Archaeological and Ethnographic Evidence for the Historic Consumption of Fish and Shellfish along the Coast of East Africa in Tanzania

— *E. B. Ichumbaki* *

By using archaeological and ethnographic evidence, this paper provides an overview of historic consumptions of fish and shellfish by local communities that lived along the coast of East Africa particularly in Tanzania. It is argued in this paper that for the past one and half millennium, fish and shellfish landing sites as well as their consumption have been changing over time and space. Data from archaeological surveys and excavations highlight some information on these two issues. Results indicate that, whereas the former (fish and shellfish landing sites) were and continue to be attributed to change in sea level and the need to meet demands of existing socio-economic setups, the latter (their consumption) was either due to availability and/or preferences. This tendency continues to-date though in a different manner. For instance, as a means to obtain preferred fishes, local communities embarked on dynamite fishing which, however, despite providing commercial and food advantages, causes serious harm to both local communities and marine resources.

Key Words - Shellfish; Sudi Bay, maritime history, landing site, dynamite fishing

For many thousands of years, marine resources particularly fish and shellfish from lakes, rivers, seashores and other related marine environments are hypothesized to have formed an important part of ancient communities' diet and commerce. This hypothesis stems from the presence of huge shell middens along the shores of water mentioned above bodies (Cook 1946; Cook and Treganza 1950; Lane 2004; Msemwa 1994; Waselkov 1987). Along the coast of East Africa, consumption of fish and shellfish during the historic times is well documented in the archaeological record but patchy in documentary sources. For instance, in his writing of the mid-12th century, Al-Idris reports consumption of these resources at Badhuna (located somewhere on the coast of East Africa – Horton 1996 assumes to be the Lamu Archipelago). He writes: "…..is a ruined thinly populated town with wretched houses full of dirt. Its' inhabitants live on fish, shellfish, frogs, snakes, mice, lizards the creatures that are not eaten" (Lewis 1974:118). In a similar vein, some of these shellfish are reported to have been exploited commercially. For instance, cowrie shells are

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reported to have been shipped from Zanzibar to the interior regions including West Africa (Allen 1974; Burton 1872; Casson 1989; Stigand 1913).

Historical documents such as these, their limitation notwithstanding, are supported by archaeological data recorded from excavations. For instance, Kirkman (1954) provides an account of the exploitation of shellfish by local communities same as Wilding (1973) who reports the same case from the northern Kenya coast. Furthermore, a limited presentation of shellfish exploitation and type of species that are more preferred have been done using both archaeological and ethnographic viewpoints (Horton 1996; Msemwa 1994; Waane 1990). Interestingly, the reported shellfish are of different species with varying quantities. Nonetheless, the existing body of knowledge, especially with a reference to the coast of East Africa (e.g. Msemwa 1994; Mudiba 1996) consider the noted variations to be the functions of environment and species' availability rather than ancient human behaviour. However, a recent study from Sudi Bay, Southeastern Tanzania indicates otherwise, and this is a subject matter for the current paper.

The research presented in this paper was undertaken as part of practical training to UDSM students conducted in 2011 and 2012 at Sudi Bay in Lindi and Mtwara Regions, South-eastern Tanzania. Both research seasons located and or identified several sites, and cultural materials reported in previous publications (see Ichumbaki 2012a:70-78; 2012b:110-112; 2011:553-564; Ichumbaki and Pollard 2015). However, the historic and current consumption of marine resources by local communities living in the area have not been covered. This paper, therefore, uses both archaeological and ethnographic evidence to ascertain this maritime history.

To be able to achieve this, the paper starts by locating the study area and its socio-economic settings. Following this are the strategies used to undertake research so as to establish the area's maritime-ness (maritime culture) for the past two millennia. Implemented archaeological surveys, excavations as well as collected ethnographic inquiries are presented to setup a clear base for understanding the type and nature of results discussed afterwards. Next to this part are results from all the techniques and their discussions in the contexts of maritime sciences. The paper ends with a general interpretation and conclusion regarding the general maritime history of particularly south-eastern Tanzania and the East African coast in general.

SUDI BAY: ITS GEOGRAPHICAL LOCATION AND SOCIO-ECONOMIC SETUPS

Sudi Bay is found in Lindi and Mtwara regions, SE Tanzania (see Figure 1) and it is one among culturally contentious and archaeologically significant places of the Swahili coast. In terms of geographical coverage, the Swahili coast covers about 2,000 km running from Mogadishu in Somalia to Sofala in Mozambique including the Islands of Zanzibar, Mafia, Comoros and northern Madagascar (Pawlowics and LaViolette, 2013; Kwekason, 2011; Horton and Middleton, 2000; Chittick, 1974). Like



many parts of this coast, previous research indicates that ancient communities that lived along the Sudi Bay participated in the Indian Ocean maritime trade (Ichumbaki, 2012a, b; 2011). Consequently, these communities grew to become politically influential and economically prosperous. Sprawling ruins of mosques, stone tombs and archaeological artefacts including trade goods such as beads and ceramics found in the villages surrounding the Bay (Sudi, Mgao and Namgogoli) are supporting evidence for the mentioned historic significance.

