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Artisanal fisher migration patterns in coastal East Africa

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ABSTRACT

Migration is a feature of most small-scale fisheries across the world and has previously been described in spatial and temporal terms. This study assessed spatial and temporal migration patterns of fishers in Kenya, Tanzania, and Mozambique from October 2009 to March 2010 covering important migrant fishers destinations on the coast. The concentrations, fishing destinations, routes, frequency as well as seasonality of migrant fishers in each of the countries were assessed using 192 surveys at 9 sites and 127 semi-structured interviews at 25 sites. Migrations in Kenya and Tanzania were mainly seasonal while in Mozambique circular migrations were common and lasted far longer. Fishers from Pemba, Unguja and Nampula were the most experienced migrant fishers in terms of the numbers involved and their ability to migrate to distant destinations. The region is likely to experience increasing influxes of migrant fishers due to increasing fisher numbers, fisheries governance, and other factors that provide an environment conducive to migration. The small scales of operation of the local co-management structures, the lack of monitoring ability and the limited knowledge about activities of migrant fishers requires a shared regional approach in terms of fisheries management with specific attention to issues concerning migrant fishers.

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1. Introduction

Migration is widely considered to be one of the most important demographic factors affecting the environment, yet is also one of the most difficult to adequately assess (Curran, 2002) among fishers' because of the temporal and spatial scale of their movements and the fact that they operate out at sea. The general descriptions of their movements as a form of mobility, nomadism or transhumance have limited the understanding of "fishers migration". In addition there have been broad categorisations, which have, for example, seen development projects grouping fishers and pastoralists together under the "agriculture" production system (Randall, 2005). The fact that migrant fishers spend extended periods away at sea has resulted in their omission from "residents" at their places of origin during national censuses. Contemporary categorisations of migration such as rural versus urban, internal versus international, modern versus traditional, or change versus continuity in general demographics do not fit the migrant fishers' movements. This apparent ambiguous recognition of migrant fishers and limited research focus in their operations is a challenge to local and national fisheries management, not least because their activities are not confined within jurisdictional boundaries (Haakonsen and Diaw, 1991; Kraan, 2005). In essence, open access fisheries contribute to a higher probability of the influx of migrant fishers in areas that receive migrant fishers with the possibility of negative environmental impacts, particularly for remote locations and areas with poor local governance (Haller and Merten, 2008; Wamukota and Okemwa, 2009).

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Fishers' movements include commutation, circulation and migration, although migration is often considered permanent shifting of both place of fishing and place of residence (Rajan, 2002). In the human and environment context, migration in its broadest sense refers not only to permanent resettlement, but also to seasonal migration, circulation flows and tourism (Curran, 2002). This is a pragmatic definition that accounts for both the spatial and temporal dimensions of the fishers' movements. Spatially, mobility is measured where a boundary is crossed as defined by existing politico-administrative structures (Rajan, 2002). Temporally, migration is achieved by crossing a dimension in time by movement from a particular origin to a destination at a designated time or during the time of study.

Fishers have been known to move from their homes to distant fishing grounds (FAO, 2008; Curran, 2002; Haakonsen, 1989; Njock and Westlund, 2010). Initially, such fishers' movements 'followed' fish and were adapted to the natural movements of target species (Cassels et al., 2005; Cripps, 2010; Nunan, 2010). However, migrations have become a way of life in some fisher communities (Glaesel, 2000; Marikandia, 2001; Marquette and Koranteng, 2002; Haakonsen and Diaw, 1991; Nunan, 2010; Binet et al., 2012). For instance the term "kwenda-ago" or "dago" was used by fisher communities in the Western Indian Ocean (WIO) region to describe their migration to fishing grounds, away from their regular home fishing areas for periods ranging from a few weeks to a few months (Fulanda et al., 2009; Jiddawi and Ohman, 2002).

In West Africa and Asia, the migration of fishers has received considerable research attention (Haakonsen, 1991; Kramer et al., 2002; Overå, 2001; Cassels et al., 2005; Marquette and Koranteng, 2002; Binet et al., 2012; Njock and Westlund, 2010). In the WIO, studies have addressed artisanal fishers' issues from local perspectives mainly at landing sites including catches and their social dimensions, or the adjacent fishing grounds and reef ecology (Glaesel, 2000; McClanahan and Mangi, 2004, McClanahan et al., 2008; Mangi and Roberts, 2007; Rubens, 1996). The general perspective in the WIO region is that fishers migrate as part of their fishing operations (Glaesel, 2000; Johnstone, 2004; Malleret-King, 2004; Malleret-King et al., 2003). However, actual migrant fishers operations have not been studied in terms of patterns of movements, intensities of migrations or influxes of migrant fishers to the receiving destinations in the coastal fisheries of the WIO. Moreover, migrant fishers have moved beyond national boundaries, yet no region-wide research exists on these movements.

The present study addresses these gaps in research in the WIO region through an investigation of the movements of migrant fishers in Kenya, Tanzania and Mozambique. It improves the current understanding of fishers' migration, the various actors engaged in migratory fishing operations and the spatial and temporal aspects of fishers' migration in the WIO region. Rather than pre-define "migration" in terms of temporality or permanence of movements (Migration, 2015, Rajan, 2002), the study adopts the definition of migration from the Oxford English Dictionary Online (OED, 2002) that is less rigid, as commonly used in fisheries (Curran, 2002). Accordingly, migration occurs when a fisher moves away to fish at other fishing grounds (or camps away from home). We studied migrant fishers at main destinations in three WIO countries (Kenya, Tanzania and Madagascar) to answer five questions: i) where do the migrant fishers originate? ii) what specific routes do they take to reach their destinations? iii) what specific times of the year do migrant fishers arrive at the destinations? iv) what particular patterns of migrations do individual fishers follow and what influences these? and v) what are the implications of influxes of migrant fishers on resources and the management options?

2. Method

2.1. Study area

Fishing in the WIO is greatly influenced by the monsoonal wind patterns. The North East Monsoon (NEM) *(kasikazi)* prevails from November to February and is characterized by higher air temperatures and weaker winds. It is good for artisanal fishers activities. On the other hand, the South East Monsoon (SEM) *(kusi)*, which prevails from April to September, is marked by lower air temperature and strong winds sometimes exceeding 5 knots (Glaesel, 1997a, 2000; Jiddawi and Ohman, 2002). There is reduced fishing activity during this period for safety reasons. Field data collection lasted six months from October 2009 to March 2010 during the NEM season. This period coincides with the main season for migrant fishers arrival at the fishing destinations. Key informant interviews were conducted at 25 sites of which nine fish landing beaches, evenly distributed across the three countries were selected for detailed study (Fig. 1). Selected study sites were the major destinations of migrant fishers identified during the preliminary data collection using key informants and from previous studies (Fulanda et al., 2009; Glaesel, 1997a; Johnstone, 2004).

2.2. Methodology and approach

The study explored migration in space (i.e. when fishers cross a boundary, e.g. the village/district/county/country boundary, to fish or camp away from their home fishing grounds) and time (i.e. the time spent fishing away from the fisher's place of origin, i.e. away from home as specified by the migrant fisher, or away from where one's family resides or away from one's place of birth or at the time of study). Preliminary data was initially collected to gather information about the main destinations of the migrant fishers. This involved reviewing the literature on fisher migration in the WIO and interviews with local elders, village leaders, community fisheries leaders and local government officials. Concentrations of migrant fishers at study sites and numbers of local fishers were established by counting migrant fisher vessels and asking local leaders at landing sites to estimate the number of fishers (Table 1). The numbers of local fishers were obtained in the same way from existing reports and frame surveys. None of the Beach Management Units (BMU) and Community Fisheries Councils (CCP) kept records of migrant fishers; the figures presented in this study were obtained from extrapolations of previous studies at the sites (Horril and Kalombo, 1997; IDPPE, 2004), from interviews with local leaderships at the study sites, and by observations at the landing sites to count the numbers of migrant fisher vessels.

The two main methods used for data collection were surveys using structured and semi-structured questionnaires, and key informant interviews using semi-structured interview guides (Bailey, 1994). The target respondents for surveys were both migrant fishers and local fishers. Questionnaires were administered to migrant and local fishers at the same time. Data was collected from a random sample of migrant fisher vessels returning to the main landing site from fishing; the vessel's captain or his assistant was interviewed. 192 surveys were conducted with migrant fishers: 71 in Kenya, 81 in Mozambique and 40 in Tanzania. These numbers represent varying proportions of migrant fishers at the sites ranging from 6.3% at Quirimbas to 39.3% at Shimoni. The population represented by the migrant fishers surveyed is 1830 fishers, which is the total number of crew members working on the boats on

