Mnaida, Mtonya and Mirumba have fragments of clear glass bottles at depth in association with 18th- and 19th-century imported ceramics or in some cases beneath such ceramics. Fragments of dark-green bottle-glass were recovered in low numbers from similar contexts at Pemba. These finds indicate that by the late-second millennium CE at least the Mikindani region was obtaining some glass vessels directly or indirectly from foreign sources. However, while glass vessels were never a particularly common import to the Swahili Coast (see Chittick 1974, Morrison 1984b, Horton 1996), their absence from the Mikindani region until the second-half of the second millennium is another indication of the region's absence from the most lucrative Indian Ocean trading networks during the first half of the second millennium. Moreover, such absence of glass is a clear indication that no significant glass-working occurred in the region.

Other Artifacts

There was evidence of other classes of imported goods in the Mikindani region in addition to ceramics, glass and beads. A ceramic spindle whorl with imported paste was found in association with the Sasanian-Islamic sherd at Pemba Mbuyu Pwani. Its presence might indicate an attempt to grow and spin local cotton during the favorable climatic conditions at the end of the first millennium and the beginning of the second millennium. In 19^{th}- and 20^{th}-century contexts around Mikindani Bay several discarded flints were also recovered. How these flints were used, whether for mundane tasks like fire-starting or possibly with firearms, is not clear, but the flint material is exotic to the region.

Comparison of Mikindani Region with Other Coastal Regions

The data regarding Mikindani's imports must be placed within the larger context of interregional trade on the East African coast. Henry Wright (1993) has shown the utility of comparing imported sherd ratios – the number of imported sherds per 100 sherds of locally produced ceramics – between sites to determining their place within coastal economic networks at different moments in time. For instance, the change in Kilwa's import ratio from 0.2 in the 9^{th} and 10^{th} centuries to 2.0 between the 11^{th} and 13^{th} centuries is indicative of its growth as a major port of trade. Comparing the import ratios of sites in the Mikindani region to those from elsewhere on the coast is similarlyuseful for documenting the region's participation in interregional trade.

Perhaps the first point to make about the imported ceramic ratios of sites in the Mikindani region is to note how many sites have no imported ceramics at all. For instance, only 9 of the 55 (16%) sites recovered during the Phase II survey produced any ceramic import at all. To a certain extent this might be the product of those sites being only preliminarily explored. However, only 4 of the 16 (25%) sites excavated during Phase III possessed any ceramic imports, and those excavations provided far larger samples of the sites' ceramics. The Phase III excavations thus indicate that the small number of sites with imported ceramics cannot be attributed solely to the extent to which the sites were explored.

For those sites that did produce imported ceramics, their import ratios make interesting comparisons with those from elsewhere on the coast (see Table 9.2). The four sites which produced first-millennium ceramics had import ratios below 2.0. While ratios around two are well below that from Manda (11), Unguja Ukuu (5), Shanga (4.2), or Tumbe (3.53), they are in line with the ratio for Kilwa between the 11th and 13th centuries (see Wright 1993, Fleisher 2003). In the Mikindani region, ratios between one and two are produced from the bottom levels of two sites – Imekuwa Mibuyu and Mgao North – whose richest stratigraphic levels date to the second millennium and produce the local ceramics with affinities to interior types. Such ratios indicate that these areas, which were to develop into densely occupied towns during the second millennium, were relatively well-connected to Indian Ocean networks at the end of the first millennium or the beginning of the second. The next highest ratio, 0.77, comes from Pemba Mbuyu Pwani. This ratio is smaller than those for cities or well-connected towns, but instead mirrors that of large villages excavated on Pemba Island (Fleisher 2003) and the Rufiji Delta (Chami 1994). The ratio for Kisiwa Fields of 0.129 is well below that of large villages, and indeed even below poorly connected villages like Kimimba (0.2) excavated on Pemba Island (Fleisher 2003) or late-first millennium Kilwa before it grows into prominence (Wright 1993), though the latter two sites probably provide a useful comparison. The ratio for Stella Maris Hills of 0.045 is significantly below even that low ratio however, and would seem to indicate almost a chance occurrence from a site without appreciable access to imported ceramics. However, the locally produced ceramics from Stella Maris Hills and Kisiwa Fields each represent periods of occupation during the first millennium covering several centuries and likely conflate periods with different levels of access to Indian Ocean trade networks, so some caution is warranted in interpreting their results.

In contrast to these ratios, those from the second half of the second millennium are indicative of increasing immersion in Indian Ocean networks. The ratios of porcelain and Indian earthenwares to local ceramics for several of the sites with those imports were between 1 and 2, which is in line with the import ratio for second-millennium towns such as Chwaka excavated elsewhere on the coast (Fleisher 2003). For three other sites along Mikindani Bay the ratios were even higher: well above 5 and thus in line with the highest import ratios recorded at Swahili sites. These high ratios stand in stark contrast with the low ratio recorded at Mgao North, which was at its apex during those centuries when the region did not access imported ceramics.

This trend towards higher ratios at sites around Mikindani Bay, and particularly in Mikindani town, carries over into the ratios of European refined earthenwares of the 19th and 20th centuries. The ratios of those imported ceramics for the Mnaida and Mtonya wards of Mikindani town were each above 13 per 100 local sherds, which is greater than the largest import ratio recorded for a pre-15th-century Swahili site. Relatively high

Site	Imported Sherds	Local Sherds	Ratio
First Millennium Imports			
Imekuwa Mibuyu (bottom)	1	73	1.37
Kisiwa Fields	3	2318	0.13
Mgao North (bottom)	1	50	2.00
Pemba Mbuyu Pwani	2	259	0.77
Stella Maris Hills	1	2234	0.04
Porcelain			
Jangwani	1	88	1.14
Mnaida	1	807	0.12
Modern Pemba	2	968	0.21
Porcelain and Indian Earthenwares			
Jangwani	1	88	1.14
Litingi	1	54	1.85
Mgao North	2	1340	0.15
Mirumba	8	484	1.65
Mitengo	9	157	5.73
Mnaida	144	807	17.84
Modern Pemba	4	968	0.41
Mtonya	11	175	6.29
Mvita	2	98	2.04
Refined Earthenwares and Stonewares			
Liwelu	1	39	2.56
Mangamba	1	62	1.61
Mgao North	5	1340	0.37
Mirumba	16	484	3.31
Mnaida	132	807	16.36
Modern Pemba	15	968	1.55
Mtonya	23	175	13.14
Mvita	1	98	1.02
Pemba	1	864	0.12
Ziwani Cashew Grove	1	6	16.67
All Late 2nd Millennium Imports			
Jangwani	1	88	1.14
Litingi	1	54	1.85
Liwelu	1	39	2.56
Mangamba	1	62	1.61
Mgao North	7	1340	0.52
Mirumba	24	484	4.96
Mitengo	9	157	5.73
Mnaida	276	807	34.20
Modern Pemba	19	968	1.96
Mtonya	34	175	19.43
Mvita	3	98	3.06
Pemba	1	864	0.12
Ziwani Cashew Grove	1	6	16.67

Table 8.2 Import Ratios for sites in the Mikindani Region

ratios of refined earthenwares were also obtained for other sites around Mikindani Bay such as Pemba and Mirumba, but these sites were clearly subordinate to Mikindani town in terms of access to imported goods at this juncture. Similar subordinate ratios at sites further distances away, such as Liwelu, also indicate the economic reach of Mikindani and its central economic position within the region.

Implications of Mikindani Region Imports

The Mikindani data provide a distinctive pattern of imported material culture relative to other coastal sites. That fact alone is interesting, as it sets the Mikindani region apart from the standard regional histories of Swahili cities, particularly during the first half of the second millennium. But it is also important to consider the implications of this distinctive pattern for archaeological reconstructions of the lifestyle of Mikindani residents at different points in the past. In particular, the divergences between the imported goods recovered at Mikindani and those found elsewhere suggest important characteristics of the nature of Mikindani's interregional trade, the relationship between the region and Kilwa, and the connection between Mikindani and the Middle East.

Nature of Interregional Trade

The fact that the imported material culture recovered at Mikindani follows some of the trends observed elsewhere on the coast but not others is important for understanding the nature of the region's trade with the rest of the Indian Ocean world. During the first millennium CE, evidence for such trade in the Mikindani region was rather sparse, but within the range of variation observed on the coast. Several sites bore imported ceramic ratios common with relatively well-connected villages or small towns. Although the region therefore shared in the trends regarding imported goods that existed elsewhere on the coast during this period, it is worthwhile to consider what sort of trading relationships these trends actually indicate. The documentary evidence, though limited in scope, provides some sense of the sorts of relationships that Mikindani residents may have experienced. Some translations of the *Periplus* accounts of trade between the Roman World and the East African coast describe coastal residents as “pirates” (e.g., Freeman-Grenville 1975), an indication of the informal nature of that trade. While this account need not be taken as literal, impartial, or mistake-free, aspects of the imported material culture recovered in the Mikindani region would support such a characterization of the region’s trade. The scarcity of imported goods precludes an expectation of regular interaction between the region’s inhabitants and foreign sailors with supplies of trade goods. Nonetheless, the presence of some of the characteristic coastal imported ceramics, and the apparent flirtation with the local production of cotton cloth—a decidedly external idea—using imported spindle whorls shows that the Mikindani region was indeed connected to the rest of the Indian Ocean world, albeit perhaps only periodically.

While the Mikindani region’s interregional trade during the first millennium would thus almost certainly have been informal and irregular, the evidence is less clear whether or not it may also have been indirect, without connection to non-African traders. Certainly some directional or redistributive trading, a form of indirect trade where imported goods are common at specific ports of trade and fall off with distance around those ports (see Renfrew 1975), was occurring in East Africa during the first millennium

CE. Such trading was likely responsible for the presence of limited numbers of imported goods at interior sites (e.g., Håland 1994/1995, Helm 2000a). The imported ceramics ratios indicate spatial distributions that might suggest similar trading around and between coastal sites, with sites like Manda and Unguja Ukuu occupying a special position evidenced by their relative abundance of imported ceramics (Wright 1993: 665). In that situation many coastal sites might have traded with other Indian Ocean regions only indirectly. Such indirect trade might also be indicated by the predominance of a single coastal site, Rhapta, supposedly under the political control of southern Arabia in the earliest accounts of trade (Freeman-Grenville 1975, Casson 1989).

Nonetheless, there are indications that direct first-millennium Indian Ocean trade may not have been restricted to Manda or only a few sites, perhaps because of its informal nature. Separate coastal regions had access to different proportions of imported ceramic types (Horton 1994b). For example, a much higher proportion of white-glazed pottery to Sasanian-Islamic ceramics was found at the 10th-century sites of Ras Mkumbuu and Mtambwe Mkuu on Pemba Island than was recorded for sites from the Lamu archipelago. Such differences may be indicative of early development of the one-to-one trading relationships between coastal communities and freelance traders that were prevalent during the second millennium. In that case, direct but informal trade relationships may have been more common during the first millennium than the imported ceramic ratios suggest. It is perhaps worth remembering that Rhapta has never been positively determined on the ground and, given references to "market towns" in the *Periplus* (Freeman-Grenville 1975: 2), perhaps the place-name refers to a region, rather than a single site. In the case of Mikindani, the overall paucity of imported goods might suggest down-the-line directional trade from another coastal port, but the relatively high imported ceramic ratios of the late-first-millennium levels of Imekuwa Mibuyu and Mgao North raise the possibility of at least some direct freelance trade by the end of the millennium. Direct trade around Mikindani would have been hampered by the less-reliable monsoon trade winds of the southern coast, which should temper our projections regarding the frequency of such contacts.

During the first half of the second millennium divergences from coastal trends regarding Indian Ocean trade emerged at Mikindani. Imported ceramics were no longer available in the Mikindani region and imported beads were rare. The beads followed the general trend towards increasing prevalence of drawn glass beads however. Beads were an important component of the indirect trade in which Swahili cities distributed Indian Ocean goods to the wider East African hinterland. Beads arriving in Africa via the Indian Ocean trade have been found as far from the coast as Mapungubwe, Great Zimbabwe and sites in southern Zambia (Robinson, Summers and Whitty 1961; Phillipson 1977; and see Pwiti 1991). So rather than demonstrating continued direct interregional trade, when coupled with the absence of imported ceramics the Mikindani beads instead seem to be a telling indicator of the loss of such trade. The only imports available in the region during the first half of the second millennium were a few of the mass-produced glass beads that Swahili cities exchanged with interior groups for all manner of natural resources. Such restricted access to imported goods, and relatively low-value ones at that, is not what one would expect from a region that has direct access to foreign traders.

The larger quantities and ratios of imported ceramics at the site of Mikindani during the second half of the second millennium demonstrate the emergence of the town as both a port that was again directly involved in Indian Ocean commerce and also served as a distribution hub for the rest of the region. The imported ceramic ratios for the town were as high as any recorded in a pre-colonial Swahili city, clearly indicating that Mikindani's contact with the Indians and Europeans providing such ceramics was not mediated by another coastal city. On the other hand, the presence of the same imported ceramics in lower quantities and proportions at nearby sites shows that Mikindani was dominating the regional trade network, and that imports were flowing down that network from Mikindani to the surrounding towns and villages. Largely due to the overall paucity of imports, such regional interactions cannot be convincingly demonstrated during earlier periods.

Relationship with Kilwa

Comparing the imported material culture from Mikindani with that recovered at Kilwa provides intriguing indications of the relationship between those two regions of the southern Swahili Coast. During the first millennium it is significant that Kilwa, and indeed the entire Kilwa region, was not well differentiated from the Mikindani region. Due to its much more extensive excavation, Kilwa produced larger raw counts of imported ceramics, but its imported ceramic ratios were actually below those of most of the sites producing imports at Mikindani. At the end of the first millennium CE Kilwa had not attained great wealth or importance and is commonly described at this juncture as a village or small town (Wright 1993, Wynne-Jones 2005a). It is perhaps not altogether surprising then that it received no higher proportion of imports than the villages and towns of the Mikindani region in this period. Indeed, at the beginning of the second millennium the two regions, Kilwa and Mikindani, appear to have occupied similar positions in Swahili networks.

This equivalence does not last during the first half of the second millennium. By the 14th century Kilwa was the richest and most powerful city on the coast and the Mikindani region received no imported ceramics at all. The relationship between these two outcomes is not entirely clear, but Kilwa's emergence certainly had an effect on nearby coastal regions and there are some indications as to what that emergence entailed for Mikindani. The oral histories collected in the late 19th century by Carl Velten (1907) suggest that Kilwa did indeed have significant influence over the southern Tanzanian coast, and perhaps controlled some portion of it. The oral history of Kilwa mentions the ruler of the city, an African named Mrimba, retiring to Rovuma after his Shirazi (Swahili) son-in-law purchased Kilwa from him. The coastal group inhabiting the area along the northern bank of the Rovuma River just below the Mikindani region – known as the Mudu – called their leaders by the same name, Mrimba. Despite these possible indications of connections to the area there is no direct evidence of political control of the Mikindani region by Kilwa. Nonetheless, it would have been well within Kilwa's shadow.

More significant are the economic ramifications of Kilwa's emergence. In the second millennium the quantity of imported goods found at Mikindani is comparable not to the amount found at Kilwa Kisiwani itself, but rather to that found at the towns and villages in Kilwa's immediate hinterland, though these still had greater access and could obtain ceramics. Wynne-Jones' (2005a) survey of the Kilwa region recovered 34 sherds of imported ceramics in the region dating to the first half of the second millennium, 17 of which were from the secondary center of Mtanga Makutani. The rest are described as having formed “a tiny proportion of the total assemblage” (Wynne-Jones 2005a: 175) and are spatially restricted to relatively few sites. Beads are more widespread, but only 18 glass beads were recovered (Wynne-Jones 2005a: 180). Shell and coral beads, which may have been produced locally, were significantly more numerous. In short, despite their relative proximity to Kilwa Kisiwani, where such imports were found in abundance, the other settlements in the Kilwa region possessed only limited access to such imports. Those limitations were likely imposed on the villages by the inhabitants of Kilwa Kisiwani, whose control of imported resources provided an important source of power and prestige.

In many ways these towns and villages might be thought of as a useful analog to the Mikindani region. Because Kilwa was located further north than Mikindani – closer to Arab trading partners – and its rulers were known to try to prevent ships from sailing past without stopping (Strandes 1899), it would likely have been in a position to restrict Mikindani’s access to Indian Ocean trade goods, or at the very least to prevent it from serving as a significant port-of-trade. If Kilwa’s rulers were able to do so, those imported goods which were available would come through Kilwa itself and, based on the evidence from Kilwa’s own regional hinterland, their number would be small. The fact that Mikindani possessed no imported sherds during the second millennium also fits with the increased distance between the region and Kilwa, and the frictional effects of distance on the availability of larger and more fragile artifacts like ceramic vessels. It is also telling that in the second half of the millennium, when Kilwa was no longer at its apex, the quantities of imports found in the Kilwa hinterland increased substantially (Wynne-Jones 2005a: 179) and the Mikindani region again began to acquire imported ceramics.

Connection with the Middle East

As discussed above, the Mikindani region seems to have had irregular trading contacts with Indian Ocean merchants during the late first millennium, but to have lost those contacts during the early second millennium. Those merchants were probably from the Middle East or would have had close knowledge of the Middle East. The significance of the irregularity and subsequent absence of those contacts will be discussed in greater detail in the final chapter, but a couple of comments should be made here, especially given the influence those contacts bore for so many coastal cities.

Perhaps the most obvious product of the interaction between the East African coast and the Middle East is the coast's conversion to Islam. That conversion took place over several centuries and involved various sects of Islam which were often in competition with one another (Pouwels 1987, Horton and Middleton 2000, Horton 2001, Insoll 2003). In this context, it is not only significant that the Mikindani region was lacking direct contact with the Middle East, but also that it was lacking particular contacts to specific areas of the Middle East. First-millennium trade between East Africa and the Middle East was dominated by the Persian Gulf states such as Siraf (Horton 1996, 2001) extending through the sgraffiato period. In the early second millennium significant challenges to the dominance of the Persian Gulf trade were made by southern Arabia, which produced the Black-on-Yellow ceramics and Islamic Monochromes. Given the Mikindani region's absence from early second-millennium trading networks, its people would seem to have missed out entirely on connections to southern Arabia during this time, and connections they had with Gulf merchants may well have withered. The dating of the introduction of Islam to the Mikindani region is uncertain, but seems to have been relatively late compared to other coastal regions and these absences may well have been a notable cause.

The other major implication of the lack of such connections during the early second millennium is that the Mikindani region's first extended interaction with southern Arabia may have been during the time of Omani colonialism and the expansion of the coastal slave trade. The Omani sultanate was deeply involved in coastal politics from the mid-17th century and in 1832 it moved its seat of government to Zanzibar, from which it exerted colonial control over much of the coast (Ingrams 1931). Velten's (1907) collected history of Mikindani provides a sense of how the Mikindani region experienced this period, and the nature of their interaction with the Arab world more broadly. It describes the arrival of Arabs whose quarrels with the resident Makonde population were mediated by Sultan Barghash from Zanzibar. Both Barghash's mediation and the fact that the foreigners are Arabs, rather than Shirazis, point to a relatively late connection between the Mikindani region and the Middle East. Further, the Arabs are described in largely negative terms: starting quarrels, stealing people into slavery and stealing slaves from local slave-owners, and obtaining huge profits through shady dealings. Some of this description is surely the product of the history being told for a German colonial officer, but such negative connotations continue to exist in the memories of Mikindani's inhabitants as I discovered through informal conversations with some of the older residents of town, who described children being tempted into slavery with gifts of dates.

Omani colonialism and the development of coastal plantation slavery under the Omani regime were factors capable of producing these negative connotations. But the presence of such connotations in Mikindani's history and their relative absence in histories of other cities on the coast (see Freeman-Grenville 1975, Tolmacheva 1993) may also point to a late start of regular interaction with the Arab world for the Mikindani region relative to the rest of the coast.

CHAPTER 9: PRODUCTION ACTIVITIES AND SMALL FINDS

While not as numerous as ceramics, other categories of artifacts offer important insights into the organization of daily life in the Mikindani region. The various classes of artifacts associated with iron-working provide information regarding the organization of production in the region. Similar information about other types of craft production such as weaving and pottery-making is also available from artifact classes such as spindle whorls and graphite sticks for decorating ceramics. Building materials provide important data regarding domestic patterns. Stone artifacts, including both flaked tools and grindstones, help document shifting subsistence strategies.

And so, in this chapter I discuss classes of artifacts which document various economic activities taking place in the Mikindani region. I begin with iron objects and other artifacts which are related to iron production. Next, I discuss artifacts indicative of other productive activities, including building materials. I then discuss the stone artifacts found in the region and their social implications.

Iron Artifacts and Artifacts Related to Iron Production

Iron Artifacts

A total of 2,560 iron artifacts were recovered during all phases of the project. The vast majority of these were recovered from the Phase I tests around Mikindani Bay (2439 or 95%). Only 1% of the iron artifacts came from the Phase III excavations. This disparity in counts between phases provides the first indication that most of the iron was from recent contexts, as Phase III excavation units did not possess the modern overburden typical of Phase I tests. Closer inspection of the contexts in which iron was found provides further evidence of its recent provenance. Eighty-four of the 97 iron artifacts from Phase II (87%) come from modern contexts unaffiliated with any site. Many of the iron objects from the Phase I excavations were recovered from the upper stratigraphic levels of the units, though iron artifacts are found throughout the strata of some units within Mikindani town. The large number of modern contexts within Mikindani town relative to the other sites surrounding Mikindani Bay such as Pemba, Mvita and Mirumba is indicated by the relative abundance of iron artifacts in Mikindani. Also telling is the prevalence of sheet iron, which makes up nearly half of the recovered iron artifacts from Phase I. Corrugated sheet iron was first developed in the 1820s (Mornement and Holloway 2007). The relatively low number of iron artifacts from non-recent contexts is not wholly surprising owing to the material's ready corrosion and the generally acidic soils of the Mikindani region.

Nonetheless, some iron artifacts were found in early contexts. At Mtonya on Mikindani Bay some heavily corroded nails and pieces of iron vessels were found at the bottom of Phase I excavation units beneath levels bearing the refined earthenwares characteristic of the 19th and 20th centuries. Though low in number, iron artifacts were also found at several sites in the Phase III excavations. Small corroded pieces of iron were found in association with first-millennium ceramics at the sites of Miseti Hilltop, Stella Maris Hills, Ufukoni Mibuyu and Kisiwa Fields and with second-millennium ceramics at Stella Maris Hills and North Imekuwa. The finds associated with the second-millennium ceramics each had more iron artifacts, six and seven pieces respectively, and a greater artifact weight, perhaps owing to the shorter span available for post-depositional corrosion.

The earlier iron artifacts provide several important pieces of information. They confirm that Mikindani's residents were indeed participants in the EIA developments taking place in East Africa during the first millennium CE, and have continued to use iron implements into the present day. They also show that iron technology was widespread in the region, as artifacts were recovered from sites in the coastal, lowland, and valley microenvironments during Phase III and iron was recovered from STPs at ridge and highland sites during the Phase II survey. The widespread distribution of iron is important to understanding how iron tools were consumed and used, but doesn't provide a great deal of information about iron production in the region. Moreover, because the iron artifacts from pre-1800 contexts are so rare, efforts to study iron production in the Mikindani region must rely on other classes of artifacts.

Slag

Perhaps the most important type of artifact to understanding iron production in the Mikindani region is slag, the byproduct of metal ore smelting, bloom refining, or refined metal smithing. During the project more than 470 pieces of slag were recovered[1] weighing 4501.3g. In contrast to the situation with the iron artifacts, most of the slag was recovered from the Phase III excavations, which yielded 337 pieces measuring 2,231.6g. The Phase I excavations produced 133 pieces of slag weighing 1675g and the Phase II survey yielded 594.7g of slag.

Much like iron, slag was recovered from across the Mikindani region. During Phase I slag was found at Mirumba, Pemba, Mvita and the Mtonya, Mnaida and

[1] During the Phase II survey phase only cumulative slag weights were recorded for STPs, not counts of individual pieces.

Jangwani wards of Mikindani town. During Phase II it was found in STPs from 11 sites covering all five microenvironments. Perhaps most tellingly, slag was found in all of the larger excavations of Phase III except for two, Likonde and Mkangala Ridgetop II. In most cases the amount of slag found at sites was not great – small pieces weighing only a few grams – but their presence still suggests the existence of iron-working activity in the vicinity. However, no site produced more than 1 kg of slag, and only Mvita produced more than half a kilogram, which carries strong implications for the type and scale of iron-working practiced at these sites.

Just as it was spatially widespread, slag was also found across periods in the Mikindani region. Reference to the Phase III excavations alone shows this to be the case. Slag is found in quantities up to 58 pieces and 429g at sites with only first-millennium ceramics. It is found in quantities up to 40 pieces and 116.6g in units with only second-millennium ceramics. Most powerfully, slag is found throughout the stratigraphies of multi-component sites spanning several periods, such as North Imekuwa and Stella Maris Hills.

Equally as significant as the presence of slag across periods and microenvironments, the kinds of slag recovered from sites likewise does not significantly differ between periods. Most of the slag is comprised of small, irregular fragments, such as that from Kisiwa Fields pictured in Figure 9.1. Less frequently, larger and much heavier pieces of slag were recovered, though these too are found at sites from different periods and microenvironments (Fig. 9.2). While the increased weight of these slags is indicative of a higher metal content, they do not show evidence of flow marks or a cake-like or bun-like nature which is often associated with smelting. Also present throughout the region but less frequent than the irregular fragments are hard, spherical bits of iron-rich slag, which seem to fit the description of "slag spheres" produced during either the refining process of an iron bloom or during smithing (Crews 1996).

Figure 9.1 Slag fragment from Kisiwa Fields

Figure 9.2 Larger piece of slag and associated EIA pottery from Pemba

Tuyeres

Another type of artifact indicative of iron-working found in the Mikindani region is the tuyere. Tuyeres are ceramic pipes used to supply iron furnaces and hearths with air to feed the fire, whether for smelting or smithing activities. Four tuyere fragments were recovered during the project. They were recovered from sites representing a variety of periods, including the mid-first, early-second, and mid-second millennia. They were found in two microenvironments, the coast and lowlands, but given the very small sample that restriction should not be considered significant. The tuyere fragment recovered from Lisoho Fields is especially notable because it is covered in slag, indicating that it was used in a functioning iron furnace, perhaps during a smelt.

Figure 9.3 Tuyere fragment recovered in Mnaida

Implications

All three of these artifact types show that the Mikindani region has been home to iron-using populations for much of the past 2000 years. However, they provide no evidence to suggest specialized or intensive production at any of the sites in the region, as none produced even a kilogram of slag and no clear production features such as smelting furnaces were recovered. Of course, sites have been subject to only preliminary investigation, and some aspects of the production process, in particular those associated with smelting, may have been removed from the main habitation areas of sites, so further archaeological work may reveal the presence of such features. Still, based on current evidence, it does not appear that iron production in the Mikindani region was at the level where it would have been a regular export. Instead, the widespread low-intensity iron-working activities suggested by the recovered artifacts suggest production organized at the local or even domestic level to fill occasional need, similar to trends in iron-working suggested elsewhere on the coast after 500 CE (Mapunda 2002, Fleisher 2003: 344).

An issue related to the scale of iron production is the kind of iron-working activities that were taking place in the region. Three different types of iron-working have commonly been identified on the East African coast: smelting, refining and smithing. Smelting involves the production of iron from iron ore; refining is the purification of smelted iron to increase its iron content; and smithing is the production of iron objects from raw iron. Many studies have suggested that iron-working along the coast after the Tana/TIW period has been limited to refining and smithing, for instance at Kilwa (Chittick 1974), Manda (Chittick 1984), Shanga (Horton 1996) and Mahilaka (Radimilahy 1998). This situation stands in sharp contrast to the slag and tuyere accumulations indicative of smelting associated with early-to-mid-first-millennium sites such as Limbo (Chami 1992, 1994) or Dakawa (Håland 1994/5). Recently Mapunda (2002) has suggested that this distinction may not relate to the abandonment of smelting on the coast, but rather a shift to less intensive, more extensive iron production, including smelting in small bowl furnaces after about 500 CE. Such small-scale smelting has been offered as an explanation for the iron-production evidence on Pemba Island (Fleisher 2003) and perhaps would explain the small pit features associated with ash and slag found at Manda and Shanga and identified there as refining furnaces (Chittick 1984, Horton 1996). Nonetheless, refining activities were surely taking place at coastal sites as well, so recognition of small-scale smelting must take place with careful consideration of the evidence and not at the expense of appreciating legitimate evidence for smithing and refining.

The type of slag found in the Mikindani region helps identify the kind of iron-working that took place there. Some of the slag found in the Mikindani region, most notably the slag spheres, is indicative of smithing or refining. The larger pieces of slag weighing more than one hundred grams are less certainly associated with one type of production or the other. They are not large enough to be definitively identified as the products of iron smelting, but on the basis of size more closely resemble smithing hearth cakes (Crew 1996, see Killick 2009b). Such hearth cakes are the most recognizable residue from both refining and smithing, form along the hearth wall just below the air inlet and typically have convex bottoms with either convex or irregular top surfaces. Still, such hearth cakes can be confused with slag from the bottom of iron furnaces and the smelting slags from small-scale production would be smaller than those associated with larger smelts containing more iron ore (Mapunda 2002). So while the size of these larger pieces of slag might suggest that they are evidence of refining or smithing activities, the possibility that some of them were produced by small-scale smelting in bowl furnaces also exists. The slag-covered tuyere recovered at Lisoho Fields also suggests that some iron smelting was taking place in the Mikindani region. Ultimately, it is clear that refining and smithing of iron took place in the region and smelting probably also took place, but less frequently, and perhaps only rarely.

There are a variety of possible explanations why iron production was organized at an extensive spatial scale involving small-scale production activities and relatively little smelting. The first explanation is environmental. Members of local ethnic groups described the region as poor in iron ore to early European ethnographers (e.g., Weule 1909, Tew 1950: 27), accounts corroborated by later geological study (Aitken 1961).

Thus one reason for the lack of more intensive iron working, and more iron smelting in particular, may have been the relative absence of suitable raw materials in the area. The prevalence of smithing slag and refining slag in the region may indicate that Mikindani obtained a significant amount of its raw iron from elsewhere. The nature of the Mikindani region's connections to Indian Ocean trade networks also undoubtedly played a role in the organization of iron production. The absence of intensive trading connections to the Indian Ocean world probably would have obviated the trial of better-organized iron production for external markets.

Other Artifacts from Production Activities

While the iron artifacts and other artifacts associated with iron-working provide some of the best evidence about the organization of production in the Mikindani region, other artifact classes document additional industries. Such industries include cloth production, pottery, and bead-making.

Spindle Whorls

Spindle whorls are an artifact type providing evidence of the textile industry. The presence of these artifacts, generally round ceramic pieces with holes drilled through the middle, indicate that some people in the Mikindani region were spinning fiber into thread, presumably a step towards making cloth, which was an important trade item on the Swahili Coast as discussed in Chapter 8. The archaeobotanical evidence discussed in Chapter 6 suggests that some of this spun fiber was locally grown cotton. Wool is also a possibility given the recovery of some sheep/goat bones, but the small size and weight of the whorls suggests that they were used for threads of lower weight (Liu 1978: 98-100).

The most notable characteristic of spindle whorls in the Mikindani region was their rarity. Only three spindle whorls were recovered from all phases of excavation. One was recovered at Pemba Mbuyu Pwani on the shore of Mikindani Bay in association with Sasanian-Islamic imported pottery. This spindle whorl appeared to have been made from an imported ceramic, as its clay was distinct from that of the local sherds recovered from the site, being finer, lighter in color, and without inclusions. Another spindle whorl was recovered in the second layer of the highland site Mji Mwema I:1, and the third was found in the second layer of Mgao North; these latter two were fashioned from local ceramics. While the total count of spindle whorls from the Mikindani region is low, only at Kilwa are they described as “relatively common” (Chittick 1974: 428). At other coastal sites they are relatively rare, though still often numbering in the dozens; for instance 86 were recovered at Shanga (Horton 1996). Mikindani yielded fewer spindle whorls than the ten found in Fleisher’s (2003: 326) comparable survey on northern Pemba Island however.

All three spindle whorls from the Mikindani region came out of layers dating to around the turn of the second millennium CE. Those centuries were a period of relatively good climate and reliable monsoons. Perhaps not surprisingly, this was also the time when other regions of the Swahili Coast begin to experiment with growing and spinning cotton (Chittick 1974, 1984; Horton 1996: 337-40; Walshaw 2010). Even during this favorable period Mikindani would have received less rainfall however, such that cultivation of cotton would have been a risky proposition, a factor which may account in part for the low level of spinning evidence and the complete absence of such evidence when less reliable conditions returned. However, even at better-watered settlements along the coast the presence of spindle whorls and the production of cloth varied over time, reflecting shifts in sites' economic positions. While Kilwa was able to support a textile industry well into the Portuguese period (Chittick 1974), the number of spindle whorls at Shanga decreased rapidly in the 13th century, perhaps signifying the growing importance of Mogadishu as a center of cloth production, a fact noted by Ibn Battuta a century later (Horton 1996: 341). Decreased access to Indian Ocean trading networks for Mikindani residents in the early second millennium may have played a role in the lack of evidence for a significant textile industry during those centuries. Again, relatively small portions of each site have been excavated however, and it is possible that more detailed investigations of individual sites could reveal more evidence of cloth production.

Pottery-making Artifacts

The production of pottery was another important industry in Mikindani. The best evidence to describe the nature of such production is provided by the local ceramics themselves, which are discussed in detail in Chapter 7. The local ceramics from different sites are at once similar enough that types can be identified and comparisons made with other regional typologies, but there is also diversity in terms of the use of particular decorative motifs, pastes and the proportions of particular vessel forms. Diversity is generally held to be indicative of household production, while standardization would indicate specialized mass production (Sinopoli 1988, Blackman *et al*. 1993). While a detailed metric or chemical analysis of Mikindani's local ceramics along common indices studied for standardization such as raw material (Rice 1981), form and measurements (Sinpoli 1991), or decoration (Hagstrum 1985) was outside the purview of this project, those measurements which were taken showed a fairly high degree of diversity both within site assemblages and between contemporaneous sites. Such diversity suggests household-level production.

Other features of pottery production can be determined as well. The frequent oxidation of sherds indicates that they were fired in such a manner that air was available, likely in an open fire rather than a kiln. The variation in surface colors indicates that the temperature of those fires was not well controlled, and the larger proportion of reds, yellows and light browns in first-millennium contexts suggests that the firing temperature in those contexts was generally lower than in the second-millennium contexts that produced darker colors.