The current inhabitants of Sudi belong to tribes from different parts of Tanzania and Mozambique. Their composition includes Yao, Makua, Makonde and Matumbi. In terms of religion, the majority of residents are Muslims, and a few are Christians. Whereas the majority of Muslims' families live in the northern part of the village (Sudi Bondeni), Christians inhabit the southern area (Sudi Kilimani). Their religious differences notwithstanding, both Muslims and Christians live very harmoniously and cooperate with each other in all aspects of day-to-day life.

Communities living along the Sudi Bay depend on maritime resources for their daily subsistence. Whereas men undertake fishing and sell their products to small-scale retailers, women and children collect seashells of the

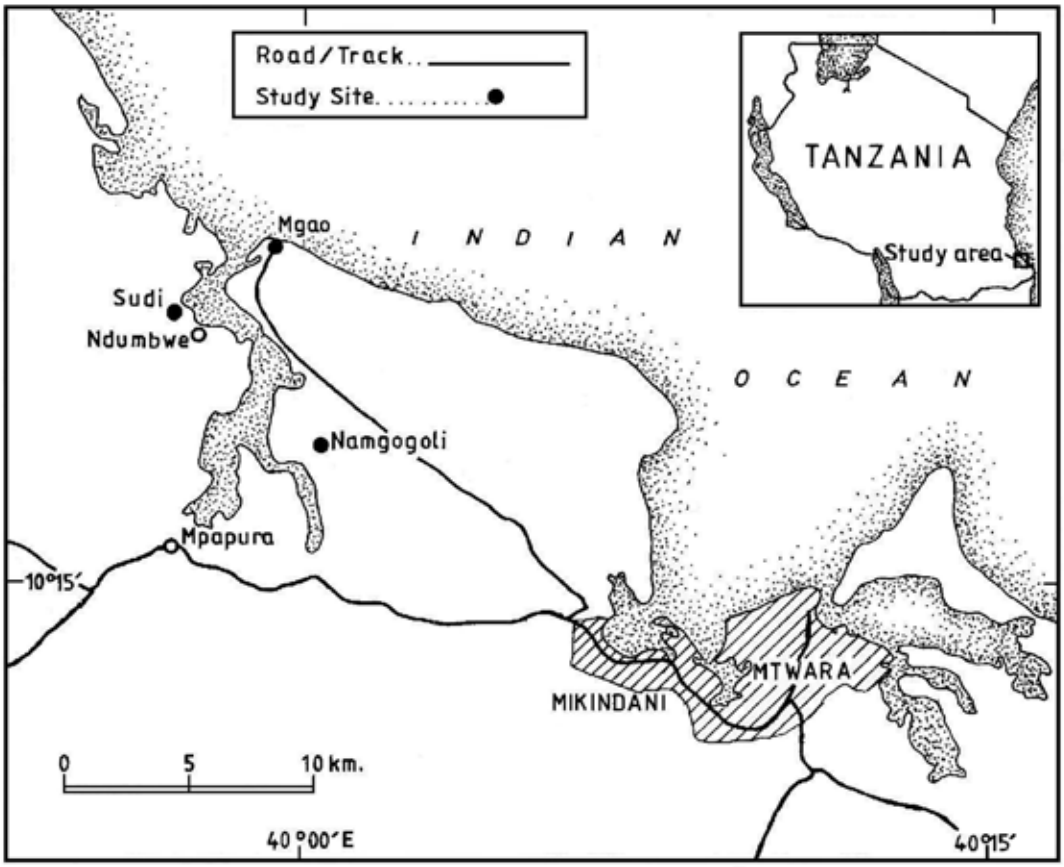


Fig. 1: A map of south-eastern Tanzania showing sites mentioned in the text.

family *Cypraeidae* highly demanded in Dar es Salaam city and other big towns in Tanzania[1] (for further discussion regarding speculation on the gender of collecting and processing shellfish see Kayombo and Mainoya, 1986; Msemwa, 1994; Mudiba, 1996). Apart from these marine resources, communities along the Sudi Bay depend on forestry, subsistence farming, small-scale business and the related informal sectors. As a consequence, these communities have become over-dependent on marine resources (Lane, 2005) and its over-exploitation is occurring leading not only to coastal environmental problems but also marginalising provisioning opportunities

METHODOLOGICAL TOOLS USED TO COLLECT DATA AT SUDI

Three techniques: surveys, excavations and collections of oral traditions and histories were implemented during data collection. Surveys were undertaken so as to understand the general layout of the area including identifying ancient and current fish landing and shell collection sites. The survey conducted in 2011 and 2012 involved terrestrial and intertidal field walking coupled with discussions with local communities undertaken to gain some insights on the bay's maritime history. I present the implemented surveys coupled with ethnographic interpretations of the coastal settlements located sites with historic maritime activities in the preceding sections.

Excavation on its part was implemented so as to understand the consumption of marine resources particularly fish and shellfish over the area and its changes over time and space. To accomplish this aim, thirteen test pits (TPs) and three trenches were excavated. Due to resource scarcity, with the exception of few TPs ($n = 3$) which were, for the purpose of training, done in a systematic manner, locations for the remaining and trenches were randomly selected. With the exception of only one pit whose size was 1m–x–1m, the rest measured 0.5m – x–0.5m. Excavations for all the pits continued at an interval of 20cm, and the maximum depth was 60cm.

