

# Dealing with the changing face of artisanal fisheries on the Kenyan coast: rationale for strengthening local institutions, challenges and way forward

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## **Abstract**

Along the Kenyan coast, artisanal fisheries make a vital contribution to food security, livelihoods and cultural identities in coastal communities. However, these benefits are at risk because fish stocks are exploited well beyond their sustainable limits. Characterised by simple traditional gears and non-mechanized vessels, the fishing operations are restricted to the shallow coral reef lagoons and seagrass beds, not extending beyond 20 metres (m) in depth. Consequently, the overall catch landed primarily consists of demersal reef species (38% of the total marine catches), the output per fisher is low, and the catch is either sold locally or consumed at the household level. Historically, fisheries operate under an open-access regime with no direct control over entry or effort. However, the government - through the state department of fisheries - has attempted to regulate fishing operations, with input control measures such as licensing, restriction of destructive gears, and the protection of breeding areas.

Nevertheless, due to lack of enforcement and capacity within the government agencies, these measures have proved ineffective; a recent analysis of interventions indicated a consistent increase in fishers' numbers and use of illegal gears. Similarly, attempts to encourage co-management by involving all the major stakeholders at the fishery in the decision-making process through the Beach Management Units (BMUs) have had limited successes. This is due to weak local institutions and the failure of current institutions to address the core problem, poverty, which is intricately linked to unsustainable fishing practices and defiance of regulations. With the changing face of artisanal fisheries, where there are strong attempts to generate profit by investing in modern gears and motorised vessels, there are concerns that the local institutions may no longer exert significant influence over who fishes and where fishing occurs, given that these responsibilities are not explicitly defined in current regulations.

**Keywords:** artisanal; fisheries; enforcement; local; capacity; government.

## **1. INTRODUCTION**

Marine fisheries play an important role along the Kenyan coast, making a vital contribution to livelihoods and food security, as well as the cultural identity of coastal communities. Fisheries are one of the few economic activities practised along the entire coast and are the lifeline of most of the coastal communities, taking into account the fishers, their families and dependants. However, the contribution to the gross domestic product (GDP) is low (<1%) and, as such, fishing receives low priority at the national level (Mangi et al., 2007b). To highlight the contribution of the marine fisheries to the livelihood of coastal communities in Kenya, Malleret King (2000) estimated that the sector contributed up to 80 percent of the total income to 70 percent of some coastal communities (Le Manach et al., 2015). However, these estimates are recognised as an underestimation. There is an apparent lack of understanding of the importance of marine fisheries to coastal peoples' livelihoods, which further explains why the real contribution of the sector to the national economy is not adequately reflected (Tuda and Wolff, 2015).

### 1.1 Description of the fishery

The Marine fisheries sector in Kenya is categorised into two subsectors; the coastal artisanal inshore fishery and an offshore fishery conducted mainly in the Exclusive Economic Zone (EEZ). The coastal fisheries are characterised by artisanal fishers, as small, non-motorized dugout canoes with rudimentary sails operate within an area of approximately 800 km<sup>2</sup>. They extend between the shore and the continuous fringing reefs, staying within three nautical miles of shore and not exceeding 20 m depth (Kaunda-Arara et al., 2003; Ochiwo, 2004).

Most of the fishing activities are conducted from the beach to the shallow coral reef lagoons, mangrove and seagrass habitats (Hicks and McClanahan, 2012). As a result, the catches, which are multi-species, are dominated by coral reef-associated species, which are estimated to constitute about 80 percent of fish catches with considerable overlap between seagrass and mangrove associated species (Bosire et al., 2012). Overall, the demersal fish species dominate the total marine catch, accounting for approximately half. In the year 2015, the demersal fish species accounted for 45 percent of the total marine landings (10 135 Metric tons)(State Department of Fisheries, 2014). Pelagics contributed 35 percent (7 843 Metric tons), while Molluscs accounted for nine percent (2 044 Metric tons). Sharks, rays and mixed-species (NIE) contributed eight percent (1 762 Metric tons), and crustaceans contributed three percent (620 Metric tons).