Other artifact classes can provide insight into pottery production as well. Importantly, these artifacts provide evidence for the production of particular ceramic types in the Mikindani region, rather than simply their presence amongst local assemblages. Graphite sticks were recovered from the first-millennium levels of Kisiwa Fields. These artifacts were used to burnish the internal and external surfaces of local ceramics. The sticks found at Kisiwa Fields would certainly not have been sufficient to decorate all of the graphite vessels recovered at that site, much less throughout the entire region, but given the fragility and small size of the sticks it is some wonder that they were recovered at all. Regardless, they provide clear evidence that at least some, and perhaps all, of the graphite decorations and burnishing were done by local potters. Such production indicates that even high-value ceramics were produced locally, rather than only being acquired through trade, and implies a more advanced technological understanding of firing than would be required for undecorated earthenwares to avoid destroying the graphite decoration (see Sinopoli 1984). Local production of graphite-decorated pottery also implies that the organization of graphite-pottery production can be studied. Though there are certain ceramic types which are consistently graphite-decorated, such as in-turned bowls, several other types are decorated only rarely, and different types of graphite-decorated vessels are found at different sites. This balance between common trends and inter-site diversity matches that seen in the local ceramics generally and suggests production organized at the household scale amongst producers who were in contact with one another.

Bead-Making Artifacts

A third major industry at many coastal sites was bead-making. As discussed in Chapter 8, shell-bead production was a significant industry at many coastal sites during the first millennium (see Flexner *et al*. 2008). Such production was evidenced not only by the beads themselves, but also by shell blanks and bead-grinders. A small number of shell beads have been recovered from the Mikindani region, and the *Andara* shell raw material is the largest component of shell middens at coastal sites. However, no bead-grinders have been recovered in the region, casting doubt as to whether Mikindani residents engaged in significant levels of shell-bead production. The absence of such production is also important for understanding the region’s place in interregional trade networks, because shell beads were a significant export for many first-millennium coastal sites. Mikindani has only very weak evidence for local production of cloth and beads, and did not seem to have been producing enough iron for export, so the region's inhabitants seem not to have manufactured any archaeologically recoverable secondary products for Indian Ocean trade networks. They might have relied instead on the exploitation of local natural resources, perhaps including mangrove poles and gum copal (see Tew 1950), to participate in those networks.

The lack of bead-grinders in the Mikindani region carries another significant implication. Because bead-grinders are a common feature of late-first millennium coastal sites (Flexner *et al*. 2008), their absence in the region provides another indication of difference emerging between Mikindani and the rest of the coast during the Tana/TIW period. When added to the low proportions of incised triangle motifs on pottery as discussed in Chapter 7, Mikindani increasingly seems not to have participated in many of the developments that marked Swahili material culture in the last centuries of the first millennium CE.

Building Material

Construction materials and certain types of features document the construction styles practiced in the region over time. Those styles in turn help describe the social organization at intra- and inter-site scales and can offer clues to the population's identity.

Coral

Coral is a particularly important building material on the East African coast. Coral architecture[2] became common on Swahili sites during the second millennium CE,

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[2] The term "coral architecture" warrants some clarification. Early coral structures often used fine-grained coral cut from living reefs (sp. *porites*). This coral was cut into blocks while wet and then mortared when

such that the presence of such architecture was used to identify sites in early coastal surveys (e.g., Wilson 1978, 1980, 1982). Coral houses became an important element in the identity of the Swahili urban elite (Donley-Reid 1982, 1987, 1990), indicating their trustworthiness to foreign traders (Donley-Reid 1990, Horton and Middleton 2000). At smaller sites construction in stone appears to have been largely restricted to mosques (Wilson 1982, LaViolette and Fleisher 2009). Nonetheless, because of its durability, widespread availability, and social significance, coral-rag has remained a common building material on the coast to the present day, including in the Mikindani region.

In all phases of excavations nearly a metric ton of coral building materials was recovered (999.15 kg), as well as an additional 461kg of mortar. The majority of the coral (84% or 842.5 kg) came from the Phase I test excavations around Mikindani Bay. Most of this coral is associated with 20th-century construction, and comes from discrete layers of building debris. However, the Phase I excavations also recovered buried stone walls which were resting on deposits dating to the middle of the second millennium CE in Mnaida ward (Fig. 9.4) and coral debris from a ruined customs house/prison dating to the era of the Zanzibari Sultanate. Still, the relative abundance of 20th-century building debris is demonstrated when exploring the contexts which produce the highest coral weights. While the most abundant test unit (154 kg) featured a buried wall-stump, the next three most abundant test units (138, 58 and 46 kg) feature only 20th-century debris, and the most abundant test also encountered a layer of 20th-century debris.

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dry. Beginning in the 12th century, structures were more commonly made of fossilized limestone coral rag quarried out of the landscape and *porites* was reserved for architectural detail (LaViolette and Fleisher 2009). Coral references in this chapter are to coral rag.

Figure 9.4 Coral wall-stump resting on mid-second-millennium deposits at Mnaida

The rest of the recovered coral (16% or 156.6 kg) comes from the Phase III excavations.[3] Interestingly, 15 of the 22 excavation units produced some amount of coral, though in 11 instances the total weight of recovered coral was below 5 kg. Because the recovered coral weights at these sites were relatively low, it is possible that the recovered material is natural, especially given the frequent limestone bedrock in the region. Alternatively, post-depositional processes could have deflated the residue of coral structures elsewhere on the sites. However, at two sites, Mgao North and Kisiwa Fields, more than 20 kg of coral was recovered in each excavation unit. At each site this was interpreted as evidence of coral-stone construction somewhere at the site, though clear evidence of such was lacking at Mgao North. In contrast, at Kisiwa Fields the highest weights of recovered coral from Phase III were found in association with compelling evidence that coral was being incorporated into local structures – and in the first millennium CE no less. At Kisiwa Fields loose coral stones, which may have been

[3] While coral was occasionally recovered during the Phase II survey, it was not retained as it was not possible to distinguish that which had been used as a building material from natural limestone.

mortared with clay in the past, were set onto a natural limestone outcrop to form the foundation for a wall (Fig 9.5), seemingly similar in function to the stone-and-mud sill walls constructed in the early second millennium at Shanga (Horton 1996). The natural coral also bears evidence of ground sockets for wooden poles (Fig 9.6). Such sockets have not been reported from elsewhere on the coast, but similar examples of ground settings for beams occur at sites in Southern Africa such as Mapungubwe.

Figure 9.5 Coral feature at Kisiwa Fields, facing east

Figure 9.6 Top of coral feature; note loose coral stones to north and ground sockets in the stone

Daub

The other major coastal building material was daub, a hardened clay material that was packed around a woven wood lattice, or wattle, in the most frequent form of building construction. Such wattle-and-daub structures have proven difficult to identify archaeologically because they are made of perishable wood and mud and unlike coral often leave behind no visible surface remains (see Fleisher and LaViolette 1999a). Nonetheless, the vast majority of Swahili commoners, and indeed many Swahili elite, would have lived in such structures. Coastal surveys incorporating sub-surface testing such as this one increasingly have recognized that many, if not most, Swahili towns and villages probably contained only earth-and-thatch buildings, something especially true of smaller settlements (see Fleisher 2003, LaViolette and Fleisher 2009). Such realizations demand specific methodologies for identifying earth-and-thatch structures, most notably the use of sub-surface testing, as well as an emphasis placed on recovered daub for understanding coastal settlement.

During this project only 84 kg of daub were recovered during all excavation phases. Such relatively low quantities are not uncommon in coastal excavations, which have rarely paid daub too much attention, but they stand in sharp contrast to the site of Chwaka on Pemba Island where a project targeting the discovery and excavation of earthen houses was carried out and comparable quantities of daub were recovered in single 2m x 2m stratigraphic layers (LaViolette *et al*. 2004). In the present project, the majority of daub (62.1 kg or 82%) comes from the Phase I tests around Mikindani Bay. Daub was found in nearly three-fourths of the units from Phase I. However, daub measured above 10 kg in only three units at Mnaida, and in each unit it was primarily found with other building debris dating to the 20th century. The widespread presence of daub indicates the prevalence of earthen housing, but the small quantities recovered prevent identification of intact structures in most cases. Unfortunately, the same is true for sites throughout the Mikindani region, as illustrated by the results from Phase III. All 21 excavation units from Phase III produced daub, but only one produced as much as a kilogram of it, and none more than 2 kg. For perspective, 17 of the units produced more than a kilogram of local ceramic sherds.

Given these results, the identification of earthen housing relied on alternate forms of evidence, most notably the presence of features. The most straightforward type of feature for identifying earthen structures is remnant earthen walls. Three daub wall-stumps were recovered during the Phase I tests around Mikindani Bay: two at Mnaida and one at Mvita. However, all three of these features were recovered in association with 19th- and 20th-century imported ceramics, which suggests that their survival was due in large part to their recent dates. Similar features have been recovered at sites dating to the early second millennium elsewhere on the coast (LaViolette and Fleisher 2009), but so far daub walls of similar age have not been recovered at Mikindani.

Many sites in the region yielded post-holes and post-molds from contexts covering the past 1500 years. These features provided evidence of earthen architecture, as they were created from the wooden poles used to create a building's frame. They were recovered at Mji Mwema, Mkangala Ridge-top, Miseti Hilltop, Pemba, Ufukoni Mibuyu, Mnaida, Mirumba and Mvita. In most cases the post-holes were found as singles or doubles, preventing identification of building orientation or certain association with structures. But at Miseti Hilltop, three postholes outline a darker sediment rich in charcoal and first-millennium decorated sherds, perhaps indicative of a past living-floor. Similar floor sediments were also recovered at Ufukoni Mibuyu. Neither of these floors were fully exposed during excavation, and while Ufukoni floor was rectilinear the Miseti floor was more diffuse with an irregular shape.

Hearth and pit features recorded at several sites also indicated human occupation, although the association with structures could not always be demonstrated. A shallow hearth was recovered at Mkangala Ridge-top, while deeper refuse pits were found at Pemba and Stella Maris Hills. In all three cases these features were associated with first-millennium ceramics. While the excavation exposures were not large enough to reveal complete structures, the wealth of feature data is indicative of the certain existence of wattle-and-daub architecture throughout much of the Mikindani region's occupied history and suggests that with further work complete structures could be identified.

Trying to understand earthen construction in the region is important not only because the majority of the area's inhabitants would have lived in such housing, but also because the nature of earthen construction can help us understand those inhabitants' relationships with the people of other regions. Notably, there is a clear contrast in the ethnographic literature between the earthen housing built by the Swahili on the coast and that found amongst other groups in southern Tanzania. Swahili houses were typically rectangular, with a central passage leading to several interior rooms or a front room controlling access to the rear, benches or *barazas* located at the front, and kitchen-activity areas in the rear (see Horton and Middleton 2000: 116-25). This particular floor plan is thought to date back to the 16th or 17th century CE, though many of the concerns that dictate its form, including the contradictory concerns of interior partitioning for privacy and the need for spaces to express hospitality to guests, may extend back much further than that. However, circular houses have been recovered from some first-millennium Swahili sites (LaViolette and Fleisher 2009). In contrast, the Makonde and Makua houses described in the ethnographic literature from the early 20th century were circular (Tew 1950) and were rarely sub-divided internally (Weule 1909). Moreover, their houses were generally described as being rather less substantial that those typically found amongst the Swahili and their construction is regarded as less intensive (Weule 1909: 261-2).[4] Ultimately, finding round, rather than rectangular, structures should not necessarily lead to the conclusion that the inhabitants of the Mikindani region had a Makonde or Makua cultural identity as opposed to a Swahili one, or vice versa. However, certain aspects of house construction such as permanence, external hospitality areas, and internal subdivision are indicative of social trends known to have become increasingly important at Swahili sites during the second millennium CE, and the extent

[4] This description should be taken with a grain of salt as Weule, though not unnecessarily unkind to the African societies he describes, often writes from a position of assumed cultural superiority and has a tendency to bemoan the hardships he endured while in Tanganyika, frequently retreating to criticism as a matter of course.

to which homes in the Mikindani region reflected those trends is one measure of their participation in broader Swahili networks generally.

Stone and Bone Artifacts

Kwekason's (2007) work has demonstrated the presence of stone-tool using populations in the Mikindani region, though the survey showed that such populations were present at low-densities and their occupations were of relatively low-intensity, indicating frequent movement. The various flaked-stone and bone tools recovered during the project provide insight into the technology and subsistence practices these pre-ironworking populations were undertaking. In addition, other classes of stone artifacts such as grinding stones and net weights are associated with settled lifestyles.

Flaked Tools

The best evidence for stone-tool using populations in the region comes from flaked-stone artifacts recovered at Mbuo Hilltop (Figures 9.7 and 9.8). These flaked-stone artifacts are made from a high-quality chert, likely derived from the replacement of calcium carbonate with silica in parts of the region's limestone formations. While relatively few artifacts were recovered from the site, they can be identified following classification systems commonly used in East Africa (see Phillipson 1976a). Identification shows this admittedly small and incomplete assemblage to have been similar to other LSA assemblages. The majority of the artifacts were flakes, two of them end-struck and the other side-struck. There was also a unilateral single-platform core and a nosed scraper. A quartzite hammer-stone was associated with these chert artifacts.

While Mbuo Hilltop provides the clearest evidence of stone-tool use from strata beneath Iron Age layers, there are indications of stone-tool use at other sites as well. Flakes of quartz were recovered from Phase III excavations at Mkangala Ridge-top 1, Imekuwa Mibuyu, and Stella Maris Hills. Unlike the situation at Mbuo Hilltop, these quartz flakes were found in association with ceramics, some of which were of iron-working varieties, though they were below the layers with the highest artifact densities. A further difficulty interpreting these artifacts is that no clear quartz tool was recovered, only flakes. While geometric quartz tools have been found in the region (Kwekason 2007), quartz is a much more difficult stone to work than chert given the unpredictability of its fracture and some instances of recovered quartz flakes may represent naturally occurring quartz shatter. However, if the quartz flakes found in the Mikindani region are indeed anthropogenic, then they suggest some interaction between stone- and iron-using populations and perhaps the continued manufacture and use of stone tools alongside iron ones. The presence of all of these flaked-stone artifacts in levels underneath or at the bottom of Iron Age settlements identifies an early, and perhaps ongoing, regional presence of groups using stone tools who contributed to the development of coastal society at Mikindani.

Figure 9.7 Flaked stone artifacts from Mbuo Hilltop. The scraper is on the left and the core is on the right.

Figure 9.8 Stone Artifacts from Mbuo Hilltop. An end-struck flake (L), and a hammer-stone (R) are shown.

Bone Tools

One bone tool was found during the survey at the Mbuo Hilltop site. The remaining bone was fragmentary, so identification of the tool's use was not possible, but one end of the tool had been embedded into a stone, perhaps to serve as a handle. Given the acidic soils of the region and the generally low-intensity occupations of pre-ironworking groups it is rather remarkable that any bone implements survived. It is likely that they were more common than this single instance, whose preservation may have resulted from its close association with the stone, would indicate. Still, such bone implements are typical of Late Stone Age assemblages, and this is more evidence that LSA populations were present in the Mikindani region in the past.

Grindstones

While the stone artifacts discussed thus far were most likely associated with hunting-and-gathering activities, a grindstone indicative of agricultural activities was also recovered from the Mikindani region, at Miseti Hilltop (Fig. 9.9). This grindstone was a pale, fine-grained sandstone with a clear concavity where grinding had taken place. When recovered it had broken into two pieces, likely providing the reason why it was discarded. The grindstone was found in association with second-millennium ceramics. Given the archaeobotanical results discussed in Chapter 6 that indicate widespread grain agriculture, most sites in the region would have engaged in grinding on a regular basis, so the lack of grindstones may indicate that Mikindani's inhabitants employed perishable materials for the task, such as wood. The probable use of wood for mundane, everyday grinding in turn suggests that this grindstone may have been used for a special purpose, which is supported by the small size of the stone.

Figure 9.9 Grindstone recovered from Miseti Hilltop

Net Weights

The other stone artifact associated with subsistence pursuits was a net weight found in the bottom layers of a test in Mtonya near Mikindani Bay, dating towards the middle of the second millennium CE. This test was located within 50m of the modern shoreline so the presence of artifacts indicative of marine exploitation is hardly surprising. Moreover, as discussed in Chapter 6, many sites have produced fishbone, despite the generally poor preservation conditions found in the region, so the presence of artifacts associated with fishing was to be expected. Nonetheless, the net-weight provides insight into the kinds of fishing activities undertaken in the region in the mid-second millennium.

CHAPTER 10: SPATIAL ANALYSIS OF THE MIKINDANI REGION

As argued in Chapters 3 and 4, understanding the developments from Mikindani's history and the region's place within large-scale Swahili networks demands the integration of different processes (economic, environmental, social, political etc.) operating over various scales. This necessitates a multifaceted regional approach incorporating the various kinds of influences on regional patterns of land use and spatial organization (see Crumley 1979). At the most basic level such work depends on figuring out where people were and what they did there at different moments. It then needs to extend to explain why activities were patterned in this way, drawing on ecology- and economics-driven locational models, meaning-centered landscape approaches, and functional settlement analyses. Such an approach to settlement patterns in the Mikindani region allows me to begin to determine how these various strands of influence came together to structure peoples' daily lives.

In this chapter I discuss data regarding land-use and settlement patterning collected during the project in pursuit of that objective. I begin by presenting the results of the survey, providing a brief overview of the sites identified during the project (see also Appendix A). I then characterize the sites using artifact data acquired from STPs and excavations and discussed in greater detail in the preceding chapters. I pay particular attention to variations that can be observed between sites from different microenvironments and different time periods. After characterizing the sites, I employ a multidimensional approach to explaining the region's settlement patterning over time that explores locational models, landscape approaches, and functional site analyses to explain why settlements and land-use activities were patterned as they were at Mikindani.

Results of the Survey

Fifty-five sites were identified in the 30 units explored during the Phase II survey.[1] Taken together with the five sites investigated around Mikindani Bay during Phase I, these sites provide an ample base of 60 sites with which to explore settlement patterning in the region. In the survey, sites were designated by multiple adjacent STPs with artifacts from “iron-cross testing” around positive STPs with more than 5 artifacts (Lightfoot 1986) and the regular pattern of subsurface testing carried out by the survey. Of the 55 sites recovered during Phase II, 54 were previously unreported, with only Pemba previously described (Kwekason 2007). Most survey units possessed one or two sites, 7 (23%) and 14 (47%) of 30 respectively. Only 3 survey units (10%) had no sites, while 4 units had three sites (13%) and two units had four (7%).

The average size of recovered sites in the survey was just under 2 ha and the median site size was 1 ha. Nearly half of the sites (26) were under 1 ha, the minimum-sized site that would always be found by the survey’s subsurface testing strategy. Of those 26 sites under 1 ha, 16 were under 0.25 ha. The large number of recovered sites (29) whose size is above one hectare emphasizes the intensity of the past human occupation of the southern Tanzania coast, something that was previously unknown. The recovery of an almost equivalent number of smaller sites allows the project to approach the smallest organized levels of Swahili settlement.

Because the survey recovered numerous small sites, the results from the Mikindani region support Fleisher’s (2003: 135) creation of a coastal settlement hierarchy that includes space for these small settlements and Kusimba’s (1999a) distinguishing of four classes of rural villages (*cf*. Wilson 1982; see Table 10.1). A

[1] For survey methodology, see Chapter 2.

Kenya Coast (Wilson 1982)				
Name	**Size**	**Characteristics**	**# of sites**	**Frequency**
Hamlet	1 ha	0-1 mosque, < 5 tombs	34	0.31
Village	< 2.5 ha	1-2 mosques, 5-10 tombs, 1-5 coral buildings	39	0.36
Small Town	2.5 - 5 ha	1-2 mosques, >10 coral buildings, >2 tombs	19	0.17
Town	5 - 15 ha	2 mosques, >2 cemetaries, 50-100 coral buildings	9	0.08
City	> 15 ha	3+ mosques, 3+ cemetaries, wards, >100 coral buildings	8	0.07
Northern Pemba (Fleisher 2003)				
Name	**Size**	**Characteristics**	**# of sites**	**Frequency**
Fieldhouse	> 0.1 ha	tight collection of artifacts	6	0.18
Hamlet	1 ha	1 household and associated midden, perhaps 3-4 homes	12	0.35
Village	< 2.5 ha	many earth and thatch houses, multiple middens	12	0.35
Small Town	2.5 - 5 ha	similar to village, multiple components more likely	2	0.06
Town	5 - 15 ha	stone architecture present	2	0.06
City	> 15 ha		0	0.00
Mikindani				
Name	**Size**	**Characteristics**	**# of sites**	**Frequency**
Fieldhouse	> 0.15 ha	restricted activity area	8	0.13
Hamlet	1 ha	1 household and associated midden, perhaps 3-4 homes	23	0.38
Village	< 2.5 ha	many earth and thatch houses, multiple middens	9	0.15
Small Town	2.5 - 5 ha	similar to village, multiple components more likely	10	0.17
Town	5 - 15 ha	possibility of stone architecture	9	0.15
City	> 15 ha	several stone buildings, along with earth and thatch	1	0.02

Table 10.1 Site classifications from three coastal regions including the results from Mikindani

relatively similar proportion and a higher total number of sites corresponding to Fleisher's smallest settlement class from northern Pemba, fieldhouse, were recovered in the Mikindani region. These settlements represented the remains of relatively ephemeral use of certain parts of the landscape, and are not expected to have been occupied year-round. The next class of settlements, hamlet, comprised more permanent settlements, but ones that consisted of only a few structures and an associated midden, representing single households. However, the presence of a LSA site, Litingi Channel, within this class indicates that within the Mikindani region there was substantial variation within the classes in terms of duration and intensity of occupation. The next two settlement classes, villages and small towns, were larger and had more middens, which is indicative of multiple households occupying the site. In the Mikindani region these classes were indicated by multiple areas of artifact density within a site. The small towns were distinguished by their larger size and increased proportion of sites with multiple components, indicating longer occupations. Larger size, more areas of artifact density within sites, and more sites with longer occupations also defined the town and city settlement classes at Mikindani. These classes also presented the few cases where stone architecture was present in the region, though stone architecture was not found at all town sites. The only site in the region that attained the class of city was Mikindani itself, though the evidence from Phase I indicates that it only did so from the middle of the 2nd millennium.

The presence of stone architecture at only some of the largest sites and its absence from others emphasizes the distinction between the types of settlements identified in the Mikindani region and those recorded in Wilson's (1982) survey of the Kenyan coast. Wilson relied heavily on extant stone architecture to identify sites, while site identification in the Mikindani survey was driven by sub-surface testing. Twenty-one of the sites recovered during the survey, or 38%, possessed no surface remains, further demonstrating the importance of sub-surface testing indicated by other studies (e.g., LaViolette *et al*. 1989; Fleisher and LaViolette 1999; Fleisher 2003). Some of the implications of such testing such as increased ability to identify smaller and more ephemeral levels of settlement are clearly significant to the accurate study of settlement patterns. The different site-identification strategies also have important implications for the recovery of sites from the first millennium, as will be discussed below. Ultimately, comparisons between coastal regions surveyed under different site-identification strategies are difficult, particularly when trying to describe first-millennium settlement patterns, settlement shifts between periods, and small-scale land use.

Survey Results by Time Period

Only the 55 sites recovered during the Phase II survey will be considered in this section and the microenvironment section immediately following in order to develop predictions for the total number of sites in the entire survey region and for the settlement patterns that existed, a process that depends on the sampling strategy used during the survey. The majority of sites recovered during the survey can be assigned an approximate date on the basis of the local and imported ceramics recovered from the sites, as discussed in Chapters 7 and 8. Only 14 of the recovered sites (25%) are without diagnostic ceramics, and four of these are likely contemporaneous with other nearby sites in the same survey unit, as will be discussed in more detail later.

The study of local ceramics from Chapter 7 allows for the identification of eight separate ceramic phases, ranging from the Late Stone Age to the 20th century. Additional clarity can be gleaned from radiocarbon dates obtained from earlier archaeological work in the region and associated with particular ceramic types (Kwekason 2007). Those dates suggest that the LSA phase dated to the last centuries BCE, the Mwangia/Early TIW to the 5th century, the Plain Ware to the 9th or 10th century, and the new early second millennium style to the 12th century. However, as discussed in Chapter 7, the time range for those early second-millennium ceramics was likely more extensive, as some have been found in close stratigraphic association with mid-second-millennium Swahili Ware. Similarly, the first-millennium types of the Mwangia/Early-Tana/TIW phase likely extend beyond the 5th century at least until the late first-millennium Mature Tana types develop from them.

The results presented in Table 10.2 show the number of sites recovered with diagnostic ceramics or other artifacts diagnostic for each phase. There are a number of notable trends. First, some phases are poorly represented. Only two sites were recovered from both the LSA and the PW phases. For the LSA this suggests a less-dense regional occupation, probably by mobile hunter-gatherer populations. For the PW phase, however, the paucity of sites is more likely representative of the increasing separation of the Mikindani region from the rest of the Swahili coast when undecorated ceramics become more common. Beyond these two underrepresented phases, the survey data suggest an expansion of settled communities throughout the first millennium into the second millennium. Towards the middle of the second millennium the number of settlements seems to decrease, particularly amongst the hamlets, villages and small towns. The longer period of use for the new second-millennium ceramic style implies that the distinction in the number of settlements between the early and middle second millennium might not be as wide as suggested however. So though it is tempting to take this data as indicative of something akin to the urban shift Fleisher (2003) documented on Pemba Island coinciding with the emergence of Mikindani as the preeminent regional center from the middle of the second millennium, caution is warranted until additional data can be marshaled to provide more refined dating.

	Number of Sites (Phase II Results Only)
LSA	2
Early First Millennium	6
Mwangia/Early TIW	17
Late First Millennium	17
Plain Ware	2
Early Second Millennium	22
Mid to Late 2nd Millennium	11
19th-20th Centuries	21
Undated	14

Table 10.2 Recovered sites by phase

Still, the survey data allow me to predict the total number of settlements that existed throughout the entire study region, and to compare those expectations with predictions obtained elsewhere on the coast. Two sets of predictions are presented in Table 10.3. The first simply extends the rate for recovering sites from each phase over the entire survey area, 97% of which remains unsurveyed. The second method is slightly more complicated, presenting the aggregate of the rate in which sites of each phase were found in each microenvironment multiplied by the rest of the unsurveyed land from that microenvironment. Each of these methods is overly simplistic, ignoring localized factors that helped shape settlement patterns and assuming a perfect sample was obtained, but they nonetheless provide a useful starting point. The survey area is large, 510 square kilometers and covering nearly the entire coast of the Mtwara Region. Still, these predictions suggest that the region would have been home to hundreds of settlements during most phases, even if our too-simple initial prediction turns out to have been far too generous.

	Number of Sites (Phase II Results Only)	Simple Prediction	Micro-led Prediction
LSA	2	68	69
Early First Millennium	6	204	208
Mwangia/Early TIW	17	578	590
Late First Millennium	17	578	586
Plain Ware	2	68	67
Early Second Millennium	22	748	768
Mid to Late 2nd Millennium	11	374	379
19th-20th Centuries	21	714	722
Undated	14	476	506

Table 10.3 Predicted numbers of sites by ceramic phase

While the predictions in Table 10.3 are only a starting point for understanding land use and settlement patterning in the region, they are nonetheless pertinent to broader characterizations of settlement on the Swahili coast. In particular, these data challenge the underrepresentation of first-millennium settlement by surveys not incorporating sub-surface testing. Drawing heavily on such data, many scholars have suggested that the total number of sites on the coast in the 8th and 9th centuries CE may not have been more than 50 (Horton 1996: 407-9; Kusimba 1999a) and that settlement in several regions, particularly those further south, was light and scattered (Horton and Middleton 2000: 46)[2]. Instead, the surveys incorporating sub-surface testing (e.g., Fleisher 2003), which have been able to identify such sites, show that hundreds can exist within a single region. Indeed, if the predictions from the survey are accurate, they suggest that nearly 600 8th- and 9th-century sites existed in the Mikindani region alone. In this sense, the relatively similar frequencies of hamlets and villages between the Kenyan and northern Pemba surveys noted by Fleisher (2003: 136; see Table 10.1) is confounded by the Kenyan survey's likely underrepresentation of first-millennium sites. So too is the suggestion

[2] However, scholars including Horton and Middleton (2000) have increasingly recognized that the picture of settlement at this time is severely restricted due to a lack of systematic survey.

(Wilson 1982) that the largest sites were also the earliest, an assertion made possible by the underreporting of buried first-millennium towns that did not develop into second-millennium urban centers.

The multicomponent sites also bear discussion. It is quite clear from the results that the numbers of sites found for each phase adds up to more than 55 sites. This occurs because many sites had diagnostic ceramics characteristic of multiple phases. In fact, almost half of the sites (27) recovered in the survey had diagnostic ceramics from multiple phases. In many cases older sites are overlain by modern occupations. Several other multicomponent sites speak to the enduring difficulty disentangling the different phases of first-millennium ceramics and early- and mid-second-millennium ceramics from one another. In fact, of the 17 Mwangia/Early-Tana/TIW phase sites, only two had diagnostic ceramics from that phase alone. Most of the others had ceramics diagnostic for at least one of the other two first-millennium phases. Rarer were the cases mentioned in Chapter 7 where very different ceramics from both the first and second millennia were present at a site. Yet even amongst those sites, only a small subgroup of three sites had substantial components from both the first and second millennium, as indicated by more than 10% of decorated sherds being derived from each millennium, indicating that sites with large occupations during both millennia were rare. Despite these cautions, the large number of multicomponent site suggests important patterns of settlement continuity existed in the Mikindani region.

Survey Results by Microevironment

The other important initial method of breaking down the survey results was to separate them according to the five microenvironments that stratified the survey. The results sorted by microenvironment are presented in Table 10.4. They show that sites were distributed fairly evenly, as the proportion of sites found for each microenvironment mirrored the percentage of the microenvironments within the entire survey region. This impression is confirmed by a chi-squared test of the results, which yields 94% likelihood that the site counts observed during the survey are produced by an even distribution of sites across the region. However, despite the general trend of equitable distribution across microenvironments relative to their proportion in the study region, there is a slight indication that the highland plain microenvironment is underrepresented. The highlands contributed more towards challenging the even distribution of sites in the chi-squared test than any of the other microenvironments, though admittedly they still largely conform to the even-distribution hypothesis.

	# of Sites	Highland	Lowland	Coast	Valley	Ridge
% of Survey Region		28.5%	37.0%	14.0%	13.0%	7.5%
Phase II sites	55	13	21	8	8	5
(% of Total Sites)		*23.6%*	*38.2%*	*14.5%*	*14.5%*	*9.1%*

Table 10.4 Sites recovered during the survey sorted by microenvironment

While the sites recovered during the survey are distributed fairly evenly when all phases are considered together, because the sites cover such a broad timeframe it is worth considering the distribution of sites across microenvironments during each phase. Those results are presented in Table 10.5 (see also Fig. 10.1) . It must be noted that during each phase we are dealing with smaller sample sizes than the cumulative recovered sites and the potential for such small sample sizes to skew the analysis should be given careful consideration. Nonetheless, even cursory inspection shows that the observed counts during each of the phases are noticeably different than what would be found under even distribution across microenvironments.

	# of Sites	Highland	Lowland	Coast	Valley	Ridge
% of Survey Region		28.5%	37.0%	14.0%	13.0%	7.5%
Total Sites	55	13	21	8	8	5
(% within category)		*23.6%*	*38.2%*	*14.5%*	*14.5%*	*9.1%*
LSA	2	0	0	1	1	0
(% within category)		*0.0%*	*0.0%*	*50.0%*	*50.0%*	*0.0%*
Early First Millennium	6	0	3	2	1	0
(% within category)		*0.0%*	*50.0%*	*33.3%*	*16.7%*	*0.0%*
Mwangia/ Early TIW	17	2	6	4	3	2
(% within category)		*10.0%*	*30.0%*	*20.0%*	*15.0%*	*10.0%*
Late First Millennium	17	3	6	5	2	1
(% within category)		*16.7%*	*33.3%*	*27.8%*	*11.1%*	*5.6%*
Plain Ware Phase	2	0	1	0	1	0
(% within category)		*0.0%*	*50.0%*	*0.0%*	*50.0%*	*0.0%*
Early 2nd Millennium	22	2	8	4	4	4
(% within category)		*7.4%*	*29.6%*	*14.8%*	*14.8%*	*14.8%*
Mid to Late 2nd	11	1	4	2	3	1
(% within category)		*6.7%*	*26.7%*	*13.3%*	*20.0%*	*6.7%*
19th-20th centuries	21	4	7	4	2	4
(% within category)		*16.0%*	*28.0%*	*16.0%*	*8.0%*	*16.0%*
Undated	14	5	6	0	2	1
(% within category)		*35.7%*	*42.9%*	*0.0%*	*14.3%*	*7.1%*

Table 10.5 Sites recovered during the survey sorted by microenvironment and phase

The chi-squared-test results corroborate this observation. Whereas the cumulative microenvironment counts show a 94% probability of even distribution across the region, only the 19th-20th-century phase has a probability of even distribution above 53% (see Table 10.6). Again, some of these results are clearly influenced by small sample sizes – the two observed sites in the LSA and PW phases could not possibly be evenly distributed across the five microenvironments – but even the better represented phases such as the Late First Millennium have probabilities below 50%. Indeed, the phase with the most sites, the Early Second Millennium, has the lowest probability of even distribution of all.