The two trenches that measured 2m–x–1m each were established at about 30 meters apart in Mitachi. These units were placed in a graveyard hypothesized to have been used by both Muslim and Christian communities (Ichumbaki, 2013). Reasons for undertaking excavations within the graveyard emanated from the knowledge that cemeteries are respected and very occasionally people visit them (Chittick, 1974; Garlake, 1966; Kirkman, 1959). It was therefore anticipated that these trenches would give archaeological marine resources from their primary context meaning that the area have not been disturbed. The third trench was whose size was also 2m–x–1m was located on a sandy island in the same vicinity.

1. During the time of this research, one kilogram was sold at Tsh. 400. An energetic woman and especially during high tide when the shells are available could collect between four and five kilograms. These seashells are marketable in big towns in Tanzania as they are used as house decorations.

In a similar vein, a collection of oral histories and traditions meant to reconstruct the current communities' maritime culture and discern its relationship with the past ones. This strategy intended to understand whether the exploitation of fish and shellfish taking place now is similar or different with what has been happening since the first millennium AD. I present results of these strategies and techniques in the next sections.

HISTORIC CONSUMPTION OF FISH & SHELLFISH: ON-SURFACE EVIDENCE

Cultural materials indicative of long maritime related activities were recorded from both terrestrial and intertidal environments including different edible seashells, local and imported ceramics, beads, coins and navigational beacon. Based on finding what could be termed as shell middens or mounds, a total of five ancient landing sites were recorded at Sudi some of which are still in use (see figure 2). The first one was located further east in an area near to what has now turned into a coconut plantation. There are possibilities that this fish landing site was a centre for exchanging both local and imported goods including beads and ceramics whose remains are evident on the surface and from test pits. The site accommodated activities beyond unloading fish and shellfish. It was important to the 15th and 18th century and might have been abandoned during the late 18th century.

The site's abandonment happened when a new site was established at a nearby location, about 1.5 km due west. Its abandonment was probably due to either increase or decrease of sea level that either flooded the site or squeezing it far away making its use more difficult. Establishment of a new landing site further west during the late 17th or early 18th century is evidenced by the presence of a navigational beacon that might have attracted participants to come nearer this place (**Figure 3**). Currently, this landing site is no longer in use. Whereas a part of it has become grounds for the production of lime and salt, the remaining land has turned into a mangrove forest and coconut farm.