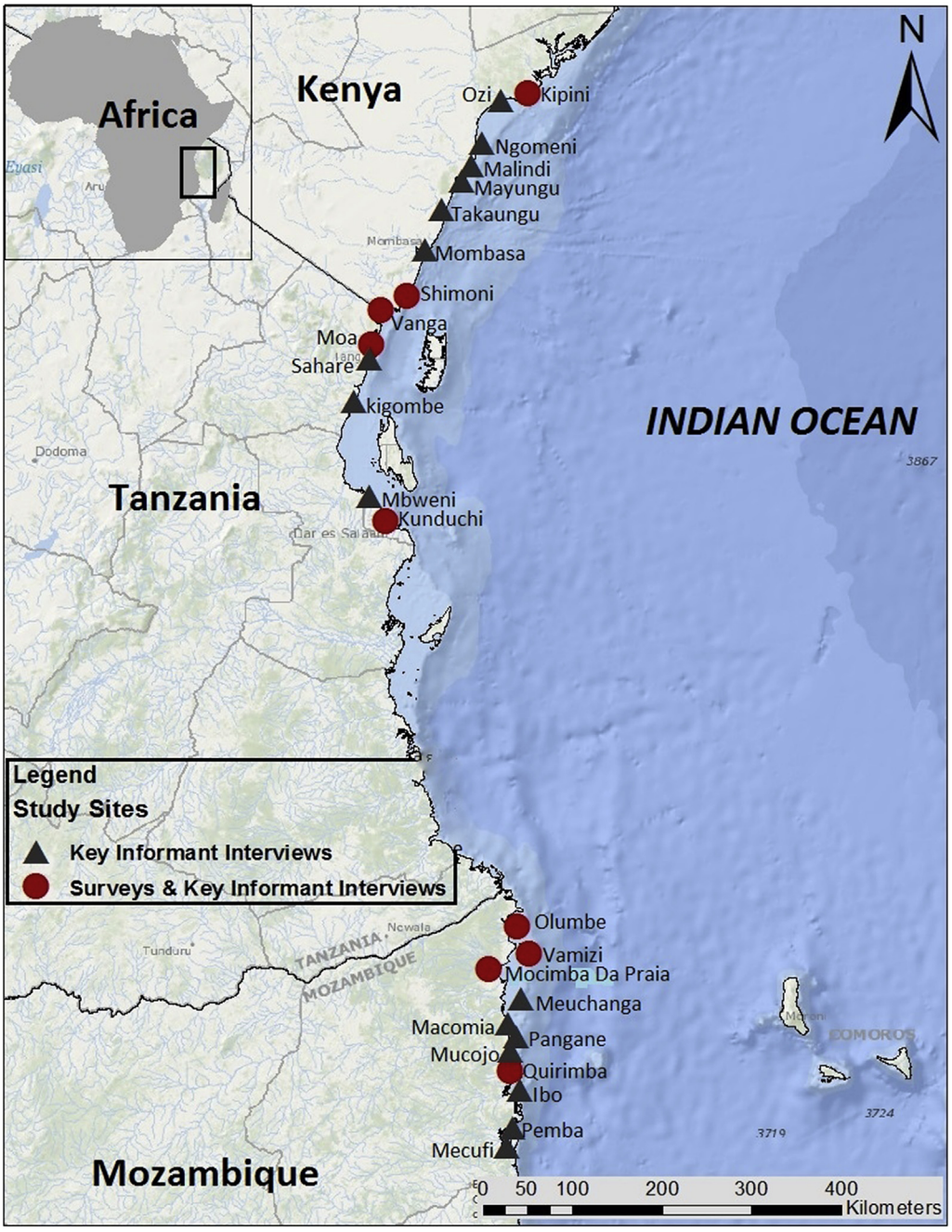

Fig. 1. Study sites in Kenya, Tanzania and Mozambique, inset location map for study areas in the respective countries.

Table 1
Concentrations of migrant fishers at study destinations in three countries 2009/10.

Landing site	Local fishers	Migrant fishers	Percent migrant fishers
Pangane	0	250	100
Muechanga island	0	400	100
Kigombe	149	300	66.8
Vanga-Jimbo	298	280	48.4
Quirimba island	440	300	40.5
Kipini	300	200	40.0
Shimoni	100	56	35.9
Moa	460	250	35.2
Mocimboa da Praia	4500	300	6.3
Vamizi island	7000	200	2.8
Total	**13,247**	**2536**	**19.1**

Table 2
Summary of drivers of fishers' migration in Kenya, Tanzania and Mozambique.

Reason for migrating	Kenya%	Tanzania%	Mozambique%	Total%
To earn more money	51	45	13	1092
Better fishing	37	18	27	82
To improve life	18	30	23	71
Tradition or habit	27	20	10	57
Hardship at home	4	5	37	46
Market conditions	8	33	4	45
Joining family or friends	4	3	10	17
Other	6		1	7
Institutions	3	3		6
To get a new experience	1	3		4

which the surveyed fishers worked. Questionnaires given to migrant fishers addressed migration patterns in time and space (frequency, location and duration, changes in patterns over time), reasons for migration, and analysis of the characteristics of different migrant groups (socio-demographics, vessel types and fishing gear) where applicable.

Key informants were selected based on their experience and referrals during fieldwork based on (Bunce et al., 2000). They included migrant fishers, local fishers, as well as local elders, village leaders and local government officials (e.g. fisheries officers, immigration officers). Information collected through key informant interviews was used to triangulate information from surveys. The themes covered were selected to focus on the most relevant issues. These included migration patterns (frequency, location and duration as well as changes in patterns over time); decisions to migrate (social, economic, ecological motivations to migrate; push, pull factors); fishing operations; social organisation (of migrant fishers); history of the village; local governance and management; attitudes and views of locals towards migrant fishers; policy of local governance bodies concerning migrant fishers; implications of migrant fishing for policy and management.

In addition to the surveys and key informant interviews, case studies were conducted to gather in-depth information. Experienced migrant crew leaders were selected to provide detailed information regarding their routes as well as the spatial and temporal dynamics of migration patterns and to map their migration patterns. Mapping facilitated the description of fishers' movements over the course of a typical fishing year. Further data elucidation was conducted using other visualisation techniques such as seasonal calendars and the Islamic calendar to create migration charts.

2.3. Data collation and analysis

Quantitative data collected through questionnaires was coded and analysed using a combination of analytical methods. The data was first checked for credibility and accuracy by a careful review of all questionnaire responses to check for unintentional responses. Methods for exploration and analysis included frequency cross tabulation and measures of variability. The process utilised the statistical package SPSS, Graphpad Prism and MS Excel Spread sheet. It was important to quantify the different variables that define migration patterns in terms of space and time. Essentially, quantitative exploration of the survey data was based on synthesis and coding by thematic areas. Analysis followed three steps: 1) all open-ended questions across surveys from all countries were reviewed as per identified themes, 2) the questions were coded using these themes, and 3) the codes were consolidated into a smaller number of code categories by grouping similar codes. The data was then synthesised and analysed for general trends across countries. Following this process, the resulting information was grouped into spatial aspects, where we established the origins, migration routes, destinations and extent of the fishers' movements within or beyond administrative boundaries as well as temporal aspects where common migration times in the year were established, and the duration of stay at destinations and frequencies of migrations determined.

The qualitative data collected from transcripts using the semi-structured questionnaires from each country, as well as key informant interviews, was analysed in Nvivo 10.2 by use of content analysis to show migration patterns in terms of space and time to 1) reveal the important themes and participants' comments with regard to the research questions, and 2) to compare themes cutting across different types of participants. The primary goal of the analysis was to produce patterns of migration grouped by spatial and temporal characteristics. Common themes identified were compared, contrasted and triangulated among the interviews to establish patterns. Based on the responses and information from the participatory methods and mapping, Esri ArcGIS 9.3 was employed to develop maps illustrating the main migratory paths in each country. Case studies were used to show unique annual migration patterns by individual migrant fishers that may be influenced by seasonality.

The entire range of results from the quantitative and qualitative analysis was utilised in assessing the implications of influxes of migrant fishers on resources and to suggest management options. Major ideas and themes from qualitative information were retained as part of the final narrative.

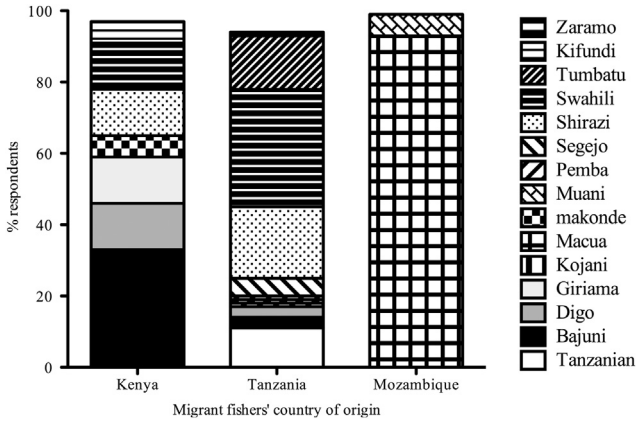

Fig. 2. Ethnicity and country of origin of surveyed migrant fishers.

3. Results

3.1. Ethnic characteristics of migrant fishers in the western Indian Ocean

The main ethnic groups among migrant fishers from Kenya, Tanzania and Mozambique were Bajuni (33%), Swahili (33%), and Macua (93%) respectively (Fig. 2). Important migrant communities included the Digo, Giriama, Swahili and Shirazi in Kenya, and the Shirazi and Tumbatu from Tanzania. Others included the Kojani, “Pemba”, Muani, Segeju, Kifundi and Makonde. The Bajuni, Swahili, Shirazi, and Digo were common migrant communities across Kenya and Tanzania. The migrant fishers were mostly aged between 25 and 45 years.