	Chi-Squared Probability
LSA	24.7%
Early First Millennium	39.3%
Mwangia/ Early TIW	48.1%
Late First Millennium	45.1%
Plain Ware Phase	52.5%
Early 2nd Millennium	13.7%
Mid to Late 2nd	50.1%
19th-20th centuries	76.8%

Table 10.6 Chi-Squared tests of even distribution for each phase

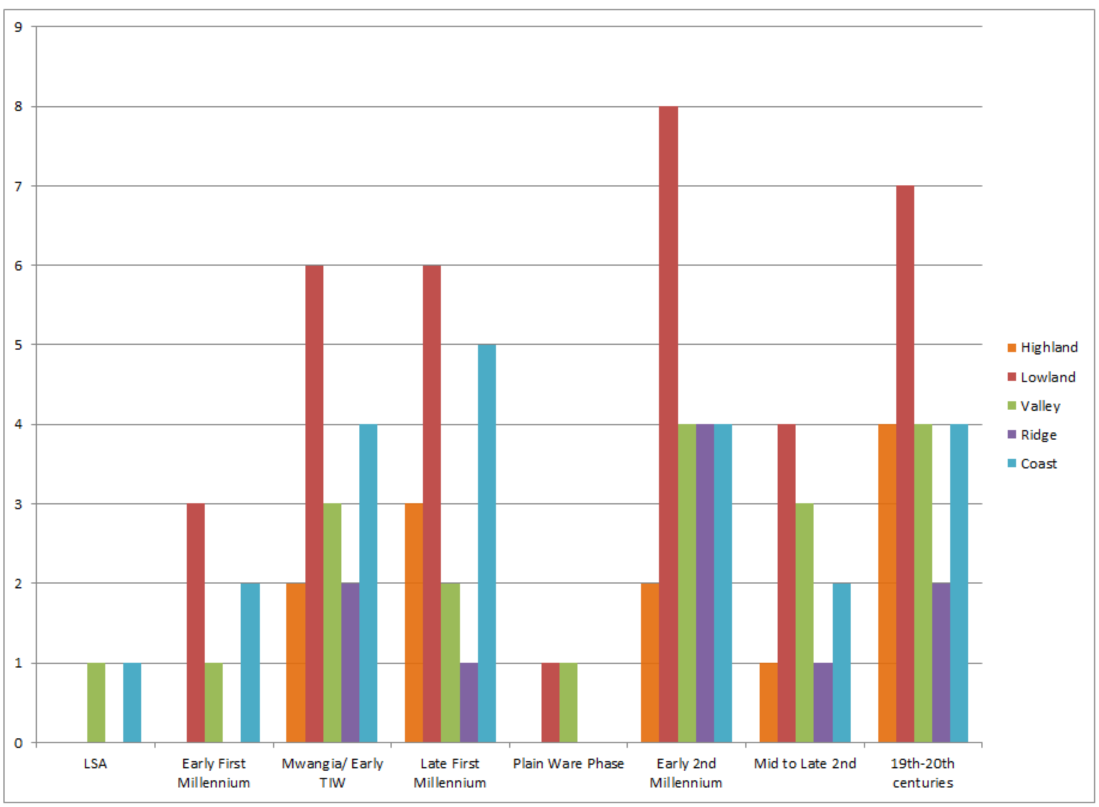


Figure 10.1 Number of sites in each microenvironment for each time period

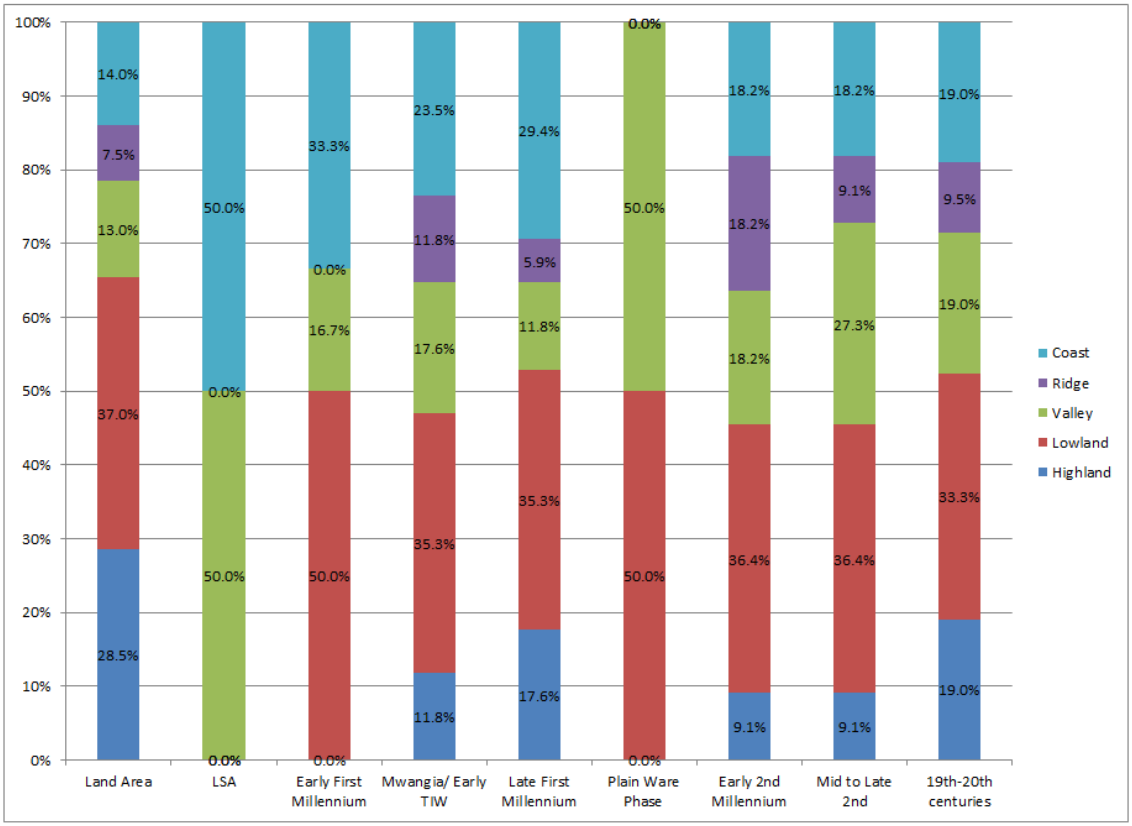


Figure 10.2 Percentage contributions of microenvironments to settlement during each phase

More importantly, several of the phases diverge from the hypothesis of even distribution in interesting ways. The coastal microenvironment significantly outperformed its expectations under the hypothesis of even distribution during the late first millennium, decreasing the chi-squared probability during that phase. Conversely, the highland microenvironment significantly underperformed its expected counts during several phases, most notably the Early Second Millennium. During that same phase the ridge microenvironment significantly outperformed its expected counts. Again, these divergences occur amidst small samples so they should not be considered conclusive, but they still suggest important regional settlement trends.

While the microenvironments thus have uneven distributions in different phases, settlement within microenvironments was also varied. For example, the lowlands to the far east of the survey region produced few sites, and most of these were of modern date. In contrast, the lowland area between Mikindani and Sudi bays was the richest area of the entire region, with several large sites many centuries old. This latter area was responsible for most of the observed counts for the lowland microenvironment during the first millennium, making up for the under-performance of the eastern regions such that the observed counts for the lowlands are quite close to the expectations under even distribution.

As with the results organized by phase, it is also possible to use the microenvironment results to predict the number of sites present in the entire study region. The predicted site counts for each of the five microenvironments, calculated using the rate in which sites of each phase were found in each microenvironment multiplied by the rest of the unsurveyed land from that microenvironment, are presented in Table 10.7. Again, these results suggest that nearly two-thousand sites existed in the region, which is a truly substantial number. Even if the predictions are two times too generous, this still suggests that each of the microenvironments would have been home to at least a hundred sites.

	# of Sites	Highland	Lowland	Coast	Valley	Ridge
% of Survey Region		28.5%	37.0%	14.0%	13.0%	7.5%
Phase II sites	55	13	21	8	8	5
Predicted	1882	420	720	286	265	191

Table 10.7 Predicted site counts for the microenvironments

The microenvironment survey results thus have some interesting implications for the Mikindani region's settlement patterns. The cumulative site counts suggest even distribution across microenvironments. However, exploring the microenvironment counts for different phases indicates that there are important elements of spatial and temporal variation in settlement both between and within microenvironments. Such variation demands that the analysis of settlements go beyond simple counts of sites organized by phase and environment to consider other details regarding settlement and land use in the region and to better characterize the sites.

Characterizing Settlement in the Mikindani Region

Survey Unit STP Data

Perhaps the most useful initial step in characterizing settlement in the Mikindani region is to reconsider the STP data from each of the survey units. For while all recovered sites were identified according to common standards, the STP data clearly show that sites, even those from the same microenvironment or phase, could be very dissimilar. The initial distinction of site size has already been discussed, but there are also important variations in terms of the number and kind of artifacts recovered. The STP data from the survey units allow us to explore the variable density of ceramics at different sites. Such distinctions enable the identification of portions of microenvironments with distinct settlement characteristics.

To begin, it is worth exploring the lowland survey units in the area between Mikindani and Sudi Bays. Five survey units were explored from this area, producing 13 sites or 2.6 per survey unit. The sites themselves also stand out: several sites are large, with dense cores and multiple loci of ceramic density. These characteristics are clearly visible in the trend-surface maps of the survey units (Figure 10.3). Those maps provide useful overviews of the artifact-recovery trends in each survey unit, though the STP interval was not set small enough to effectively capture spatial autocorrelation in all units so they do not necessarily provide statistically accurate predictions at small scales. Several sites, including Imekuwa Mibuyu, Kisiwa Forests, and North Imekuwa, present as dark brown areas covering several hectares, thus representing Wilson (1982) and Fleisher's (2003) small towns or towns, amidst largely artifact-free surroundings. Such sites cover the full range of phases, with Kisiwa Fields and Kisiwa Forests providing some of the best examples of multicomponent first-millennium sites, Lisoho North and Imekuwa Mibuyu doing likewise for the late-first and early-second millennium, and North Imekuwa and Lisoho Fields serving as examples of multicomponent sites with elements from widely separated phases. Amidst these larger sites there are also small sites, akin to fieldhouses in size, with dense artifact concentrations from one phase. Kisiwa Small dates to the early second millennium, Naumbu to the 19th-20th century, and Kisiwa South, which is slightly larger, is undated but likely contemporary with nearby Kisiwa Forests. The third type of sites from these survey units are comprised of medium-sized sites, equivalent in size to villages, which are less dense, without any STP yielding 10 or more sherds. Because they had no dense artifact concentrations, these sites lacked extensive ceramic samples. Three of the four, Imekuwa Fields, Naumbu Hills, and Naumbu Upupu, lacked diagnostic artifacts, though Imekuwa Fields is likely contemporaneous with nearby Imekuwa Mibuyu. The last of the four, North Imekuwa West, possessed some of the early second-millennium ceramics with interior connections.

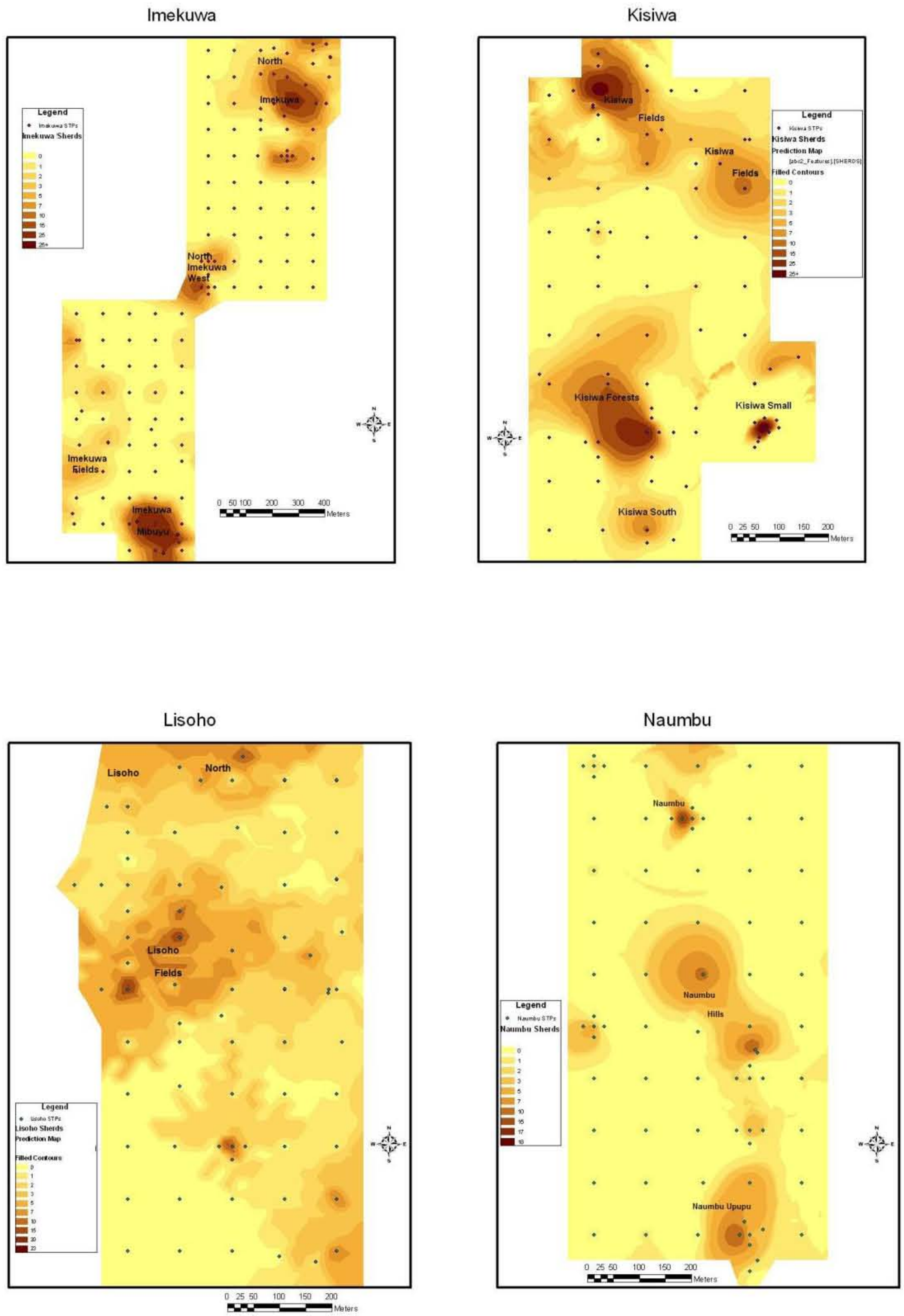
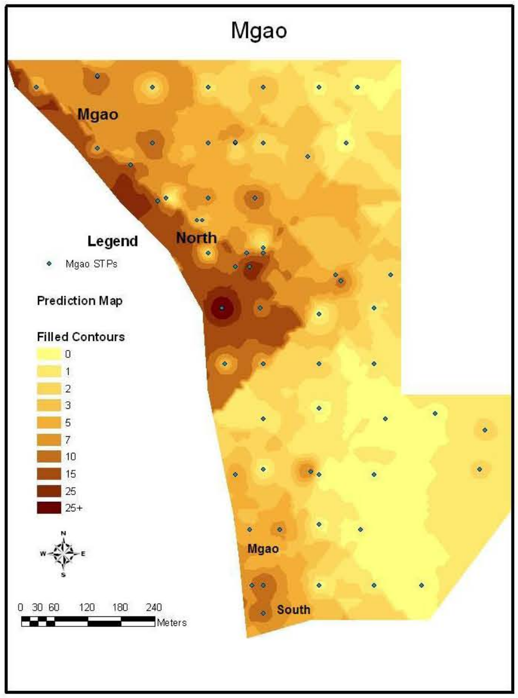


Figure 10.3 Survey Units 104, 112(Imekuwa), 36 (Kisiwa), 60 (Lisoho), and 142 (Naumbu)

Two coastal survey units explored the oceanfront area on either bay adjacent to the lowland area just described. The characteristics of these two units are similar to those of the lowland survey units. Five sites were found in the two units, for an average of 2.5 sites per unit. Each survey unit yielded one large, town-sized, artifact-dense site hugging the shoreline, Pemba and Mgao North (see Figure 10.4). While each of these sites had multiple components, their densest components represent phases from the first and second millennia respectively. There is also a small, hamlet-sized site, Pemba Bomani, with many artifacts and a 19th-20th century date. The last two sites are village-sized with lower artifact densities than the larger sites nearby and with more restricted date ranges, covering the late-first and early-second-millennium phases.

While these two groups of survey units provide important indications regarding settlements in the area between Mikindani and Sudi Bays, they also provide an important comparison for sites found in survey units elsewhere. Perhaps the most striking contrast is with the various highland survey units (see Figures 10.5, 10.6 and 10.7). The nine highland survey units produced only 13 sites (1.4 sites per unit), none of which possessed a size or artifact density comparable to the large sites between the bays. Taking the survey units from Figure 10.5 for example, none of the class of large sites found in the lowland and coastal regions are present. Instead, amidst the negative shovel tests are patches of low artifact density. Some of the larger patches, such as those in the two Naliendeli units, were clearly associated with modern occupations and were thus not designated as sites. In most cases what is left are fieldhouse- or small-hamlet-sized sites of uncertain date with either relatively low artifact density or one isolated high-density test. These sites were likely occupied for relatively short periods of time by individuals



Pemba

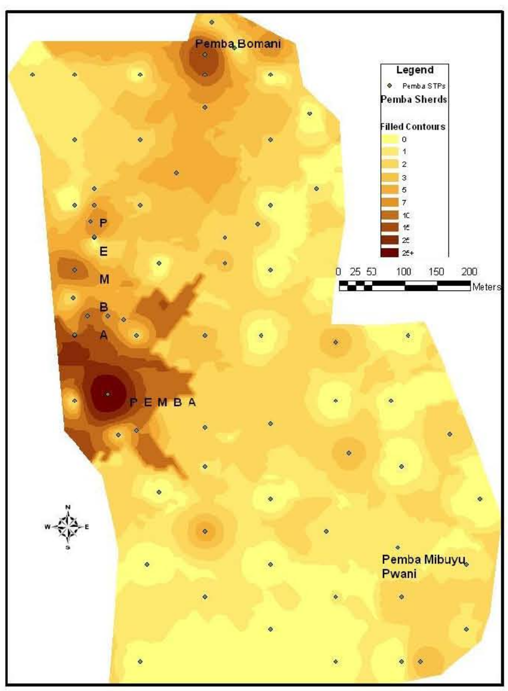


Figure 10.4 Survey units 10 (Mgao), 152a (Pemba)

or small groups. The lack of diagnostic artifacts from many of these sites is not wholly surprising given the few artifacts present at such sites overall; the recovery of clearly diagnostic decorated rims at Likonde Forest was actually fortuitous, rather than expected. Even in the case of larger sites, such as Likonde or Mji Mwema II (see Figure 10.7 for the latter), it appears that a small core site has been deflated over a larger, low-density area given the restricted space of high artifact density. The highland survey units without sites such as Mji Mwema West and Past Likonde (Fig 10.6) mostly follow this pattern of low artifact density amidst negative tests. However, the subsequent iron-cross shovel tests around the STPs with sherds in those units were negative, so no site designations were made. Still, from a non-site perspective the survey of these highland units documents a similar pattern of low-density, short-term use.

Within this general highland settlement trend there are indications of permanent occupation (see Figure 10.7). At Misijute and Mji Mwema I, I identified three hamlet-sized sites with higher artifact densities. The boundaries of the Misijute site were difficult to define because of its location amidst a modern village[3]; two other sites from the unit correspond to 19th and 20th century phases of that settlement. All three of these hamlet-sized sites show larger cores of artifact density than the other highland sites. Moreover, these sites have larger samples and can be assigned dates on the basis of diagnostic ceramics. Each of the Mji Mwema I sites has multiple components from the mid to late first millennium and Misijute dates to the early to middle second millennium. These findings indicate that some denser, longer-term settlement existed in the highlands, though the communities inhabiting these settlements were smaller than those found at the

[3] Despite being located within a modern town a site designation was made because its local ceramics clearly predated the modern occupation.

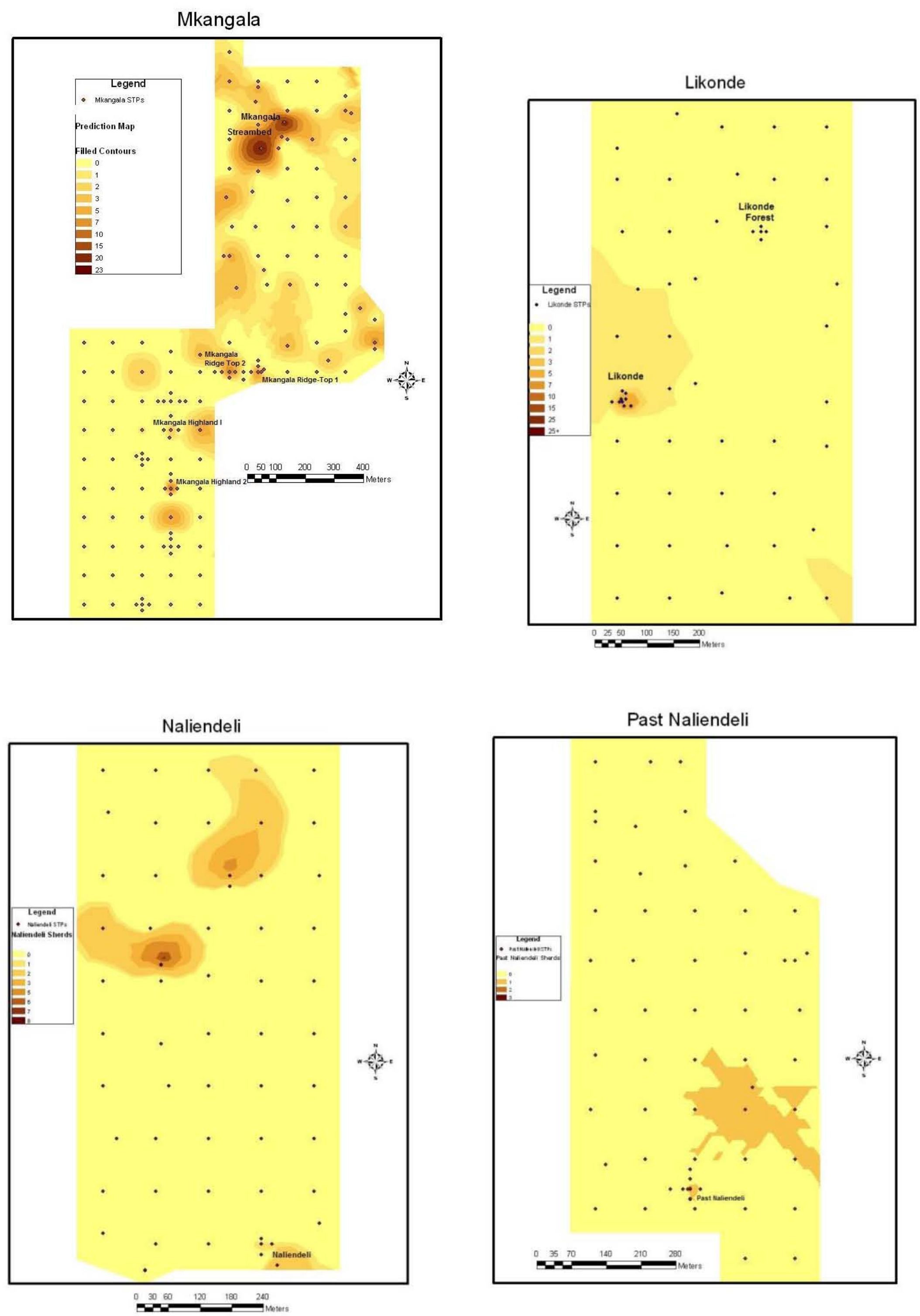


Figure 10.5 Survey Units 510 (Mkangala Highland, block to the bottom left), 331 (Likonde), 513 (Naliendeli), 505 (Past Naliendeli)

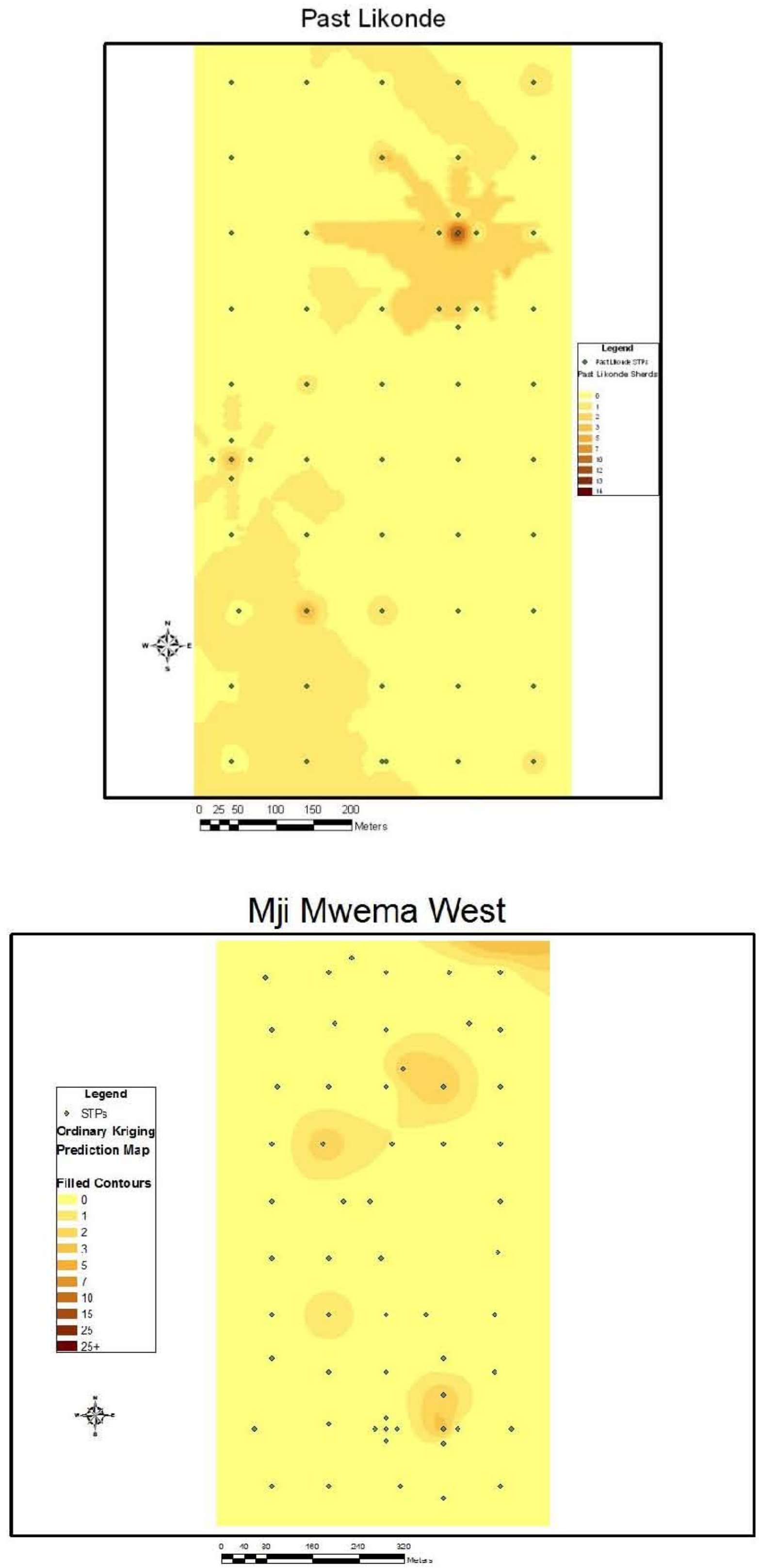
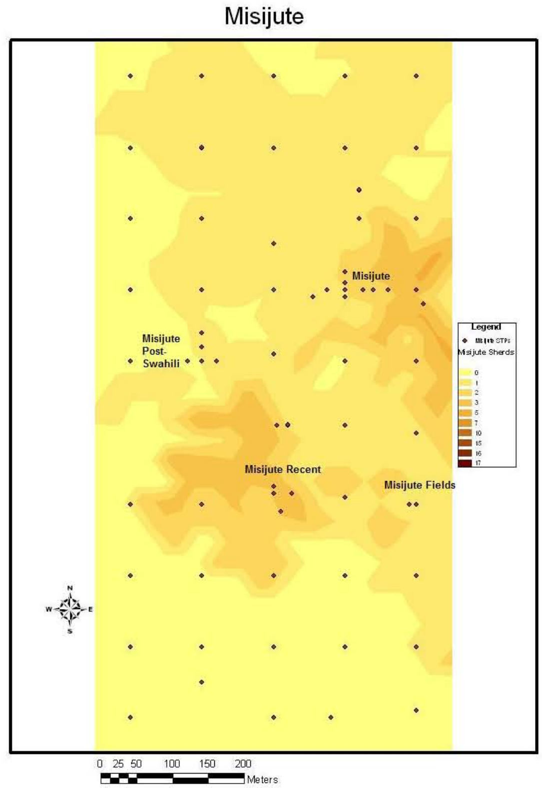


Figure 10.6 Survey units 325 (Past Likonde) and 435 (Mji Mwema West)



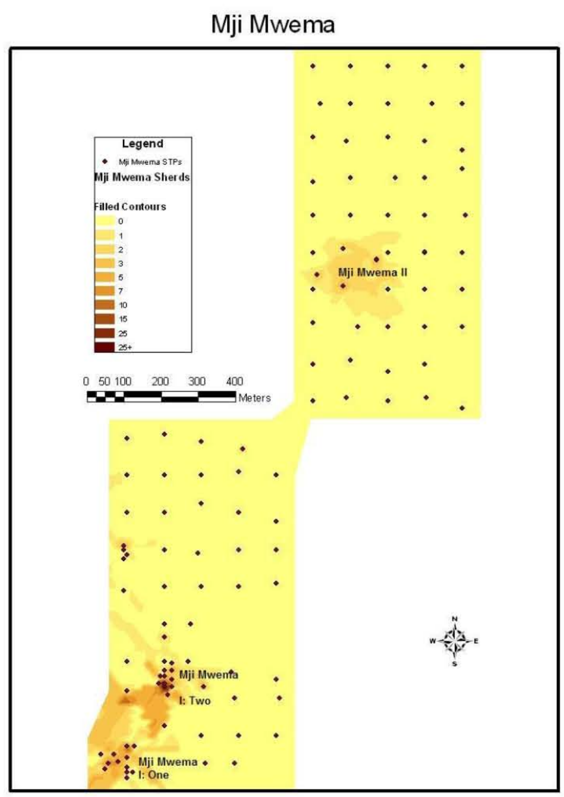


Figure 10.7 Survey units 370 (Misijute), 449, and 459 (Mji Mwema)

large lowland and coastal sites. While relatively few of these highland settlement sites were identified, it is also worth remembering that their size – below one ha. – implies that they would not always have been recovered by the survey's subsurface testing program due to the STP interval.

Other portions of the study area also showed low-density settlement patterns. The lowland area on the alluvial soils in the easternmost portion of the study area has similarly low artifact density (see Figure 10.8). In fact, inspection of these units' trend surfaces suggests that artifacts were at least as sparse in them as in the highlands and in the case of the easternmost units, Misn'gombe and Mnazi, more so. These four survey units produced just four sites. As with the Naliendeli units in the highlands, Misn'gombe and the two Ziwani units had dense areas that were clearly associated with modern occupations, not diagnostic to earlier phases, and thus not designated sites. One similar area, Modern Ziwani, was designated a site due to a separate undated component of local ceramics recovered well below the topsoil, but the only diagnostic artifacts at that site were from the 19th and 20th centuries. These units also had small sites about fieldhouse-size of moderate density: Misn'gombe, which is undated, and Ziwani Cashew Grove, which produced ceramics from the mid-to-late second millennium. The last site, Old Ziwani, yielded diagnostic ceramics for the Mangia/Early TIW phase, but it too was small – hamlet-sized – and had an artifact density of only a few sherds per STP. Taken together, these sites suggest that limited small, low-density settlements existed in the area amidst more ephemeral patterns of short-term use, but the easternmost lowland area was not a major focus of regional settlement.

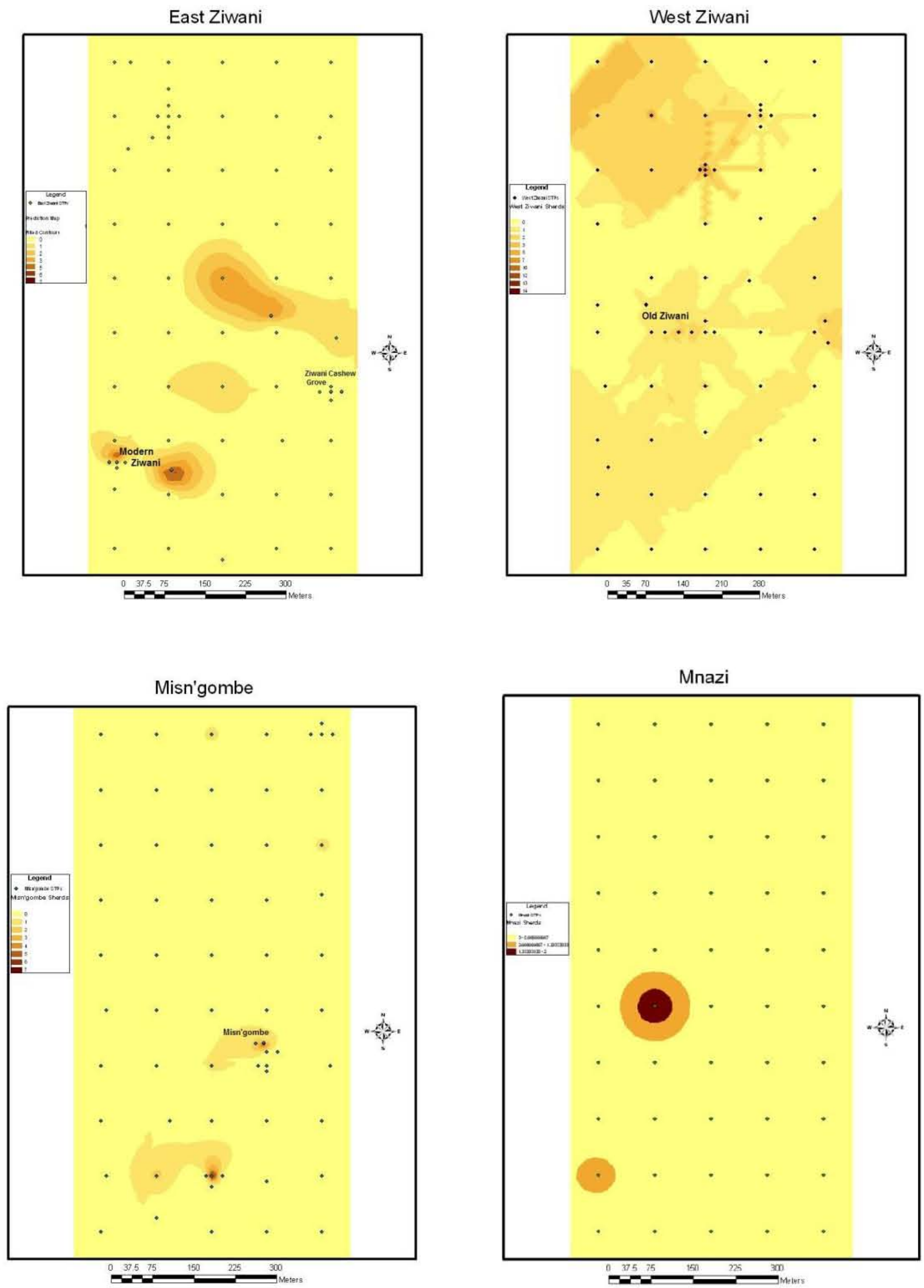
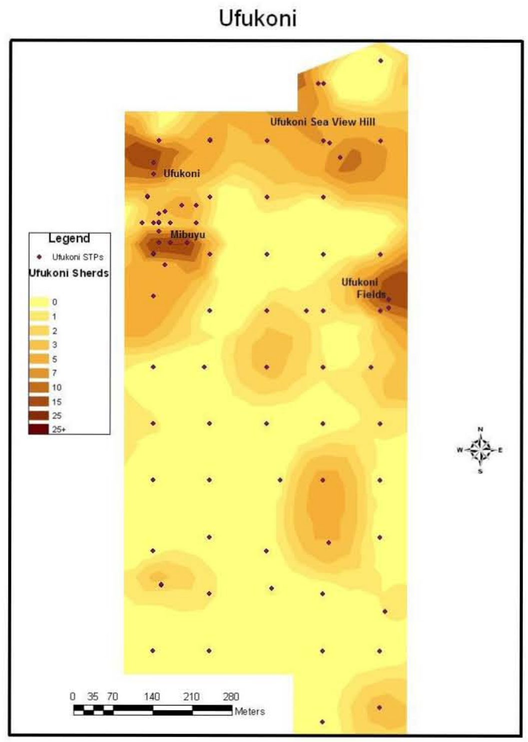


Figure 10.8: Survey units 184 (East Ziwani), 545 (West Ziwani), 210 (Misn'gombe), and 226 (Mnazi)

While the highlands and eastern lowlands were relatively sparingly used and settled, there were other areas of more intense, higher-density settlement in the region. The lowland area between Mikindani Bay and Mtwara Bay (i.e. east from Mikindani) is one such example. Like the lowlands between Mikindani Bay and Sudi Bay, soils in this area are derived from Pleistocene coral limestone. The two survey units from this area are home to four sites. Investigating the trend surfaces of the two survey units (see Figure 10.9) shows that these sites contain large areas of high artifact density. Ufukoni Mibuyu and South Mikindani were each small towns with multiple loci of artifact density. The latter site dates to the mid-second millennium, while the former is a multicomponent site covering the first and second millennia. The other two sites from Ufukoni were smaller – village-sized – but similarly dense. Ufukoni Sea-View Hill possessed diagnostic early second-millennium ceramics, while Ufukoni Fields has not been dated.