Fig. 2: Navigational Beacon at Sudi Village

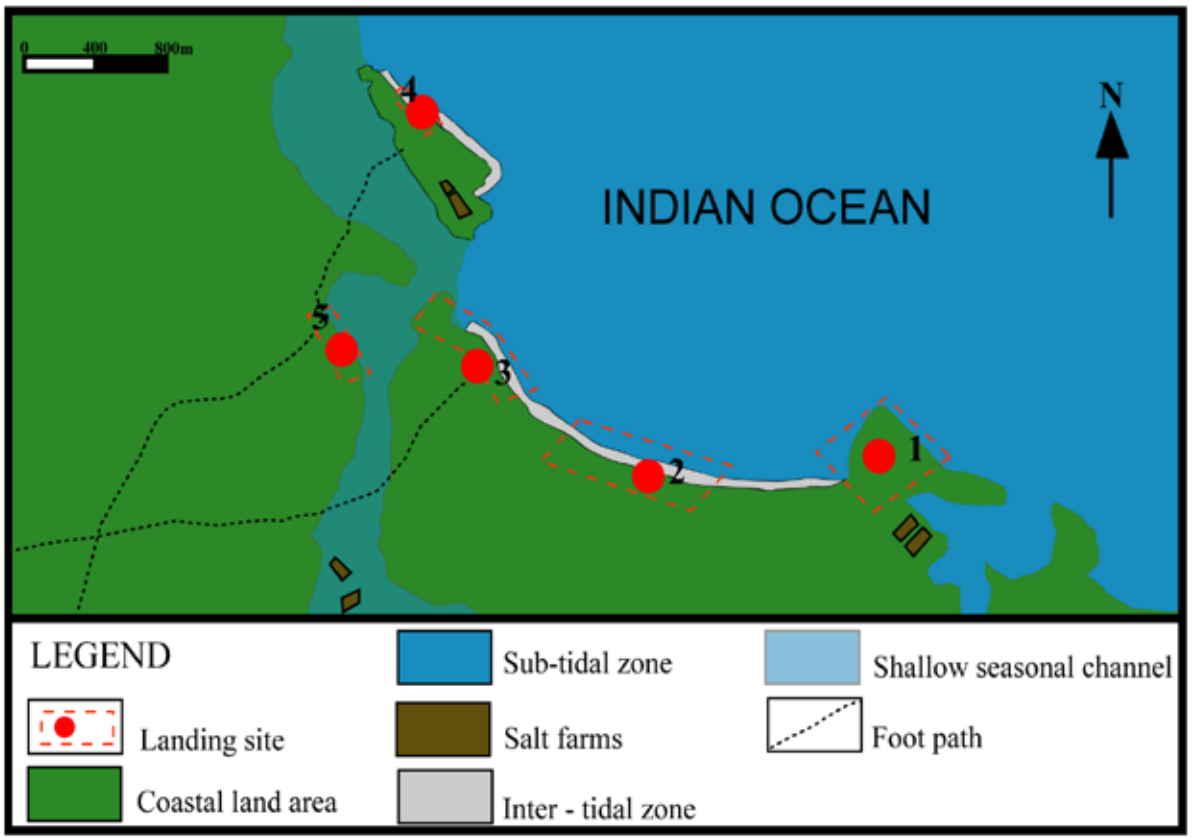


Fig. 3: Map of Sudi showing location ancient landing sites

The location of the second landing site is between Mikumbi Mosque and the navigational beacon (Ichumbaki 2012a, b). Nearby the site are coral stone-built tombs and abandoned German and British courts. This landing site was either contemporaneous with the one located nearby the coconut plantation or else, it grew soon after its collapse. Establishment of this landing site probably aimed at meeting the requirements of foreign traders who landed at nearby sites. Evidences for this assumption are imported goods such Indian ceramics and beads. The site might have been established during the late 16th through the 19th century or existed for a short time during the 19th century. It is, however, surprising that this site is located nearby a graveyard whose tombs are dated by Mturi (1972) to be of 18th/19th century and by Ichumbaki (2012a & b) to be of between 13th and 15th centuries. Notwithstanding which date is correct, there are possibilities that this cemetery area were heavily vegetated to be seen by participants of this particular business.

The third site is located on the shore directly to the heart of the village and is still in use today. It is located in the Friday Mosque and Mangrove Forest Reserve. As of now, this is the major fish and shellfish landing site of the village whereby both local small-scale fish businessmen and retailers from as far as

Mtwara, Lindi and Songea meet for buying and selling fishes. Oral histories informed this research that, it was an Indian trader who influenced this landing site to be located here. It is believed that, this Indian trader had a big shop around here and involved in both fish and agricultural products business. Thus, since he was a major customer, fishers were automatically forced to bring their agricultural and marine products to him by the situation. This scenario means that instead of carrying their fishes at a distance of about 400 meters away, they started landing very perpendicular to this Indian's house/shop, hence establishing a new landing site. Oral traditions narrate that, he left the area somewhere in the 1960s, and his two storey house collapsed very recently. Unfortunately, only the foundation of the house is present today, and a window frame belonging to that house was found in a nearby house.

The fourth landing site is located to the extreme west, on a sandy Island famously known as Minondo. Minondo Island site that is still in use today, mostly by few small-scale fishers, rises to about 1.5-2m above the high water mark (HWM). The island can easily be reached through a narrow water channel across the mangrove forest. Alternatively, it can be accessed from Tipuli village passing through the shallow extended water channel. Its size is about 0.5 by 0.2 km and is well known for having fishes not obtained by using dynamite[2]. This narration is confirmed by evidence located on the surrounding landscape. The large part of the landscape and especially across the shore has scatters of broken pieces of seashells of *potamididae* family locally known as 'tondo'. Both oral information and personal observation indicate that 'tondo' are collected from the shore during low water tide and pilled on the island. Then, the fishermen do break them to obtain the flesh that is used for two purposes: to obtain bait locally known as 'chambo'[3] (also see Kirkman 1954; Radimilahy 1998) and for domestic consumption. However, oral information revealed that these are minor uses. For instance, oral histories maintain that 'tondo' flesh is only eaten by local beer (mnazi) brewers. Local people do not prefer 'tondo' as one produces a very bad smell after eating them[4].

Moreover, tondo's flesh is not good bait as they do not attract some good fish species. In due regards, fishers use it very rarely and especially when one fails to obtain 'sunukwa'. Sunukwa are marine organisms mostly residing in the mangrove forests and explained by local fishers to be excellent bait (chambos). The very useful part of the 'tondo' is the shell outer cover. These outer covers (broken pieces of 'tondo') are thrown on mudflats within the mangrove swamps and are left there for 2-3 days. It is said that, these pieces become nests for 'sunukwa' which are highly needed by the fishers. After that,

2. Interview with Mama Gafaru 20/7/2011. Mama Gafaru was our cook and was always encouraging us to buy fishes from Minondo as they are not poisonous like those fished using bombs.
3. Chambo refers to an insect or something similar attached on fish trap to attract fishes from the ocean.
4. Interview with a group of elders who were drinking 'mnazi' in a local bar at Sudi

these broken pieces of 'tondo' are collected from the mudflats so as to take away the 'sunukwa'. 'Sunukwa' are explained by local fishers to be very good 'chambos' as they attract varieties of fish species compared to 'tondo' fresh.

The largest part of the island has scatters of both seashells and pottery fragments. Moreover, both excavation and test pitting indicate a continuation of such a tendency for both pottery and seashells up to 100.0 cm. The pottery fragments from the trench qualify to be subsumed within what has been recorded as Plain Ware (PW) (Kwekason, 2011) or Early Kitchen Ware Type 2 and 5 (Chittick, 1974) all dating to between the 9th and 14th centuries. This environment with fragmented potsherds and seashells is similar to what was recorded in Bagamoyo at the sites of Mkadini (Chittick, 1975) and on a mound at Bwembweni (Pollard, 2008), and Umbo Kisiwa at Kiswere Bay (Ichumbaki and Pollard, 2015). Mkadini, located about 5 km north of Bagamoyo is reported to be a salt-working site (Chittick, 1975), and oral information reports Minondo to have been used for that purpose. Although current salt-working is taking place at nearby areas, the archaeological record from both surveys and excavation are not convincing enough to support this assertion.