3.2. Spatial aspects of migration

i)Concentrations of migrant fishers

The combined number of migrant fishers at the 9 study sites during the present study of was 2536 (Table 1). Pangane and Meuchanga islands in Mozambique were used exclusively by migrant fishers who camped on the islands. At Kigombe in Tanzania, the proportion of migrant fishers was high, exceeding 65% of the total fisher population. The number of migrant fishers at Vanga-Jimbo in Kenya (48.4%) was almost equal to that of local fishers. Migrant fishers were slightly fewer (40%) than local fishers at Kipini in Kenya and Quirimbas Island in Mozambique. Similarly,

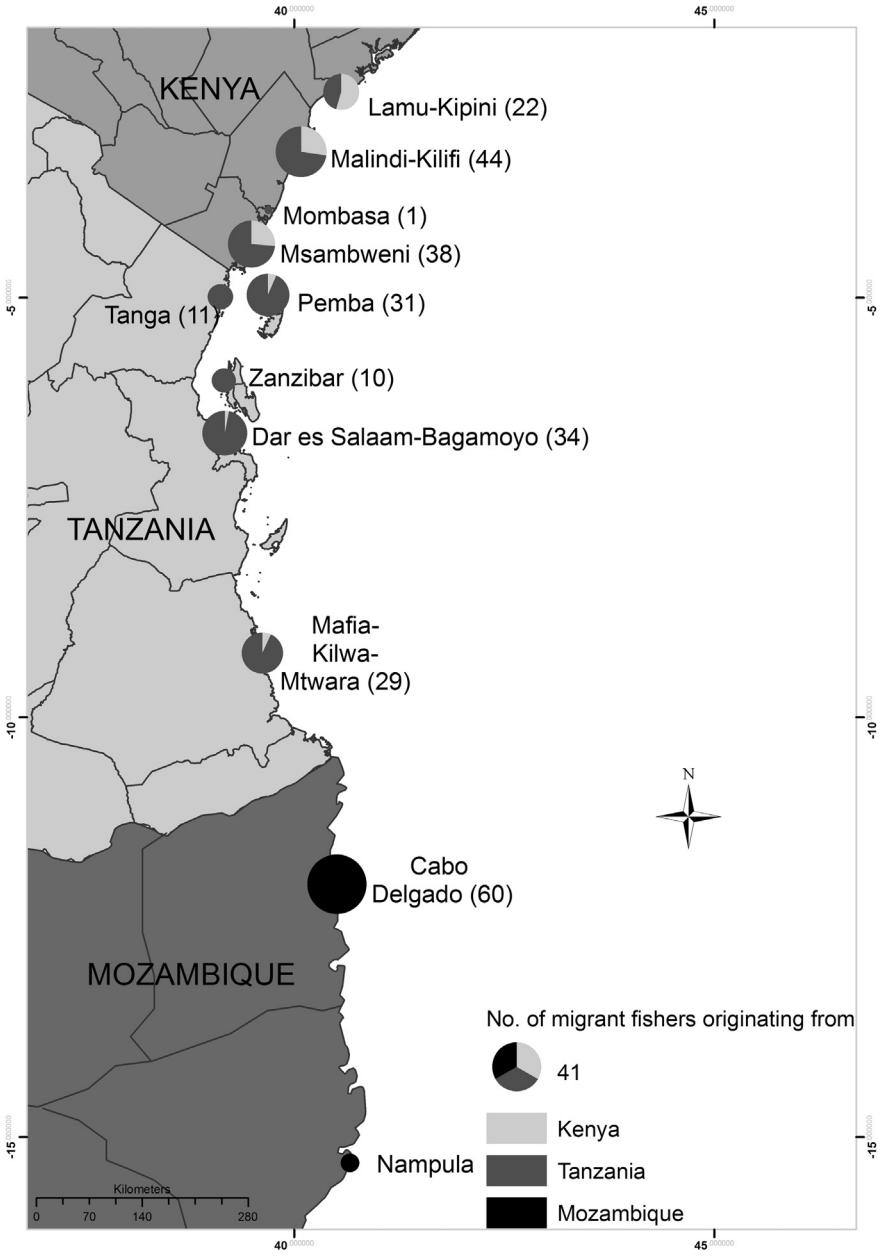

Fig. 3. Numbers of migrant fishers to receiving zones and their relative proportions by country of origin.

at Shimoni in Kenya and Moa in Tanzania the number of migrant fishers (35%) was fewer than local fishers. At Mocimboa da Praia and Vamizi Island in Mozambique, migrant fishers represented less than 7% of the fisher population, but their actual numbers were high, exceeding 200 fishers.

A detailed list of other migrant fisher destinations on the WIO coast is provided in Annex A and grouped into zones for illustration purposes (Fig. 3). The zone that received the greatest number of migrant fishers was Cabo Delgado which also had a comparatively large total area. This was followed Malindi-Kilifi, Msambweni and Dar es Salaam-Bagamoyo respectively. Other important zones were Pemba, Mafia and Lamu-Kipini and Tanga and Unguja.

ii)Migration-flows

There were a considerable number of migrations within country, where fishers crossed local administrative boundaries i.e. their village/regional/provincial boundaries (Fig. 4). Transboundary migration flows between countries were also recorded and were most common from Tanzania to Kenya, with minimal flows into Mozambique. Migrant fishers from Kenya travelled shorter distances while those from Nampula in Mozambique migrated longer distances but all to destinations within their own country.

The most common migration flows at destinations in Mozambique were within-country, into Cabo Delgado province from neighbouring Nampula province (in the range of 67–81%) with fewer migrations originating within Cabo Delgado province (10–32%). Transboundary flows of migrant fishers were minimal, with 6–10% of arrivals into Mocimboa and Pangane coming from Tanzania.

The main migration flows to Kenyan destinations were from Tanzania. Close to two thirds (65%) of the migration flows into

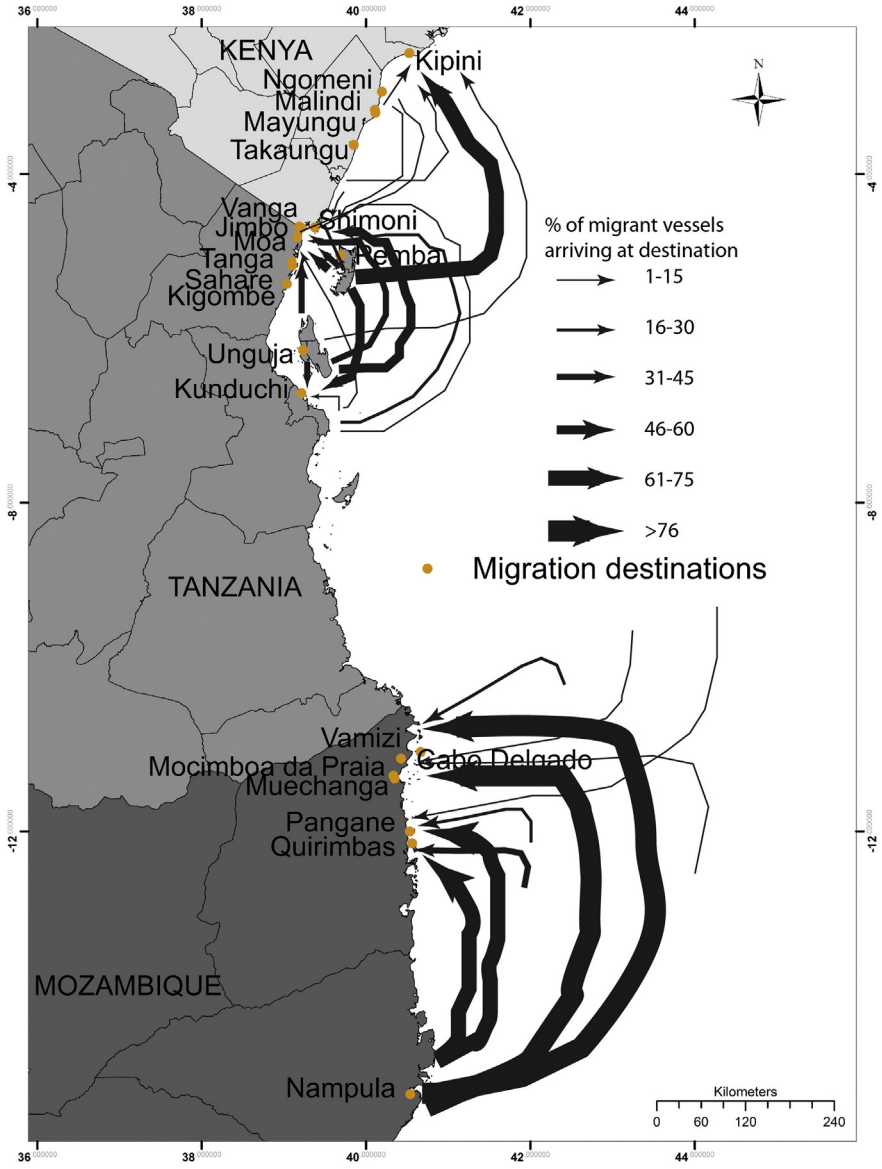

Fig. 4. Flows of migrant fishers in the region from October 2009–March 2010 showing the number of vessels, their source regions and destination sites.

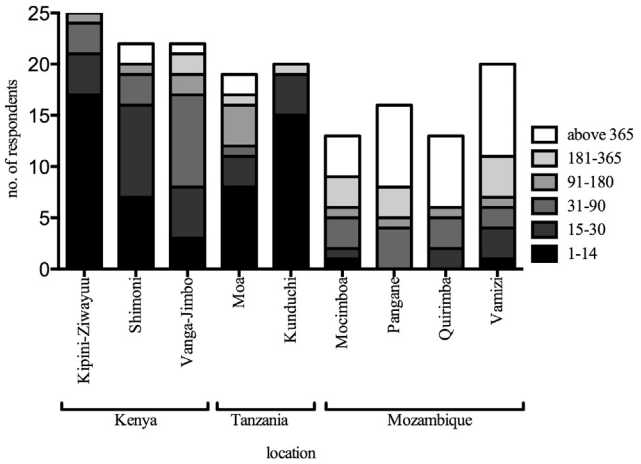

Fig. 5. Duration of stay (days) of migrant fishers at destinations in Kenya, Tanzania and Mozambique.

