Artisanal fishing gears of the Kenyan coast

Melita Samoilys* George Waweru Maina and Kennedy Osuka

CORDIO East Africa, P.O.BOX 10135, Mombasa 80101, Kenya
*Corresponding Author, Email msamoilys@cordioea.org

Introduction

The purpose of this book is to clarify the names, usage and legal status of artisanal fishing gears used on the Kenyan coast. We define ‘artisanal’ gears as those used by local fishers within 12 nautical miles of Kenya’s shoreline (ie. within Territorial Waters). These gears span those traditionally used for centuries made from organic fibres to contemporary manufactured gears introduced to Kenya within the last few decades. Artisanal fisheries are defined in the draft Fisheries Management and Development Bill (2011) as small-scale traditional fisheries that may be carried out for subsistence or commercial purposes in which the owner is directly involved in the day-to-day running of the enterprise and relatively small amounts of capital are used.

This book aims to clarify the impacts of different gears—on the fishing grounds’ habitats and the target species—and to clarify the by-catch in order to help in the management of coastal fisheries and the compliance of fisheries regulations. We hope that the book will improve awareness and understanding of coastal fishing among managers, fishers and the general public. It is also intended for institutions of research, development and learning.

In this status report paper we present four of the main gears used in Kenya, both legal and illegal, as samples of the contents of the book. The gears covered in the book include:

- Traditional traps
  - Basket trap
  - Fence traps
- Hook and lines
  - Handline/Hook and line
  - Longline
  - Trolling
- Spears/harpoons
  - Speargun
  - Spear
  - Harpoon
- Nets
  - Gill nets
  - Gill nets: Stationary
  - Gill nets: Drifting
  - Prawn seine net
  - Beach seine/Reef seine net
  - Cast net
  - Ringnet
  - Trammel net
  - Scoop nets/Hand net
  - Monofilament gillnets
  - Mosquito net

The book does not discuss the general impacts of fishing across all gears. For example, Endangered or Vulnerable species should not be fished at all as their populations are so reduced. Any fish population can only sustain a certain amount of fishing, termed the ‘fishing effort’, and this level of effort is closely related to the life history of the species—how long it lives, how frequently it reproduces, its range and where is it fished across its range. It is likely that Kenya’s artisanal fisheries are exceeding the sustainable level of fishing effort for some species—there are simply too many fishers taking a finite population of a certain species. This critical fisheries management issue is not addressed in this book.

Management options to reduce the effects of fishing include setting up marine protected areas (MPAs) where no fishing is allowed in order to protect a sub-population of fish that can breed undisturbed and juveniles can grow and mature. Kenya has a number
### Basket Trap

**Description**
Traps are handmade with a split bamboo frame and interwoven with split bamboo reeds to form a hexagonal-shaped basket with a regular hexagonal mesh. Bait attracts the fish inside through a cone-shaped entrance on one side of the trap. Pieces of rock or dead coral are tied onto the sides to weigh the trap down. Basket traps have a life expectancy of 4–6 months, though the reeds are frequently replaced within this period due to damage and decay.

**Deployment**
Fishers deploy traps from paddle canoes or outrigger sailboats, carrying typically 1–2 but up to 4–6 traps per canoe with an average crew of 2 fishers. Traps are baited before being lowered into the water by 1–2 light ropes and are set on the seabed. The ropes are attached to small floats or plastic bottles that serve as a buoy or surface marker. They are usually left overnight, with a normal soak time of 24 hr. The following day the trap is raised, the catch removed, the bait replenished and the trap re-set, sometimes in a different location.

**Dimensions**
On average 150 x 141 x 34 cm, with a volume of ~645,070 cm³. Cone-shaped entrance: 30–37 cm diameter, 45–70 cm length.

![Basket Trap Image]

### Gill Net—Stationary

**Description**
Gill nets fall into two broad categories based on how they are used: drifting or stationary. The net is made of multifilament nylon string of varying thickness (weight) and mesh size. Gill nets are suspended by floats and held vertically in the water—column with lead or stone weights. Fish become entangled in the netting by their operculum and further entrap themselves as they struggle to escape.

**Deployment**
Stationary gill nets are deployed by at least 2 fishers from a canoe or boat. They are set at the bottom, mid water or at the surface, largely depending on the target species. Bottom set nets are anchored to the seabed. The net is anchored at either end with large buoys, marked with a large float and left to fish overnight. Hauling is done daily to prevent catch spoilage. The smaller nets are used inshore in shallow lagoon waters of <5 m depth, free of corals. This net is pulled slowly while hitting the water with stakes to corral fish towards the net.

**Dimensions**
Lengths usually range from 20 to 50 m. Weight of multifilament nylon typically ranges from 24 to 36 lb (10.9–16.3 kg). Inshore nets are 1.5 x 30 m with small mesh and string weight of only 9 lb (4 kg).