The fifth landing site, from now on referred to as Mitachi, is located between the current Mitachi and Tipuli graveyards about 300m North West of Sudi Primary school. It is located on the opposite side of Minondo Island after crossing the shallow, wide channel. The site has different species of seashell scattering on the land surface. This landing site was probably used concurrently with that of Minondo Island most likely at different time periods. While that of Minondo was used very often, the one between Tipuli and Mitachi worked very occasionally. Most likely, it was used during the high tide locally known as 'bamvua' when people could not cross the channel to use Minondo. This site is now abandoned, and the whole area has become a residential place.

HISTORIC CONSUMPTION OF FISH AND SHELLFISH: SUB-SURFACE EVIDENCE

Table 1 shows that cultural materials from TPs included potsherds, seashells, beads, fish bones and lithics, few to mention. Whereas local ceramics were collected from all TPs and almost at all levels, imported ones majority of which are European wares and few Indian, came from the top levels of TP 1, 5 and 13. Like local pottery, seashells dominated the recovered materials from both TPs and excavations. The seashells are of different species some of which are consumed by the current communities living along the Bay (see Table 2). These seashells recovered from the TPs range in numbers. At almost all levels of all TPs, *Tereblaria palustris* of the family *potamididae* lead followed by *Volema paradisiaca* and *Volema pyrum* both belonging to the family *melongidae*. *Anadara erythraeonensis* and *Anadara antiquata* of the family *Arcidae* were more or less in similar numbers with those of *Melongenidae*. The remaining species of seashells recovered from both survey and excavations were very limited in numbers.

Table 1: Established Test Pits with their respective recovered cultural materials (in pcs)

STP No.	STP Level (cm)	Recovered cultural materials (in pcs)						
		Local Potsherds	Foreign Potsherd	Seashells	Beads	Bones	Lithics	Others
1	1 (0 – 20)	05	02	-	01	-	-	01 (bullet)
	2 (20 – 40)	13	-	-	-	-	-	-
	3 (40 – 60)	03	-	-	-	-	-	-
2	1 (0 – 20)	05	-	-	-	-	-	-
	2 (20 – 40)	03	-	-	-	-	-	-
	3 (40 – 60)	31	-	03	-	-	-	01 (burnt clay)
3	1 (0 – 20)	03	-	05	-	-	-	01 (glass)
	2 (20 – 40)	01	-	04	-	-	-	09 (glass)
	3 (40 – 60)	-	-	-	-	-	01	01 (nail), 03 (glass)
	4 (40 – 80)	01	-	02	-	-	34	-
4	1 (0 – 20)	136	-	-	-	-	-	-
	2 (20 – 40)	30	-	78	-	-	-	-
	3 (40 – 60)	01	-	05	-	-	-	-
5	1 (0 – 20)	395	01	-	-	-	-	01 (glass)
	2 (20 – 40)	310	-	-	-	-	-	-
	3 (40 – 60)	140	-	-	-	-	-	-
6	1 (0 – 20)	76	-	03	-			
	2 (20 – 40)	358	-	25	-	-	01	-
	3 (40 – 60)	19		02	-	-	-	-
7	1 (0 – 20)	01	-	02	-	-	-	-
	2 (20 – 40)	-	-	-	-	-	-	-
	3 (40 – 60)	-	-	-	-	-	-	-
8	1 (0 – 20)	02	-	03	08	-	-	-
	2 (20 – 40)	01	-	-	-	-	-	-
	3 (40 – 60)	-	-	-	-	-	-	-
9	1 (0 – 20)	08	-	01	-	-	-	-
	2 & 3 (20 – 60)	-	-	-	-	-	-	-
10	1 (0 – 20)	17	-	16	-	08		
	2 (20 – 40)	30	-	23	01	03	-	2 (tomb gravel)
	3 (40 – 60)	12	-	03	-	01	-	1 (tomb gravel)
11	1 (0 – 20)	29	-	-	-	-	-	-
	2 (20 – 40)	11	-	-	-	-	-	-
	3 (40 – 60)	03	-	-	-	-	-	-

12	1 (0 – 20)	02	-	-	-	-	-	10 (glass)
	2 (20 – 40)	13	-	-	-	-	-	-
	3 (40 – 60)	01	-	02	-	-	-	-
13	1 (0 – 20)	15	01	17	-	-	-	-
	2 (20 – 40)	02	-	10	02	-	-	-
	3 (40 – 60)	06	-	10	-	03	-	-