Kipini-Ziwayuu were from Pemba Island while 77% and 68% of migration flows into Shimoni and Vanga-Jimbo combined arrived from Pemba Island and Unguja Island respectively and 27% of migrant fishers into Vanga-Jimbo arrived from mainland Tanzania. Migrations in Tanzania were strictly within-country flows; the combined fisher arrivals from Pemba and Unguja into Moa and Kunduchi made up 95% and 90% respectively with the remaining proportion arriving from mainland parts of Tanzania.

3.3. Temporal aspects of migration

Duration of stay at respective destinations was measured as the period migrant fishers had stayed at the site at the beginning of the study. Migrant fishers at destinations in Kenya and Tanzania had stayed 2–4 weeks, except in Vanga-Jimbo where they had spent 2–3 months (Fig. 5). Most migrant fishers in Mozambique had stayed for considerably longer durations, exceeding 6 months and sometimes more than a year. Kibuyuni and Kichaka Mkwaju, villages adjacent to Shimoni, were not study sites, however they

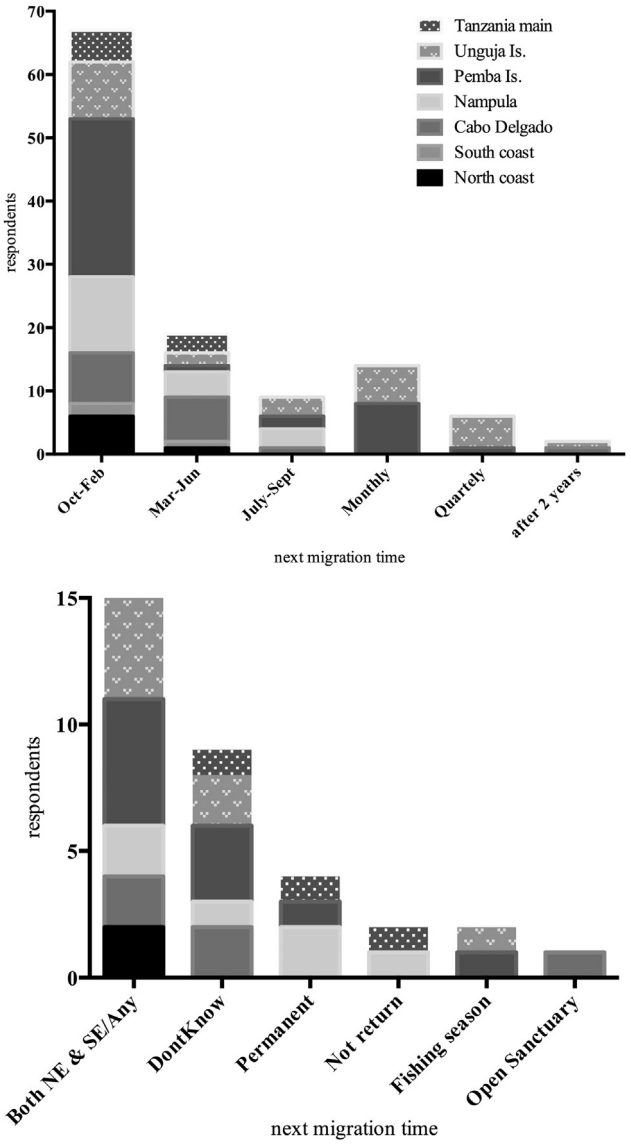

Fig. 6. Period of planned return migrations.

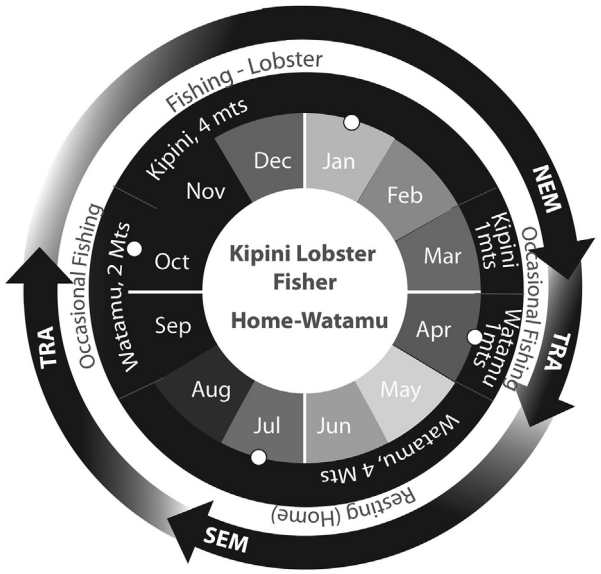

Fig. 7. Annual patterns of movements by a migrant crew fishing for lobster at Kipini, Kenya.

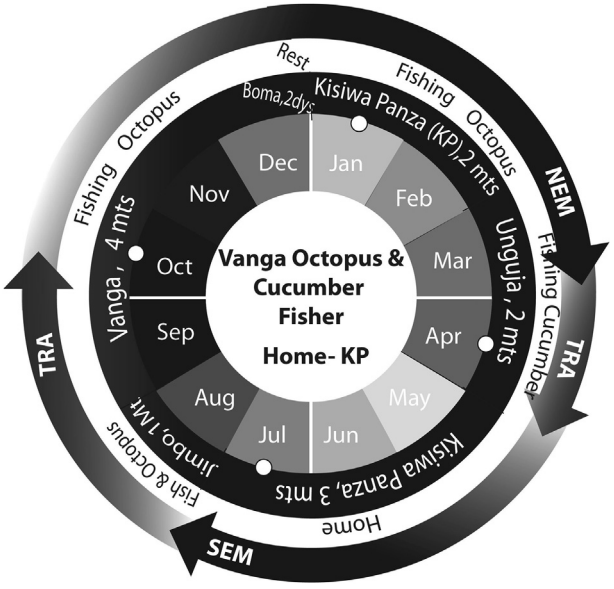

Fig. 8. Annual patterns of movements by a migrant crew fishing for Octopus and sea cucumber at Vanga, Kenya.

were of special interest in that 50% of their population consisted of fishers of Pemba origin who had arrived in Shimoni in the 1960s. Their arrival coincided with the Zanzibar revolution and thus their migration may not have been purely for fishing purposes. Unlike other migrant fishers, this group had travelled with their families and settled permanently but had not formally registered as citizens.

Most fishers planned to make return migrations to present destinations from October to February (Fig. 6). This timing followed the monsoons where fishers arrived at the onset of the NEM. Seasonal migration was typical among migrant fishers from Pemba, Unguja and the north coast of Kenya. The next most common return migration period was March–June. This period coincides with the transition between the NEM and SEM seasons when winds are not strong in either direction and was typical of migrant fishers from Mozambique. The third most common return migration period was during either the NEM or SEM or "any time of the year". Fishers following this pattern tended to spend more time away making circular migration patterns. A fourth type was monthly migration, which often occurred at new moon, when there was a high spring tide, and this mainly occurred amongst fishers from Pemba and Unguja. Few migrant fishers planned to migrate at the onset of the SEM season and from July to September; their migration was quarterly and mainly by from Pemba Island. Migrations after at least 2 years or permanent settlement were even less common and occurred only in Mozambique. The least common return migration planned was the beginning of the next fishing season in November. This pattern was unique to lobster and octopus fishers who made seasonal migrations during the NEM that coincided with the optimal fishing season of their target species. A few fishers could not state their planned return migrations, since their boat owner,

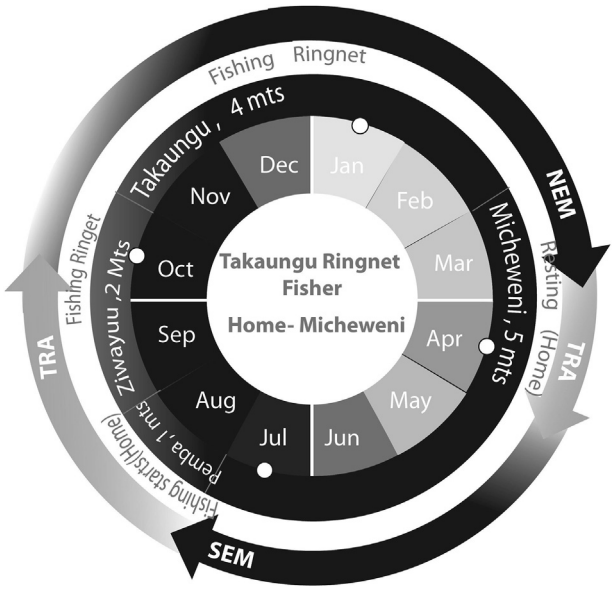

Fig. 9. Annual patterns of movements by a migrant crew using ringnet at Takaungu, Kenya.