Overall, species belonging to the families Siganidae, Scaridae and Lethrinidae dominate the catches, reflecting the most abundant and commercially important species. Of the commercially important species landed by the artisanal fishers, at least 13 species dominate and represent more than 75 percent of overall catch (Hicks and McClanahan 2012; Tuda et al. 2016). Among these, six of the most common species are the shoemaker spinefoot rabbitfish (*Siganus sutor*) - which accounts for 11 percent of the artisanal fish landings - the marbled parrotfish (*Leptoscarus vaigiensis*), the blackspot snapper (*Lutjanus fulviflamma*), the pink ear emperor (*Lethrinus lentjan*), thumbprint emperor (*Lethrinus harak*), and the Carolines Parrotfish (*Calotomus carolinus*).

Over the past decades, there has been increasing evidence of fishery decline with some commercially important species considered overexploited (Hicks and McClanahan, 2012; Kaunda-Arara et al., 2003; McClanahan et al., 2008). However, the status of fish species exploited in these fisheries remains relatively unknown (Kaunda-Arara and Ntiba, 2006; Ntiba and Jaccarini, 1988). Out of the 121 commercially exploited species, only about 45 have been studied biologically, mainly due to insufficient or inadequate data to conduct a full assessment (Fondo et al., 2014). Most of the data that is collected by the state department of fisheries is nonspecific (i.e., landings not defined to species) and is reported in highly aggregated items. Thus, the majority of the stock assessment studies are based on specific species and limited to specific regions and may not be fully representative of the entire fishery. More recently, an attempt to assess the overall stock status of *Siganus sutor* along the Kenya coast has revealed that the species is exploited way above its sustainable limits (Wambiji et al., 2015).

### 1.2 Fishing communities and fishing activities

Historically, fishing has been the domain of the local communities that live along the coastline. However, given the changing socio-economic conditions along the coast, fisheries have expanded to include a new generation of fishers. These fishers may come from non-traditional fishing communities, and there's also been an increase in migrant fishers from neighbouring countries (Versleijen and Hoorweg, 2008; Wanyonyi et al., 2016). This has resulted in an increase in fishers numbers (undocumented) and landing sites, and also the introduction of fishing gears and practices, which have tremendously changed the fisheries (Crona et al., 2010; Ochiwo, 2004). Even though section 84 of the Fisheries Management and Development Act, No. 35 (2016), states that a valid and applicable licence shall be required for using an

artisanal fishing vessel for commercial purposes, the majority of the fishers and the fishing crafts operating at the Kenyan coast are not licensed, due to weak regulations (FiD, 2013).

### 1.3 Fishing boat fleets and gear

The fishery is a multigear-multispecies one in nature. Commonly used fishing gears include traditional gears such as basket traps and spearguns as well as more conventional gears such as hand lines, beach seines, ring nets and gill nets (Alidina, 2005; Obura, 2001; Samoily et al., 2011). According to the results of the biannual marine frame survey conducted in 2016, there has been an increase in the number of recorded gears, which could be an indication of an increase in fishing capacity directed to the inshore coastal fisheries Table 1. Therefore, the government has set out to experiment with offshore fish aggregation devices (FADs) in an attempt to reduce the pressure inshore and to encourage offshore fisheries. The number of fishing crafts has also increased in the past years, with the number of mechanised vessels increasing marginally compared to the manually operated crafts, which are propelled by poles, paddles and sails (see Table 2). The majority of fishing crafts are smaller than 10 m in length and are dominated by dug-out canoes propelled by either paddles, poles or rudimentary sails. Regarding ownership, up to 95 percent of the fishing crafts are owned by boat owners, with only a few of the crafts owned by fishers (Karuga and Abila, 2007; Wamukota, 2009).