The coastal survey units at the margins of this central lowland area show similar settlement patterns (Figure 10.10). The two surveyed units produced three sites. All three have high artifact densities. Miseti Hilltop was a large town with multiple loci of artifact density and several components ranging from the early first millennium to the 20th century. Not all components covered the entire site however, and additional research will be necessary to determine the fluctuating size of the site over time. The Litingi sites are each hamlet-sized with high artifact density. Litingi Channel is a deflated Late Stone age site. Litingi is a multicomponent site with two distinct loci of high sherd density and late-first-millennium and mid-second-millennium components.



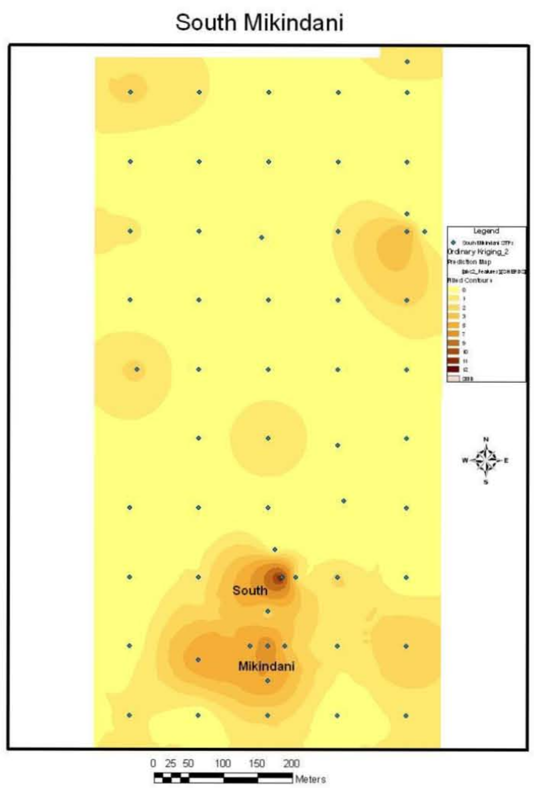
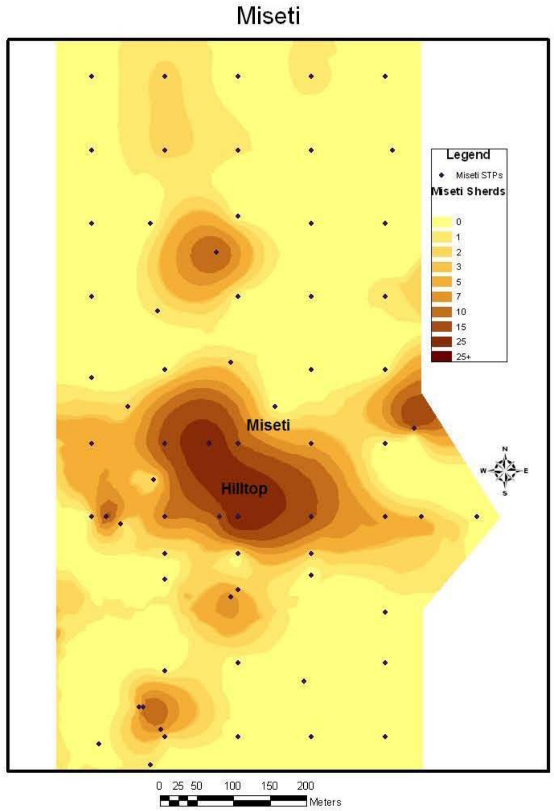


Figure 10.9: Survey units 506 (Ufukoni) and 456 (South Mikindani)



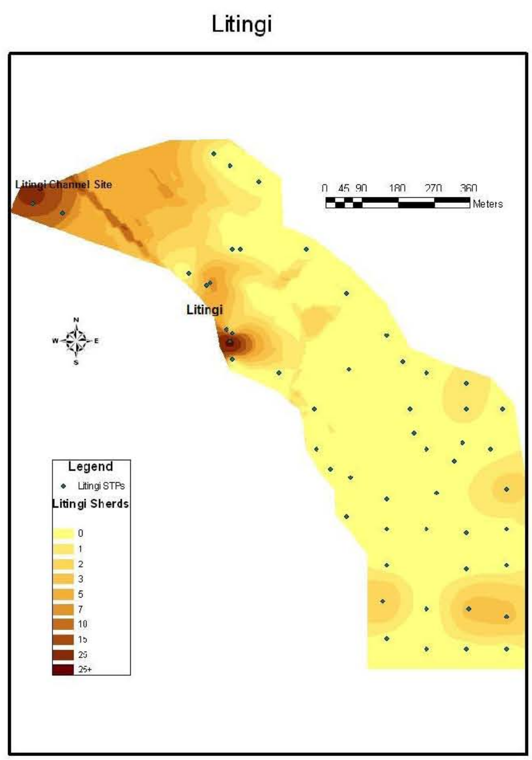
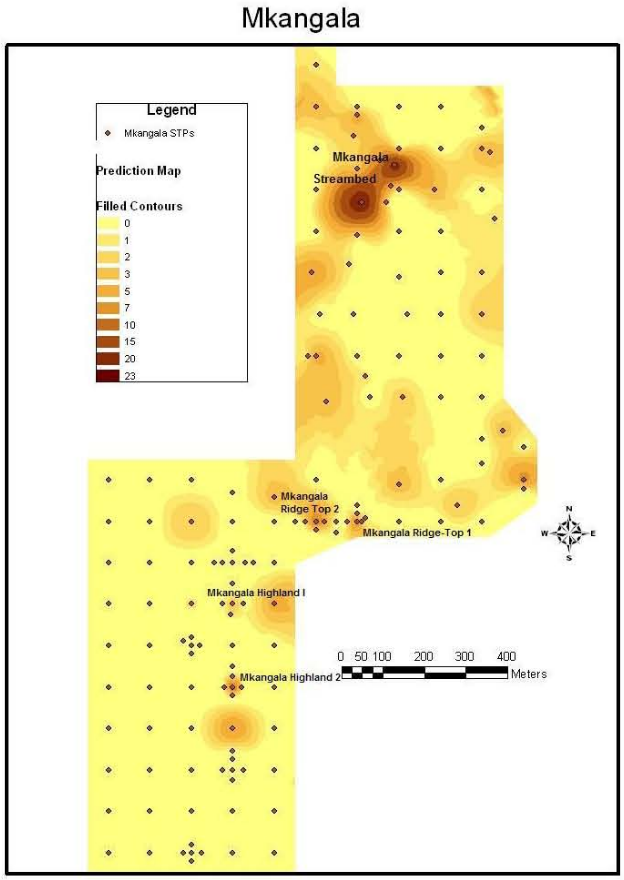


Figure 10.10: Survey units 490 (Miseti) and 466a (Litingi)

The ridge microenvironments present a distinct pattern of settlement and land use. The trend surfaces for the two ridge units are presented in Figure 10.11. Both units were home to settlement atop the ridge. These three ridge-top sites are small – two hamlets and a fieldhouse – and overall not very artifact-rich, but centered on denser cores. The Mbuo Ridge site is undated, but the Mkangala sites are each multicomponent, from the late-first and early-second millennia. Elements of the sites were found at the base of the ridges, whether brought there through anthropogenic or erosional action. In addition to the sites atop the ridge, there were also two larger sites, a village at Mbuo Ridge and a town at Mkangala, in the lowlands below the ridge. Each of these sites was denser than the sites atop the ridge and possessed multiple second-millennium components. While the two units surveyed present a very small sample size, they suggest that ridges were relatively intensely used and occupied, albeit through smaller settlements than those found on the lowland plains or the coast.

Finally, four survey units were explored from the three main watercourse valleys in the study area (Fig 10.12). One unit was placed in the Mbuo Valley at the far western edge of the study area, another at Mangamba tested the Mto Pwazi valley that separates the eastern lowlands from the rest of the region, and the remaining two tested the Mirumba Creek watercourse running to Mikindani Bay. While each unit recovered two sites, the striking aspect of the trend surfaces of these survey units is that they are not particularly similar to one another despite their shared microenvironment. Instead, they share certain characteristics with the surrounding portions of the study area. For instance, the Mangamba unit has two sites but relatively few artifacts aside from the band



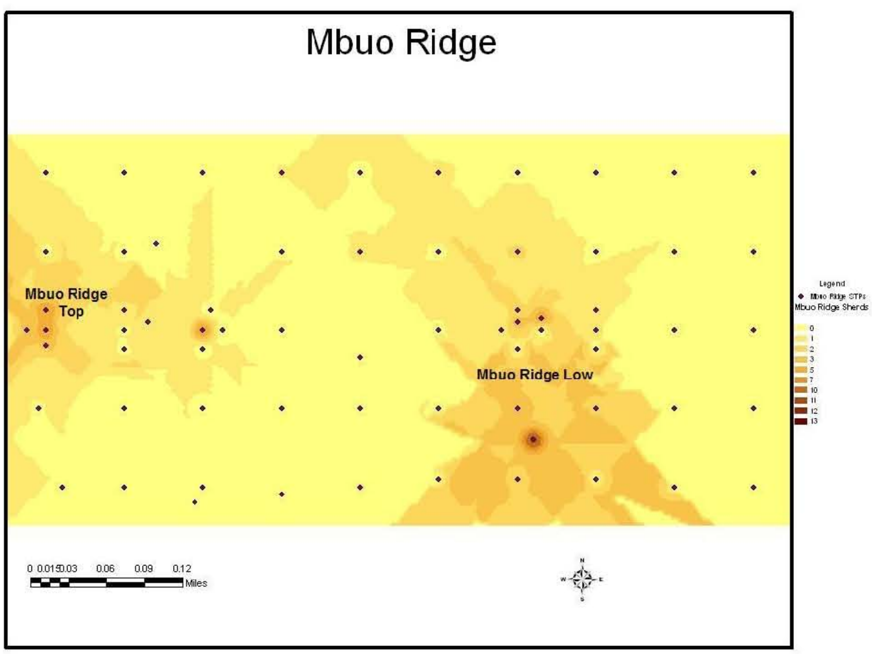


Figure 10.11 Survey units 509 (Mkangala Ridge; block to the right) and 161 (Mbuo Ridge)

associated with modern occupation along a main road. The sites themselves are small, and the only dense component is the recent 20th-century material from the Mangamba site. Mangamba Low, which is deeper into the valley, possessed relatively few artifacts and no diagnostic sherds. These relatively sparse indications of human settlement and land use in the unit match the pattern from the eastern lowlands.

In contrast, the Mbuo Valley survey unit has two large sites with dense artifact concentrations. In each case, erosion of the hilly terrain seems to have impacted the site's deposition, yet the recovered ceramics are still indicative of multiple components. In fact, excavation at the Mbuo Hilltop site, which covered a town-sized area atop a hill overlooking the valley and, in the distance, Sudi Bay, revealed that its components stretched from the LSA into the middle of the second millennium CE. Mbuo Mbuyu is smaller, between a large village and a small town, and its components dated exclusively to the second millennium. Nonetheless, the presence of these large, dense sites is common to the settlement patterns found on the nearby coast at Mgao and in the lowlands between Mikindani and Sudi Bays. It is also intriguing that this extension of dense settlement occurs along the best water route into the interior.

The survey unit near the Stella Maris church produced similar large, dense sites from the other side of that region a short distance away from Mikindani Bay. Each of the two sites from the unit, Stella Maris Hills and Stella Maris Mission, has loci of extreme density and covers a relatively large area – they are town- and village-sized respectively. Each also has multiple components. Stella Maris Hills, in fact, has components for every phase except for the LSA and the 20th century. Each of the sites was situated atop short hills raised up off the valley floor. Again settlement in this unit, with larger, denser

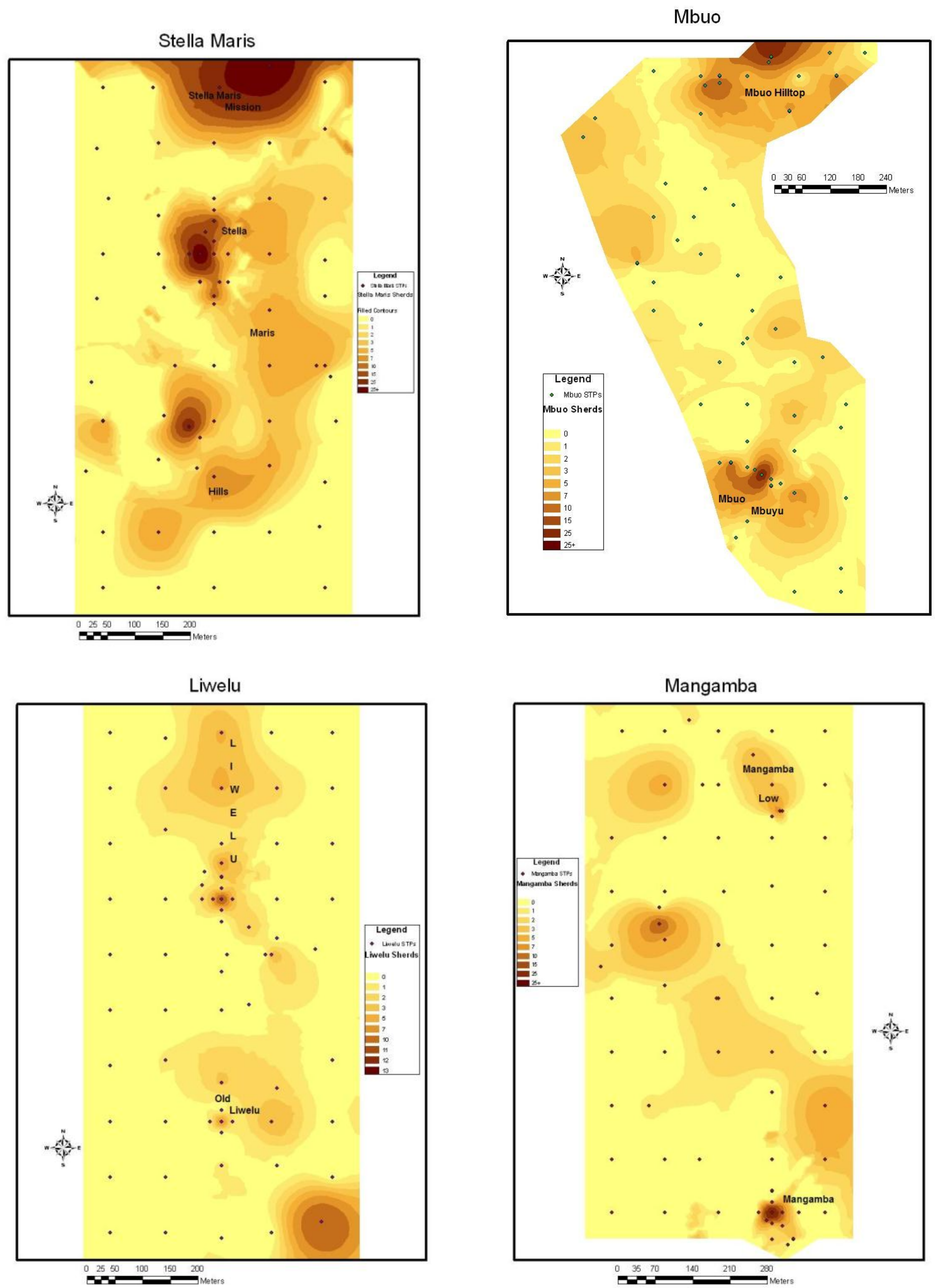


Figure 10.12: Survey units 430 (Stella Maris), 297 (Mbuo), 390 (Liwelu), and 516a (Mangamba)

multicomponent sites, largely conformed to the patterns described elsewhere around Mikindani Bay.

The Liwelu unit further away from the coast along the same valley shows some of the same trends, but overall seems to have been less intensely occupied, much like the highland region surrounding it. The two sites identified here are larger than those commonly found in the highlands – a village and a small town respectively – but they do not have as high an artifact density as found at either Mbuo or Stella Maris. Instead, each site yielded less than 5 sherds per STP and one site, Old Liwelu, did not produce a diagnostic sherd, though the thickness of its recovered sherds would suggest a first-millennium date. The other site, Liwelu, has sherds diagnostic of the Mwangia/Early TIW phase, but also several sherds from a recent 19^{th}-20^{th} century component. In general, both of these sites were larger and denser than most highland sites, but they are smaller and less dense than the big coastal and lowland sites (see Table 10.8).

In addition to recognizing intra-regional variability in terms of settlement patterns and the intensity of human occupations, it is also important to understand the shifting organization of settlement in the Mikindani region over time. The site classifications for each phase are presented in Table 10.9. Some aspects of the results are slightly misleading however. Because the project was unable to engage in extensive intra-site survey to determine the spatial boundaries of distinct temporal components of sites, multicomponent sites were recorded at the full site extent for each phase, even though they would not have been that large during each phase. For instance, all six of the sites from the Early First Millennium are also occupied during both of the other first-millennium phases, so while it is possible that they were all town-sized from the early first millennium it is more likely that some of the sites grew from smaller settlements into towns over the course of the millennium. Similarly, as we know from STPs and excavations at Miseti Hilltop, where the first-millennium component covers more area than the second-millennium one, some sites contracted over time as well. Given that about half of the sites from each phase had been occupied in the preceding phase as well, this is a notable difficulty.

	Lowland I	Lowland II	Lowland III	Coast I	Coast II	Highland	Ridge	Valley I	Valley II	Valley III
Number	13	4	4	5	3	13	5	2	4	2
Size	39.83	1.37	10.25	21	7.5	4.89	26.1	6.75	10.5	0.5
Fieldhouse	2	1	0	0	0	4	1	0	0	0
Hamlet	1	3	0	1	1	9	2	0	0	2
Village	3	0	2	2	1	0	1	1	2	0
Small Town	4	0	2	0	0	0	0	1	1	0
Town	3	0	0	2	1	0	1	0	1	0
City	0	0	0	0	0	0	0	0	0	0
Lowland I is between Mikindani and Sudi Bays										
Lowland II is between Mnazi and Mtwara Bays										
Lowland III is between Mikindani and Mtwara Bays										
Coast I is adjacent to Lowland I										
Coast II is adjacent to Lowland III										
Highland comprises all highland units										
Ridge comprises all ridge unts										
Valley I is Mto Mbuo										
Valley II is Mirumba Creek watercourse										
Valley III is Mto Pwazi										

Table 10.8. Site classification organized by microenvironmental areas

	LSA	Early First Millennium	Mwangia/Early TIW	Late First	Plain Ware	Early Second	Mid to Late 2nd	19th-20th	Undated
Number	2	6	17	17	2	22	11	21	14
Size (ha)	5	37.75	59.67	60.07	7.75	73.3	37.13	62.42	12.07
Fieldhouse	0	0	1	2	0	3	1	2	3
Hamlet	1	0	4	2	0	3	0	6	6
Village	0	0	2	3	0	6	3	4	4
Small Town	1	1	4	4	1	3	4	3	1
Town	0	5	6	6	1	7	3	6	0
City	0	0	0	0	0	0	0	0	0

Table 10.9 Phase II site classifications by phase

Nonetheless, there are a few trends that site classifications help elucidate. Perhaps most notably, they document increasing settlement density in the region over time, steadily increasing from the sparsely populated Late Stone Age and Early Iron Age phases into the more densely populated early second millennium. As mentioned earlier, the decrease in settlement density during the mid-second millennium is at least in part an artifact of the persistence of the early second-millennium ceramics into the second half of that millennium, such that it is sometimes difficult to distinguish between early and mid-second millennium sites. Nonetheless, Mikindani emerges as a regional center and city during this phase, and the concentration of people in the city seems to have reduced settlement size and density elsewhere. Bubonic plague also may have had an effect on regional population during this phase (see Killick 2009), though there is no evidence showing Mikindani definitely suffered from the disease. In any case, such reductions are less severe than the rural depopulation described with emergent urbanization further north on Pemba Island (Fleisher 2003).

Revised Predictions

The more nuanced understanding of regional settlement patterns which the analysis of the survey units provide also allow us to tweak our predictions for the total number of sites present in the study area. In particular, being able to recognize the diversity within microenvironments, such as the different settlement patterns in the lowland areas, enables more accurate predictions. As shown in Table 10.10, the salient difference is a reduction in the predicted numbers of lowland-plain and coastal sites driven by the lower site density of the eastern portion of the study area. Sample size remains an issue, particularly as the predictions are now sometimes based on only a few survey units for a given microenvironmental area. However, even these revised predictions emphasize that the Mikindani region was densely settled.

	# of Sites	Highland	Lowland	Coast	Valley	Ridge
Predicted	1882	420	720	286	265	191
Predicted Stratified	1816	420	699	241	265	191

Table 10.10 Revised predictions for total sites in the Mikindani region

Information Gleaned from Excavations

The other major source of information to characterize settlement in the Mikindani region comes from the Phase I and Phase III excavations. Those excavations provide data in the form of both features and large material culture samples. The features in particular provide access into the organization of household-level activities within sites. As discussed in Chapter 9, several types of features are indicative of houses and construction activities. Postholes were recovered at several sites from contexts covering almost all occupation periods of the region. Such features indicate that earthen structures were the most widespread building form over Mikindani's history. Nonetheless, it is clear the Mikindani region was home to some coral construction as well. Coral was recovered in relatively large quantities from one early second-millennium site, Mgao North, though admittedly from a context where natural coral was available. Buried coral wall stumps also existed in the Mnaida ward of Mikindani, well below the late-19th- and early-20th-century construction debris and sitting on mid-second-millennium deposits. Finally, there is the intriguing evidence of construction incorporating coral outcrops into building foundations from Kisiwa Fields.

Yet the pits and middens that were recovered are perhaps even more interesting for characterizing regional settlement patterns. A number of small pits and hearths were found during excavations. At Mkangala Ridge-top 1 a 12-cm-deep hearth, with abundant charcoal in a dark-brown sandy loam and several small sherds and daub pieces was recovered from the dense first-millennium occupation at the site. At Miseti Hilltop a shallow, 8-cm-deep, sand-filled pit containing some sherds was excavated from the edge of a first-millennium living floor. At Lisoho Fields a 9-cm-deep pit containing charcoal, bits of slag, and some fruit/nut seeds was recovered in association with early-to-mid-second-millennium ceramics. These small pits not only identify human occupations, but they also suggest that several activities were being organized at relatively small scales, likely households. It is not surprising that cooking was organized at such scales at small sites such as Mkangala Ridge-top 1, which may not have been occupied by more than one household anyway, but the presence of small pits, including one with a possible association with metalworking based on the presence of slag, at large sites indicates the importance of household groups within those sites as well.

However, not all recovered pits and middens were small. The excavation unit at Pemba produced two large pits filled with shell and first-millennium sherds that were each more than 25-cm deep. Each of these pits was in turn dwarfed by the 81-cm-deep pit at Stella Maris Hills, which was also filled with shell, charcoal and first-millennium sherds. These large and deep pits were either the product of much longer periods of deposition or larger groups of people filling the pits. A similar picture comes from the several excavated shell middens. The two middens from Miseti Hilltop and the midden from Pemba each contain several kilograms of shell, as well as abundant sherds and charcoal. While the multiple middens at Miseti show that shellfish-processing was not centralized at one location, the sheer volume of shell would seem to indicate that the middens were the product of collective activity. The second sediment layer at Mgao

North may also represent a portion of an extensive midden given its high shell and artifact density, in which case such middens can be shown to exist in sites dating to both the first and second millennia. However, these shell middens are only recovered in coastal contexts.

The artifacts recovered at different sites also provided an important means to study the organization of human activity in the Mikindani region. As already discussed, the different ceramic types recovered at each site allow us to distinguish their phases of occupation and the density of sherds at a site provides a measure of the intensity of the site's occupation. Recovered slag also helps distinguish settlements and other intensely occupied sites from more ephemeral ones. While slag was found at sites throughout the region in all five microenvironments during both the first and second millennia, it was restricted to relatively large or densely occupied sites and their near environs. Slag was found at the smaller highland and ridge sites that had been identified as long-term settlements, such as Mkangala Ridge-top 1 and the two Mji Mwema I sites, but otherwise it was restricted to dense sites that were larger than 1.25 ha. Tellingly, no slag was recovered from the larger but less dense highland site at Likonde. Also, no slag was reported from any of the sites from the eastern portion of the study area. Other spatial distinctions regarding the restriction of imported goods to the area between Mikindani and Sudi Bays (Chapter 8) and the archaeobotanical materials found in each microenvironment (Chapter 6) have been discussed elsewhere.

Overview of Settlement Characterization

Bearing sample size issues in mind, careful consideration of the data from STPs and excavations permits us to begin to characterize settlement patterns in the Mikindani region and to identify distinctions between and within regional microenvironments. The largest and most densely occupied settlements, as well as those occupied for the longest duration, were found in the area between Sudi Bay and Mikindani Bay, and between Mikindani Bay and Mtwara Bay. Those areas include survey units from the lowland, coastal, and valley microenvironments. Their geology is primarily derived from fossilized Pleistocene coral limestone, though some alluvial sediment is present in the valleys. The portion between Mikindani and Sudi bays also contains all the sites with first- and early second-millennium imported goods. Significantly, it is also the space in between the eventual stonetowns of Mikindani and Sudi. While some long-term settlement occurred in the highland region, and perhaps especially along the ridges separating it from the coast, these settlements were smaller and sites at higher elevation on the older Mikindani Formation soils tended to be both small and relatively ephemeral. Similar small, low-density settlements also occurred on the alluvial soils east of Mtwara Bay and the Mto Pwazi Valley. Beyond a failure to access imported goods, it seems likely that the economic activities of these eastern settlements were widely limited, as none has evidence of ironworking, which was otherwise widespread in the region. Nonetheless, within the broader region settlements seem to have been linked up as part of a regional system, as subsistence resources such as shell and fish moved between settlements, and to settlements located many kilometers from the ocean, during both the first and second millennia.

The distribution of sites during different phases is also telling, notwithstanding difficulties appreciating the internal temporal variation of multicomponent sites (see Table 10.11). First, it is worth noting that the two identified coastal areas do not include all coastal sites, as coastal survey units in the easternmost portion of the survey unit were not explored for logistical reasons. Again, sample sizes are small, so caution should be exercised when interpreting any particular result. Nonetheless, some recurrent trends are compelling and help to characterize settlement in the region. For instance, the lowland region between Mikindani Bay and Sudi Bay (Lowland 1) has more sites that would be expected under an even distribution in all phases before the 19th century, indicating that it was not only home to the largest and densest settlements but was also relatively densely settled during each phase. The Mirumba Creek Valley draining into Mikindani Bay (Valley 2) similarly outperformed its expected counts during each phase from the mid-first millennium, as did the ridge microenvironment after the early second millennium. In contrast, as suggested by the STP data, these results show that both the highland and easternmost areas underperformed their expected counts under even distribution. These results have important economic and environmental consequences in terms of long-term continuities in human-environment relationships and the sorts of environmental resources exploited by Mikindani's inhabitants. The analysis of the Plain Ware phase suggests that the phase was restricted to sites near Mikindani Bay, with important implications for the region's connections with the rest of the coast.

	Lowland I	Lowland II	Lowland II	Coast I	Coast II	Highland	Ridge	Valley I	Valley II	Valley III	Total
(% of studied area)	*19.0%*	*17.7%*	*2.9%*	*6.3%*	*2.1%*	*30.3%*	*7.9%*	*5.4%*	*5.2%*	*3.1%*	
LSA	0	0	0	0	1	0	0	1	0	0	2
% within period	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*50.0%*	*0.0%*	*0.0%*	*50.0%*	*0.0%*	*0.0%*	*100.0%*
Early First Millennium	3	0	0	1	1	0	0	1	0	0	6
% within period	*50.0%*	*0.0%*	*0.0%*	*16.7%*	*16.7%*	*0.0%*	*0.0%*	*16.7%*	*0.0%*	*0.0%*	*100.0%*
Mwangia/Early TIW	4	1	1	3	1	2	2	1	2	0	17
% within period	*23.5%*	*5.9%*	*5.9%*	*17.6%*	*5.9%*	*11.8%*	*11.8%*	*5.9%*	*11.8%*	*0.0%*	*100.0%*
Late First Millennium	5	0	1	3	2	3	1	0	2	0	17
% within period	*29.4%*	*0.0%*	*5.9%*	*17.6%*	*11.8%*	*17.6%*	*5.9%*	*0.0%*	*11.8%*	*0.0%*	*100.0%*
Plain Ware	0	0	1	0	0	0	0	0	1	0	2
% within period	*0.0%*	*0.0%*	*50.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*50.0%*	*0.0%*	*100.0%*
Early Second Millennium	6	1	1	3	1	2	4	2	2	0	22
% within period	*27.3%*	*4.5%*	*4.5%*	*13.6%*	*4.5%*	*9.1%*	*18.2%*	*9.1%*	*9.1%*	*0.0%*	*100.0%*
Mid to Late 2nd Millennium	2	0	2	1	1	1	1	2	1	0	11
% within period	*18.2%*	*0.0%*	*18.2%*	*9.1%*	*9.1%*	*9.1%*	*9.1%*	*18.2%*	*9.1%*	*0.0%*	*100.0%*
19th-20th Centuries	3	2	2	3	1	4	2	1	2	1	21
% within period	*14.3%*	*9.5%*	*9.5%*	*14.3%*	*4.8%*	*19.0%*	*9.5%*	*4.8%*	*9.5%*	*4.8%*	*100.0%*
Undated	4	1	1	0	0	5	1	0	1	1	14
% within period	*28.6%*	*7.1%*	*7.1%*	*0.0%*	*0.0%*	*35.7%*	*7.1%*	*0.0%*	*7.1%*	*7.1%*	*100.0%*

Table 10.11 Sites by phase and microenvironmental area

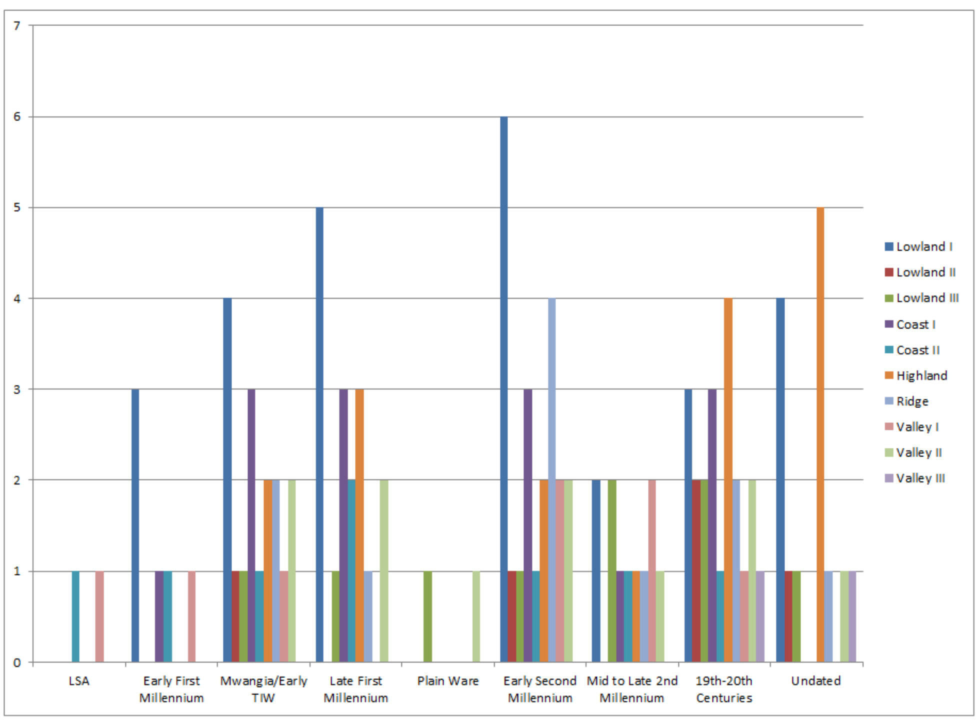


Figure 10.13 Sites by microenvironmental area for each phase

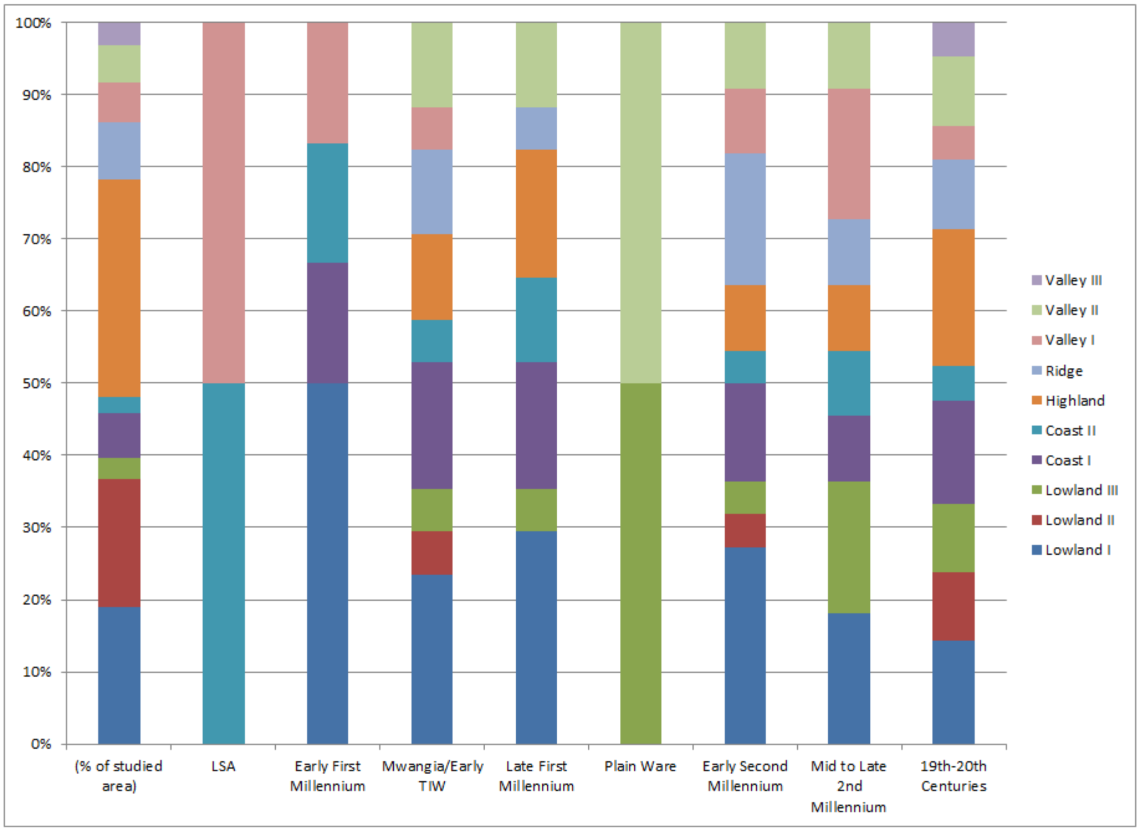


Figure 10.14 Percentage contributions of microenvironmental areas to settlement during each phase

Finally, there is also a recurrent aspect of settlement within many survey units which bears discussion. In many survey units contemporaneous sites are located quite close together, within a few hundred meters and sometimes quite a bit less than that, but still separated by artifact-free zones that prompted their designation as distinct sites. In some cases one of the sites is much smaller than the other, such as the relationship between Kisiwa South and Kisiwa Forests (see Figure 10.3). But in several other instances the sites are of comparable size and density, as with Kisiwa Fields and Kisiwa Forest, Lisoho Fields and Lisoho North, Stella Maris Hills and Stella Maris Mission, the two Mkangala Ridge-top sites, and the three Ufukoni sites. This point has not been raised to get bogged down trying to determine whether or not a particular pair of sites should be considered distinct or not. Rather, it is raised so that we might consider the implications of such spatial relationships for the social relationships between sites. Elsewhere on the coast Horton (1991, 1994a) has suggested that clans might occupy different portions of a site, and while there are no central enclosures here as he describes at Shanga, his work inspires consideration of a possible social explanation for the spatial pattern observed at Mikindani, particularly given ethnographic evidence regarding clan-based settlement organization amongst the Makua and Makonde in southern Tanzania (Tew 1950).