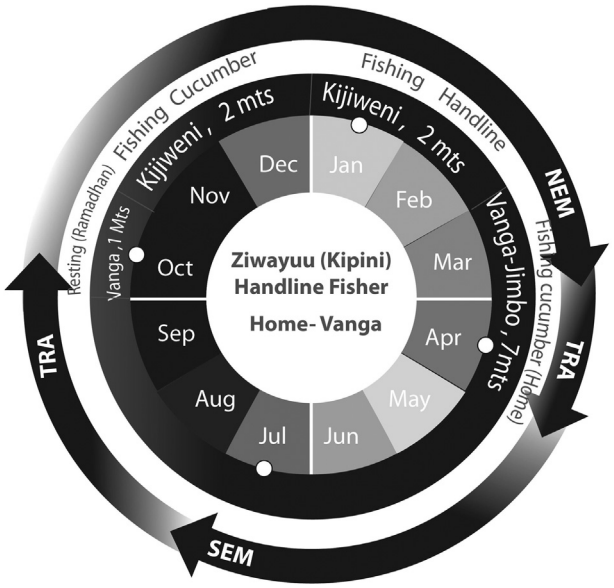

Fig. 10. Annual patterns of movements by a migrant crew fishing using handline at Kipini, Kenya.

captain or patron was in charge of the fishing operations and made the decisions.

The temporal patterns of migration are distinguishable in terms of duration, seasonality and regularity. Like other fishing operations, the *dago* activity was strongly influenced by the monsoon winds. Most fishing trips begin at the end of the SEM in September, when the sea is relatively calm and safe for sea travel, and the fishers arrived at their destinations starting October to February during the NEM. The typical length of stay for most migrant fishers was 2–3 months and the return trip home took place around March/April.

Migrant fishers who arrived at the destinations using the same vessel used for fishing would return home together. A few migrant fishers travelled to their destination by passenger boats or by road; these fishers mainly fished individually or were recruited by a patron who owned the boat stationed at the destination, e.g. Vanga-Jimbo and Shimoni. Migrant fishers arriving as part of a fishing unit, and those who were brought by patrons, did not make their own decisions on the duration of their migration; they depended on the captain or patrons to make the final decisions about the timings and destinations of migration as determined by fishery conditions.

3.4. Annual patterns of individual migrant fisher movements

Individual migrant fisher crews demonstrated unique migration patterns and routes (Figs. 7–10) and these characterised the specific crews and their target fishery. Lobster fishers from Watamu migrated to Lamu from November to March. This migration coincided with the lobster fishing season (NEM season). They fished at one main destination and returned home for about seven months (Fig. 7) during the SEM. They rested for four months, occasionally fishing during the two transition periods in March–April and September–October. This group made within-country migrations to nearby destinations confined along the north coast of Kenya. They did not have multiple migration destinations and exhibited seasonal migration pattern.

Octopus and sea cucumber fishers from Kisiwa Panza (KP) in Pemba migrated to Jimbo and Vanga in Kenya and within their home country to fish in Pemba and Unguja in Zanzibar. These fishers migrated during the NEM and part of the SEM season before resting for two to three months during the SEM. Their migration was seasonal, turning into circular migration. It included migrations to the principle destination for up to five months and to other destinations for one or two months each (Fig. 8) with a brief stop to rest in Boma on mainland Tanzania. They exhibited transboundary and internal migration.

Ring net fishers from Micheweni in Pemba migrated to Kipini-Ziwayuu at the peak of the NEM Both destinations, including the principal destination, were in Kenya and were distant and transboundary. The crew stayed away from home continually for 7 months during the NEM season and rested during most of the SEM (Fig. 9). They fished occasionally at their place of origin towards the end of the SEM in preparation for their migration to other destinations. They exhibited seasonal and circular migration to both transboundary and internal destinations. Another ring net crew migrated to destinations close to home where they made regular monthly returns (not in Fig. 9). Their migration followed the tidal regime, lasting for 2 weeks at the destination and alternating with a similar period of rest at their place of origin.

Handline fishers from Vanga migrated to Kijiweni in Kipini for most of the NEM and part of the SEM and to sheltered bays in Vanga-Jimbo on the south coast (Fig. 10). Some handline crew members changed fishing gear to beach seine nets in the south coast locations at the peak of the SEM from June. Migration by these fishers was seasonal and circular. They fished at their principle destination for four months in the NEM and for one month each at other destinations during the SEM. This group migrated within the country to distant destinations.

Basket trap fishers from Unguja and Tumbatu islands migrated to Vanga during the NEM (not shown in Figs. 7–10). This period coincides with the main rain season and fishing is in the near-shore areas in Shimoni and Vanga. These sites were attractive to basket trap fishers due to the heavy sediment load from the Ramisi River

Table 3
Fishing techniques used by surveyed migrant fisher crews of different origins.

	Pemba	Unguja	Nampula	Tanzania mainland	Cabo Delgado	North coast	South coast	Total
Hand line	25	8	18	3	6	2	2	64
Gill net (bottom)	8	10		5		2	1	26
Basket trap	5	12	1	2	2	1		23
Gill net (drift)	1	2	16		2	1		22
Beach seine net	3		12		4	1	1	21
Ring net (night)	7	5		4				16
Spear	1		11		1			13
Ring net (day)	6		1	1	1	1		10
Long line	2	4	1	1		1		9
Hook & stick	3	1		1		2	2	9
Gill net	5	3						8
Speargun						2	1	3
Unknown			2	1				3
Cast net		2						2
Monofilament net						1		1
Scuba diving gear						1		1

and Umba. However, the greatly reduced visibility was not conducive for octopus fishers who were forced to migrate to other fishing grounds on the north coast at this time of the year.

3.5. Drivers of fisher migrations

Reasons for migration in the three countries were diverse (Table 3); the four top driving factors, which together accounted for over 57% reasons at all sites, were the possibility of earning more money, the search for better fishing grounds, a general desire to improve one's life and migration as a culture or tradition. The most important reasons for migration in Tanzania were economic, particularly better earnings and access to better markets at destinations, which included access to more traders and better prices for fish. Similarly, in Mozambique economic factors were the most important; reasons given included escaping hardships at home, a factor which was mostly related to lack of fish at home and to a lesser extent poverty. Main factors driving fishers' migration in the WIO were economic, but ecological reasons, such as the search for better fishing conditions at destinations, including availability of fish, were also important, as were purely social reasons such as visiting new sites, migrating to gain new experiences, to live in a new place and meet new people, or join family or friends at the destination. Cultural reasons were prevalent in Kenya and Tanzania but not in Mozambique. Migrant fishers were attracted to specific destinations for particular reasons; Kigombe was located directly opposite and in close proximity to Pemba Island where most migrant fishers originated, and the two areas shared a historical connection. Kigombe had 16 reefs, which offered rich fish resources to fishers.

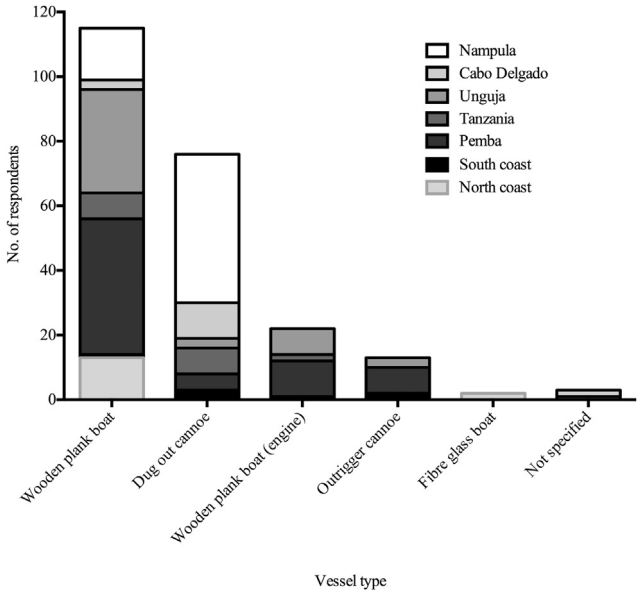

Fig. 11. Type of vessels used by migrant fishers from different regions.

3.6. Migrant fishers' gear and vessels

The most common type of gear used by migrant fishers in the survey were hand lines (28%), various types of gillnets (24%), various types of ring nets (11%), basket traps (10%), and beach seines (9%) among others (Table 3). There were clear preferences for particular types of fishing gear by migrant fishers of different origin but hand lines were common across all origins. Bottom gill nets and ring nets (night) were mainly used by Pemba and Unguja fishers and were not used at all by fishers from Tanzania mainland and Mozambique; monofilament nets, spear guns and scuba gear were used by migrant fishers from North Coast Kenya while gillnets (drift), beach seines and spears were mainly used by migrant fishers from Nampula.

Migrant fishers used different types of fishing vessels, the most common being the wooden plank sailing boats (n = 115) and dugout canoes (n = 76). Others used wooden plank boats equipped with outboard engines (n = 23) (Fig. 11) while the study included fewer than 15 outrigger canoes and just one fibreglass boat. Types of vessels associated with migrant fishers from particular origins included wooden plank boats with/without engines and outrigger canoes used mainly by fishers from Pemba and Unguja while the migrant fishers from Nampula mainly used dugout canoes.

Crew size varied among migrant fishers depending on the type of vessel (Table 4). Wooden plank boats usually had 4–6 fishers but the number ranged from 2 to 46 with a mean of 12. Dugout canoes were smaller, and mostly had a crew of 1–3 fishers, but larger ones would take up to 7 to 15 fishers with a mean of 4. The outrigger canoes had a crew size mostly ranging from 4 to 6 fishers with a mean of 5.