Table 2: Seashell species recovered from the archaeological record at Sudi Bay

S/N	Species' local name/ Kiswahili	Family and Species' scientific name	Species' current local uses
1.	Kiokolo / Viokolo	Melongenidae – *Volema pyrum / paradisiaca*	-Collected by women only and used as food by almost all local people in the village - Sometimes sold at the market or in door especially at the local bar
2.	Tondo	Potamididae - *Terebralia palustris*	-Used for food and '*chambo'* trap. It is mostly collected by men
3.	Kumbwa	Arcidae - *Anadara erythraeonensis / antiquata*	-Collected by women only and used as food by almost all local people in the village. Local people appreciate that when well-cooked becomes very delicious than any other seafood[5]. Having taken out the fresh, the remains are used for fish skinning
4.	Mwezi	??	-Collected by women for food but very occasionally
5.	Simbi	Cypraeidae - *Cypraea tigris*	-Collected by women for sell
6.	Kome / Makome	Gestropodis spp.	-Collected by women for food but very occasionally. Their broken pieces are used as 'knives' for fish skinning
7.	Udododo	Erycinidae – *Scientilla oblonga*	-Collected by women for food but very occasionally.
8.	Ngovu	-	-Collected by women for food but very occasionally.
9.	Kinung'idi / Vinung'idi	-	-Collected by women for food but very occasionally.
10.	Kig'ong'wa	-	-Collected by women for food but very occasionally.
11.	Kono kono	*Achatina fulica*	-Collected for food but very occasionally. One group eats them said to have migrated from Mozambique
12.	Lisingula / masingula	-	-

5. Interview with Mama Gafaru and Mama Saidi (05/8/2012). These two women had become very close friends as helped to cook food for the research group. They had therefore trusted the group to an extent of providing oral information as soon as they were requested.



Apart from the seashell and potsherds presented above, remaining cultural materials recovered from the test pits include fish bones, beads, lithics and others[6]. These material remains from TPs do not differ much with what I recovered from three established trenches. The trenches that measured 2m–x–1m and their locations were randomly selected as well. While one trench was located in Minondo Island, the remaining two were established at Mitachi located about half a kilometre in the southern part within the graveyard. Whereas recovered cultural materials from the three established trenches are summarized in Table 3, their brief presentation is made in the next section.

The upper layers of trenches one and two (T1 & T2) provided cultural materials of different nature. For instance, while I recovered none from level 1 of T1, T2 yielded a total of 70 seashells. The trend continues at level 2 where T1 yields 35 pieces compared to 502 produced by T2. I also noted this major difference in seashells count at level 3 of both trenches. For example, whereas 42 seashells were recovered from level 3 of T1, that of T2 produced a total of 383 seashells. In addition, while nothing came from level 4 of T1, 47 seashells were recorded at T2. Neither seashells nor fish bones were observed at level 4 of both trenches.

Interestingly, the two trenches have almost a similar trend when it comes to fish bones. For instance, while the first levels of both units produced none, the second ones produced 35 and 42 seashells for T1 and T2 respectively. Whereas level 5 of T2 produced only very few ($n = 2$) seashells, neither seashell nor fish bone was recovered from that of T1. Moreover, whereas three fish bones were collected from level six of T2 that of T1 was recorded at 2. The remaining levels (6-9/10) of both trenches yielded neither seashells nor fish bones. In a similar vein to all established TPs, an important aspect noted was the dominance of *Tereblaria palustris* of the family *potamididae*.

6. Others as used in the table refer to different artifacts recovered from the pits that are not indicated on a separate column. These included bullet, tomb gravel, glass, bunt clay etc. where necessary these materials are discussed so as to reveal the connection with the current community at Sudi and nearby vicinities.

Table 3: Established Trenches with their respective recovered cultural materials (in pcs/kg)

Trench No.	Level (cm)	Recovered cultural materials (in pcs)						
		Local Potsherds	Foreign Potsherd	Seashells	Beads	Bones	Lithics	Others
1	1 (0 – 20)	10	-	-	-	-	-	1 (tomb gravel)
	2 (20 – 40)	133	-	35	-	35	-	
	3 (40 – 60)	183	02	42	22	22	-	-
	4 (60 – 80)	25	-	-	-	-	-	-
	5 (80 – 100)	26	-	-	-	-	-	-
	6 (100 – 120)	36	01	-	-	-	-	-
	7 (120 – 140)	03	-	-	-	-	-	-
	8 (140 – 160)	10	-	-	-	-	-	1 (tomb gravel)
	9 &10 (160–200)	-	-	-	-	-	-	
2	1 (0 – 20)	130	03	70	01	-	-	1 (coin), 1 (slag)
	2 (20 – 40)	128	05	502	02	42	09	-
	3 (40 – 60)	310	-	383	01	16	-	-
	4 (60 – 80)	178	-	47	01	-	33	2 (red ochre)
	5 (80 – 100)	07	-	07	-	-	-	-
	6 (100 – 120)	11	-	02	-	-	30	2 (red ochre), 1 (tomb gravel)
	7 (120 – 140)	02	-		-	-	11	3 (gravels)
	8 & 9 (140–180)	-	-	-	-	-	-	-
3	1 (0 – 20)	2097	03	169	-	16	02	772 (metal scrapes)
	2 (20 – 40)	6291	-	5824	-	-	-	219 (metal scrapes)
	3 (40 – 60)	10066	-	9729	-	-	-	37 (metal scrapes)
	4 (60 – 80)	1258		3618	05	-	-	-
	5 (80 – 100)	393		897	-	-	-	-
	6 (100 – 120)	398		513	-	-	-	-
	7 (120 – 140)	784		925	-	-	-	-