Locational Models and Settlement Patterns in the Mikindani Region

The data from survey and excavation thus has allowed us to produce a provisional characterization of sites in the Mikindani region, identifying distinct settlement patterns from different portions of the survey area. These descriptive characterizations can then be tested using the various locational models described in Chapter 4. This section explores how the observed site locations suggest certain patterns of site distribution, studies the extent to which the Mikindani region corresponds to the rank-size rule, and examines the economic and environmental implications of site-catchment analysis.

Site Distribution in the Mikindani Region

While important qualitative distinctions between settlements from different microenvironments have already been described, it is important to be able to move from the survey results to the model of site distribution that best matches the observed data. In particular, it is crucial to determine which of the three patterns of settlement distribution

– uniform, random, or clustered (Hodder and Orton 1976) – the Mikindani data most resemble. This is all the more important because the preceding analysis produced mixed suggestions. The initial site counts from each microenvironment suggested an even distribution of sites across microenvironments and thus also a random or uniform distribution. However, the site characterizations showed that larger and denser sites are overwhelmingly found in the lowland and coastal zones between Sudi and Mtwara Bays, suggesting an element of clustering, though uniform distribution could exist within those areas.

Archaeologists typically test these patterns of distribution using nearest-neighbor analysis (e.g., Adams and Nissen 1972, Plog 1974, Earle 1976, Hodder and Orton 1976). Nearest-neighbor analysis compares the mean observed distance between sites or classes of sites with the expected mean distance under random distribution. The resulting ratio – observed over expected – provides an indication of whether the distribution is more indicative of clustering (below 1), random distribution (near 1), or uniform distribution (above 1) (Pinder *et al*. 1979). Unfortunately, the survey data does not lend itself to nearest-neighbor analysis because the sampled portion of the study area was quite small and the observed sites did not provide the entire complement of any site category for any phase. As a result, the observed mean distances were artificially high because of the distance between surveyed units, rather than between the sites themselves.

Still, while straightforward nearest-neighbor analysis is not possible, the expected mean nearest-neighbor distances can still provide some useful indications of distribution patterns. Several of the instances of contemporaneous sites located relatively close together within the same unit were closer than the expected mean distance, indicating a degree of clustering. Further, if the predicted sites for given size categories were restricted to the microenvironmental areas wherein they were found – if all mid-first millennium towns were only found in the coastal microenvironment, the Mirumba Creek Valley, or the lowlands between Mikindani Bay and Sudi Bay for instance – then the predicted distances would be significantly lower than the expected distances for a random distribution over the whole of the region. If that assumption carries weight, and the relatively robust survey sample suggests it might, then there is an indication of clustering of at least some settlement classes in the areas between and around Mikindani and Sudi Bays. However, it would remain to be seen whether settlements within that area were distributed in clustered, random or uniform patterns.

The same difficulties that stymied full nearest-neighbor analysis for the settlement data in the Mikindani region also prevent a thorough comparison of the region with the Central-Place-Theory model. Without a complete complement of sites representing any given hierarchical level, excepting Mikindani itself after the mid-second millennium, the system of spatial relationships between sites remains mostly unclear. But again, certain assumptions of the central-place model can be tested against what observed data is available and, though CPT is not designed to explain settlement distributions, certain aspects of hierarchical behavior may be suggested. For instance, as discussed in Chapter 4, empirical evidence has shown that third-order markets are located about 33 km apart, second-order markets about 13 to 16 km apart, and the lowest-level markets 6 to 10 km apart (Hodder and Orton 1976). The observed distances suggest that the largest settlements in the Mikindani region before the middle of the second millennium CE – those classified as towns – are closer together than even the lowest-level distances typically found between markets.[4] Of course, not every town would necessarily have had a market and non-marketing functions could have been, and probably were, significant determinants of spatial arrangements. Nonetheless, the proximity of towns in the Mikindai region relative to expected distances for hierarchically organized activities provides not only a further suggestion of clustering but also hints at a lack of significant intra-regional competition between sites. It also bears noting that the lack of strong market influence occurs here in a region of the Swahili coast, whose societies are typically described as "mercantile" (Horton and Middleton 2000).

Rank-Size Rule

While use of Central Place Theory is problematic because the project did not recover a full complement of the Mikindani region's sites, the rank-size rule allows us to approach the question of hierarchical settlement organization in a different fashion that our robust sample of the region's sites is more suited to. However, sample size remains a caution when interpreting the results for any given phase. As discussed in Chapter 4, the rank-size rule assumes that larger sites occupy elevated, central places in the regional site hierarchy. Following from this, the rule predicts a linear lognormal relationship where a site of rank r will have a size equal to $1/r$ of the largest settlement (Haggett 1965, Smith 1974). Stochastic variation accounts for the model's departure from the step-wise pattern suggested by CPT, but otherwise the rank-size rule largely corroborates CPT assumptions (Johnson 1977).

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[4] It is however interesting that the distance between Mikindani and Sudi, the nearest stonetown during the latter half of the second millennium CE, is about 33 km.

Archaeologists have most commonly employed the rank-size rule to test economic and political integration within a region (e.g., Hodder and Orton 1976, Stein 1994, Fleisher 2003), with greater conformity to the rule indicating a greater degree of integration (Zipf 1949, Berry 1961, Stein 1994). Usefully, a region's fit between the expected linear relationship and the observed results can be depicted graphically. It is a fairly simply process to determine a measure of the goodness of fit from such graphs, measuring the area above and below the line and then adjusting for the total number of sites to produce a score between 1, representing total lack of hierarchy where all sites are the same size, and -1, where one site is overwhelmingly dominant, with a score of 0.0 for cases matching the linear relationship (Drennan and Peterson 2004). The rank-size graphs for the Mikindani region are presented in figures 10.15-17 and their scores in Table 10.12.

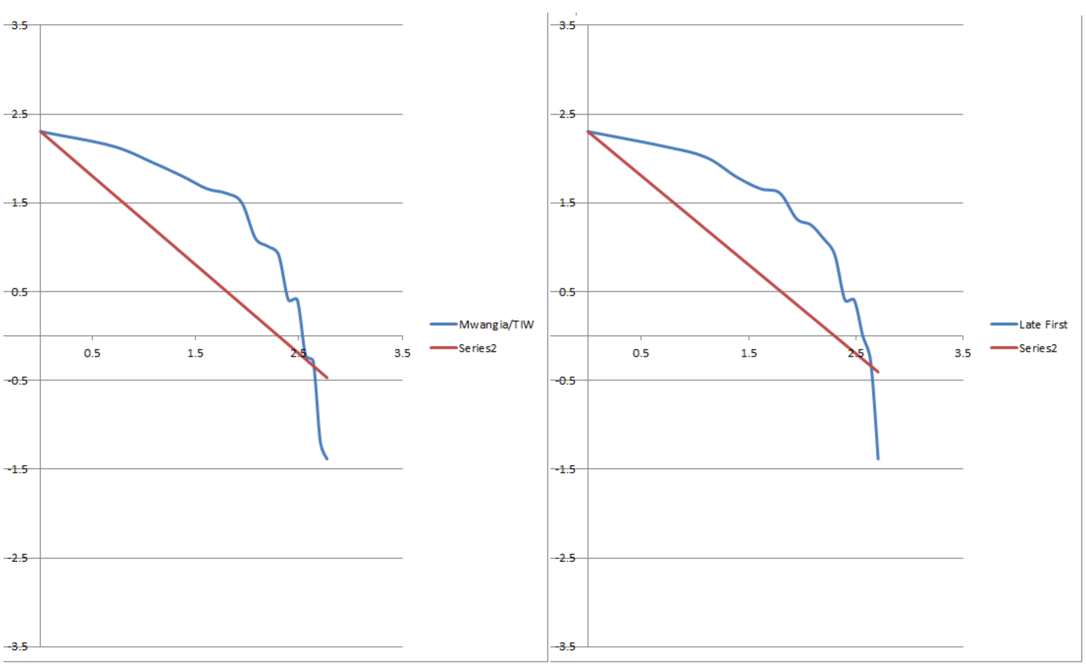

Figure 10.15 Rank-Size charts for first-millennium phases

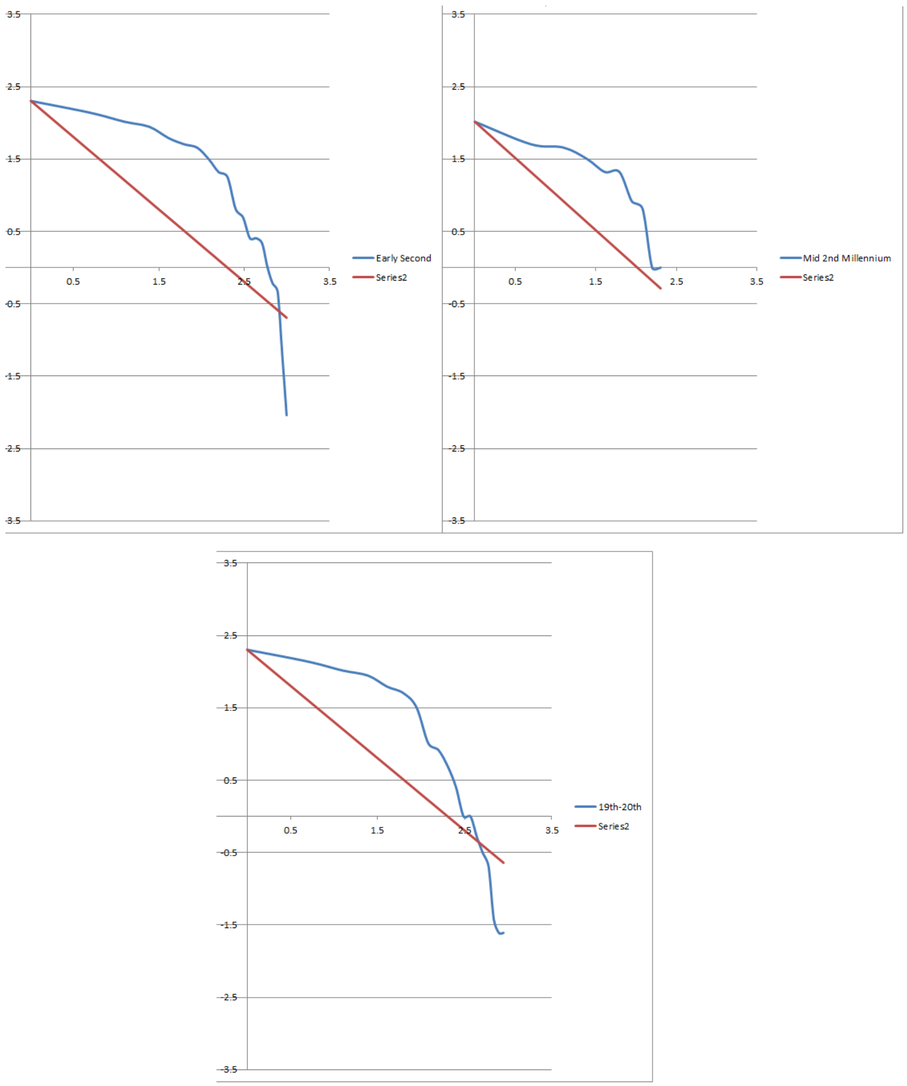

Figure 10.16 Rank-Size charts for second-millennium phases

	rank-size score[a]
Mwangia/Early TIW	0.4265
Late First Millennium	0.4724
Early Second Millennium	0.4850
Mid to Late 2nd Millennium	0.5014
Mid to Late 2nd w/M. Bay	0.1552
19th-20th Centuries	0.3717
19th-20th With M. Bay	0.1822
[a] Following Drennan and Peterson 2004	

Table 10.12 Rank-Size scores for phases in Mikindani region

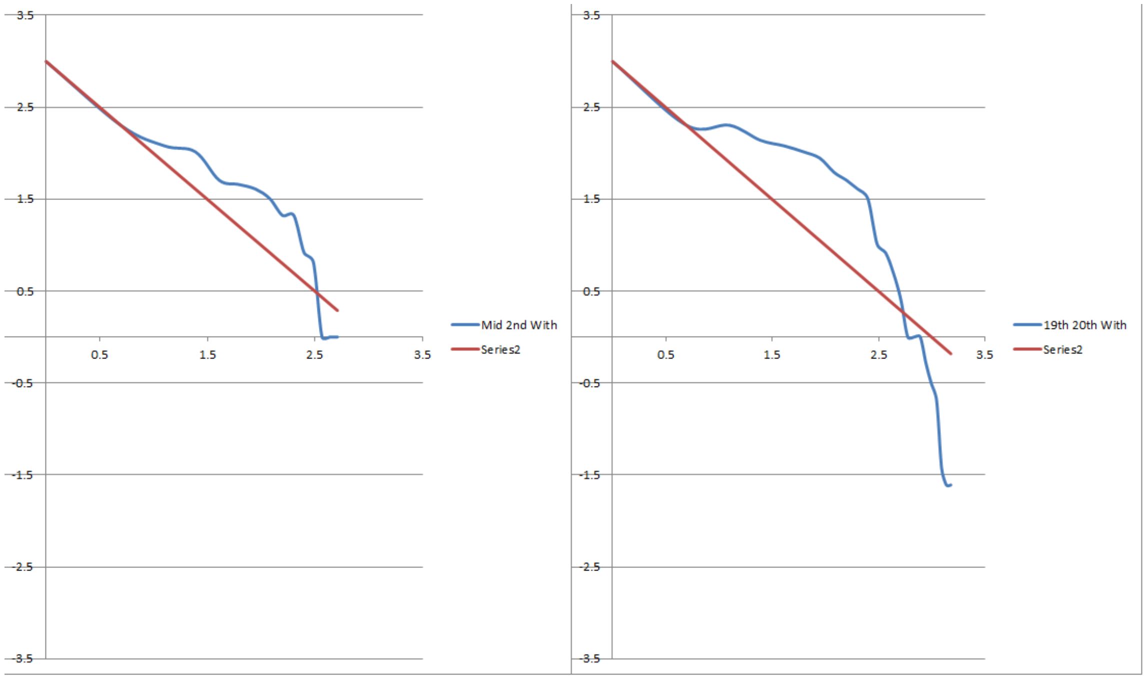

Figure 10.17 Rank-Size charts for mid and late second millennium including Phase I sites

In each phase the rank-size chart for the Mikindani region departs from the expected linear relationship and instead shows a convex form. While there is one site that is the "largest" in each phase, for instance Pemba during the first millennium, there are always multiple other sites within 25% of its size and many other sites classed as towns or villages. Convexity in rank-size charts is associated with a lack of hierarchy and relatively poor political and economic integration, in the sense of interdependent components of a larger system. The suggestion that the Mikindani region might lack such integration is supported by the organization of local production of iron and other goods as discussed in Chapter 9. Production was organized at the local or even household level to meet domestic needs, rather than specialist settlements producing for the entire region or for export.

Also of note are the extended tails on several of the charts, representing the small hamlets. Fieldhouses are not included because they are not expected to have been continuously occupied. These tails represent the opposite pattern from the overall convexity. Falling below the line, they suggest something akin to the primate pattern where large sites suppress second-order centers such that some sites are much smaller than expected relative to the largest sites based on their rank (Smith 1976a). To some extent these results might be an artifact of a failure to distinguish settlements from more ephemeral activity areas, though settlements such as Mkangala Ridgetop 1 and Mji Mwema I: 2 are represented amongst the sites in the tails. The presence of such settlements in the tails of these charts is indicative that multiple orders of settlements existed in the Mikindani region, the model corroborating the picture from the survey artifacts.

To a certain extent these two trends balance each other out, though the rank-size scores still indicate a greater degree of concavity and departure from the rank-size rule's expectations. Perhaps more importantly, these results also suggest patterns for the interactions and growth of settlements. First, it is clear that no settlement was able to increase in size beyond a certain point until the emergence of Mikindani as a center in the latter half of the second millennium CE. Given that many of the largest settlements were occupied over several phases, social mechanisms were probably operating to limit settlement size, perhaps most likely through the regular departure of groups of citizens to form new settlements or join other existing settlements. The implications of such limits for the functions of large sites will be discussed later. Second, the consistent convex shape of the rank-size curve indicates that a pronounced settlement hierarchy did not exist in the region. Further, it suggests that there was not a strong, coherent set of social, economic, and/or political forces that prevented hamlets and villages from developing into towns. It is not clear, however, that these results imply stiff competition between the towns and small towns of the Mikindani region. In fact, competition often produces a uniform distribution pattern rather than the tendency for settlement clustering that the Mikindani survey indicated, though competition for a limited resource might provoke a degree of clustering. The lack of settlement hierarchy and of heavy inter-site competition should not imply that sites were not in regular contact however. The third pattern indicated by the rank-size results regards small settlements. While many settlements were able to grow and attain greater size, a number of them remained small, particularly those in the highland and ridge microenvironments. This would suggest that there is some factor or set of factors limiting the growth of such settlements, though whether that is from competition with other settlements or some characteristic of the settlements themselves remains to be determined.

It is also worth noting that the region fitted the rank-size rule much more closely in the latter half of the second millennium if the sites excavated during Phase I, most notably the center of Mikindani, were included. The charts still show some convexity where there are more large towns than expected, and a low tail from several fieldhouses and smaller hamlets. The persistence of each of trends suggests that even after Mikindani emerged as a regional center the rest of the region remained relatively poorly integrated economically and politically with limited ordering of second-tier centers, namely the towns, from Mikindani, as the category appears to remain open to expanding smaller settlements.

Rank-Size Rule for Southern Tanzania

The rank-size rule can also be applied to study the relationship between Mikindani and the rest of the coast. Given its economic predominance on the southern coast, perhaps the most important question is how such an analysis would work if Kilwa was included. In that case the rank-size chart (Fig. 10.18) again deviates from the expected log-normal relationship, but this time it presents a convex curve below the line the entire time. That curve is indicative of a primate-city situation, where Kilwa is substantially larger than the largest settlements in the Mikindani region – about 5 times as large, rather than twice as large as predicted by the rank-size rule. Such patterns are generally thought to signify imperfect economic competition and dendritic systems where trade is funneled through the largest site. Given the overall paucity of imported goods in the Mikindani region in the early to mid-second millennium, such a relationship indeed may have existed. It is worth remembering, however, that Wynne-Jones' (2005a) survey results suggest that a similar primate pattern existed when comparing Kilwa with its own surrounding hinterland amidst broader patterns of settlement continuity.

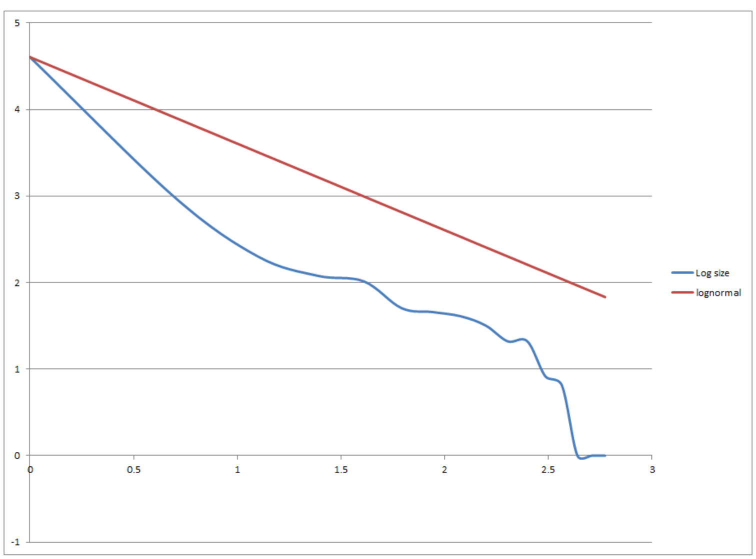

Figure 10.18 Rank-size chart for the mid-second millennium including Kilwa

While the disadvantage in Indian Ocean commerce that the primate pattern predicts did exist for the Mikindani region, the lack of evidence for strong economic integration in the Mikindani region coupled with broader patterns of continuity and self-sufficiency in settlement suggests that this may not have been a case of straightforward impoverishment. Rather than developing markets that would have been dependent on the primate city, Kilwa, there is little evidence that the local economy was significantly oriented towards Indian Ocean commerce or towards Kilwa even after reestablishing cultural ties to the northern coast in the middle of the second millennium. Instead, the region remained only occasionally involved in such commerce, as would seem to be indicated by imported ceramic ratios, the spatial restriction of such imports, and the continuing prevalence of local ceramics with interior associations. Kilwa’s rulers, dealing with local and foreign challenges (Fleisher 2004) and whose wealth was founded on trade relationships further afield, are not likely to have minded.

Site Catchment Analysis

Another useful tool to help understand settlement patterning in the Mikindani region is Site Catchment Analysis (SCA). SCA aims to show which natural resources were available around sites with the basic premise that site function and site location are correlated. While perhaps overemphasizing the environment and associated economic functions, SCA provides useful insights into the sorts of resources that were readily available, as well as which resources found at sites would have required more effort to come by. The distances for the areas within daily access derived from ethnographic analogy tend to vary somewhat but rarely exceed 10 km or a couple hours’ walk, and agricultural populations are often thought to travel much less than that (Stone 1991, 1992; Horne 1994). Given that Mikindani's population was agricultural, a zone of 4 km around each site seemed a reasonable estimate for daily use.

When mapping these 4 km catchment zones around sites in the Mikindani region the most striking feature is the extent to which the zones overlap, even setting aside instances where multiple sites were found in the same survey unit (see Figure 10.19). Even when broken down by phase the catchment zone from a site almost always overlaps with those from multiple other sites (see Figure 10.20). Such overlap has a number of important implications. First, it shows that many sites in the region probably shared access to certain resources, including fresh water flowing in the valleys. Such shared reliance on certain resources indicates that, if not cooperation, there was at least an absence of outright hostility to enable continued access. At the same time, the frequent overlap between the 4 km catchment zones also suggests that the important environmental resources influencing settlement location were located closer to home. The marine resources provide a case in point. Shell and fishbone was found at several sites in the region, including some which were further away from the shore than 4km, such as the sites from Mji Mwema and near Imekuwa. However, the quantity of shell found at a site decreased rapidly with increasing distance from shore, even for sites whose catchment areas included coastline. Shell middens were only found at sites from the coastal microenvironment within a few hundred meters from the ocean. Sites within a couple kilometers of the ocean, such as Ufukoni Mibuyu and Stella Maris Hills, sometimes produced as much as a hundred grams of shell. However, site such as Kisiwa Fields, whose catchment area just barely included coastline along Sudi Bay, produced only fragments of shell, no more than was available to sites whose catchment areas did not include the ocean. This suggests that the spatial importance of marine resources possessed a greater immediacy than is captured in even a relatively conservative catchment area. Given the persistent overlap of sites' catchment areas, it is likely that their spatial arrangements were similarly oriented to exploit resources in the immediate surroundings. For lowland sites this almost certainly related to agricultural space. Indeed, the settlement history of the region shows early settlement of the lowland plain area regarded by some modern farmers as particularly fertile and this area has remained a zone of dense settlement into the present. An intriguing direction for future research would be to determine the extent to which agricultural settlements in this area may have eventually impeded one another in terms of the land they were able to bring under cultivation, beyond the simple overlap of catchment zones.

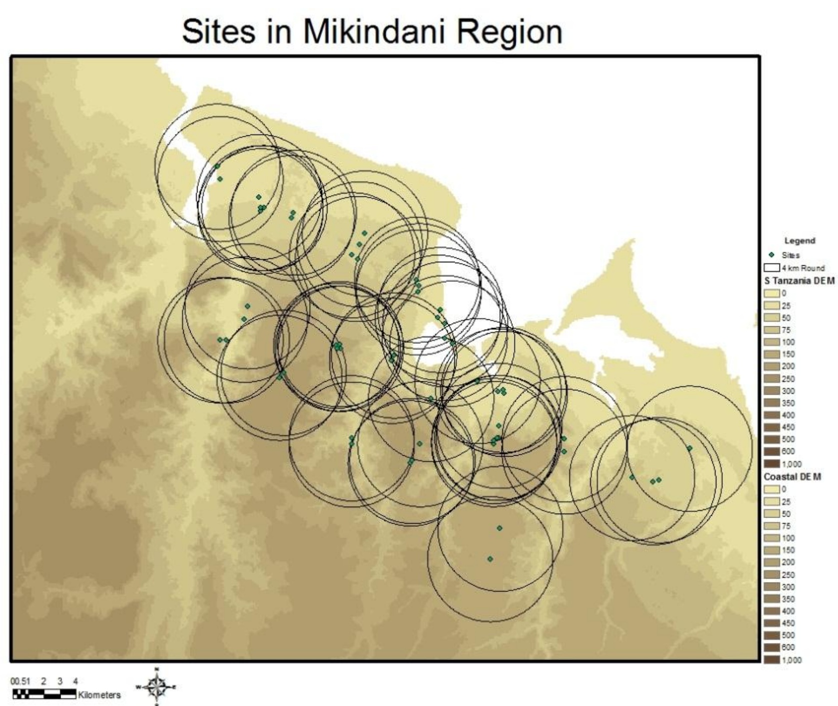

Figure 10.19 Sites in the Mikindani region with 4 km catchment zones

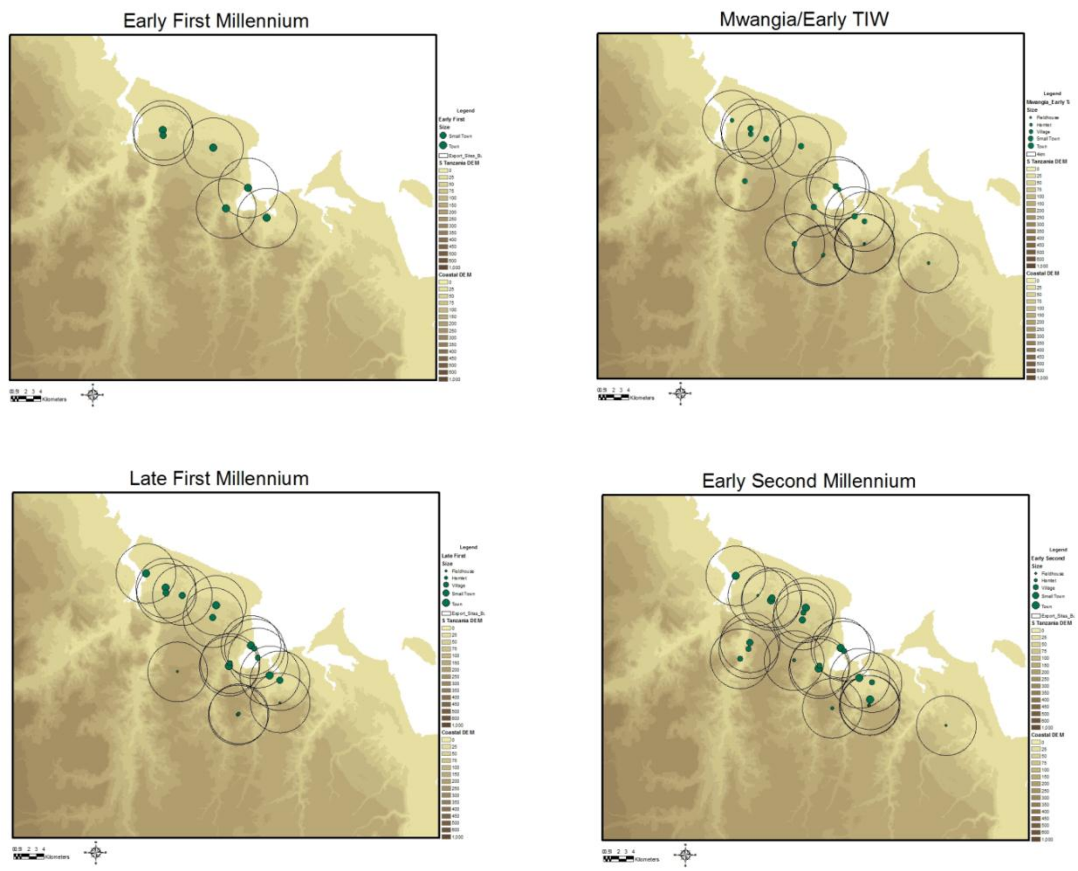

Figure 10.20 Catchment zones around sites in the Mikindani region during four phases

The overlap of catchment zones and reliance on immediate subsistence resources also had practical consequences for the relationships between sites. One salient feature of settlement in the first millennium was a startling intervisibility of sites around Mikindani Bay (see Figure 10.21). As was first noticed during survey and later confirmed with GIS analysis, contemporaneous sites around the bay, while in many cases being several kilometers distant, could literally see one another. Such striking intervisibility reinforces the broader site-catchment implications: sites would have been able access to some of the same resources – a point reinforced by the presence of marine resources at each site – but such open access does not seem to have led to competition and eventual restriction, given that many of these sites were occupied during several phases. Instead, these shared resources must have been complemented by more privileged access to other resources in the immediate vicinity. While the rank-size curves suggest a lack of regional economic and political integration, this intervisibility and open access to resources indicate that the populations of different sites were nonetheless highly aware of one another's activities and were willing to cooperate and share resources even if they did not become dependent on one another economically.

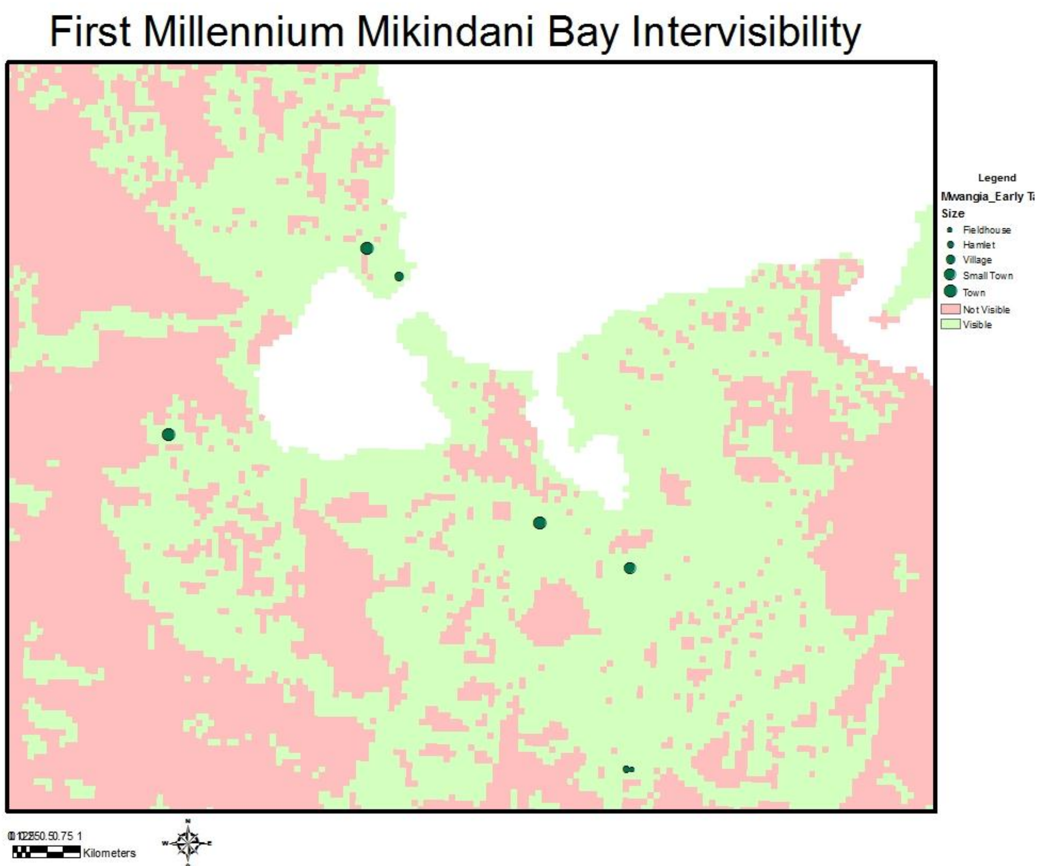

Figure 10.21 Inter-site visibility around Mikindani Bay, first millennium CE

Landscape Archaeology and Cultural Significance of Space

As discussed in Chapter 4, cultural constructions of landscape can be effectively approached through the material correlates of human interaction with the environment by which cognitive landscapes were made real. The habitual and habituated practices that are part of the recursive relationship between humans and their environment can describe the coastal population's practical orientations to their surroundings. Importantly, those orientations are grounded within the cultural and cognitive structures of coastal society and are as responsive to social and cultural dynamics as they are to environmental change. Archaeologists only rarely have sufficient evidence to reconstruct the actual cognitive meanings ascribed to landscapes, but the material correlates of human interaction with the environment, when placed in within a well-understood long-term context, nonetheless provide insight into how cognitive landscapes influenced behavior. For the Mikindani region, spatial data regarding land-use and settlement patterns, when understood within the broader context provided by different artifact classes and environmental analyses, suggest three significant themes regarding Mikindani landscapes, though again not the exact meanings which would have illuminated those themes.