Migrant fishers in Kipini and Shimoni suspended their basket traps mid-water in deep waters while those in Vanga used

Table 4
Crew sizes for different types of vessels used by migrant fishers and numbers sampled.

	Wooden plank boat	Wooden plank boat-engine	Dugout canoe	Outrigger canoe	Fibreglass
Number of values	113	22	74	13	2
Minimum	2	3	1	3	5
Maximum	46	22	15	10	5
Mean	11.1	11.5	3.4	4.7	5.0
Total number of fishers	1254	253	252	61	10

considerably larger traps (madema) set in much deeper waters within channels. Migrant fishers in Vanga, Kipini and Takaungu used ring nets, and mainly fished during dark nights using lanterns to attract fish, similar to the methods used by migrant fishers from Nampula. Migrant fishers used ring nets in the daytime together with scuba equipment to locate schools of fish which they then surrounded with the nets. Migrant fishers using ring nets often kept bags of sand on board which they used for weighting down their nets when fishing in deep areas; this sand was discarded at sea to allow for fish storage when catches were good. Conversely, local ring net fishers did not use scuba equipment and sand bags and mostly fished during the day. Migrant fishers targeting lobster and octopus in Kipini fished in larger, organised crews using outrigger canoes with sails. They accessed deep reefs which they fished using hook and stick and scuba equipment to locate their target fish. Local fishers for lobster and octopus, on the other hand, were foot fishers, who were not organised into groups, instead fishing individually and limiting themselves to fishing grounds they could reach by skin diving or reef walking. These were shallow lagoonal reefs and therefore did not require the use of scuba equipment. Gill nets were the most diverse gear type in terms of their deployment by local and migrant fishers. Migrant fishers in Shimoni used large gill nets as drift nets which they deployed further out at sea. The net was weighted in the mid-water column in deep areas and allowed to drift, capturing large pelagic species by entanglement. Lobster fishers and basket trap fishers travelled to their fishing destinations from November–February during the NEM and fished for 2–4 months.

Vessel type influenced the migration patterns of the fishers. Wooden planked boats covered longer distances and made longer-term migrations. Outrigger canoes with sails also cover long distances, but their movement can be restricted by prevailing winds. Wooden plank boats with engines migrate any time of the year while outrigger canoes avoid migrating during transition months when winds are unreliable. Fishers using motorised wooden plank boats with better sea-going capabilities stay at the destinations for the longest periods of time, while dugout canoes make characteristic short migrations.

3.7. Governance of fisheries at migrant fisher destinations in the WIO

Officials of the Fisheries Department at Vanga, Shimoni and Kipini granted fishing permits to non-Kenyan migrant fishers as long they had valid passports, which were processed by Immigration Department officials at Shimoni entry point upon arrival. New migrant fishers arriving at their fishing destination had to fulfil various conditions: they reported to the village elders who notified the villagers of their presence; they presented copies of letters/permits from their local Beach Management Unit (BMU) and fisheries department to the village chairman for forwarding to the assistant chief, BMU officials and fisheries department in the host village. Upon acceptance, migrant fishers worked closely with the local BMU. BMUs and local communities in Vanga and Kipini assisted migrant fishers in terms of finding housing to rent and obtaining food, water and fuel. Occasionally, migrant fishers from neighbouring landing sites fished and camped at Ziwayuu island without first reporting to the Kipini BMU as required. The majority of non-Kenyan migrant fishers encountered lacked fishing licences from their host fisheries authorities but had valid passports from their country of origin.

In Tanzania BMUs provided the means for local resource management and were managed by the village through an elected executive committee with three or more sub-committees. Traditionally, migrant fishers only had to introduce themselves to the local authorities and fisheries officers. BMUs at Moa and Kigombe were involved in migrant fisher issues, including granting permission to fish.

In Mozambique, migrant fishers obtained a permit from their Community Fisheries Councils (CCP) of origin to migrate while CCPs at destination checked the legality of migrant fishers. In essence, they had to show fishing and boat licenses and permits issued by the CCP or Maritime Administration at their place of origin. Quirimbas Island CCPs had bylaws limiting the length of stay and introduced fees for migrant fishers and the Vamizi island CCP created a sanctuary with no-take zones and restrictions on migrant fishers. Nonetheless, Quirimbas inhabitants were more open to migrant fishers because they were themselves not native to the island. The Pangane CCP included migrant fishers and its duties included recording the number of migrant fishers and granting them authorization to fish, provided they fulfilled the legal requirements for artisanal fishing.

4. Discussion

It is not certain when fishers in the WIO first started migrating, but the communities from Pemba and Zanzibar are among the earliest known migrant fishers in coastal Kenya, dating to before the 1940s. Their initial migrations were short (Jiddawi and Ohman, 2002) in comparison to later arrivals during the colonial era and following the Zanzibar revolution of 1964 (Glaesel, 1997a) which were longer and involved larger numbers. The Kojani of Pemba Island are renowned migrant fishers (Fulanda et al., 2009; Glaesel, 1997a, 2000; Jiddawi and Ohman, 2002). Other migrant communities in the WIO include the Bajuni and Digo of Kenya (Fulanda et al., 2009) and the Vezo of Madagascar (Cripps, 2010; Marikandia, 2001; Koechlin, 1977). These communities have a long tradition of migrating to fishing grounds away from their homes. Migrant fishers from Pemba made shorter-term movements over limited distances, and longer-term movements to distant areas and across country boundaries; their migrations patterns were seasonal, complex circular itineraries (Glaesel, 2000) (Fulanda et al., 2009) or even permanent migrations.

Some communities have turned migration into a way of life (Glaesel, 2000; Marikandia, 2001; Marquette and Koranteng, 2002; Binet et al., 2012; Nunan, 2010). Kraan (2005) confirmed the existence of ethnic specialization in fishing activities among the Anlo-Ewe and the Fante of West Africa; these groups showed a particular type and duration of migration (Haakonsen, 1991). Similar ethnic specialisation exists among migrant communities in the WIO such as the Bajuni and Digo (Fulanda et al., 2009) as well as the Swahili, and Shirazi of Kenya and the Swahili, Shirazi, Tumbatu and Kojani from Pemba and Unguja. Fishers from Pemba and Unguja made the most transboundary migrations, fishing in Kenya and to a limited extend in Mozambique. The Macua from Nampula were a prominent migrant fisher community in the region, accounting for the highest numbers of fishers involved in movements and migrating to relatively distant destinations. However, the Macua migrations were not transboundary.

The large numbers of migrant fishers (2536) at the 9 destinations indicate significant concentrations of migrant fishers in the region (estimated to be in excess of 20 000). Migrant fisher numbers in the region are on the increase, as confirmed in Kipini (and Ziwayuu), Shimoni, Vanga (and Jimbo) in Kenya; Moa and Kunduchi in Tanzania; Mocimboa, Pangane, Quirimbas and Vamizi in Mozambique. A similar trend is expected at other confirmed destinations for migrant fishers (Annex A) partly because the open-access nature of fisheries in the WIO allows easy participation in fishing resulting in an increase in the numbers of local as well as migrant fishers who travel from their homes to camp and fish at select destinations (Glaesel, 2000; Jiddawi and Ohman, 2002).

Migrant fishers made migrations within their countries of origin as well as transboundary migrations. The main migration flows in Kenya were transboundary while internal migration flows dominated in Tanzania and Mozambique. Migrant fishers in Kenya and Tanzania arrived mainly from Pemba and Unguja islands. Migrant fishers in Cabo Delgado in Mozambique arrived mainly from the neighbouring Nacala province. Migrant fishers from Kenya and Mozambique did not migrate outside their country boundaries. The fact that there were no migration flows either from Mozambique or Kenya into Tanzania is attributed to the strong Kenyan currency (fishers get a higher price for their fish), better markets which attract fishermen, and the less favourable conditions for foreign fishers at some destinations in Tanzania where migrants are not accepted or fish was less plentiful. Social ties played an important role in Mozambique, where, for example, the close relationship between the resident community in Cabo Delgado and migrant fishers from Tanzania who spoke the same languages (i.e. Kimwani and Kimakonde) initially promoted transboundary migration. However, this has reduced recently; from 2003 the migrant fishers arriving from Nampula (Macua) were not accommodative to the foreign migrant fishers from Tanzania. This was because the Nampula fishers were Mozambican nationals and therefore believed they had right of access to fish in Mozambique while the foreign fishers did not. Relevant factors include the already high numbers of fishers at the destination sites, overfishing in the inshore areas, declining fish stocks (IDPPE, 2004) and the establishment of the Quirimbas National Park and a sanctuary in Vamizi which discouraged migrant fishers (Johnstone, 2004).

The seasonal monsoon patterns are a major factor shaping the migration patterns of fishers in the WIO. Seasonal migration is a common migration pattern for most migrant fishers arriving from Tanzania and Kenya. Besides seasonal migrations, fishers also make considerably shorter and longer migrations, such as monthly arrivals on moonless nights, any time of the year including during the SEM season, and longer migrations to sheltered bays such as Vanga-Jimbo area in Kenya where fishing grounds are accessible during the SEM. In Mozambique migrant fishers also return home during the SEM, which coincides with the rainfall season for agricultural activities.