Trench three (T3) was sited on Minondo Island on the south-western corner near the channel. The point at which this trench was established is a shell midden. As previously presented, on this Island many beads, local ceramics and seashells were collected from both on the surface and test pits. As revealed in **Table 3**, the same trend was revealed by this trench although not for beads. The first level composed of dark grey sandy with a concentration of seashells and local potsherds. Several pieces of metal scraps (*n* =



772), lithic materials (*n = 2*), fish bones (*n = 16*) and imported potsherds (*n = 3*) were also recovered. Level two which was composed of ash-like but dusty sand soil produced an extra concentration of seashells and local potsherds. A good number of metal scraps (*n = 219*) were also recovered from this layer. As seen in **Table 3**, the third layer produced more local pottery (*n = 10066*) and seashells (*n = 9729*). The soil for this level was sandy with some sort of dark greyish in colour.

When compared to the second and third, layer four produced fewer seashells and potsherds. Of interest to this level and which was missed in the previous two, was encountering clay beads. Local potsherds and seashells were produced throughout levels 5–8. Whereas level 5 and 6 produced one lithic artefact and 'stoneware' respectively, only seashells and local potsherds were recovered from level 8. Although cultural materials were still coming out, after level 7 excavations could not continue as water started to appear. Again, like in trenches 1 and 2, *Tereblaria palustris* of the family *potamididae* dominated the recovered seashell.

HISTORIC CONSUMPTION OF FISH & SHELLFISH: ETHNOGRAPHIC EVIDENCE

After understanding a trend of fish and shellfish consumption from the archaeological record, it was considered important to understand the current situation and compare it with evidences recovered from on and under the surface. I wanted to see whether there has been a change in these resources consumption or not. An interaction with few community members living along the shore including fishers and seashells collectors with the view to achieving the target. Both ethnographic inquiries and physical observations established that in addition to fish, *kumbwa*, *viokoro* and *tondo* are marine resources that are highly consumed by the local communities along the Sudi Bay. However, whereas the consumption of *tondo* is well established from both archaeological and ethnographic evidence, *kumbwa* and *viokolo* are not evident in the archaeological record prior the late 19th century. This absence means that both *kumbwa* and *viokoro* were introduced in the local communities' diet very recently. The likely reason for this inclusion may be the diminishing of more robust and delicious marine resources such as fish. It is in a similar vein that, dynamite fishing that I now turn on might have gained popularity.

During the first days of our stay at the village, two shocking issues were noticed. The first was finding the village with a good number of younger and energetic gentlemen having either one or both of their hands off and the second a bomb-like eruption which used to come out between noon and 2 pm every day. An interest to learn how and why those village members lost their hands and where that bomb like sounds came from rose. To obtain this information, few students[7]

7. Chachilu Anangisye, Kibona Michael, Edward Masongo and Seleman Nzota were involved in this exercise. They attended both 2011 and 2012 field schools at Sudi and had established many contacts with local people. They also knew at what time fishes will be brought at the landing site and could easily identify which fishes were either captured normally or by using the bombs.

who had increased their interaction with the locals and I started to seek answers for these two shocks. Since it was difficult to ask the casualties directly what happened to them, I took strategies to ask the school children about what had happened to those gentlemen. The children answered very shortly *'bomu hilo'* loosely meaning ''that is a bomb[8]''.

A close follow up on this matter and results of the analysis of the collected oral histories, indicated that dynamite fishing takes place over the area. This type of fishing takes place within shallow water found in between Sudi Village on one side (in Lindi Region) and Mgao Village on the other (Mtwara Region). A few members of the local community make the bombs by using an empty '*that'* water bottle, plastic rope and poisonous powder. Once these bombs are made, they are taken and blown up under the reefs where fishes and other aquatic organisms live. This kind of fishing is very destructive not only to fishes but also the lives of all marine organisms situated within a 15-20m radius (Guard and Masaiganah 1997). It moreover becomes more destructive when done in shallow water like that of Sudi Bay. For instance, it is argued that corals that take hundreds of years to grow are broken into pieces within a second, and that the seabed is devastated over a diameter of 4–5m (Richmond 1997; Samoilys and Kanyange 2008; Solandt and Beger 2000). In addition, local people involved in this activity lose their arms and sometimes the whole hand during either the making or when throwing the bomb into the water[9].

Dynamite fishing is done over a large area of the waters, and this was identified through the surveys undertaken along the shores. When I used a dhow to survey around the channel while looking for built heritage assets located on the shores, I identified many buoys[10] at different locations. The dhow captain interpreted these buoys as signs showing where the bomb was to be dropped next time[11]. In a discussion I had with this dhow captain, it came clear that once the bomb is dropped at a particular reef, it usually takes two to three weeks before the next one is performed at the same place.

I further had discussions with the current and ex-dynamite fishers about dynamite fishing taking place in their waters. An important lesson I learnt from them was their confirmation that the practice was bad to the extent of being discouraged not only by the Government but also village elders. One of the research participants who had lost one of his hands informed that money was the motive towards dynamite fishing. This participant had practiced this fishing for about six years and by the time we visited the village for our fieldwork, he had stopped it for about a year. When asked about the benefits he mentioned none accrued from this activity and recorded losing his hand.