The first important theme of the Mikindani landscape is the persistence of settlement in particular locations. In each phase multiple sites from the preceding phase remained occupied – more than half of the sites recovered during the Late First Millennium and Mid-Second Millennium – and some sites had components that covered phases several hundred years removed with little evidence of abandonment and resettlement. Just looking at the largest settlements, continuity is even more striking. In the four phases between the early first millennium and the mid-second millennium, three sites are among the five largest sites in each phase, Pemba, North Imekuwa and Miseti Hilltop, and a fourth, Stella Maris Hills, is occupied during all phases but falls out of the top five during the early second millennium. While the size comparisons might be a bit misleading because of difficulty disarticulating the boundaries of sites' multiple phases, this evidence still suggests a remarkable persistence of settlement at the region's towns. Looking at the region more broadly, the lowland area between Mikindani Bay and Sudi Bay was the focus of settlement in the region in each phase, which similarly suggests persistence and continuity at the supra-site scale.

Continuity of settlement has a number of important implications in the Mikindani region. The persistence of settlement in areas near relatively young, limestone-derived soils suggests that the inhabitants of the Mikindani region recognized and exploited the value of that soil from a very early period. Those soils, with their propensity towards being more alkaline and relatively high levels of phosphorus were both more fertile and possibly more resistant to nutrient depletion. Easy access to similarly valuable marine resources also helps explain the continuity at coastal sites such as Pemba and Miseti Hilltop. But settlement persistence is not simply about environmental features, nor is it problem-free. Continuity at a town also implies that the settlement would have developed and held historical meaning(s) for the region's inhabitants and, whatever the specifics of those meanings, they likely contributed to the town's social reproduction generation after generation. What ethnography exists from the region (Weule 1909, Tew 1950) suggests that the relationship between these long-occupied places and ancestors might have been significant. The persistence of settlement at sites in the Mikindani region also would have brought certain challenges. As described in Chapter 6, many of the sediments near settlements lost important nutrients and the stress that persistent agriculture and expanding settlements placed on the surrounding environment was substantial. Similarly, for agricultural populations there is not an inexhaustible supply of nearby land available to be farmed. Taken together, difficulties providing good, nutrient-rich agricultural land over time may have contributed to limiting settlement size, though in most cases apparently did not lead to the dissolution of the settlement.

The second major landscape theme from the Mikindani region is the recognition and reification of microenvironmental difference. In the same way that persistence of settlement in the lowland plains on limestone-derived soil implies, in part, cultural recognition of the agricultural potential of that land, so too do the small, more ephemeral settlement extensions into the highland sandstone-derived plains imply cognizance of the less fertile soils there, even if agriculture in that microenvironment was supplemented by forest resources. A negatively reinforcing loop existed; highland environmental characteristics made the development of large settlements more difficult and the knowledge that such settlements did not exist seemed to deter even smaller highland settlements after the late first millennium until the 20th century.

But perhaps the most significant microenvironmental differences on the Mikindani landscape distinguished the coastal areas from others as places offering unique opportunities. Marine resources were heavily exploited only in coastal areas. These resources provided important sources of protein and thus held significant value, but were much less common away from the coast, even in "near-coast" areas of other microenvironments only a few kilometers from shore. Instead, non-coastal regions seem to have exploited marine foodstuffs only intermittently and perhaps via trade with coastal partners, even though the deposition of such resources in the Mikindani region was widespread. Coastal areas also possessed access to the rest of the Indian Ocean world, although near-coastal areas shared this distinction. Coastal and near-coastal settlements possessed most of the early imported goods to the Mikindani region, and coastal and near-coastal sites around Mikindani Bay are the only locations where Plain Ware ceramics, with their connections to contemporaneous Swahili sites, were found in the early second millennium. In this sense the coast was also the place that communicated knowledge from and about the Indian Ocean world, ranging from new crafts such as weaving and new crops like cotton to Islam, whose earliest traces are found along Mikindani Bay. Although the practices of Mikindani's inhabitants suggest that the coast was understood as a distinct portion of the landscape, coastal settlements were not static and monolithic. For instance, while Pemba on Mikindani Bay was the largest coastal site during the first millennium, Mgao North on Sudi Bay was the largest and densest site in the early second millennium before the rise of Mikindani as a regional center, and yet two near-coast sites, Stella Maris Hills and Ufukoni Mibuyu, provide the best evidence for Plain Ware.

Despite awareness of its cultural distinctiveness and attractiveness, the third major theme of the Mikindani landscape is that the region did not rely on the ocean and what it brings, and that coastal sites were not dominant. As indicated by site-catchment analysis, most sites focused on their immediate resources for subsistence. Production was organized to suit local needs through local manufacture. Several aspects of Swahili society whose presence in the region was mediated through the coast, ranging from rice agriculture to ceramic styles, were not adopted. While several coastal sites were large, dense settlements, rank-size analysis shows that, even when they were indeed the largest sites for a given phase, they were but one or two among several similarly sized, similarly dense habitations and there is no evidence to suggest they were appreciably richer or economically more powerful. So instead of sitting atop settlement hierarchies, coastal sites were enmeshed in local networks that may have had a more heterarchical organization where sites kept in sustained contact through mechanisms like intervisibility and frequent interaction amidst overlapping catchment zones. This non-dominance is apiece with the broader picture of Mikindani history where coastal ties fall away and interior ones become more pronounced during the second millennium.

Functional Analysis of Shifting Settlement Patterns in the Mikindani Region

A necessary element to understanding settlement patterning in the Mikindani region is to understand the functions of sites with the broader regional system. Such efforts to recognize site functions have been important components of archaeological studies of urbanism (Trigger 1972) and have been particularly effective identifying urbanism in Africa (McIntosh and McIntosh 1993, 2003; S. McIntosh 1999; Fleisher 2003; LaViolette and Fleisher 2005). Nonetheless, identifying site functions is also important to understanding regions without urban agglomerations.

Mikindani was not an urban place for the majority of its history. Trigger's (1972: 577) influential, functional definition of a city as "a unit of settlement which performs specialized functions in relationship to a broad hinterland" further implies a certain degree of interdependence between the hinterland, reliant on the city's functions, and the city, whose existence is supported and enabled by the hinterland it serves (Fox 1977). Such interdependence was not evident in the Mikindani region, where production and subsistence were managed locally with nearby resources and the specialized functions of particular regions, such as exploiting marine resources, were shared with other settlements only intermittently. Nor was there evidence of ideological leadership promoting and naturalizing stratification at larger sites as took place on northern Pemba Island (Fleisher 2003) and at Kilwa (Wynne-Jones 2005a). Only in the late second millennium when Mikindani became an important port and managed the distribution of imported ceramics including European refined earthenwares can some of these urban characteristics be said to exist. Even then the relative lack of economic integration of the broader region shown by the rank-size analysis suggests that interdependence was not well developed.

Although the settlements of the Mikindani region were thus not performing "urban" functions, that does not imply that they were not carrying out any functions, nor that settlement functions were undifferentiated. Some settlements were larger, denser and likely more important than others, but there was neither a pronounced hierarchy nor a clear #1 settlement. Settlements in the region tended towards persistence, rather than the pattern of rural depopulation and urban agglomeration that has elsewhere been associated with the emergence of ranking (Fleisher 2003) or the clustering of settlement around a coastal center (see Kusimba 1999a, Wynne-Jones 2005a). Still, some sites were able to carry out a broader range of functions. Most obviously, some sites were able access particular resources through participation in interregional exchange networks and other sites could not. Through a combination of location and settlement prominence some sites were able to attract trade in imported goods, if on a scale far below that found at Swahili centers. The informality and low volume of such exchange prevented this from becoming a significant enough site function to enable urbanism, as has been argued for other Swahili sites such as Kilwa (Kusimba 1997, Spear 2000). Instead, even the largest sites in the Mikindani region seem to have remained primarily organized around local subsistence and production objectives with only moderate intra-regional trade in bulk resources indicated by the spread of marine resources and site distribution more indicative of clustering than competition. Nonetheless, the persistence of settlement in particular locations in the coastal lowlands is indicative of additional site functions. While the limestone-derived soils were clearly an attractive resource, there would be little reason not to move elsewhere within the lowlands from a subsistence perspective, especially given evidence of anthropogenic soil-nutrient depletion, yet several towns in this area were occupied for centuries. Landscape analysis suggests one potential functional reason in terms of the social importance of sites' histories which promoted their reproduction. Moreover, given the potential pattern of towns hiving off smaller settlements into the surrounding countryside (see Kusimba 1999a) such histories likely carried important social implications not only for the settlement's residents but also within the wider region. But towns were not able to control those smaller settlements in the same fashion that Swahili urban centers did using their accumulated wealth and ideological influence. Instead, even larger towns that may have had greater regional significance were unable to grow beyond a certain size because they were unable to monopolize either economic or ideological assets as other Swahili communities did with imported goods and Islam, particularly in terms of access to mosques and material-intensive rituals. The Mikindani towns likely did retain regional importance and influence, perhaps with regards to subjects such as local styles of ceramics where the fine-grained dating necessary to demonstrate influence does not yet exist, but there was no social mechanism impeding the growth of other towns, including those that once derived from earlier settlements, that might eventually become as influential. This feature of Mikindani's settlement compels us to recognize the dynamics of settlement in the region rather than just presenting a mostly static picture of settlement persistence. For although many large settlements in the Mikindani region were occupied for long periods of time, most were eventually abandoned, new settlements were expanding and growing all the time, and the size and regional importance of settlements was likely in perpetual flux in a region where connections and interactions between sites were very frequent.

CHAPTER 11: CONCLUSION, MIKINDANI IN THE SWAHILI WORLD

Mikindani, a Town on the Southern Tanzanian Coast

The various analyses in the preceding chapters provide important insights into Mikindani's history and the ways its inhabitants participated in the Swahili world. Using the data from my field project, I have documented, for the first time, a regional history describing how this part of the coast came to be occupied and the activities of its inhabitants. That regional history combines ecological, economic, political, and cultural perspectives, as advocated by Crumley (1979). It also provides the information-rich foundation for approaching the question of how the large-scale networks of the Swahili coast operated in and articulated with the Mikindani region.

In this chapter I synthesize the data collected during this project and build an integrated history of the Mikindani region. The first section details the archaeological periodization of the Mikindani region, charting developments across the various data classes investigated during the project's survey and excavations. I then discuss ways in which the narrative that emerges from this region compares and contrasts with the narratives that have been developed from other regions on the Swahili coast, recognizing similarities, elements of regional differentiation, and clear deviations from expectations regarding coastal society. The chapter then directly addresses the project's primary research question, exploring the implications of the Mikindani case for understanding large-scale Swahili networks and studying large-scale systems archaeologically. I conclude by discussing the lessons from this project for Swahili archaeology more broadly and suggest certain fruitful directions for future research.

Occupation Periods: Building an Archaeological Narrative for the Mikindani Region

The data from survey and excavation in the Mikindani region allows for the identification of seven distinct periods of regional occupation. These periods are initially derived from the study of local ceramics as presented in Chapter 8, but the other data classes add detail and nuance to the ceramic evidence and the periods deviate from the identified ceramic phases in certain important ways. In this fashion, we are able to trace continuities between periods and new developments that distinguish each period. The dating of these periods remains rather unrefined however. There are a handful of radiocarbon dates from the Mikindani region (Kwekason 2007) that provide some grounding for ceramics-based chronologies, but the stratigraphies and larger ceramic samples obtained in this project show that these dates do not encompass the full range of any of the ceramic types. The periods described here are thus ordered by relative date based upon the stratigraphic relationships of the different varieties of locally produced ceramics. Absolute dates are suggested from Kwekason's (2007) radiocarbon samples, imported artifacts, and comparisons to dated material elsewhere on the coast, but additional radiocarbon samples would certainly allow for better resolution and appreciation of the period ranges.

Period 1(200 BCE- 300 CE)

The first period of occupation identified in the area around Mikindani corresponds to Late Stone Age settlement of the region. Two LSA sites were identified during the survey: one, Litingi Channel Site, with ceramics characteristic of the LSA and with strong similarities to ceramics dated to 200 BCE excavated by Kwekason (2007), and the other, Mbuo Hilltop, which had a layer bearing several flaked-stone artifacts of chert found in association with a quartzite hammerstone. Evidence from these sites, and the relatively small amount of evidence of LSA occupation across the region, suggests that the LSA occupation of the Mikindani region was less dense than that of later periods, indicating more frequent movement and a lack of permanently settled sites. Despite the more ephemeral nature of LSA sites, they occurred across different microenvironments, showing that LSA people in the region exploited a range of different resources, perhaps seasonally. There was no evidence of involvement in Indian Ocean trade at this juncture.

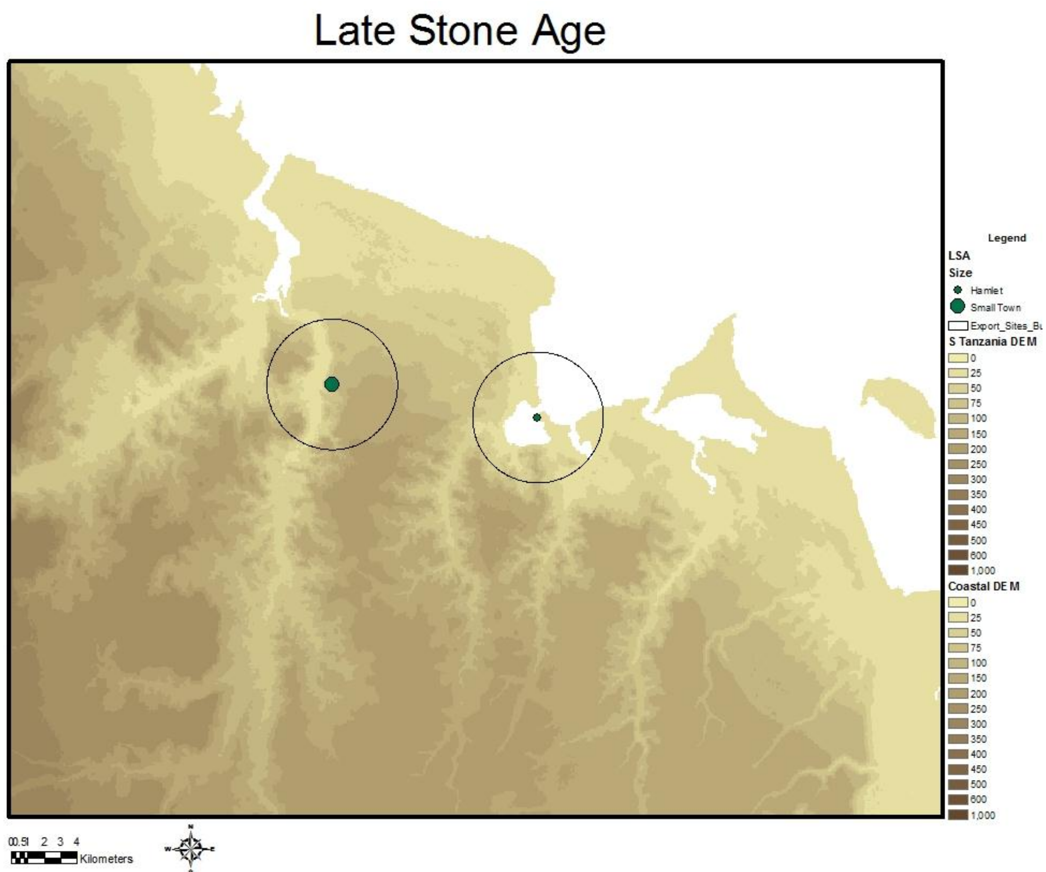

Figure 11.1 Settlement during period 1

One final note for this period regards its timeframe. Although LSA sites in the region have been dated as early as 200 BCE (Kwekason 2007), there is no particular reason to expect that earlier LSA occupations could not have also occurred. On the other end of the period, LSA sites have been found in close association with later occupations. In the most obvious example, Mbuo Hilltop's LSA occupation is overlain by Iron Age ceramics from the first and second millennia CE. These associations suggest a more complicated relationship between LSA and EIA populations than simple replacement, as the reoccupation of LSA sites or their near vicinity by EIA populations suggests that stone-tool using groups made contributions to Iron Age society, providing environmental and geographic knowledge, and indicates that stone-tool using groups persisted in the region into the middle or later first millennium. This latter idea would also be supported if the quartz fragments identified in the lower levels of several first-millennium sites were anthropogenic. Such persistence has been documented elsewhere in East Africa (e.g., Kessy 2005, Kusimba and Kusimba 2005), though Late Stone Age material culture seems less resilient around Mikindani. It also accords better with new interpretations about the multi-faceted, overlapping spread of farming, iron technology and Bantu languages in East Africa (Vansina 1995, Robertson and Bradley 2000, Lane *et al*. 2007).

Period 2 (ca. 300-600 CE)

The second occupation period was associated with the first Iron Age settlements in the Mikindani region. The closest external similarities of the ceramics of these sites were to the Kwale phase of Kwale ceramics identified by Chami (1998), with rim-beveling, in-turned bowls, and frequent use of the decorative motif of bands of incised lines bounded by lines of dot impressions. There are relatively few sites (6) in the Mikindani region from this period, but those sites possess more significant archaeological footprints than sites from the preceding period, demonstrating that this was the initial expansion of settled agriculture into the region. The location of these settlements in the lowland and coastal plain on the region's best farmland indicates both the importance of agriculture to these sites' subsistence as well as recognition of agriculturally advantageous areas. Agriculture is attested to by the archaeobotanical remains of African grains, especially pearl millet, and by stable-isotope results that show the clearing of forested land for C4 plants such as grain crops.

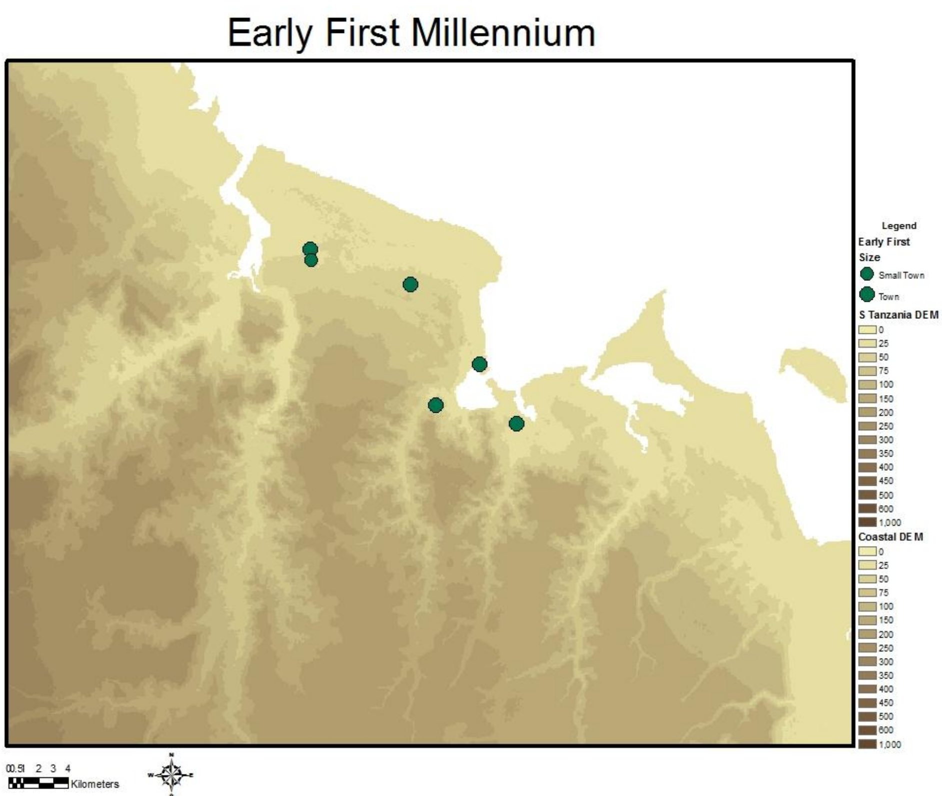

Figure 11.2 Settlement during period 2

These early sites also possessed evidence of iron-working in the form of slag, though there is not enough evidence to determine the scale of production. While most people probably lived in wattle-and-daub houses during this period, there is also intriguing evidence from Kisiwa Fields showing that coral was incorporated into some structures. Kisiwa Fields also provided possible evidence of involvement in Indian Ocean trade during this period, though the identification of the sherds as imports is not secure.

Period 3 (600- 900 CE)

The most significant development of Period 3 in the Mikindani region was the substantial expansion of Iron Age settlement. All of the sites from Period 2 remained occupied, Mbuo Hilltop was reoccupied, and 13 additional locations were occupied for the first time. And so this period represents both a significant expansion of settlement, as well as the first clear evidence of the continuity of settlement that will become a theme of the Mikindani landscape. Settlements remained concentrated in the limestone-derived soils of the lowlands and on the coast, but also extended into the highlands and ridge microenvironment. Archaeobotanical evidence of African grains shows the continuing importance of agriculture, though soil chemistry suggests that agricultural use of land around some of the largest sites began to result in soil nutrient depletion. There was also abundant evidence for the exploitation of marine resources at coastal sites and archaeobotanical evidence for the exploitation of wild forest resources in the highlands. Taken together, this evidence suggests an expansion of the subsistence base, perhaps precipitated by population pressure or economic shifts that extended the environmental focus of Mikindani's inhabitants beyond agriculture.

One economic shift which might have influenced such an expansion was involvement in Indian Ocean trade. The Sasanian-Islamic pottery found at Pemba Mbuyu Pwani was from this period and the region as a whole had a notable, if small-scale and perhaps irregular, involvement in interregional commerce. Because the inhabitants did not appear to be making any secondary products for export such as shell beads, they likely exploited natural resources to participate in trade, potentially ranging from gum copal in the forests and ivory in the interior to pearls, mother-of pearl, and mangrove poles on the coast.

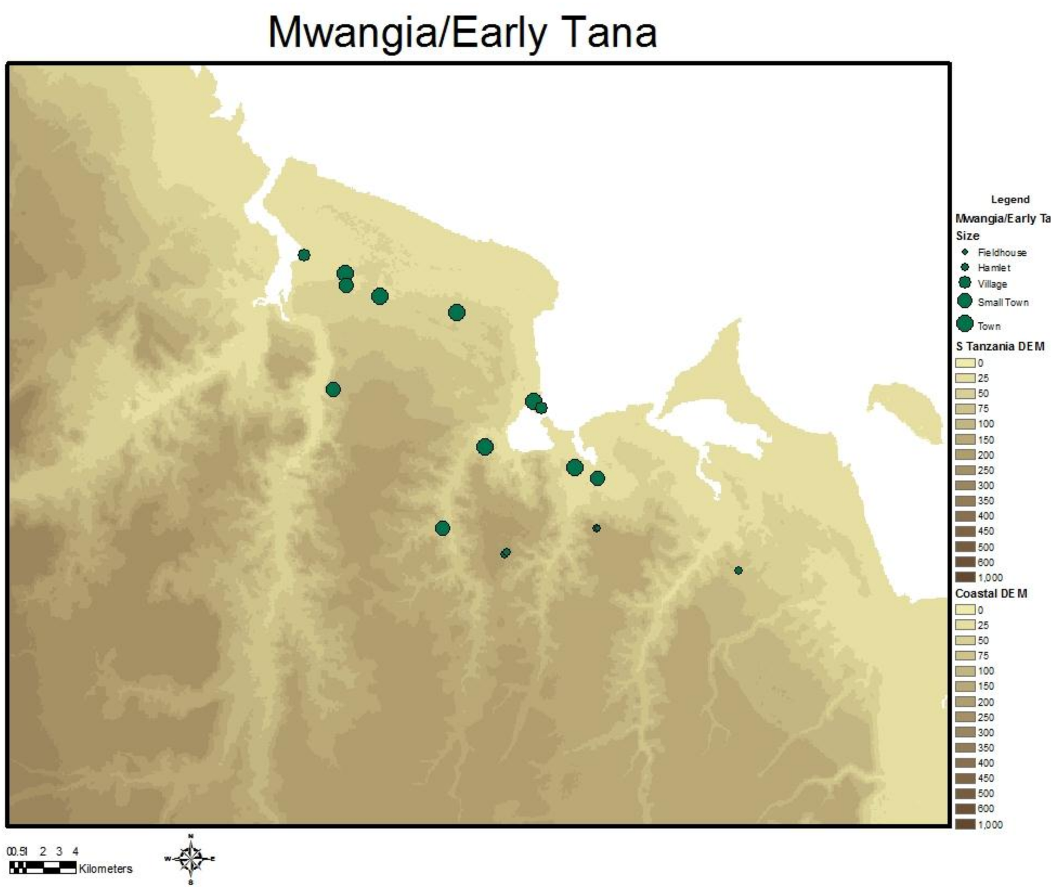

Figure 11.3 Settlement during period 3

Ironworking was found at sites throughout the region in all microenvironments during this period. The characteristic pottery of the settlements during this period was a local variant of the common coastal Tana/TIW types. The Mikindani region shared the majority of its ceramic types during this period with contemporary coastal sites such as Kilwa (see Chittick 1974), though it expresses notable decorative conservatism, perhaps representative of enduring influences from the final Mwangia phase of Kwale ceramics (see Chami 1998). While similar structures likely dominated at earlier sites as well, excavations from Period 3 contexts also provide the first evidence of earth-and-thatch housing, with stained floor areas identified in association with postholes.

Period 4 (900-1100 CE)

Period 4 represents an extension and consolidation of many of the trends that developed during Period 3. Settlement numbers remained mostly constant, with 19 sites identified during the period, as opposed to 20 previously. The distinction in settlement numbers may, to a certain extent, be an artifact of our inability to obtain fine-resolution dating for the region and forced reliance on relative ceramic chronologies, so not too much should be made of the minor drop in settlement numbers. Settlement patterns were largely the same as well. The six sites from Period 2 were all still occupied during this period, as were seven additional sites occupied during Period 3, such that less than one-third of the sites occupied during Period 4 were originally settled during the period. Settlements also continued to be found across microenvironments, indicative of a broad subsistence and economic base. The rank-size analysis of settlement during this period showed that no regional settlement hierarchy had developed. There was also continued evidence for widespread ironworking, though again no indication of high-intensity or specialized production.

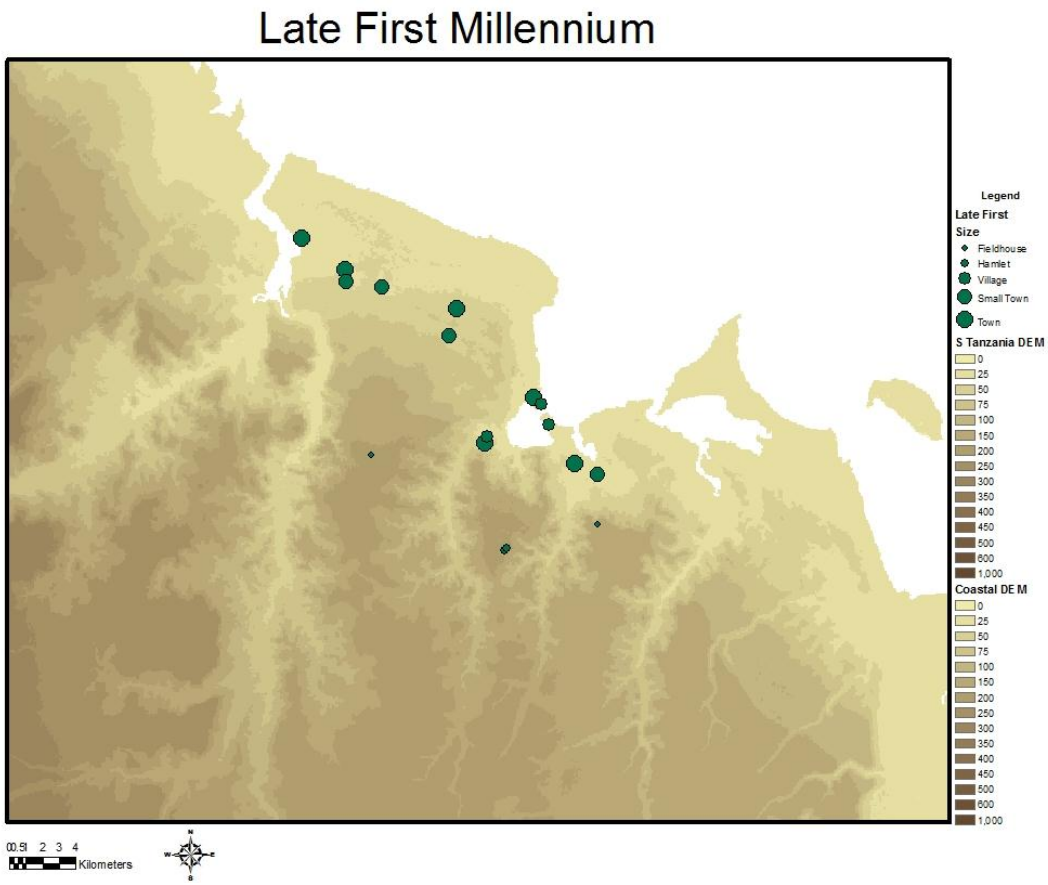

Figure 11.4 Settlement during period 4

While Period 4 settlement patterns thus suggest broad similarities with earlier periods, especially in terms of settlement continuity, other aspects of the archaeological record show a number of new developments that distinguished this period. Period 4 witnessed the development of two new styles of local ceramics, each of which show similarities to ceramic types found further north along the coast. While potters in the Mikindani region continued to use the triangle-motif relatively infrequently, they developed ceramic types whose morphology matched “Mature Tana” types found in

Kenya and on Pemba Island (Horton 1996, Fleisher 2003). These types were found throughout the region. The second ceramic style developed in Period 4 showed continuities with the early second-millennium Plain Ware style described for the Swahili coast by Chami (1998), though at Mikindani it has been dated to the 10th century (Kwekason 2007). In contrast to the Mature Tana types, Plain Ware was restricted to a few sites within two kilometers of Mikindani Bay. This is by far the most spatially restricted Iron Age pottery type in the study region and shows that Plain Ware was not adopted here on a large scale after a few early experiments.

Other new developments can be identified in trade and agricultural production. Period 4 produced the highest import ratios prior to the late second millennium. Imported ceramics were recovered from the bottom layers of mostly second-millennium sites such as Imekuwa Mibuyu and Mgao North, and from late first-millennium sites like Pemba Mbuyu Pwani. These sites were not restricted to Mikindani Bay, but included sites on Sudi Bay and in the lowlands some distance from the coast. Period 4 also had archaeobotanical evidence for experiments with local cotton production, and the presence of spindle whorls at multiple sites indicates that any such cotton was being spun locally. African grains continued to comprise the bulk of the local agricultural package however, although this period also witnessed experiments with finger millet. These experiments with new crops benefitted from more predictable monsoons at this time (Quinn 1992).

Period 5 (1100-1500 CE)

Period 5 presents at once the clearest separation from the largely shared coastal trends that characterized earlier periods and the persistence of certain regional continuities. The most obvious differences were observed with the ceramics. There were no imported ceramics from this period at all. This absence was unique for the coast. It was also a development in the opposite direction from that which characterized the coast at this time: these centuries typically showed the incorporation of *more* imported ceramics into everyday Swahili society and economy, and here they incorporate *none*, based on this research. Sample-size issues and the limited exploration of most sites merit consideration, but several thousand local sherds were recovered from the early second millennium CE in the region, suggesting that this is a real and striking contrast with the archaeological record for the rest of the Swahili coast. In fact, the only trade goods found were drawn glass beads of Indian origin similar to the type found throughout eastern and southern Africa. At the same time, Mikindani's potters developed a new style of local ceramics with clear similarities to ceramics found in Malawi and northern Mozambique, but very few similarities to coastal sites further north. These clear ceramic connections to interior types at the expense of coastal varieties were also unique on the coast, even during a period of increasing regional differentiation.

Despite the development of these clear local and imported ceramic differences with the rest of the coast, several other aspects of the Mikindani region's archaeology remained largely similar to earlier periods. Ironworking was still widespread and low intensity. Marine resources including shellfish were heavily exploited at the coast and available in much smaller quantities elsewhere in the region. Agriculture continued to be based largely on African grains led by pearl millet. There were indications of animal husbandry from the soil chemistry, though there is no reason to expect that animal husbandry would not have been practiced in preceding periods as well. Settlement actually expanded, as there were 26 sites occupied in this period, including several around Mikindani Bay. While some sites were abandoned from the preceding period[1] and 14 sites were newly settled, there was still a great deal of settlement continuity and some of the "new" sites were reoccupations of mid-first-millennium Tana/TIW locations. A possible reason for the abandonment of some settlements was the continuing depletion of soil nutrients occurring at most of them. Despite the increased number of settlements, there was still no indication of a regional site hierarchy.