Fisher migration is complex in that no two migrant fisher crews follow similar routes, destinations or durations of stay. Some fishers migrated to one main destination after which they returned home, while others migrated to their main destination for several months during the main fishing period and to other destinations for shorter periods, either as part of the main fishing migration, or as separate short migrations from their home of origin. On the other hand, fishers making circular migrations stay away most of the year, while some changed their fishing techniques or gear at different destinations. Migrations patterns in the WIO include within-country and transboundary, short, seasonal movements, circular longer-term migrations and permanent migration when extended. A feature of fishers migration patterns were resting periods, most of which were during the SEM or close to the transitional periods for seasonal migrations.

The duration of stay at destinations is determined by various factors, including changes in actual conditions at fishing sites due to seasonal changes, which relates to the type of target fish, fishing techniques and vessels used by the migrant fishers (Annex C). Better technology, such as outboard engines, or cold storage facilities on board has been shown to influence the duration and timing of fishing trips, enabling fishers to make longer and more distant migrations (Jiddawi and Ohman, 2002; Haakonsen, 1991). Migrant fishers in Mozambique use dugout canoes, which have less sea-going capability yet the duration of their migrations exceeded 6 months, they also had tendencies towards permanence. This was partly due to the difficulty in making regular migrations to and from remote fishing grounds on islands as such as Quirimbas and Olumbe. The organisation of migrant fisher crews determined temporal patterns of migration. Migrant fishers who arrived at the destinations using the same vessel used for fishing would return home together.

Migrant fisher movements adapt to the natural movements of target species (Cassels et al., 2005; Randall, 2005; Cripps, 2010; Nunan, 2010). Fishers have been shown to make seasonal migrations that reflect the biological cycles of target species, as confirmed by the arrival of lobster and octopus fishers and other migrant fishers during the NEM season. Fishers exhibiting seasonal migration are of special interest in the context of this study and for artisanal fisheries management in that they follow predictable migration patterns each year.

Apart from “following fish”, migration patterns exhibit other attributes. For instance, fishers using ring nets targeted small pelagic fish but the duration of their migrations and routes differed. Whereas one ring net crew migrated to multiple destinations, another migrated directly to one destination. One crew migrated to close destinations within the country while the other crossed country boundaries to a distant destination. One ring net crew made short migrations and returned home regularly after 2 weeks, while the second made circular migrations and returned to its place of origin after 6–7 months.

The driving factors for migration in the WIO – including natural, economic, and personal factors – reflect the reasons for migrations in West Africa (Kraan, 2005) but developing a checklists of reasons would be insufficient as these factors are a combination of bio-environmental and socio-economic conditions and related

historical aspects, the details of which may not be addressed fully in the present study.

Migrant fishers from Pemba are among the most experienced fishers in the region (Glaesel, 1997a, 2000; Jiddawi and Ohman, 2002) making dramatic movements to distant and remote destinations in the region, as opposed to migrant fishers from Kenya who travelled shorter distances, while those from Nampula in Mozambique migrated to destinations within the country. Whereas migrant fishers in the WIO used gear similar to that of the local fishers (Glaesel, 1997b; Samoilys et al., 2011) their technique of deployment differed for some of the gear, enabling the migrant fishers to be more effective. Local fishers used small and medium sized basket traps within inshore lagoons which are often shallow, weighting the traps to the bottom using stones (Obura and Wanyonyi, 2001). The migrant fishers, on the other hands, used larger traps in deeper water within channels. Migrant fishers used drift nets which are associated with high bycatch rates and which continue trapping fish when lost at sea (Samoilys et al., 2011).

The gear modifications and techniques of deployment by migrant fishers often yield greater catches compared to those of the local fishers. Migrant fishers use some uncommon, even controversial, fishing techniques (Evans et al., 2011; Glaesel, 1997a) and may be targeting marine resources using more destructive methods. The use of equipment such as beach seines, spear guns, ring nets, cast nets, monofilament nets and scuba diving equipment in combination with hooks and sticks or with ring nets raises social and environmental concerns. The question that remains is "do migrant fishers introduce new fishing techniques, skills that could be transferred to local communities to improve their fishing or do they use less sustainable fishing techniques at the destination?" The focus of the current study on migration patterns clearly highlights the importance of gear use interactions and the connection to conflicts between migrant and local fishers. The arrival of the Pemba fishers in large numbers at specific receiving destinations has created tensions with local communities and artisanal fisheries over the use of destructive gear (Glaesel, 2000). Influxes of migrant fishers to local jurisdictions and across national boundaries can lead to significant social and cultural changes, overexploitation of marine resources and the disruption of local resource governance (Binet et al., 2012; Cassels et al., 2005; Glaesel, 2000; Gössling, 2001; Jiddawi and Ohman, 2002; Wanyonyi et al., 2011; Crona and Rosendo, 2011). During the period of this study, sporadic clashes occurred between migrant fishers and local communities in Kilifi, Malindi and Msambweni. However, lack of clear management decision-making to address the situation was evident due to a lack of national policies or regulations that specifically address migrant fisher issues.

Migrant fishers of different origins show clear preferences for particular fishing gear. Bottom gill nets and ring nets (night) were mainly used by fishers from Pemba while migrant fishers from Nampula mainly used gill nets (drift), beach seines and spear. Hand lines were common to all origins.

Similar co-management arrangements for fisheries are in place in the three countries where Beach Management Units (BMUs) and Community Fisheries Councils (CCPs) are mandated to support the government implementation of existing fisheries regulations at the local level (URT, 2003; GoM, 2003; GoK, 2007, GoK, 2008; Horrill et al., 2001; Wells et al., 2007). Nevertheless, issues concerning migrant fishers remain largely unaddressed in national policies and regulations in the WIO (Wanyonyi et al., 2010; Crona and Rosendo, 2011). BMUs in Tanzania consist of devoted stakeholders in a fishing community whose main function is management/conservation of fish in their locality in collaboration with the government (URT, 2003). CCPs in Mozambique, which consist of local communities and other stakeholders, were created to assist the government in implementing existing fishery regulations within a defined local geographical area (GOM, 2003). BMUs in Kenya assist in the enforcement of fishing regulations with regard to gear and boat licensing requirements and illegal gear use (GoK, 2007, GoK, 2008). Key functions by these collaborative management units are monitoring, control and surveillance, illegal gear regulation, information collection and dissemination, as well as finance and production. CCPs in Mozambique have a clearly outlined responsibility relating to migrant fishers, including managing migration both at origin and destination. CCPs are required to record migrant fisher numbers and grant the migrants authorization to fish, provided they have fulfilled the legal requirements for artisanal fishing. Similar responsibilities were not articulated for BMUs in Kenya and Tanzania; there were no records of the total numbers of migrant fishers arriving at landing sites. Lack of proper records of the arrival of migrant fishers at landing sites makes it difficult to confirm the exact numbers of migrant fishers involved in the practice. This lack of records is due to a general deficiency in capacity to manage migrant fisher issues among local management structures. Other difficulties in establishing the number of migrant fishers were logistical: in Mocimboa migrant fishers live in dispersed houses in the area instead of their allocated fishing camps; in Pangane some migrant fishers live in camps on the village boundaries, in Kipini and Kunduchi they live on their boats. Migrant fishers also prefer fishing on islands and more isolated sites where the capacity of government agencies to enforce fishing rules and regulations is likely to be weak, as in the Quirimbas archipelago and Ziwayuu Island in Kipini.

Government departments in charge of fisheries and immigration lack uniform structures or enforceable guidelines with respect to dealing with foreign migrant fishers. Ad hoc decision making often occurs during conflicts, the resultant disparities allowing for the unregulated operation of migrant fishers. The lack of uniformity among the operations of BMUs/CCPs allows migrant fishers to operate freely at all study sites, even when they may not have been welcome at adjacent landing sites, such as Msambweni and Mwabungo in Kenya. The geographic scale at which BMUs & CCPs operate is apparent: their delimitation is the landing site, which is too small for the management of coastal marine fisheries, thus leading to conflicts with adjacent BMUs over fishing grounds. This deficit was partly addressed in Tanga region by the creation of Collaborative Management Areas (CMA), which brought together specific shared fishing grounds managed by several adjacent villages (Horrill et al., 2001; Wells et al., 2007). Community Conservation Areas (CCA) are an emerging tool by local communities and BMUs in Kenya, whose aim is managing activities of a section of the sea by restricting exploitive and damaging human impacts by implementing No Take Zones, seasonal closure and gear restriction. More than 18 CCAs have been established including Shimoni-Vanga, which is a network of 6 CCAs covering Shimoni, Wasini, Mkwiro, Majoreni, Vanga and Jimbo (Murage et al., 2012; Maina et al., 2011).

The number of migrant fishers in the region will increase due to the fact that fishing grounds are considered common pool resources and coastal communities at migrant fishers destinations such as Kigombe, Gazi and Quirimbas island are closely related to the migrant fishers (Glaesel, 2000); many have intermarried,

creating strong connections with the main migrant source area of Pemba and Unguja, as is the case in Kenya and Tanzania. In Mozambique strong connections exist with the main source areas of Nampula. Besides historical connections, migrant fishers are tolerated or even welcomed for economic reasons. Migrant fishers are attracted by the abundance of fish to areas where local fishers have limited capacity to exploit fishing resources due to their limited technology as was the case in Kigombe (Horrill et al., 2001) where migrant fishers from Pemba were attracted to the rich fishing grounds in reefs that were not fully used by local fishers; coupled with an increased demand for fish, they come in to supply this demand. Some BMUs and CCPs welcome migrant fishers because they raise funds through fees paid by migrant fishers.