![Gill Net Image]
### Artisanal fishing gears of the Kenyan coast/Samoilys, Maina & Osuka. CORDIO Status Report 2011

#### Beach seine/Reef seine net

<table>
<thead>
<tr>
<th>Description</th>
<th>Juya/Nyau ya kukokota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust nets made of multifilament nylon with variable but small mesh size. The net has a float line and a weighted foot rope. A section of larger-mesh netting on each wing of the net corrals fish towards the smaller-mesh centre (codend) of the net.</td>
<td>&quot;1 inch (&lt;3 cm)</td>
</tr>
</tbody>
</table>

#### Deployment

Deployed from the beach (beach seine) or offshore from two boats (reef seine) and pulled through the water. A team of 8–25 fishers is used to haul the net. Once the mouth of the net is ~5 m across, fishers may enter into the enclosed area, spread out a sardine net (smaller mesh size) and scoop up the fish into the vessel or they drag the net onto the beach.

#### Dimensions

100–200 m long and 3–4 m deep, created by joining smaller pieces of net together. Lead weight or stones are tied at 0.3 m intervals along the bottom foot rope.

#### Bait

<table>
<thead>
<tr>
<th>Target species</th>
<th>Latin names</th>
</tr>
</thead>
</table>

#### Fishing grounds habitat

Seagrass, reef lagoons and occasionally offshore reefs.

#### Impacts—Habitat

Crushes and disslodges corals. Reduces habitat topographical complexity. Linked to high rate of direct coral damage per unit catch and unit area. High take of juveniles—average of 68% of catch are immature fish. Also, 6.5% of the catch is discarded due to no value or being inedible.

#### Advantages

No operational costs or fishing skills required for crew members.

---

#### Ring net

<table>
<thead>
<tr>
<th>Description</th>
<th>Nyau ya kufunga</th>
</tr>
</thead>
<tbody>
<tr>
<td>A small purse seine made of multifilament nylon mesh netting which is suspended from floats and weighted at the bottom to hold the net vertically in the water. A foot-rope threaded through metal rings at the bottom of the net is used to close the net (hence the name &quot;purse&quot;) to encircle a school of fish.</td>
<td>&quot;0.5–3 inches (1.2–7.6 cm)</td>
</tr>
</tbody>
</table>

#### Deployment

A ring net is usually deployed from either a single vessel or by a ‘mother’ vessel and a smaller support vessel, with a crew of 15–40 fishers. Surface and subsurface schools of fish are located by telli-tale surface activity of the fish or by birds feeding on them, or by snorkel/SCUBA divers. Once located, the net is fed out overboard to encircle the fish. Sacks filled with sand are commonly used as weights (they sink faster) to prevent fish from escaping below the net and they keep the net off the bottom to reduce net damage. When the circle is complete the foot rope is pulled to close the net while the surface float rope is pulled to bring the net ends together. The net is then hauled into the boat keeping the net up wind or current to prevent the boat drifting into the net.

#### Dimensions

15–30 x 90–300 m long

#### Bait

<table>
<thead>
<tr>
<th>Common names</th>
<th>Target Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended for offshore pelagic species such as trevally, tuna and barracuda. However, also deployed on outer reef slopes to catch demersal snapper; and in bays and deep lagoons to target small pelagic sardine and anchovy.</td>
<td>Carangidae, Scombridae, Sphyraenidae, Lutjanidae, Cupeidae and Engraulidae.</td>
</tr>
</tbody>
</table>

#### Fishing grounds habitat

Designed to fish in surface waters offshore in depths <50 m. However frequently used on outer reef slopes in <20 m and in deep lagoons and inshore bays.

#### Impacts—Habitat

Highly damaging to living seafords that contain corals and seagrass when deployed in shallow waters. Sand-filled sacks, employed as weights, are normally poured into the sea after use, which increases sedimentation that damages corals.

#### Advantages

High yield. Cost effective if deployed properly offshore in pelagic waters not close to the sea bed.
of established Marine Parks and increasingly coastal communities are establishing small community conservation areas. The 'brood stocks' supply surrounding fishing grounds either by the drifting of their larvae out of the protected zone or by adults moving. Other management options include gear regulations such as a restricted minimum size of capture, which allows juveniles to mature, or a maximum size of capture to protect the largest most fecund females.

The information has been collated from many sources and our own combined observations over 25+ years. While we have verified information based on scientific data wherever possible, it is not available for all gears; therefore, some information is qualitative. Ultimately, any mistakes are ours and we take full responsibility.

Fishers are innovative and gears change, therefore this book will become outdated as technology transforms largely traditional gears that are still widely used on the Kenyan coast. Nevertheless we hope this guide serves to clarify and resolve the numerous confusions and conflicts over defining gears and their impacts. Further, we expect this publication to serve as a baseline record of artisanal fishing gears currently in use on the Kenyan coast in the second decade of the 21st century.

Acknowledgements

The information in this guide has been obtained from a variety of sources. We would like to especially thank many highly experienced fishers who have given us their time and extensive knowledge of their fishing gears and how they operate. We are grateful to external reviewers for their valuable input: Mr Jim Anderson, Prof. Boaz Kaunda-Arrara, Madame Mwaka Barabara and Mr Emmanuel Yaa. We appreciate USAID's generosity in funding this publication.

Key references and further reading