**Table 1. Results of the bi-annual marine frame survey detailing the number of fishing gears.**

Fishing Gears	Years					
	2004	2006	2008	2012	2014	2016
<b>Gill nets</b>	7431	5916	3956	4168	3325	3835
<b>Monofilament gill nets</b>	902	1050	1472	3239	2692	2739
<b>Prawn seine</b>	226	264	545	730	610	445
<b>Beach seine</b>	294	560	139	217	193	131
<b>Reef seine</b>	158	146	146	63	89	157
<b>Trawl nets</b>	21	20	28	3	-	-
<b>Cast net</b>	520	812	499	408	332	357
<b>Ring nets</b>	1	11	15	22	31	38
<b>Trammel nets</b>	28	23	35	48	9	-
<b>Long lines</b>	10608	8224	9009	16476	9349	14511
<b>Hand lines</b>	5682	6540	4132	4686	5806	4358
<b>Traps</b>	6318	5224	3169	4438	4057	3483
<b>Scoop nets</b>	562	764	596	652	566	827
<b>Trolling lines</b>	608	500	625	741	803	554
<b>Spear gun/Harpoon</b>	449	624	1007	2939	2423	1700
<b>Hand gathering</b>	-	-	-	-	391	376
<b>Others</b>	956	2116	290	443	8	45

*Data source:* State Department of Fisheries, 2014.

**Table 2. Results of the bi-annual marine frame survey detailing the number of fishing crafts.**

Fishing crafts	Years					
	2004	2006	2008	2012	2014	2016
Inboard engines	66	61	98	71	72	41
Outboard Engines	69	133	221	296	428	587
Paddles	1023	991	1021	1242	974	1243
Sails	1075	1179	1227	1340	1248	1042
Poles	-	3	120	167	191	61
<b>Total crafts</b>	<b>2233</b>	<b>2368</b>	<b>2687</b>	<b>3118</b>	<b>2913</b>	<b>2974</b>

Source: State Department of Fisheries, 2014.

#### 1.4 Economic contribution and social implications of the fishing activity

The handling and marketing of fish start at the landing sites, with boat owners (who also double as fish dealers) playing a significant role in the value chain (Wamukota, 2009). In a subsector that is dominated by women, the exact number and contribution of those directly involved in the processing and marketing of fish is scanty; remote estimates, however, suggest that close to 200 000 people may be directly employed in auxiliary services such as fish trade, boat building, engine repair and gear sales (Mwakilenge, 1996). Nevertheless, the women play a significant part in the value chain, directly involved in the purchase of fish from the fish traders and intermediaries, from where the fish is processed and sold to the local households (Wamukota, 2009). It is estimated that women control over 95 percent of the marine fish retailing function, where the majority of the catch (~96%) is sold and consumed locally, and only a small proportion is taken home for local consumption (Hoorweg et al., 2003). However, men are more directly involved in the actual fishing, with women representing merely two percent of this segment of the workforce (see Table 3).

**Table 3. Results of the bi-annual marine frame survey detailing the number of fishers.**

Year	Number of fishers	
	Male	Female
2004	9017	-
2006	10254	-
2008	12077	-
2012	13706	-
2014	12748	167
2016	13162	255

Source: State Department of Fisheries, 2014.

## **2. MANAGEMENT OF THE FISHERY AND RIGHTS-BASED APPROACH**

### **2.1 Management of the fishery**

Since independence, the management of fisheries in Kenya has been under the control of the central government through the state department of fisheries, which implemented a top-down approach to manage fisheries resources (Alidina, 2005). However, considering the low compliance to fisheries regulations and continued decline in fish stocks, a co-management approach through BMUs was introduced with the aim of involving fishers in the decision-making, implementation, and monitoring processes.

In a sense, the BMUs, through the Beach Management Units Regulations, 2007 of the Fisheries Act, 1989, have the primary rights over fish landing sites and are required to provide data on catches and develop co-management plans, in order to ensure sustainable fisheries. Nevertheless, BMUs must comply with the fisheries measures, which include licensing of fishers and fishing vessels, restriction of certain fishing gears and compliance with mesh size regulations. Despite the introduction of co-management, the department of fisheries still has the primary mandate to perform Monitoring, Control and Surveillance (MCS) activities, but it has severely underperformed given the low budgetary allocations and inadequate staff and expertise. Therefore, even though the sector has a well-developed structure in place, the lack of followup and enforcement have rendered these measures ineffective.

### **2.2 Brief history of the former rights-based approaches used in the fishery**

Historically, traditional and customary rights served in some ways as fisheries management measures in Kenya (Glaesel, 2000). The local level leaders in the form of village elders like modern fisheries managers played a central part in marine conservation by regulating access to fishing grounds, restricting fishing gear and fishing times, and determining who gained access to their resources (Alidina, 2005; McClanahan et al., 1997). However, following independence, the management of fisheries was taken over by the central government. The state department of fisheries introduced a top-down approach with little input from local stakeholders. However, with the introduction of the co-management approach in 1994, fisheries management has changed to include the participation of fishers and other stakeholders in the decision-making process.