5. Conclusion

The coastline of Kenya, Tanzania and the northern provinces of Mozambique has significant hotspots of migrant fisher concentrations at particular landing beaches (Annex A). Understanding the movement patterns of migrant fishers in the region, and their influx into local jurisdictions, including remote locations, is a precondition for the management of coastal fisheries. Migrant fisher movements in the region have not been limited by administrative boundaries. Types of fisher migrations in the WIO include within the country, transboundary, short, seasonal, circular longer-term or permanent migrations. Seasonal migration patterns are of special interest for artisanal fisheries management in that fishers follow a predictable migration pattern each year, and this can be the basis for their monitoring. At the same time, the spatial and temporal patterns of movement are unique to individual migrant fishers and we cannot make generalisations about all fishers. Nonetheless, influxes of migrant fishers into local jurisdictions can have significant social, cultural and environmental changes or disruptions, regardless of whether the source is within country or transboundary migrations. Type of fishing gear, duration, and destination of migration are associated with migrant fishers of a particular origin. This is critical for management of, for example, the use of destructive or controversial fishing methods by particular migrant fishers coupled with arrivals to specific receiving destinations in large numbers. The focus should not only be on the intensity of the migrations but also their composition, as migrant fishers from different origins act differently (Annex B). Knowledge of migrant fishers' origins and gear use makes it easier to identify migrant fishers that are likely to use unconventional fishing techniques or unacceptable gear, which then allows for the local management to institute monitoring and surveillance at the destinations visited by the fishers, including remote locations.

The numbers of migrant fishers in the region are likely to increase. Better monitoring and record of migrant fishers and non-local crews at the landing sites, their origin, time/period of arrival and duration of stay, gear used, as well as species and quantities of catch landed is a requirement for sustainable fisheries management. Existing local co-management structures lack the capacity to monitor migrant fisher influxes or manage migrant fishers' issues. They lack information about the status of many resources and thus have a limited ability to make informed decisions. This capacity should be enhanced urgently to enable them to play their roles effectively. At the same time, the transboundary nature of fisher migration makes it a priority regional issue that should be addressed at that level: it is important to involve the places of migrant fishers' destination (Annex A) and origin through integrated approaches, and not just base on stand-alone management efforts by individual countries, as has been the case so far.

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Annex A. Other migration destinations used by fishers

Table A.1
Other destinations for migrant fishers surveyed in Kenya

Kenya	Tanzania	Mozambique	Other
Bodo	Bagamoyo	Mozambique	Ndoa (Somalia)
Bofa	Boma	Pemba	
Chale	Bububu		
Diani	Buyuni		
Funzi	Bweni		
Gazi	Chake–Chake		
Jasini	Dar es Salaam		
Jimbo	Kaole		
Kilifi	Kichalikani		
Kinyaole	Kigamboni		
Kipini	Kigombe		
Kiunga	Kilwa		
Kiwayu	Kinondoni		
Kizingitini	Kipumbwi		
Lamu	Kitame		
Majoreni	Kiuyu		
Malindi	Klindoni		
Mayungu	**Kunduchi**		
Mkokoni	Kwale		
Mnarani	Mafia		
Msambweni	Malindi		
Mtwapa	Mazizini		
Ngomeni	Mbweni		
Shaleshale	Mizingani		
Shimoni	Mkokotoni		
Tenewi	**Moa**		
Uyombo	Msasani		
Vanga	Msuka		
Watamu	Mtwara		
Ziwayuu	Mwarongo		
	Myanyani		
	Pangani		
	Pemba		
	Songosongo		
	Tanga		
	Tanzania		
	Tumbe		
	Unguja		
	Ununio		
	Ushongo		
	Wesha		
	Wete		

Table A.2
Other destinations for migrant fishers surveyed in Tanzania

Kenya	Tanzania	Mozambique	Other
Funzi	Bagamoyo		
Gazi	Buyuni		
Jimbo	Bweni		
Kenya	Dar es Salaam		
Malindi	Ferry		
Mayungu	Juani		
Mombasa	Kastumu		
Shaleshale	Kawe		
Shimoni	Kichalikani		
Takaungu	Kigamboni		
Vanga	Kilwa		
Watamu	Kisiju		
	Klindoni		
	Kunduchi		
	Kwale		
	Mafia		
	Malindi		
	Mbweni		
	Mkumbuu		
	Mlingotini		
	Moa		
	Mwarongo		
	Nyororo		
	Pangani		
	Sahare		
	Songosongo		
	Tanga		
	Unguja		

Table A.3
Other destinations for migrant fishers surveyed in Mozambique

Kenya	Tanzania	Mozambique	Other
Vanga	Kilwa	Angoche	
	Mafia	Capaceira	
	Pemba	Ibo	
	Tanzania	Ilha de Mocambique	
		Kivure	
		Macaloe	
		Macomia	
		Matemo	
		Mecufi	
		Mecula	
		Mefuvo	
		Muchanga	
		Mocimboa da Praia	
		Mombuzi	
		Mtundo	
		Nacala	
		Namatinga	
		Nhondje	
		Nsangue	
		Olumbi	
		Palma	
		Pangane	
		Quifuqui	
		Quilaleia	
		Quionga	
		Quirambo	
		Quiranhune	
		Quirimbas	
		Quissanga	
		Quissimadjolo	
		Quissive	
		Quiterajo	
		Rongue	
		Sirica	
		Sitio	
		Tambuzi	
		Tindi	
		Vamizi	

Annex B. Origins migrant fishers

Table B.1
Origins of migrant fishers found at destinations in Kenya

Place of origin	Village of origin	%
Unguja Is	Tumbatu	13
	Nungwi	7
	Micheweni	8
	Kilimani	1
Pemba Is	Shumba	7
	Kisiwa panza	1
	Micheweni	7
	Maziwa Ng'ombe	3
	Mkia Ng'ombe	3
	Pemba	4
	Tumbe	4
	Bumbwini	1
	Wete	1
	Gado	1
	Kigunda	1
	Unguja	**1**
	Tanzania visiwani	**1**
	Tazari	1
	Wesha	1
Kenya	Watamu	4
	Malindi	3
	Shimoni	3
	Malindi	3
	Gazi	1
	Kikambala	1
	Kinungwi	1
	Majoreni	1
	Mkinga-Kasera	1
	Msambweni	1
	Pate	1
	Shanake	1
Tanzania Mainland	Tanga Kijijini	1
	Tanga-Chongoleani	1
	Tanga-Mwambani	1
	Taolani (near Moa)	1

Table B.2
Origins of migrant fishers found at destinations in Tanzania

Place of origin	Village of origin	%
Pemba Is	Msuka	10
	Mtoni	10
	Pemba	**8**
	Micheweni	8
	Tumbe	5
	Bumbwini	5
	Kojani	5
	Shumba	3
	Wete	3
	Chakechake	3
	Kichalikani	3
	Kinyaole	3
	Mtambwe	3
	Pangatupu	3
	Remba	3
	Tovukuu Pemba	3
Unguja Is	Tumbatu	8
	Unguja	**8**
	Nungwi	3
	Daraja bovu	3
	Tumbatu/Gomaru	3
Tanzania mainland	Kunduchi pwani	3
	Magomeni	3

Table B.3
Origins of migrant fishers found at destinations in Mozambique

Place of origin	Village of origin	%
Mozambique	Nacala-Porto	38
	Memba	20
	Mecufi	7
	Ilha de Mocambique	6
	Pemba	5
	Quissanga	5
	Fernao Veloso	2
	Kisimajolo	2
	Baixo-Pinda	1
	Kamakuro-Posto Matibane	1
	Mocuba	1
	Mongicual	1
	Mucojo	1
	Olumbi	1
	Pangane	1
	Quionga	1
Tanzania Mainland	Dar Es Salam	1
	Mtwara	1
Unguja Is	Unguja	**1**

Annex C. Description of vessels used by migrant fishers in East Africa

Table C.1
Different types of boats used by migrant fishers in East Africa

Vessel type	Local name	Description of vessel
Dug out canoe	Mtumbwi (In Kenya & Tanzania) Dau (in Kenya only) Mtumbwe (In Mozambique)	Boat made from a single log, its bottom is slightly flattened for stability. It is powered by paddle or stick. Some have modified sail
Outrigger canoe	*Lancha* (In Mozambique) Ngalawa (In Kenya, Tanzania & Mozambique)	Boat made from a single log, its bottom is flattened for stability. Usually much larger boats with outriggers for stability and are powered by sail or motor
Wooden Boat	*Cangaia* (In Mozambique) Boti (In Kenya, Tanzania Dau (Tanzania)	Wooden planked boat. Has a more pointed bow with rounded or pointed stern. It is powered by sails with an outboard engine (engines is rare). It is a flat-bottomed vessel, and more agile than canoes
Wooden boat (engine)	Boti (In Kenya, Tanzania) Mashua (In Kenya, Tanzania) Mtori (In Kenya)	Wooden planked boat Has flat-bottom and a square stern. Are large boats average 11 m vessels and powered by sails also and out board engines. It is a flat-bottomed vessel, and more agile than canoes but also requires more skill to operate. May have cooling facilities on board
Fibre glass boat	Boti (In Kenya, Tanzania)	Fibreglass boat with inboard engine. Often with cooling facilities on board. It requires more skill to operate.
Dinghy	Hori (In Tanzania)	Very small wooden planked boat that accompanies the bigger boats in the nets fishing

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