8. Interview with children who visited me and requested for a short drive (July 17, 2011).
9. Interview with Said Bakari who during this study was the village chairman
10. Plastic like round ball tied to a rope and sunk to the water. It is moving around and is tied to the boulder such that it cannot move away.
11. Interview with the dhow Kaptain aka Snake (20/7/2012.

However, when I investigated more, it was found that compared to village fishermen he was somehow rich. He owned a three bedroom house which was roofed with modern iron sheets and plastered using white lime. In addition, he had a solar generated power, television and modern antenna in which local channels such as TBC, ITV and Star TV were available.

For many villagers and especially younger and energetic gentlemen, this is good life the majority wish to have. This scenario means that, unless alternative measures are taken, dynamite fishing in the area will continue. There are a number of lines to support this assertion. First, despite the fact that many people in the village have lost their hands, few died, and others have ended in jail, the activity still continues. Second, those bomb experts have and initiatives to teach the young ones on how to make and use the bombs for fishing continue. The majority of village children who, during the fieldwork in 2011 and 2012, were supposed to be in class five, and six respectively had left the school in order to engage in such activities[12]. Third, alternative activities such as cashew nuts farming that used to bring incomes to local people have significantly declined. Fourth, dynamite fishers are sons of the village who were born, raised and continue to reside in there. Although some of the village elders are unhappy with the dynamite fishing taking place in their waters, they are not ready to expose the practitioners to the police who have always searched for them without success. They make it secret such that even those who die from the activity are buried in the same day, and village members are prohibited to speak about the death cause[13].

DISCUSSION & CONCLUSION

Results presented above demonstrate the importance of fish and shellfish for subsistence strategies of local economies particularly along the Sudi Bay and the coast of East Africa in general. Also, fish and shellfish landing sites and consumption of these marine resources at Sudi Bay for the past one and half millennia has not been static. Instead, it has been changing through time (and probably space). The issue of geographical proximity remaining constant, this dynamism observed at Sudi Bay can be attributed to two factors: availability of the resources themselves and preferences. Whereas local communities, from the historic times, consumed robust, easily obtainable and delicious fish and shellfish, turned to whatever was available whenever the preferred ones became scarce. This practice explains why, as evidenced by both archaeological and ethnographic evidence, consumption of *viokolo* and *kumbwa* by local communities living along the Sudi Bay during the late 20th century has increased as a result of fish diminishing. In due regard the propagated idea that shellfish are generally considered a lower-quality food and that their consumption are restricted to poor and

12. Interview with Mwalimu Noeli Mpeture who was the head teacher for Sudi Primary School (1/8/2012).
13. Interview with an anonymous research participant at Sudi Village (27/7/2012).

marginalized members of the community (Cain 2005; Chittick 1974; Fleisher 2003), despite its workability during the pre and historic times, can no longer be sustained in this 21st century.

Archaeological data from surveys and excavations indicate that exploitation of 'tondo' (*Tereblaria palustris* of the family *potamididae)* was very high when compared to other marine resources from AD 1000. Previous studies recorded a similar trend at Shanga along the Kenyan coast (Horton 1996; Horton and Mudiba 1993) and Mikindani located at about 25 km from Sudi further south (Pawlowicz 2011). This situation continued until the 20th century when *viokolo* and *kumbwa* (*Volema paradisiaca / pyrum* of the family *melongidae* and *Anadara erythraeonensis / antiquata* of the family *Arcidae* respectively) started to take the lead. The possible interpretation of this scenario is that preferred fish species became very scarce beginning the late 19th century. In due regards, local people could not continue exploiting 'tondo' for the purpose of obtaining 'sunukwa'. In other words, 'sunukwa' used as baits were no longer required as fish became either scarce or run to deep water where local fishers with traditional fishing gears cannot reach. As a consequence, consumption of 'kumbwa' and 'viokolo' increased at a significant pace because they are available and are obtainable easily.

Another alternative solution towards this scarcity of preferred fish and shellfish, especially beginning the second half of the 20th century, was dynamite fishing. Dynamite fishing practiced along the Sudi Bay is of recent period characterizing the maritime culture of the area. Globally, dynamite fishing dates back to the Second World War when American troops introduced and used it. Between the 1950s and 60s the techniques spread to different parts including the coast of East Africa (Bryceson 1978; Guard and Masaiganah 1994; Ray 1968; Talbot 1961). Since dynamite fishing is harmful in nature and destroys aquatic biota, environment and the users, it is outlawed in almost all countries in the world. In Tanzania, the practice is prohibited under the 1970 Fisheries Act.

However, while the Tanzanian Government has a law that prohibits dynamite fishing; its enforcement seems to be very poor. As a consequence, although local communities do gain considerable incomes from this activity (Riedmiller 2006; Samoilys and Kanyange 2008), their health and well-being are highly endangered. Some community members die, and others lose their body parts due to this practice. Thus, an intervention which is consistent and appropriate to identify, promote and support new alternatives to offer opportunities for increasing economic status and food security, albeit small and limited, will result in social well-being of local communities living along the Sudi Bay and save loss of marine resources.

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