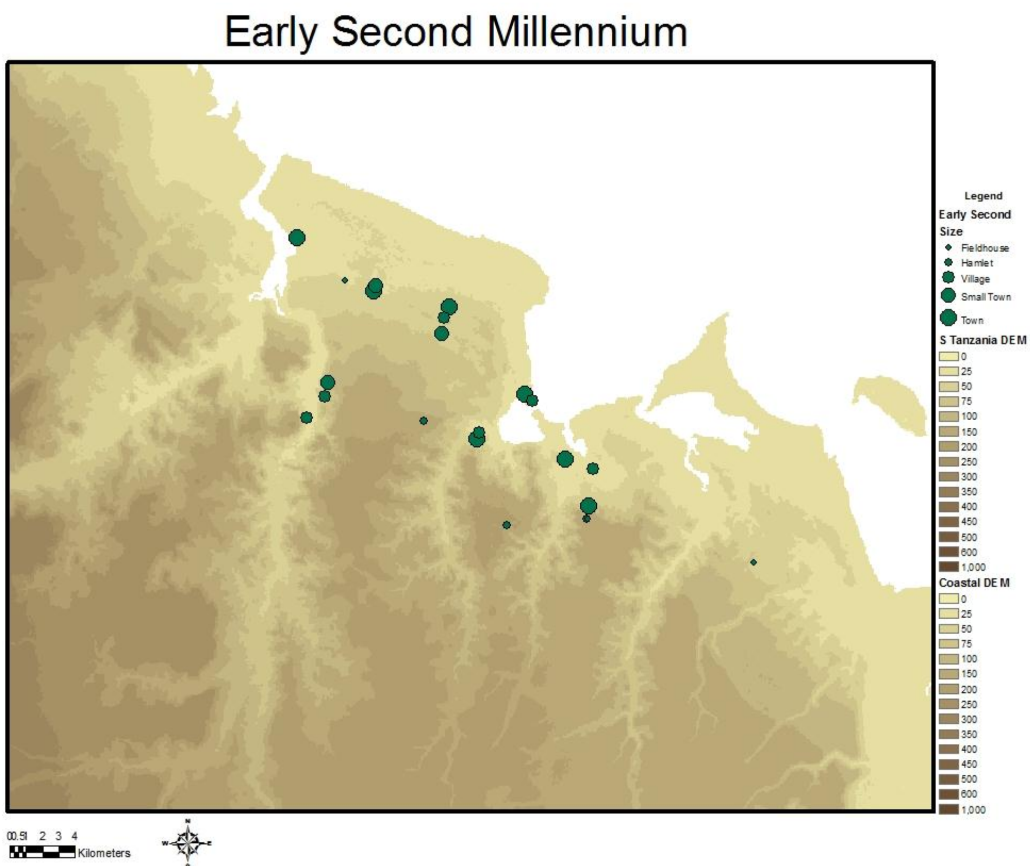

Figure 11.5 Settlement during period 5

[1] Notably this includes two of the six sites occupied during all three Iron Age phases of the first-millennium.

While these continuities point to a vibrant local economy that was able to expand settlement during this period despite the absence of coastal connections and Indian Ocean trade partners, the continuities themselves also provide evidence for Mikindani's distinctiveness relative to the rest of the coast. For instance, continued shellfish exploitation occurred only at poorer village sites further north, while most Swahili communities exchanged marine protein for increased consumption of domesticated animals (Horton 1996). Similarly, many Swahili communities developed an agricultural and dietary preference for rice (Walshaw 2005, 2010) and resorted to the production of African grains only in moments of necessity such as drought. Ultimately, Period 5 stands out for its increasing distinctiveness from contemporary developments elsewhere on the Swahili coast, but importantly that distinctiveness was not indicative of regional contraction or economic failure.

Period 6 (1500-1800 CE)

Perhaps the most important development during Period 6 was the reintegration of the Mikindani region into the cultural and economic networks of the Indian Ocean. Settlement either began or significantly intensified at the main Mnaida ward of Mikindani town during this period and in the area around the Boma. Settlement in the Mnaida ward was accompanied by some mortared coral-stone architecture. Ceramics belonging to the coastal Swahili Ware variety (Chami 1998), most notably red-painted open bowls with linear graphite decorations and carinated vessels with punctate designs, were found in the region during Period 6 as well. These Swahili Ware ceramics were restricted to sites around Mikindani Bay. Other painted and graphite-covered sherds are found at other second-millennium sites in the region, but did not match the standard open bowl form and in some cases showed continuities with first-millennium graphite-covered types. In addition to the presence of local ceramics bearing similarities to Swahili ceramics, the Mikindani region also gained increased access to Indian Ocean trade commodities, as porcelain from China and Indian earthenwares were recovered from sites in the region. These imports were mostly concentrated around Mikindani Bay, with two sherds of Indian earthenware found in the upper levels of Mgao North being the only examples of imports not restricted to sites around the bay. Particular concentrations were found in Mnaida ward, whose import ratio is above 17 because of large numbers of Indian earthenwares. There also may be a shift in regional iron production, as this period provided the most and the clearest evidence of iron smithing, epitomized by the slag balls from the Mkangala Streambed site. Given the absence of abundant iron ore recorded ethnohistorically and the resumption of trade links, a move to smithing suggests that the region may have been importing iron smelted elsewhere in this period, though there was no direct evidence of this.

Alongside these reintegrative developments from the area around Mikindani Bay there were also important aspects of continuity in the wider region. The unique local ceramic variety with connections to the south and west continued to be produced. Examples of such ceramics were found from the same contexts as Swahili Ware around Mikindani Bay, and though some new forms were introduced the Mikindani variety continued to dominate assemblages elsewhere in the region. Marine resources continued to be exploited on the coast and African grains continued to be vital to regional diet. Though I have suggested that the kind of ironworking practiced in the region shifted in this period, it continued to be spatially widespread. The trend towards settlement continuity also continued during this period, as more than two-thirds (11 of 16) of settlements were also occupied during the preceding period. However, it is possible that this degree of continuity is somewhat overblown owing to the lack of finer chronological resolution for Mikindani's second-millennium local ceramics, resulting in splitting single phases of occupation. The opposite analytical problem, lumping relatively later phases in with the ceramics of the preceding period, might account for some of the decrease in overall settlement numbers during this period. Unfortunately, until we have better resolution on the dating for Mikindani's ceramics this issue will persist, so some caution should be exercised when making interpretations based upon settlement counts for the mid-second millennium.

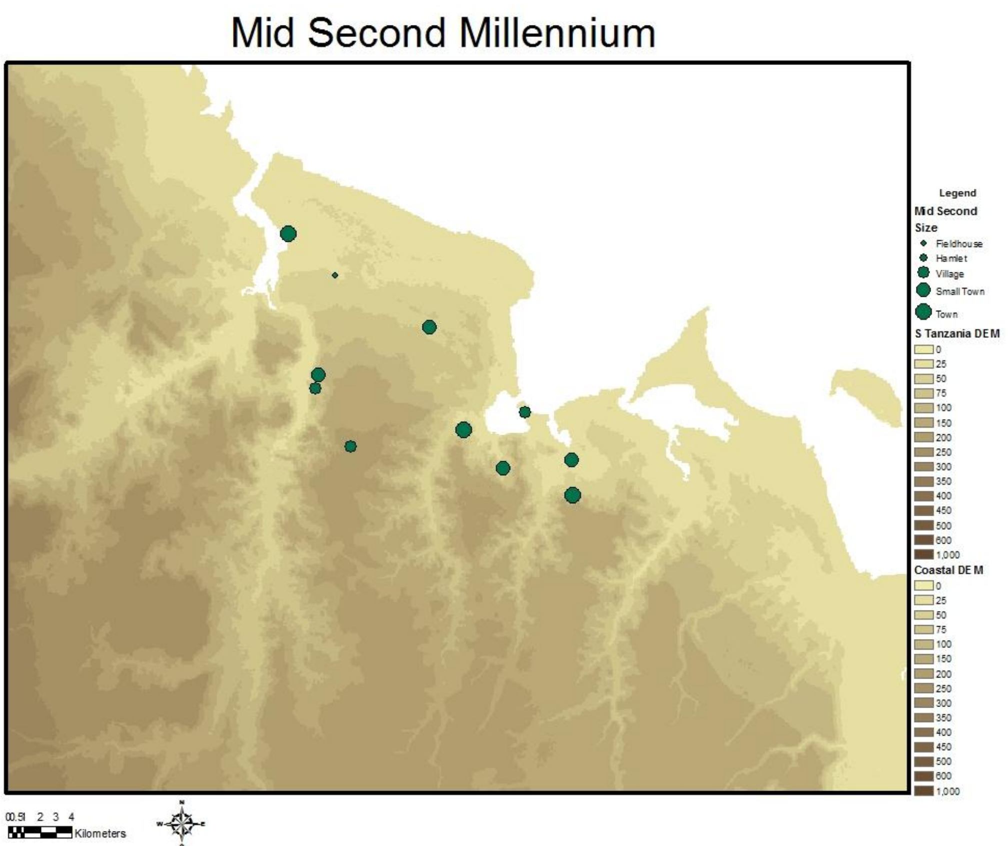

Figure 11.6. Settlement during period 6

Period 7 (1800- present)

The seventh and last period covers those sites and elements of sites that date to the 19th and 20th centuries. A number of significant developments characterized regional society during this period. The town of Mikindani grew significantly and became more deeply connected with Indian Ocean commerce than it ever was before, serving as an export port for captives in the 19th-century slave trade (Alpers 1975) and for a number of commodities ranging from gum copal and ivory to sisal (Tew 1950). Archaeologically, increased participation in Indian Ocean commerce is associated with the widespread availability of imported European refined earthenware ceramics. External connections in this period also drove the adoption of maize agriculture, attested archaeobotanically from specimens in the highland and ridge microenvironments. There was also clear evidence for the importation of sheet iron, which continues to be an important construction material in modern Mikindani.

The other important, and related, development from Period 7 was the emergence of Mikindani town as a regional center. Rank-size analysis suggests that Mikindani clearly separated itself from the rest of the region on the basis of size – it is the only settlement in the region to attain a large enough size to be designated a city according to Wilson (1982) or Fleisher's (2003) typologies. The imported ceramics show that the town managed the distribution of imported goods such as refined earthenwares throughout the region. Period 7 also witnessed an expansion of coral architecture at Mikindani. In addition, Mikindani's location on Mikindani Bay gave it easy access to marine resources, which it exploited heavily.

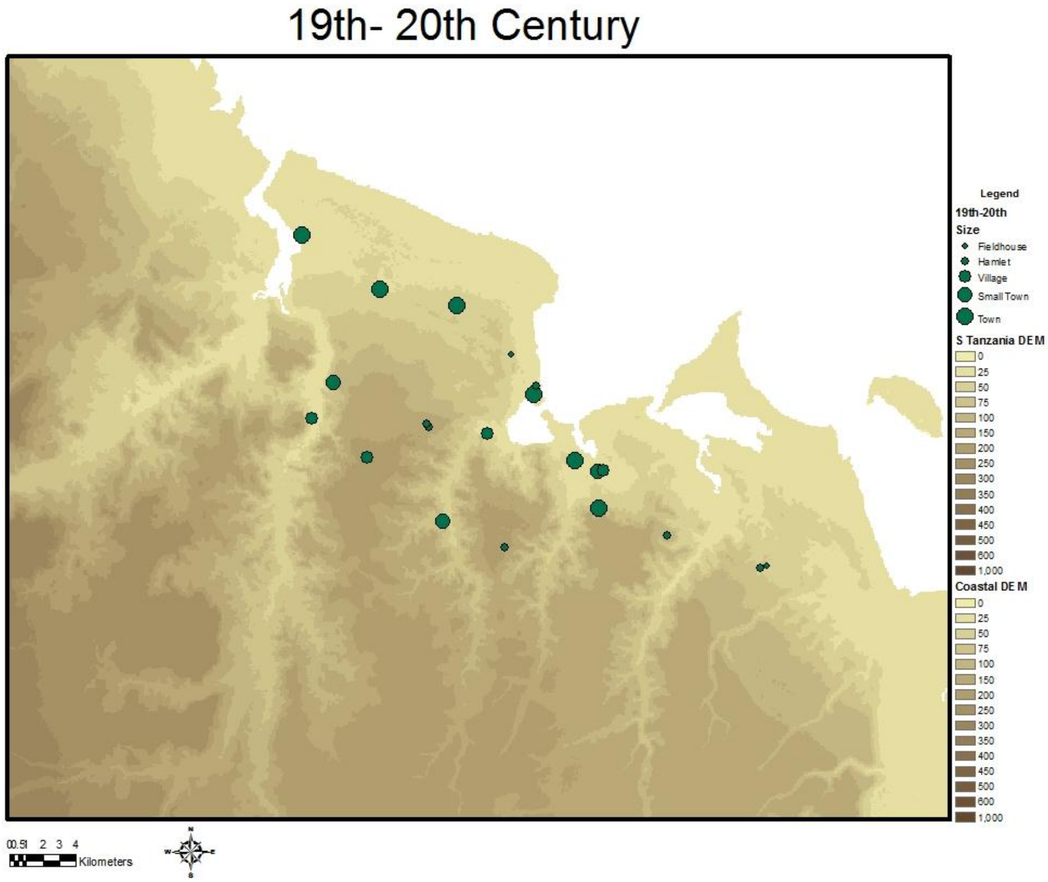

Figure 11.7 Settlement during period 7

In terms of archaeology, Period 7 was characterized by the replacement of the preceding local ceramic types with new types. The latter represent both new forms, such as open vessels with heavily everted rims, and new decorative motifs, including a variety of roughly incised patterns. Together with increased numbers of imported vessels, these constitute a new pattern for regional assemblages.

Deviations and Continuities: The Mikindani Region and Swahili Meta-Narratives

The seven periods of occupation described above provide a foundation from which to construct an archaeological narrative for the Mikindani region, placing the developments of each period within a regional and historical context. That narrative can then be usefully compared with the standard metanarrative of Swahili history derived from archaeological studies elsewhere on the coast. This section compares those two narratives during each period. As will become clear, the striking result from this comparison is that at certain times Mikindani's story deviates sharply from typical Swahili expectations in ways that suggest different patterns of social orientation and historical development.

Nonetheless, Mikindani's archaeology also correlates with Swahili expectations during many periods. Such correlation is evident during the first two periods covering the first centuries CE. As expected based upon previous research (Kwekason 2007) and models of East African coastal history (e.g., Lane 2004, Kusimba and Kusimba 2005, Phillipson 2005), this project confirmed that the Mikindani region was initially occupied by LSA populations. While evidence elsewhere suggests that LSA populations in some parts of the coast were settled and possessed domesticated resources (Chami 2001a, 2004, 2006, 2007), the sites in the Mikindani region were shallow and lacked the artifact density of later occupations, showing them to have been more ephemeral despite the occasional presence of ceramics. These LSA occupations were then followed by the establishment of settled, iron-using, agricultural communities during the early- to mid-first millennium. The history of the Mikindani region in these periods was thus little different from the patterns of EIA settlement of other coastal regions. The close relationship between EIA and LSA settlement locations show that EIA settlement of the coast in the region was not the result of a migration and replacement scenario,[2] but of a

[2] As an aside it is also worth noting that there is no evidence to suggest that the EIA inhabitants of the Mikindani region would have spoken a Bantu language only or to determine which Bantu language they

more complicated process of interaction between agricultural groups and autochthonous populations. Of course, this sort of complexity is increasingly expected for the East African coast following widespread rejection of flawed migration and diffusion-based explanations (see Vansina 1995, Robertson and Bradley 2000, Kusimba and Kusimba 2005, Lane *et al*. 2007).

The Mikindani region continued to conform largely to expectations from the standard Swahili narrative in the second half of the first millennium CE, but with increasing regional differentiation in the ways expected patterns of development were realized. Mikindani's inhabitants made and used a regional variant of Tana/TIW ceramics including some Mature Tana forms (see Horton 1996), but one which was quite conservative in its use of decorative motifs and employed the incised triangle motif both relatively infrequently and in a peculiar fashion: surrounded by impressed dots. Denser settlement of the coast took place, including several locations within a kilometer of Mikindani Bay, but amidst broader patterns of settlement continuity and clustering around fertile agricultural land. The presence of imported ceramics attests to the region's participation in Indian Ocean trade, but the imported ceramic ratios suggest that only low levels of this trade occurred, and probably infrequently. Consistent with this trend, there was no recovered evidence of Islamic practice in the region during the first millennium. None of these elements would have distinguished the Mikindani region as outside of the developing coastal culture in this period, even if taken together, but they indicate an emerging regional distinctiveness and failure to participate as fully in that developing

might have spoken, mostly because there has been no good historical linguistic research in the region. The subsistence diversity that seems to have existed in the region might cause us to expect other patterns of diversity, including linguistic, though diversity likely would not have been continuous across different measures.

culture as parts of the coast further north. Indeed, while differentiation within coastal society has been increasingly emphasized (Horton 1994b, Sinclair 1995) and Mikindani's history still resembled Swahili developments for the late first millennium, the Mikindani region stood out as being more different, or perhaps just more frequently different.

In the second millennium CE this regional distinctiveness developed into an outright departure from the Swahili metanarrative. The elements of this departure have been discussed in detail above but it is worth reiterating that they cover virtually every line of evidence available archaeologically, ranging from local and imported ceramics, to agriculture and dietary preferences, to settlement location and organization. These differences did not represent elements of regional variation only, but distinct patterns of development from Swahili expectations, and in many cases moves in the opposite direction. Still, these developments are not just important for showing how the Mikindani narrative departs from Swahili expectations. They also outline the historical narrative of the region that did take place. That shift in focus enables us to appreciate the economic achievements of the Mikindani region during the early second millennium rather than underscoring this period as one of exclusion and "failure" to attain Swahili norms.

The achievements of the early second millennium were substantial. While some long-occupied sites were abandoned, many others persisted and settlement expanded, both in terms of the number of settlements and the cumulative size of all settlements, so quite likely in terms of population as well. The patterns of local self-sufficiency from iron production and agriculture persisted, but the distribution of marine resources throughout the region suggests that important intra-regional connections were fostered and maintained. While connections to communities around the Indian Ocean diminished, those to communities to the south and west in the African interior and along the Mozambique coast were strengthened. These connections were evidenced by the local ceramics, but also by the presence of large and dense sites along the Mbuo River, the Mikindani coast's best route into the interior, which comes within 20 km of the Rovuma River and even closer to various tributary channels and streams. Also indicating the importance of such riverine routes, the Mambi River, which like the Mbuo empties into Sudi Bay but was outside of the study area, runs towards Lake Kitere in the interior where sherds very similar to the early second-millennium Mikindani variety were recovered (Chami and Kwekason 2003). This theme of deviation from the standard Swahili narrative and connections with interior groups was echoed in the historical chronicles from this part of the coast (see Pawlowicz and LaViolette *forthcoming*). Unfortunately, the nature of these interior connections cannot be determined without additional research, especially as the area to the interior is virtually unknown archaeologically, but it seems reasonable to suggest that they helped sustain a period of growth and expansion in the Mikindani region.

Around the middle of the second millennium certain continuities with expected coastal norms begin to reemerge. These came in the form of evidence for participation in Indian Ocean trade and the acquisition of fine imported pottery, as well as the production of ceramics with similarities to other northern coastal types. However, these developments were largely confined to the area immediately around Mikindani Bay. Elsewhere throughout the region similar patterns of settlement and subsistence continuity persisted alongside the early second-millennium ceramics. Ultimately, the reemergence of Swahili trends was thus less a reversal from the developments that characterized the early second millennium than a spatially-restricted resumption of involvement with the Swahili world alongside continued connections with the interior. The restriction of resumed contact to the area around Mikindani Bay and its focus in Mnaida ward set the stage for the emergence of Mikindani as a regional center in the centuries to follow. This resumption of contact occurred at a moment in the 16th century when the coast was subject to both external disruptions, ranging from the arrival and intrusions of the Portuguese and the Turks to military campaigns launched by African groups (Strandes 1961[1899]; Freeman-Grenville 1976), and increasing levels of intra-coastal and intra-regional competition (Fleisher 2004, LaViolette 2004, Fleisher and LaViolette 2007). Notably, the 16th century was a period of significant decline for Kilwa, which never regained its former economic or political importance. If this seems like an odd time to have resumed participation in Swahili networks, it should be remembered that many of these disruptions, perhaps the raids of African groups in particular, would have affected interior populations as well as the Swahili, so the Mikindani region was by no means insulated from them, such that expanding its coastal relationships once more could easily have served as a resilience strategy in times of difficulty.

As the developments of Period 7 unfold, Mikindani's history continued to mirror expected Swahili trends and the town was increasingly able to involve the rest of the region. As Mikindani became more entangled in the slave trade and other Indian Ocean commerce in the 18th and 19th centuries, its developmental trajectory mirrored that of other similar communities that grew as ports during the period, especially other southern Tanzanian ports such as Sudi and Kilwa Kivinje (Alpers 1975). The wealth Mikindani acquired from such commerce not only enabled its own growth but also prompted it to draw other settlements in the region into more closely integrated economic relationships. Moreover, the extractive nature of that trade, and in particular the violence of slave raiding, likely stressed relationships with interior communities. Nonetheless, historic and ethnohistoric data attest to the presence of non-Swahili Africans within Mikindani and its immediate vicinity in this period, as well as their continued contributions to southern Tanzanian coastal society (Velten 1907; Gray 1950; see Pawlowicz and LaViolette *forthcoming*).

Summary

Mikindani's regional history thus bears a complicated relationship with the developments usually thought to characterize Swahili archaeology and history. The significant patterns of the first millennium, ranging from initial occupation by mobile stone-tool using groups, to settlement by iron-using agriculturalists, to the development of early Swahili culture marked by sailing and Tana/TIW ceramics, were shared. However, while regional differences existed along the Swahili coast throughout the millennium – given its geographic expanse they should be expected to – the Mikindani region became increasingly distinct from the rest of the coast as the millennium progressed. It then thrived during the early second millennium without sharing in the developments that characterized the Swahili florescence. The region then reentered the Swahili sphere in the middle of the millennium before seeing significant growth as a port town in the 18th and 19th centuries, in a pattern similar to many other previously unremarkable portions of the Swahili coast as well as other regions, such as Kilwa, enjoying a second period of prosperity (see Horton and Middleton 2000: 85-8).

Of course, the unanswered question in this comparison is what drove these similarities and differences and, in particular, why Mikindani diverged so dramatically from expectations in the early second millennium. It is likely that a variety of geographic, social, political, economic, and religious factors influenced Mikindani's patterns of development; although few of these can be fully evaluated without more evidence, I suggest a few likely influences. Regarding geography, because Mikindani sat at the southern end of the monsoon area it would have had the most difficult time establishing regular connections with the Middle East because of the decreased reliability of monsoonal trade winds. But while sailing in the Indian Ocean was more difficult, Mikindani was also relatively close to the Rovuma River, which would have provided a relatively easy means to access the interior and vice versa (Liebenow 1971). These geographic considerations might not have mattered much in the early phases of coastal history, but sailing difficulties would have become significant as the emphasis on Indian Ocean trade increased in the late first and early second millennia, even in terms of maintaining connections with other coastal communities along a "Swahili corridor" (Horton 1987). At the same time, easy travel into the interior may have provided a viable alternative strategy.

Politico-economic relationships between the Mikindani region and others also would have played a role. Evidence of such relationships is sparse for most periods, and especially for the important centuries of the early second millennium. There was no evidence for a significant relationship with the closest major center Kilwa, as Mikindani has little evidence for Kilwa-produced commodities such as shell beads or Husuni Ware, Kilwan architectural styles, or Kilwan attempts to exert administrative control over the region. What few ceramic similarities that did exist may have resulted from shared connections to hinterland groups, rather than direct contact. But this lack of relationship does not mean that Kilwa was not significant to Mikindani's history. Mikindani was absent from coastal networks when Kilwa was most prosperous, perhaps due to Kilwa's emergence as a primate city, and reentered them when Kilwa declined. We do not have to suggest something so politically and economically aggressive as active exclusion from Indian Ocean trade to acknowledge that Kilwa's unparalleled success limited opportunities for Mikindani in that trade. As raised earlier, Mikindani's geographic advantages for economic interactions with interior groups perhaps served as a counterpoint to its difficulties in the Indian Ocean, but our ignorance of the archaeology for the southernmost Tanzanian interior inhibits our ability to fully judge this possibility.

Social and religious hurdles also could have contributed to Mikindani's divergence from more widespread Swahili trends. Much of the coast's population had converted to Islam by about 1200 CE, and such conversion promoted a cosmopolitan lifestyle that included a taste for imports of various kinds. It is possible that relatively late conversion in this region – and there is little evidence of Islam there before the 16th century – would have provided a religious hurdle to the building of close ties with other coastal communities. In many ways these processes could have catalyzed one another: difficulties with maritime commerce would have led to less interaction with Muslims and less incentive for conversion, while at the same time encouraging Mikindani's residents to stress interior relationships. Interior connections in turn would have made them ever more distinct from the increasingly Muslim Swahili coast and thus less suitable partners for exchange and interaction.

Lessons for the Functioning of the Swahili Coast Networks

The study of Mikindani's archaeological history and the comparison of that history and the rest of the Swahili coast allow me to identify a number of important lessons about the functioning of the large-scale networks of the Swahili coast over time, answering some of the project's initial research questions. I address four of the most significant here.

The first lesson which Mikindani bears for Swahili networks is the emphasis placed on relationships with groups in the African interior. The evidence from local ceramics and imported goods in the second millennium suggests that at times these relationships were more important to the growth and sustainability of Mikindani's society than connections with groups around the Indian Ocean, including Swahili communities elsewhere on the coast. The importance of relationships with interior is not a new concept in Swahili historiography. Historians have documented close, complicated relationships between Swahili cities and neighboring non-Swahili groups (Glassman 1991, Willis 1993, Pearson 1998, Vernet 2004) and contributions of non-Swahili migrants to coastal society (Glassman 1995) for the second half of the second millennium. Perhaps more obviously, archaeologists have shown that Swahili society shared roots with other African communities (see Horton 1980, 1984; Abungu and Mutoro 1993; Chami 1994, 1998; Horton and Middleton 2000). Nonetheless, the continued focus on Indian Ocean trade and narratives of Swahili difference has led to interior connections being relatively underappreciated aspects of Swahili large-scale systems of interaction. This is not to deny the significance of Indian Ocean connections or the ways in which Swahili people have chosen to distinguish themselves from other African groups (see LaViolette 2008), but rather to assert that interior communities were participants in the broader Swahili networks as well and the functioning of those networks cannot be fully grasped without an understanding of their participation. The relative importance of Indian Ocean and interior connections to any coastal region varied over time according to systemic constraints and opportunities and local conditions.

The second major lesson flows from the first, in that it argues for an expansion of the way archaeologists commonly view the Swahili and the coast. Mikindani's experience clearly shows that not all coastal regions were full-time participants in Indian Ocean trade, but that some were either excluded or simply did not participate during certain periods. However, Mikindani also shows that even if Swahili communities were not participating in Indian Ocean trade, they were well-capable of turning away from the sea and forging important connections with interior African groups. This absence from Indian Ocean trade and ability to forge interior connections is not a wholly new concept. Archaeologists have documented coastal locations where participation in trade was not extensive (e.g., Gramly 1981, Brown 1988, Wynne-Jones 2005a), though in no case yet recorded was the absence as complete as at Mikindani. It is also recognized that even in communities where trade was substantial, only a minority of inhabitants would have been involved in actual commerce (e.g., Horton and Middleton 2000: 72). The ability to forge interior connections should perhaps also be obvious given shared African roots, speech communities, and coastal cities' reliance on interior resources. Still, the absence from

Indian Ocean trade, whether through exclusion or for other reasons, was unexpected in the context where such trade is understood as being characteristic of living on the Swahili coast. Those trade connections were indeed important to understanding Swahili society at many locations, yet the focus on such connections and resources is also at least in part the product of a historiography which has focused on external trade within large Swahili urban centers when most of the Swahili lived outside of them. It seems likely that in many places outside those centers access to Indian Ocean trade goods and other trappings of emergent coastal wealth would have been restricted. Mikindani's experience forces us to reevaluate the popular notion of the Swahili as, first and foremost, a mercantile society "organized to engage in a particular kind of culture and … based on mercantile values" (Horton and Middleton 2000: 72). This is discussed in greater detail in the final section.

The third lesson for Swahili large-scale networks concerns the question of the economic relationships that existed within those networks. Most scholars tend to view the Swahili as occupying a middle ground between Africa and the rest of the Indian Ocean world, mediating the exchange of resources between them and drawing wealth from that role. For many, this middle ground has also implied an intermediate role: relatively weak compared to the larger states and empires ringing the Indian Ocean, yet able to exploit and extract surplus from the African interior[3] (Alpers 1975, 2009; Sheriff 1975; Pearson 1998; Beaujard 2007, Killick 2009). The existence of the slave trade is often invoked to demonstrate the power imbalances of that relationship. Still, scholars have increasingly also recognized that the Swahili, Indian Ocean merchants, and interior Africans all operated under unique value systems until the 19th century, such that trade

[3] In world-systems terminology, the Swahili are usually regarded as semi-peripheral and the African interior as peripheral.

was perhaps not so much about exploitation as it was about occasional "mutual windfalls" (Pearson 1998; Horton and Middleton 2000: 89; *cf*. Killick 2009; see also Kopytoff 1986).

The Mikindani region, as a place with relatively poor access to trade goods, particularly during the early second-millennium Swahili florescence, offers a good opportunity to investigate this question of Swahili economic dominance, exploitation, and extractive capacity. After all, the drawn Indian beads that are the only imported goods found in the region during the early second millennium may well have been traded there from another Swahili city or even from locations in the interior. Yet despite this disadvantaged commercial position, we find economic self-sufficiency and even expansion throughout the Mikindani region at the time. Nor is there any indication that Mikindani was being economically manipulated in any way: they were not producing goods or even agricultural products that were unavailable in the region, there is no evidence of an economic or settlement reorganization to exploit a particular resource, and there is no evidence of conflict or internal destabilization from economic exploitation. Ultimately it seems that they simply weren't part of what was going on further north along the coast, or were only very remotely connected to it. They certainly were not dependent upon it. When they later became participants in trade again these trends of local continuity and self-sufficiency largely persisted into the 19th century. Such economic resiliency and local success for a commercially impoverished region challenges models of trade-enabled economic exploitation of the hinterland by Swahili centers (*cf*. Sinclair and Håkansson 2000, Killick 2009). Instead, a more nuanced model wherein participation in trade, or non-participation, was driven by mutually beneficial social outcomes and relationships or their absence seems to have existed at Mikindani and may have characterized Swahili trade before the 19th century more broadly.

At the same time, the question of why Swahili centers might not have exerted economic or political domination and why the Mikindani region fell out of the Swahili networks in the early second millennium CE bears consideration and provides a fourth insight into Swahili large-scale systems. The difficulties in Mikindani's relationship with Indian Ocean trade can be attributed to a certain extent to transportation difficulties. Often scholars have stressed the capacity of the ocean to link coastal communities in one culture, particularly when the monsoon winds are blowing (e.g., Horton 1987). Indeed, even the earliest histories suggest that certain voyages would only have taken a matter of days (Freeman Grenville 1975). These opportunities that sailing in the Indian Ocean provided existed, but it is worth balancing our view with an appreciation of the scale of the coast and some of the navigational difficulties that also existed. Because the monsoon had such an impact on winds and currents it enabled relatively quick transport by boat, but at the same time the cycling of the monsoon usually restricted coastal voyages to certain months of the year (Gray 1955). Further, it is worth once again stating that the Swahili coast runs for roughly 2500 km north-south along the coast; Mikindani is a full 200 km away from the nearest major center, Kilwa. Even with sailing these could be substantial distances. And the boats themselves were often not especially large or suited for travelling very long distances, evidenced by the importance of northern Kenya as a transshipment point into the late second millennium (Horton and Middleton 2000: 87). Finally, whatever the difficulties with sailing, land transport was hugely more difficult, with large areas covered in dense vegetation forcing reliance on riverine passages. All of these issues would have made it more difficult, though not impossible, for Swahili centers to extend political or economic control over wide areas.

Implications for the Archaeological Study of Large-Scale Systems

Because this study of Mikindani provides insight and nuances our understanding of the functioning of Swahili networks, it also has implications for the archaeological study of large-scale system of interaction. Mikindani's resiliency and self-sufficiency, as well as its enduring connections with interior groups, are perhaps most relevant in this context. Those aspects of Mikindani society persisted whether they were participating in Indian Ocean trade as in the late-first and mid-second millennia or whether they were absent from such commerce as in the early-second millennium. They thus echo many of the distinctions that have been drawn between ancient and modern world systems, emphasizing the difficulty of establishing dominance and the ability of marginal or "peripheral" areas to shift participation to other systems offering better opportunities (e.g., Kohl 1987). As has been shown elsewhere (Kohl 1987; Stein 1998, 1999), some of these distinctions were driven by distance and difficult transport, which also appear to have been relevant in the Mikindani case. While this evidence suggests that a straight application of classic world-systems theory is perhaps inappropriate on the East African coast (Killick 2009, *cf*. Beaujard 2007), given the demonstrated importance of Indian Ocean connections to Swahili society (LaViolette 2008) adoption of a World-Systems perspective (Chase-Dunn and Hall 1991, 1997; Peregrine 1996; Hall *et al*. 2010), which recognizes the importance of long-distance connections within variable power relationships between differentiated areas, might be valuable. The Mikindani region shows that such a World-Systems perspective sometimes needs to focus on a coast-interior system that did not include Indian Ocean communities however.

Though the archaeological contexts of the Mikindani region before the late second millennium operated amidst a different system of social and economic organization across space than the modern capitalist one, their involvement in large-scale interactions suggest that certain continuities with modern globalized patterns of interaction exist and are relevant to understanding ancient coastal contexts (see Schneider 1977). In particular, archaeologists should explore the extent to which certain themes from anthropological studies of globalization (e.g., Lewellen 2002, Inda and Rosaldo 2008) might provide insight into past examples of large-scale, "globalized" networks.[4] While many archaeologists have approached globalization through its impacts on modern archaeological practice (e.g., Benavides 2008), others have recognized aspects of globalization within past contexts (e.g., Sweetman 2007). Indeed, various ideas from globalization theory have resonances with the Swahili case. Most importantly, globalization theory stresses that people in the periphery are not passive receptors of global goods and ideas, but actively and selectively incorporate them according to local logics (see Inda and Rosaldo 2008). In this fashion, the consumption of goods can be held to mediate encounters between peoples and cultures; the significance of Indian Ocean imports to the emerging Islamic Swahili culture is important in this regard. But these globalized contacts exist as "selectively dense interconnections and not the thorough interlinking of the world" (Inda and Rosaldo 2008: 99). Again, this insight possesses some relevance to the Swahili case, where Mikindani's example has shown that while dense interconnections did exist at certain major port cities, the whole coast was not

[4] I use the term "globalized" here in the world-systems sense.

linked into Indian Ocean trade to the same degree, if at all. At the densely occupied centers, imported goods and new Muslim ideologies "create new subject positions" (Inda and Rosaldo 2008: 371) where an urban Swahili identity can emerge, which Swahili centers then worked to transmit, with more or less success, to the rest of the coast.