### **2.3 Rights-based approach: allocation and characteristics**

Artisanal fisheries on the Kenyan coast are under an open-access regime and, like many common property resources that suffer from open-access conditions, fisheries are characterised by overcapacity. According to the Fisheries Act Section 9(1), "No person shall fish in Kenya fishery waters unless he is a holder of a valid fishing licence or is an employee of a licensee or he is fishing for his consumption." The issuance of fishers' licences is restricted to persons who are citizens of Kenya; foreign or migrant fishers must typically work for a craft owner whose licence 'covers' them but must stipulate the number of the crew onboard the craft.

However, most of the fishers do not have a fishing licence: it is estimated that up to 82% of the fishers are not licensed (GOK, 2013). The main problem with the licensing regime on the coast is that most of the fishers operate as casual fishers under a boat owner, and are thus provided for by the craft or gear owners. Therefore, even though the regulations require that fishers and craft licences be renewed annually, the majority of the fishers do not comply with these regulations. With the onset of the co-management approach, the BMUs have the primary rights over fish landing sites but are expected to establish by-laws, which serve to regulate the fishing operations within their jurisdiction. It is noticeable that most of the by-laws are influenced and determined by informal regulations, but unfortunately, they are undermined by the activities of other fishers from other BMUs and the erosion of cultural and informal rules and traditions

by new entrants to the fisheries. The result is an increase in non-compliance with gear restrictions and an increase in the use of smaller mesh sizes and destructive gears such as beach seine and monofilament nets.

### **3. CONTRIBUTION OF THE RIGHTS-BASED APPROACH TO ACHIEVING SUSTAINABILITY**

#### **3.1 Sustainable use of the resources**

The management of artisanal fisheries in Kenya is confounded by non-compliance with fishery regulations, which stems from poor/lack of monitoring and enforcement both at the national and local level. At the local level, BMUs have been ineffective in implementing the regulatory measures meant to guide fisheries management decisions, due to the lack of skills and expertise and financing mechanism to sustain their roles as co-managers. At the National level, the department of fisheries has been unable to realise its mandate of promoting sustainable fisheries management due to inadequate budgetary provisions to hire staff and engage in research extension stem the problem of diminishing fish stocks. As a result, monitoring of fish catch, one of its prime responsibilities has been severely compromised for decades, which hampers the proper assessment of the status of marine stocks. Nevertheless, as underlined in many studies, the increase in fishing effort occasioned a progressive rise in fishers numbers, yet non-compliance with fisheries regulations has been highlighted as the cause of the falling catch per unit of effort (CPUE) and the decreasing mean size of fish caught, which are indicators of a declining fishery (Mangi and Roberts, 2006; McClanahan and Mangi, 2004).

#### **3.2 Economic viability of the fishery**

The general trend in the artisanal fisheries in Kenya is characterised by a consistent increase in fishing capacity and effort resulting from the open-access nature of the fisheries, which omits attempts to regulate effort. There are indications suggesting that the increased fishing effort has compounded levels of competition within fisheries and, as such, altered the fishing patterns. For instance, Le Manach et al. (2015) indicate that fishers are now active fewer days per year since the initial decline in CPUE. Even though much of the fishing effort is concentrated inshore, there are indications that fishers using some of the nets (such as ring nets) are increasingly exploiting offshore *fish* resources. Further, fishers have, in response to the declining inshore resources, started modifying their gears. For instance, the traditional hand line to target deepwater demersal species to depths of 200m in offshore grounds (State Department of Fisheries, 2014). The increasing number in the use of mechanised boats and the interest to deploy fish aggregation devices are indications of the declining inshore resources and the need to exploit offshore grounds, which have been considered underutilised in the past. However, as the investment in mechanised crafts increases due to desire to access offshore grounds, the ownership of gears and vessels continues to shift towards investors, most of whom are fish dealers directly engaged in the fishing. Thus, the dynamic of the artisanal fisheries is changing in such a way that the access to the fishery resource is gradually determined by the capacity to invest in modern fishing gears and mechanised crafts. As a result, most of the new entrants into a fishery participate as labourers – this affords the low investment and easier access (Mangi et al., 2007a).