Mikindani's experience thus emphasizes several of the themes emerging in archaeological studies of interaction and globalization theory, particularly regarding difficulties of core dominance, active roles for people in the periphery, multiple potential systems of interregional interaction, and spatial differentiation within those systems in terms of the nature and intensity of interaction. Given these resonances, it is worth considering what these themes actually meant on the ground. In particular I would like to reconsider the question of whether Mikindani was a peripheral place. An important initial step is to realize that Mikindani's non-participation in Swahili networks during the early second millennium was not limited to economy, but that those networks comprised multiple nested and overlapping spheres of exchange of different goods, ideas, and people (Chase-Dunn and Hall 1991). At the same time, we need to make a distinction between knowledge of a wider area and economic participation with the communities of that area. In the Mikindani case, it is highly unlikely that the region's inhabitants, who exhibited a significant degree of settlement continuity, would simply have forgotten that there were other communities elsewhere in the Indian Ocean and that trade with those communities could provide imported goods. Instead, there is every reason to expect that, as a successful maritime community in their own right, Mikindani's inhabitants would have had some notion of developments occurring elsewhere along the East African coast, such as increasing conversion to Islam. In that context, we might characterize

Mikindani's absence from Swahili systems in the second millennium not so much as failure to achieve success within those networks, which could be represented as "peripheral," as it was a choice to focus on other relationships and abide by other structures of meaning and value. This latter scenario would have been driven by multiple forces potentially ranging from disadvantageous terms of Indian Ocean trade on offer, maintenance of existing religious beliefs, to recognition of monsoonal and distance-related transport difficulties. Further, while the Mikindani scenario would be described as "external" in World-Systems terminology, it is important to note that "external" does not imply "unknown" for either Mikindani or the rest of the Swahili world, such that when conditions changed towards the middle of the second millennium Mikindani became reintegrated into the Swahili system.

Summation and Future Directions for Research

To conclude, it is worth returning to the primary research question of this project to discuss once more how large-scale Swahili networks functioned at Mikindani at different moments and what they meant to its history. Certainly the history of Swahili networks at Mikindani was unexpected and revealed the diversity of local manifestations of those large-scale coastal systems. Yet beyond the simple fact of divergence from Swahili expectations, the most compelling aspect of the Swahili networks at Mikindani was the extent to which their importance and shape was dependent on how they addressed the local needs of the region. Indian Ocean trade in the Mikindani region existed alongside patterns of local continuity and regional self-sufficiency, when it was present at all, and those patterns persisted when trade was absent. This striking situation from the Mikindani region should prompt a reappraisal of the external, trade-driven models applied to African urbanization and complexity generally (Coquery-Vidrovich 1978) and to Swahili society in particular (e.g., Sinclair and Håkansson 2000).

Ultimately, this study of the Mikindani region in many ways represents one endpoint of the movement to democratize Swahili archaeology by extending its focus beyond the elites living in stone houses. Certainly the Mikindani region presented a new geographic context and a focus on non-elite social strata. To the extent which its experience can be generalized to other coastal regions in relatively similar contexts,[5] its archaeology forces us to reconsider what we mean when we talk about Swahili culture and social complexity on the East African coast. If "Swahili culture" referred only to Islamic mercantile communities managed by elite *waungwana*, then Mikindani did not belong. If "Swahili complexity" relied upon participation in Indian Ocean commerce, then Mikindani followed a different, non-Swahili path. Yet Mikindani society shared Swahili roots in the Early Iron Age, elements of maritime culture, Tana/TIW ceramics, and, at times, participation in Indian Ocean trade. If the implication is that Mikindani might have been Swahili in some periods and not in others, that is, in and of itself, an important insight into the fluidity of coastal society and identity. In extending archaeological analysis outside of the major centers and away from the elite this research uncovered new paths to complexity and forms of social organization that were more self-sufficient and less likely to draw up barriers between coastal communities and interior groups. This is not to deny the importance of trade, urbanism, and Islam in some coastal contexts, including to communities outside of Swahili urban centers, or even to suggest

[5] Given regional differentiation along the coast this is a significant concern. However, similarly low levels of trade goods in places like the Kilwan coastal hinterland (Wynne-Jones 2005a) suggest that some aspects of Mikindani's experience are indeed relevant elsewhere.

that some Swahili communities would not have been mercantile, but rather to suggest that in some coastal regions around the margins of the Swahili world these things would have been subordinated to other concerns. In many ways then it is incumbent on us as researchers to strike a balance between recognition of the importance of trade, Islam, and urbanism to Swahili society and not regard those things as deterministic essentialisms – after all Mikindani participated in long-distance trade to the same degree as Kilwa in the first millennium – but as socially meaningful elements of broader strategies being used to attain social and economic advantage within some coastal circumstances but not others. In the end, any debate over whether Mikindani is "Swahili" – for the record, I am of the opinion that it is, even during the early second millennium – should be subordinate to the message from its history that the communities of the East African coast could interact with Swahili culture and organize their socio-economic structures in a variety of ways, and that the elements thought "characteristic" of Swahili culture were part of particular strategies that could be adopted, or not, to suit regional contexts.

But the question does remain: were the communities of the Mikindani region Swahili? The continuities that existed between the Mikindani region and the rest of the coast suggest they were, ranging from Tana/TIW and Sasanian Islamic ceramics in the first millennium, to Swahili Ware and porcelain in the second, to , perhaps most tellingly, their speaking Swahili language and eventual adoption of Islam. Still, even if they were Swahili, Mikindani's inhabitants were nonetheless a different kind of Swahili community than what we have come to expect archaeologically (Horton and Middleton 2000, LaViolette 2008), with cultural connections to the African interior, a lack of common imported goods for several centuries, and late conversion to Islam. This prompts a further question of whether Mikindani is an exception or something more. In certain respects, such as the absence of early second-millennium imported ceramics, the region is an exception from the rest of the coast's known archaeological record. Yet similarities to other coastal places away from major centers such as Pangani (Gramly 1981) and the Kilwan hinterland (Wynne-Jones 2005a) suggest that Mikindani also embodies a new model for the coastal Swahili system where interior connections had priority over Indian Ocean ones and society was not driven by mercantile concerns, that might have existed alongside the developmental path of Swahili cities. Clearly this Mikindani model does not describe the large-scale interactions of those major Swahili centers – though it does suggest that interior connections be paid more attention – but I expect continued archaeological work on the East African littoral in locations away from those centers will demonstrate similar patterns to the Mikindani region and show that it was not so odd after all.

With that said, it is still possible to gain further insight into the coastal experience outside of major centers and to further broaden our understanding of coastal history by increasing our knowledge of the large-scale systems in which Mikindani operated. It should be possible to improve our knowledge of Mikindani's context at scales that were not the focus of this regional project. Intensive local survey and wider excavations of individual sites would allow us to better approach questions of intra-site and intra-regional variation, so that the strategies employed in Mikindani, and the reasons for their use, might be better understood. This fine-scale work should also be accompanied by broader macro-scale comparative work extending beyond the coast to encompass more of the Indian Ocean system as well as the Rovuma watershed. In many ways Mikindani's history has been unique and unexpected within coastal historiography, but the region was never isolated from other areas and, just as it provides insight into the large-scale networks it was a part of, its developments cannot be understood without them. Coastal archaeologists, then, need to appreciate the diversity of coastal histories and coastal communities, the active social role that artifacts associated with both Swahili culture and interior cultures played, and the capacity for coastal inhabitants, even those living outside of urban centers, to choose among a range of socio-economic options in pursuit of their own ends.

Appendix A: Sites Recovered During Phase II Survey

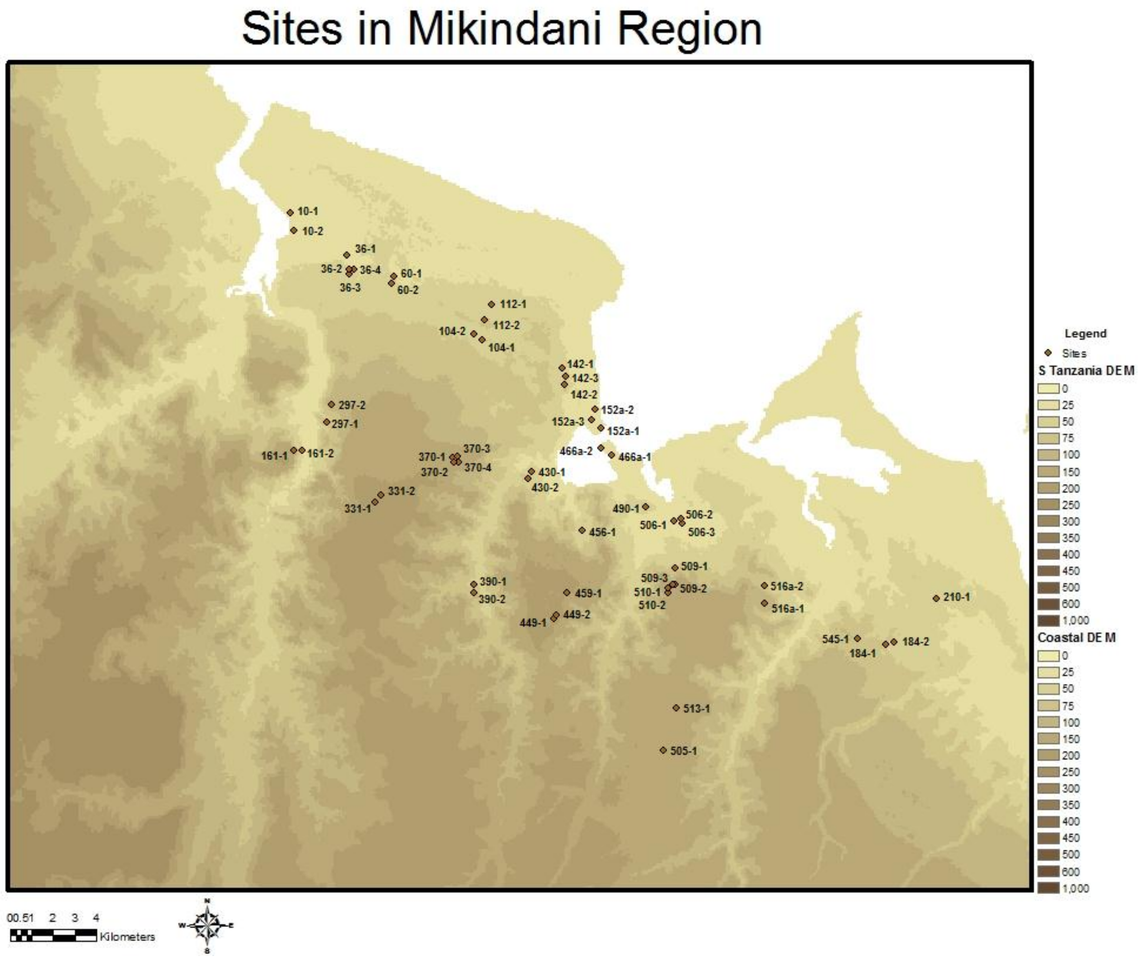

Figure A.1 Map of Phase II sites

1. **Imekuwa Fields**

   Site Code: 104-2

   Location[1]: 617550 E, 8870350 N

   Microenvironment: Lowland Plains

   Surroundings: Overgrown cassava and cashew area just southwest of Imekuwa's modern well.

[1] All locations are given in UTM coordinates. Mikindani is located in UTM zone 37L.

Size: 1.5 ha

Periods Represented[2]: Undated

Total Sherds Recovered: 16

Other Artifacts: iron spike, likely modern; daub

Notes: Site is likely contemporaneous with nearby Imekuwa Mibuyu.

2. **Imekuwa Mibuyu**

Site Code: 104-1

Location: 617935 E, 8870110 N

Microenvironment: Lowland Plains

Surroundings: Maize fields and flat grasslands a short distance south of Imekuwa's modern well; baobab trees are in the vicinity.

Size: 3.75 ha

Periods Represented: Periods 4, 5, and 6

Total Sherds Recovered: 1324

Other Artifacts: Slag; Indian-red glass beads; some late-first-millennium imported ceramics; daub

Notes: Site was excavated during Phase III. Site yielded more than 20 sherds per STP during the survey.

3. **Kisiwa Fields**

Site Code: 36-1

Location: 611550 E, 8873950 N

[2] Periods are those discussed in Chapter 11.

Microenvironment: Lowland Plains

Surroundings: Modern maize and millet fields, with some patches of woodland brush, west of Kisiwa.

Size: 5 ha

Periods Represented: Periods 2, 3, and 4

Total Sherds Recovered: 2321

Other Artifacts: Slag; potential imported earthenware; shell; coral; daub;

Notes: Site was excavated during Phase III. A coral construction feature was uncovered during excavation.

4. **Kisiwa Forests**

Site Code: 36-2

Location: 611650 E, 8873250 N

Microenvironment: Lowland Plains

Surroundings: Site is located amidst maize fields and scrub forest southeast of Kisiwa

Size: 3 ha

Periods Represented: Periods 2, 3, and 4

Total Sherds Recovered: 1621

Other Artifacts: Slag; daub; shell; bone

Notes: Site was excavated during Phase III. The richest and oldest portion of the site is located towards its southern edge.

5. **Kisiwa Small**

Site Code: 36-4

Location: 611890 E, 8873260 N

Microenvironment: Lowland Plains

Surroundings: Scrub forest south of main road to Mikindani

Size: 0.125 ha

Periods Represented: Periods 5 and 6

Total Sherds Recovered: 72

Other Artifacts: daub; shell

Notes: This is a small site around a very dense core.

6. **Kisiwa South**

Site Code: 36-3

Location: 611650 E, 8873050 N

Microenvironment: Lowland Plains

Surroundings: Scrub forest

Size: 0.25 ha

Periods Represented: Undated

Total Sherds Recovered: 10

Other Artifacts: None

Notes: Site was likely contemporaneous with nearby Kisiwa Forests.

7. **Likonde**

Site Code: 331-1

Location: 613060 E, 8862425 N

Microenvironment: Highland Plains

Surroundings: Dry woodland and brushy grassland north of modern village

Size: 1 ha

Periods Represented: Periods 6 and 7

Total Sherds Recovered: 211

Other Artifacts: Daub

Notes: Site was excavated during Phase III.

8. **Likonde Forest**

Site Code: 331-2

Location: 613325 E, 8862750

Microenvironment: Highland Plains

Surroundings: Clearing in forest south of modern homestead

Size: 0.0016 ha

Periods Represented: Period 4

Total Sherds Recovered: 17

Other Artifacts: None

Notes: Recovered artifacts are pieces of a single broken pot. No other material was recovered

9. **Lisoho Fields**

Site Code: 60-2

Location: 613650 E, 8872650 N

Microenvironment: Lowland Plains

Surroundings: Maize fields and a cashew grove with some intervening woodland just north of main road to Mikindani

Size: 7 ha

Periods Represented: Periods 3, 5, and 7

Total Sherds Recovered: 306

Other Artifacts: Slag; tuyere; daub

Notes: Site was excavated during Phase III. The various components of this site are not spatially coterminous.

10. **Lisoho North**

Site Code: 60-1

Location: 613770 E, 8872995 N

Microenvironment: Lowland Plains

Surroundings: Agricultural Fields and scrub forest north of Lisoho

Size: 3.5 ha

Periods Represented: Periods 4 and 5

Total Sherds Recovered: 34

Other Artifacts: None

Notes: The northern boundary of this site has not yet been adequately determined. Bedrock is relatively close to the surface at this site.

11. **Litingi**

Site Code: 466a-1

Location: 624060 E, 8864820 N

Microenvironment: Coast

Surroundings: Grassy area just above the shoreline, several baobab trees in the vicinity.

Size: 1 ha

Periods Represented: Periods 4 and 6

Total Sherds Recovered: 54

Other Artifacts: Indian earthenware; shell; bone; daub

Notes: Site has multiple loci of artifact density, which may help explain the multiple components.

12. **Litingi Channel**

Site Code: 466a-2

Location: 623567 E, 8865165 N

Microenvironment: Coast

Surroundings: Shoreline and grassy area just above it on northeast arm of the Mikindani Bay lagoon

Size: 0.5 ha

Periods Represented: Period 1

Total Sherds Recovered: 41

Other Artifacts: None

Notes: Site's ceramics bear similarities to LSA wares described by Kwekason (2007)

13. **Liwelu**

Site Code: 390-1

Location: 617750 E, 8858650 N

Microenvironment: Valley

Surroundings: Agricultural fields and an overgrown coconut stand west of the main road to Mikindani

Size: 2.75 ha

Periods Represented: Periods 3 and 7

Total Sherds Recovered: 40

Other Artifacts: Refined earthenware import

Notes: Older material is buried 45-70 cm below the surface.

14. **Mangamba**

Site Code: 516a-1

Location: 631350 E, 8858050 N

Microenvironment: Valley

Surroundings: Maize fields near Mangamba Primary School

Size: 0.2 ha

Periods Represented: Period 7

Total Sherds Recovered: 63

Other Artifacts: Iron artifact; daub; shell; bone

Notes: Site is mostly recent, though some non-diagnostic artifacts were recovered at depths of about 70 cm.

15. **Mangamba Low**

Site Code: 516a-2

Location: 631350 E, 8858850 N

Microenvironment: Valley

Surroundings: Woodland with significant brush north of the modern village and down in the valley

Size: 0.3 ha

Periods Represented: Undated

Total Sherds Recovered: 14

Other Artifacts: None

Notes: Some sherds were exposed on the surface from water erosion.

16. **Mbuo Hilltop**

Site Code: 297-2

Location: 610940 E, 8866950 N

Microenvironment: Valley

Surroundings: Agricultural fields and medium density scrub brush wite a bit northwest of the modern town along the tarmac road

Size: 4.5 ha

Periods Represented: Periods 1, 3, 5, 6, 7

Total Sherds Recovered: 241

Other Artifacts: Several flaked stone tools

Notes: Site was excavated during Phase III. Erosion has exposed sherds in places and is clearly a disturbance, likely exacerbated by modern agriculture.

17. **Mbuo Mbuyu**

Site Code: 297-1

Location: 610780 E, 8866100 N

Microenvironment: Valley

Surroundings: Baobab tree and forest south of the tarmac road.

Size: 2.25 ha

Periods Represented: Periods 5 and 6

Total Sherds Recovered: 70

Other Artifacts: None

Notes: The bedrock is fairly close to the surface at this location, providing a compressed stratigraphy.

18. **Mbuo Ridge Low**

Site Code: 161-2

Location: 609650 E, 8864760 N

Microenvironment: Ridge

Surroundings: Millet fields on black clay vertisol west of Mbuo River

Size: 1 ha

Periods Represented: Periods 5 and 7

Total Sherds Recovered: 30

Other Artifacts: None

Notes: Most artifacts at this site came from the topsoil but diagnostic sherds also found at a depth of 50 cm.

19. **Mbuo Ridge Top**

Site Code: 161-1

Location: 609250 E, 8864750 N

Microenvironment: Ridge

Surroundings: Cleared maize field and surrounding forest; site overlooks the Mbuo Valley

Size: 0.5 ha

Periods Represented: Undated

Total Sherds Recovered: 23

Other Artifacts: None

Notes: The thickness of the recovered sherds suggests a potential first-millennium date, but no diagnostic material was recovered.

20. **Mgao North**

Site Code: 10-1

Location: 608850 E, 8875850 N

Microenvironment: Coast

Surroundings: Agricultural fields and light intervening thicket; baobabs along the shoreline

Size: 7.5 ha

Periods Represented: Periods 4, 5, 6, and 7

Total Sherds Recovered: 1347

Other Artifacts: Slag; tuyere; large quantities of shellfish, both late first millennium and refined earthenware imported ceramics, glass beads; daub with pole impressions

Notes: Site was excavated during Phase III. It is a very dense site providing the largest material culture sample for the early second millennium.

21. **Mgao South**

Site Code: 10-2

Location: 609050 E, 8875050

Microenvironment: Coast

Surroundings: Millet fields and forest along the coastline

Size: 1.5 ha

Periods Represented: Period 3

Total Sherds Recovered: 43

Other Artifacts: Slag; shell; daub

Notes: The southern boundary for this site has not been adequately determined.

22. **Miseti Hilltop**

Site Code: 490-1

Location: 625710 E, 8862450 N

Microenvironment: Coast

Surroundings: Agricultural fields interspersed with cashew and baobab trees on hill north of modern village

Size: 6 ha

Periods Represented: Periods 3, 4, 5, and 7

Total Sherds Recovered: 1727

Other Artifacts: Slag; abundant shell; daub

Notes: Site was excavated during Phase III. The various components of this site are not spatially coterminous. One is able to see at least 4 other first millennium locations from this site.

23. **Misijute**

Site Code: 370-3

Location: 616890 E, 8864650 N

Microenvironment: Highland Plains

Surroundings: Agricultural fields east of modern town

Size: 0.72 ha

Periods Represented: Period 5

Total Sherds Recovered: 26

Other Artifacts: Iron artifacts on surface

Notes: The surface material is likely modern and the older material comes from between 50-75 cm below the surface.

24. **Misijute Fields**

Site Code: 370-4

Location: 616950 E, 8864350 N

Microenvironment: Highland Plains

Surroundings: Fallow fields east of modern village

Size: 0.01 ha

Periods Represented: Undated

Total Sherds Recovered: 8

Other Artifacts: None

Notes: Site is probably contemporaneous with Misijute. One decorated sherd bears a double row of punctates.

25. **Misijute Post-Swahili**

Site Code: 370-1

Location: 616650 E, 8864550 N

Microenvironment: Highland Plains

Surroundings: Maize fields around some modern houses

Size: 0.2 ha

Periods Represented: Period 7

Total Sherds Recovered: 7

Other Artifacts: Daub

Notes: Sherds from this site include decorated and red-burnished examples.

26. **Misijute Recent**

Site Code: 370-2

Location: 616750 E, 8864365 N

Microenvironment: Highland Plains

Surroundings: Maize field amidst modern houses

Size: 0.6 ha

Periods Represented: Period 7

Total Sherds Recovered: 21

Other Artifacts: Daub

Notes: Most material from the topsoil, though some non-diagnostic sherds found around 60 cm

27. **Misn'gombe**

Site Code: 210-1

Location: 639345 E, 8858390 N

Microenvironment: Lowland Plains

Surroundings: Cassava field southwest of modern village

Size: 0.2 ha

Periods Represented: Undated

Total Sherds Recovered: 10

Other Artifacts: Daub

Notes: This site is likely modern, as most material comes from the topsoil.

28. **Mji Mwema I: One**

Site Code: 449-1

Location: 621550 E, 8857120 N

Microenvironment: Highland Plains

Surroundings: Cassava fields and woodland brush far to the south of the modern village.

Size: 0.75 ha

Periods Represented: Periods 3, 4, and 7

Total Sherds Recovered: 161

Other Artifacts: Slag; fishbone; daub

Notes: Site was excavated during Phase III. Most of the site is buried under more than half a meter of soil.

29. **Mji Mwema I: Two**

Site Code: 449-2

Location: 621650 E, 8857280 N

Microenvironment: Highland Plains

Surroundings: Cassava fields and woody thicket

Size: 0.25 ha

Periods Represented: Periods 3 and 4

Total Sherds Recovered: 262

Other Artifacts: Slag, daub

Notes: Site was excavated during Phase III. This site had no surface remains.

30. **Mji Mwema II**

Site Code: 459-1

Location: 622130 E, 8858360 N

Microenvironment: Highland Plains

Surroundings: forest south of broad agricultural fields

Size: 0.8 ha

Periods Represented: Period 5

Total Sherds Recovered: 13

Other Artifacts:

Notes: Artifacts were recovered from a depth of more than 50 cm.

31. **Mkangala Highland I**

Site Code: 510-1

Location: 626850 E, 8858650 N

Microenvironment: Highland Plains

Surroundings: cashew grove and cassava cultivation

Size: 0.1 ha

Periods Represented: Undated

Total Sherds Recovered: 4

Other Artifacts: none

Notes: Site is likely a short-term use-area, rather than a permanent settlement.

32. **Mkangala Highland II**

Site Code: 510-2

Location: 626850 E, 8858450 N

Microenvironment: Highland Plains

Surroundings: cassava field and surrounding dry forest

Size: 0.06 ha

Periods Represented: Undated

Total Sherds Recovered: 13

Other Artifacts: None

Notes: One decorated sherd bears punctate decoration.

33. **Mkangala Ridge-top I**

Site Code: 509-2

Location: 627150 E, 8858850 N

Microenvironment: Ridge

Surroundings: Cassava field just north of ridgeline

Size: 0.07 ha

Periods Represented: Periods 3, 4, and 5

Total Sherds Recovered: 375

Other Artifacts: Slag; daub; glass

Notes: Site was excavated during Phase III. Excavation revealed several features indicative of human settlement. Site possessed no surface remains.

34. **Mkangala Ridge-top II**

Site Code: 509-3

Location: 627050 E, 8858850 N

Microenvironment: Ridge

Surroundings: cassava fields and some intervening thicket just north of ridgeline

Size: 0.3 ha

Periods Represented: Periods 3 and 5

Total Sherds Recovered: 44

Other Artifacts: Potential worked quartz

Notes: Site was excavated during Phase III. Artifacts were typically recovered from less depth at this site than the other atop the ridge.

35. **Mkangala Streambed**

Site Code: 509-1

Location: 627160 E, 8859620 N

Microenvironment: Ridge

Surroundings: Grassy area following a dry streambed below the ridge

Size: 5.5 ha

Periods Represented: Periods 5, 6, 7

Total Sherds Recovered: 70

Other Artifacts: Iron artifact; slag; daub;

Notes: Erosion is an issue at this site, and many artifacts have been brought to the surface along the streambed.

36. **Modern Ziwani**

Site Code: 184-1

Location: 637055 E, 8856210 N

Microenvironment: Lowland Plains

Surroundings: Agricultural fields at edge of modern village

Size: 0.24 ha

Periods Represented: Period 7

Total Sherds Recovered: 11

Other Artifacts: Daub

Notes: Most artifacts were from the surface and topsoil, but some came from a depth of about 50 cm.

37. **Naliendeli**

Site Code: 513-1

Location: 627350 E, 8853050 N

Microenvironment: Highland Plains

Surroundings: Forested area south of the town of Naliendeli

Size: 0.21 ha

Periods Represented: Undated

Total Sherds Recovered: 5

Other Artifacts: None

Notes: Sherds come from depth and include an incised decorated sherd, but the dating is uncertain.

38. **Naumbu**

Site Code: 142-1

Location: 621720 E, 8868850 N

Microenvironment: Lowland Plains

Surroundings: Grassy area and some tree crops north of modern village

Size: 0.05 ha

Periods Represented: Period 7

Total Sherds Recovered: 25

Other Artifacts: Daub

Notes: The sherds from this site were quite beaten up.

39. **Naumbu Hills**

Site Code: 142-3

Location: 621850 E, 8868450 N

Microenvironment: Lowland Plains

Surroundings: Grass and brush covered hills south of the modern village, some agricultural fields in vicinity

Size: 4.5 ha

Periods Represented: Undated

Total Sherds Recovered: 28

Other Artifacts: None

Notes: Despite its size, the site is not particularly dense, consisting mainly of widely scattered sherds without a denser locus.

40. **Naumbu Upupu**

Site Code: 142-2

Location: 621830 E, 8868050 N

Microenvironment: Lowland Plains

Surroundings: Grassland with some light brush well south of modern village and associated fields.

Size: 1.25 ha

Periods Represented: Undated

Total Sherds Recovered: 35

Other Artifacts: wound glass bead; daub

Notes: Glass bead, sherd width, and deeply incised decorations suggest that site might date to the late first or early second millennium. The bead was discussed by the survey crew as similar to a Makonde waist-bead.

41. **North Imekuwa**

Site Code: 112-1

Location: 618350 E, 8871750 N

Microenvironment: Lowland Plains

Surroundings: Agricultural fields and scrub woodlands north of modern town

Size: 8.5 ha

Periods Represented: Periods 2, 3, 4, 5 and 7

Total Sherds Recovered: 796

Other Artifacts: Slag; shell; daub

Notes: Site was excavated during Phase III. No stratigraphic break was identified between the site's components. The site could potentially be even larger than recorded, as has difficulty testing in wooded area to the northeast.

42. **North Imekuwa West**

Site Code: 112-2

Location: 618025 E, 8871050 N

Microenvironment: Lowland Plains

Surroundings: Grassy area around cashew grove north of modern village

Size: 1.4 ha

Periods Represented: Period 5

Total Sherds Recovered: 48

Other Artifacts: Slag; daub

Notes: This site has very few decorated sherds, so may potentially have connections to Plain Ware, in which case it would be the first site located away from Mikindani Bay to do so. This possibility has not yet been adequately investigated however.

43. **Old Liwelu**

Site Code: 390-2

Location: 617750 E, 8858250 N

Microenvironment: Valley

Surroundings: grassy area with some woodland brush south of modern agricultural fields

Size: 1 ha

Periods Represented: Undated

Total Sherds Recovered: 18

Other Artifacts: None

Notes: Despite lack of diagnostic artifacts, sherd width and depth suggests a first-millennium date.

44. **Old Ziwani**

Site Code: 545-1

Location: 635700 E, 8856450 N

Microenvironment: Lowland Plains

Surroundings: overgrown cassava field and cashew grove at outskirts of modern town

Size: 0.8 ha

Periods Represented: Period 3

Total Sherds Recovered: 8

Other Artifacts: Daub

Notes: Site is relatively small and without great density, but antiquity seems beyond question. However, this puts it relatively far away to the east from contemporary sites.

45. **Past Naliendeli**

Site Code: 505-1

Location: 626740 E, 8851090 N

Microenvironment: Highland Plains

Surroundings: Located in a cassava field

Size: 0.19 ha

Periods Represented: Undated

Total Sherds Recovered: 8

Other Artifacts: Daub

Notes: Sherds were mostly found in the topsoil, so a recent date is suggested for this site.

46. **Pemba**

Site Code: 152a-3

Location: 623100 E, 8866460 N

Microenvironment: Coast

Surroundings: scrub thicket and modern agricultural fields northwest of modern village

Size: 10 ha

Periods Represented: Periods 2, 3, 4, 5, and 7

Total Sherds Recovered: 796

Other Artifacts: Slag, plentiful shell,

Notes: Site was excavated during Phase III, and first explored by Kwekason (2007). The first-millennium material seems to be the most spatially extensive.

47. **Pemba Bomani**

Site Code: 152a-2

Location: 623250 E, 8866950 N

Microenvironment: Coast

Surroundings: Agricultural fields and moderate scrub brush well north of modern village

Size: 0.5 ha

Periods Represented: Period 7

Total Sherds Recovered: 35

Other Artifacts: Refined earthenware; shell

Notes: Site is in the vicinity of ruined building associated with German colonial occupation, though test by ruins in Phase I was negative.

48. **Pemba Mbuyu Pwani**

Site Code: 152a-1

Location: 623580 E, 8866050 N

Microenvironment: Coast

Surroundings: Open field surrounded by baobabs on the coast east of modern village

Size: 1.5 ha

Periods Represented: Periods 3, 4, and 5

Total Sherds Recovered: 265

Other Artifacts: Spindle whorl, Sasanian Islamic and other imported ceramics

Notes: Site was excavated during Phase I. This location provides clear evidence of connections in the Indian Ocean. The site is also relatively nearby and perhaps related to Pemba, though it is on the other side of the peninsula.

49. **South Mikindani**

Site Code: 456-1

Location: 622770 E, 8861250 N

Microenvironment: Lowland Plains

Surroundings: Baobab surrounded agricultural fields south of Magangeni ward of Mikindani.

Size: 3.75 ha

Periods Represented: Period 6

Total Sherds Recovered: 41

Other Artifacts: Daub

Notes: Despite size, this site is not particularly dense. It was probably associated with the growth of Mikindani in the second millennium.

50. **Stella Maris Hills**

Site Code: 430-2

Location: 620225 E, 8863650 N

Microenvironment: Valley

Surroundings: Grassland with occasional trees and scrub brush covering several low hills west of Mikindani

Size: 5.25 ha

Periods Represented: Periods 2, 3, 4, 5, and 6

Total Sherds Recovered: 2883

Other Artifacts: Slag; shell; late first-millennium imported ceramic; daub; coral

Notes: Site was excavated during Phase III. It is a multicomponent site, though components are not spatially coterminous.

51. **Stella Maris Mission**

Site Code: 430-1

Location: 620350 E, 8863990 N

Microenvironment: Valley

Surroundings: Open fields just south of church property

Size: 1.5 ha

Periods Represented: Periods 4, 5, and 7

Total Sherds Recovered: 70

Other Artifacts: Shell; daub

Notes: This is a dense, multicomponent site perhaps related to Stella Maris Hills. It was not fully investigated due to its proximity to the church.

52. **Ufukoni Fields**

Site Code: 506-3

Location: 627465 E, 8861670 N

Microenvironment: Lowland Plains

Surroundings: Maize fields west of dumping area

Size: 2 ha

Periods Represented: Undated

Total Sherds Recovered: 36

Other Artifacts: Shell; daub

Notes: Decorated sherds are not clearly diagnostic, but seem to suggest a date from the second half of the second millennium based upon their execution.

53. **Ufukoni Mibuyu**

Site Code: 506-1

Location: 627060 E, 8861820 N

Microenvironment: Lowland Plains

Surroundings: Cassava fields around modern houses and large baobab trees up the hill east of the salt flats

Size: 2.5 ha

Periods Represented: Periods 3, 4, 6, and 7

Total Sherds Recovered: 429

Other Artifacts: Slag; shell; bone; rock crystal; coral; daub

Notes: Site was excavated during Phase III. It is quite artifact rich, and the dense areas consist of several loci. Artifacts were recovered from significant depth.

54. **Ufukoni Sea-View Hill**

Site Code: 506-2

Location: 627380 E, 8861920 N

Microenvironment: Lowland Plains

Surroundings: Agricultural fields and grassy brush southeast of Mikindani Bay inlet (the sea in "sea-view")

Size: 2 ha

Periods Represented: Periods 5 and 7

Total Sherds Recovered: 34

Other Artifacts: Daub

Notes: Bedrock is relatively high at this site, so the stratigraphy is compressed. The site carries a modern overburden from agricultural activities.

55. **Ziwani Cashew Grove**

Site Code: 184-2

Location: 637450 E, 8856340 N

Microenvironment: Lowland Plains

Surroundings: grassy field adjacent to a cashew grove southeast of modern village

Size: 0.13 ha

Periods Represented: Periods 5 and 7

Total Sherds Recovered: 7

Other Artifacts: European refined earthenware ceramics; daub

Notes: Artifacts recovered here from both the topsoil and a depth of 70 cm. The latter material appears earlier based on decorative motifs, while the former includes European imports. Overall the site is rather small however.

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