#### **3.3 Social equality**

Even though the artisanal fisheries operate under an open-access regime providing equal opportunities to both male and female, fishing is mostly male-dominated with women performing complementary activities such as fish processing and trade. Despite their contribution to the artisanal fisheries, information relating to the role of women in fisheries is still scanty. Social and cultural beliefs are the major impediment to women's involvement in fishing in Kenya, and this has hindered attainment of the fisheries policy objectives, which is geared towards enhancement of the oceans and wealth creation from the fishery sector, as well as increased employment for both youth and women (National Oceans and

Fisheries Policy, 2008). Nevertheless, fisheries are a platform for a close-knit activity with close ties of kinship, where male members of the same family often use similar gears or fishing vessels and in some cases fish in the same areas. Therefore, in the past, the rights to fish could be passed on from generation to generation, from father to son, or through a marriage where, for instance, migrant fishers would intermarry with the locals and by marriage attain access to the marine resources of another community (Crona et al., 2010). Unfortunately, the introduction of illegal and destructive fishing gears has largely been attributed to the sharing of fishing rights with foreign fishers. This has led to conflicts between the local fishers and foreign fishers who are seen as outsiders. Despite the existence of current regulations, which limit the issuance of fishing rights (license) to Kenyan citizens, the local communities consider themselves to have rights over their area's resources, and to be able to determine who gets access.

#### **4. CHALLENGES FOR THE FISHERY**

In general, progress has been made in the fisheries sector bordering around legislative and policy framework, which are meant to enhance growth, development and inclusion in the fisheries sector in Kenya. However, the implementation and actualisation of these policy changes have been impeded by funding and staffing constraints, which has limited the capacity of the state department of fisheries to fulfil their mandate. Therefore, key responsibilities such as monitoring and collection of fisheries data and information remain neglected. This creates an enormous shortfall in information regarding fishing pressure and the status of the fish stocks, which are at the core of fisheries sustainability.

Recent decades have seen a tremendous increase in the number of fishers, which unfortunately has not been matched by supportive infrastructures such as cold storage, access roads and sanitary facilities including piped water. For instance, out of the 197 fish landing sites currently listed in the Kenyan coast, (serving approximately 14 000 fishers) there are only seven functional cold rooms, with only 30 landing sites connected to both electricity and potable water. These services are prerequisites for improving post-harvest catch quality and ultimately, the value of the fish. However, given these constraints, fishers in remote landing sites are forced to sell their fish cheaply to intermediaries due to the highly perishable nature of fish. The lack of cooling and sanitary facilities at the landing sites is one of the major constraints of the artisanal fisheries, yet often they appear the most neglected.

Other major challenges include the rampant use of illegal and destructive fishing gears, which indiscriminately target small-sized fish and juveniles, thus compromising the sustainability of fish stocks. The weak enforcement of regulations and MCS system have been blamed for the rising cases of IUU fishing, as compliance rates among fishers are low. Thus, the sustainable use of these fishery resources cannot be guaranteed - even with current regulations such as restrictions on mesh size, gear, and the sale of juvenile fish.

##### **4.1 Improving fishery sustainability in the future**

Improving the sustainability of the fisheries can only be achieved if there is a concerted attempt from the government and the BMUs to regulate effort, reduce unsustainable fishing practices and ensure that only licensed fishers and fishing crafts have fishing access. Already there is a well laid out framework that allows BMU to participate in the vetting process before the issue of fishers licenses and the report offenders and any illegal fishers to the fisheries authority.

However, the above represents a very demanding mandate. This places importance upon the provision of sustainable financing schemes to BMUs, and of incentives that ensure compliance with current management regulations, by supporting investments such as infrastructure, which will ensure the quality and standard of catch. Additionally, there must be continued capacity-building efforts targeted towards BMUs in order to empower them as local fishery regulations enforce and to support community-based

monitoring and information collection. Together, these measures will ensure that the local fishers, through BMUs, have full access and significant influence over resources: tenure and access rights will define the success or failure of the intervention in these fisheries.

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