

FACT SHEET

Stock Status of Small-scale Prawn Fisheries of the Malindi-Ungwana Bay, Kenya

Fishery description

The small-scale prawn fishery of the Malindi-Ungwana Bay is an important livelihood mainstay for the people within Tana River and Kilifi Counties. This fishery resource provides food, employment and income besides being important ecological and biodiversity components. Total annual landings from this fishery approximate 363.5 t based on the recent catch assessment survey data of 2013-2014 with Malindi-Ungwana bay contributing up to 40% of the catch. With the current estimated average value for prawns of KES. 350 (US\$ 3.4) per kg, this fishery generates up to KES.127 million (US\$ 1.234 million) per annum nationally. Currently there are approximately 400 foot fishers operating at the main landing sites within the bay.

Most prawns in the bay are caught primarily using prawn seines made of monofilament or multifilament material, castnets and prawn traps. Main target prawn species caught in the fishery include the Indian white prawn – *Penaeus indicus* (see Picture 1), the giant tiger prawn - *Penaeus monodon* (Picture 2), the speckled shrimp- *Metapenaeus monoceros*, the hairy river prawns - *Macrobrachium rude*, the green tiger prawn - *Penaeus semisulcatus* and peregrine shrimp - *Metapenaeus stebbingi*.

Geographic extent

This small-scale prawn fishery is carried out within the Malindi-Ungwana Bay that extends from Malindi in the south to Ras-Shaka in the north and lies between latitudes 2°30'–3°30'S and longitudes 40°00'– 41°00'E (see Figure 1). The bay is characterized by a shallow continental shelf that ranges from 15 - 60 km offshore. The Sabaki and Tana rivers, the largest Rivers in Kenya, discharge their waters into the bay. Four sites: Mijikenda and Kipini in the open inshore areas, and Gongoni and Kurawa in the salt works were surveyed between May 2013 and April 2015.

Objectives of the surveys

- To determine the spatial and temporal patterns in catch and effort variation for both the target shrimp species and by-catch; and
- To determine the prawn fishery stock status /performance indicators.

Composition of the by-catch taxa landed with the prawn catches

Up to 80% of the total catch constituted of mixed by-catch species of which *Oreochromis mossambicus* constituted 67.6%, mixed marine finfishes (30.5%), crabs (1.4%), molluscs (0.31) and other crustaceans at 0.17%.

Stock status performance indicators and reference points

The current catch per unit effort for the prawn fishery ranges between 1.0 – 2.17 kg fisher⁻¹ day⁻¹ (CAS) and 0.17 – 0.66 kg fisher⁻¹ day⁻¹ (this survey).

The average fishing mortality (F) of 1.99 is above the rate that would produce maximum sustainable yield by 89.5% thus indicating that heavy overfishing is occurring in the fishery.

Spawning stock biomass per recruitment (SSB/R) estimate of 0.06 is below that required for maximum sustainable yield (0.2) thus indicating the spawning stock is currently overfished.

Current exploitation rate (F/Z) of between 0.59 and 0.76 for the prawn species is above 0.5 indicating that the fishery is overfished.

(Refer to Tables 1 and 2 for details)

Bycatch – The fishery is associated with higher proportions of finfish and non-fish by-catch. Approximately 20% of the fishery catches are prawns while 80% constituted of mixed by-catch species. Most of the by-catch is retained for sale and home consumption.



Pic 1. Indian white prawn - *P. indicus*



Pic 2. Giant tiger prawn - *P. monodon*

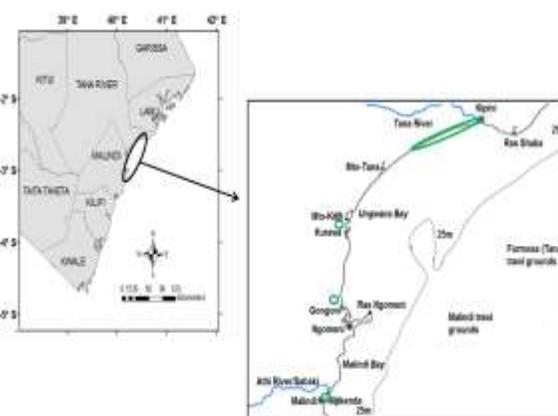


Figure 1: Map of the Kenyan coastline showing location of the four main study sites (green open circles)

Results

Composition of the landed prawn catches

Approximately 20% of the total catches were prawns. Of these, the Indian white prawn, *Penaeus indicus* was the most dominant prawn species, representing 37.2% of the total prawn landings. The other commonly caught species were the giant tiger prawn - *Penaeus monodon* constituting 26.7%, the speckled shrimp- *Metapenaeus monoceros* with 11.5%, the hairy river prawns - *Macrobrachium rude* (11%), green tiger prawn - *Penaeus semisulcatus* (5.1%) and peregrine shrimp - *Metapenaeus stebbingi* with 3.2% (Figure 2).

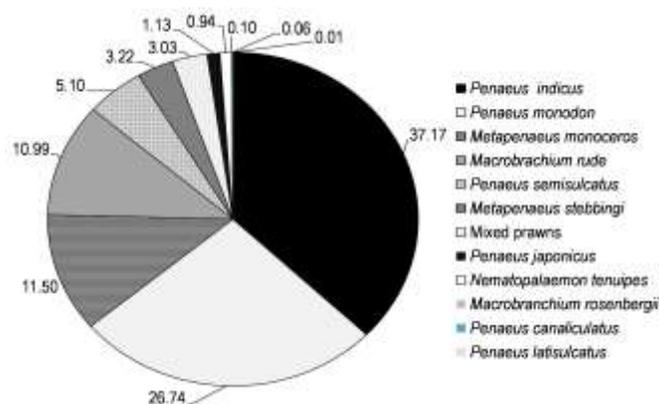


Figure 2: Relative abundance of landed prawn catches

Table 1. Current stock status performance indicators of the landed prawns

Exploitation parameter	<i>P. indicus</i>	<i>P. monodon</i>	<i>M. monoceros</i>	<i>M. stebbingi</i>	<i>P. semisulcatus</i>	Average
Current fishing mortality, (F_{CURR})	2.54	1.09	1.51	2.49	2.34	1.994
SSB/R _(CURRENT)	0.113	0.127	0.065	0.005	0.001	0.0622
Yield per Recruit (Y/R) _(CURRENT)	0.263	0.231	0.182	0.383	0.232	0.2582
Exploitation rate (F/Z) _(CURRENT)	0.76	0.59	0.59	0.61	0.66	0.642

Table 2. Fisheries stock status reference points used in the study

Exploitation parameter	<i>P. indicus</i>	<i>P. monodon</i>	<i>M. monoceros</i>	<i>M. stebbingi</i>	<i>P. semisulcatus</i>	Average
Fishing mortality at maximum sustainable yield (F_{MSY})	0.90	1.04	0.75	1.55	1.00	1.048
SSBR/R _(MSY)	0.139	0.135	0.205	0.032	0.047	0.116
Yield per Recruit (Y/R) _(MSY)	0.264	0.231	0.214	0.403	0.283	0.279
Exploitation rate (F/Z)	0.5	0.5	0.5	0.5	0.5	0.5

Management regulations and plans

Prawn Fishery Management Plan (PFMP) of 2010, but small scale prawn fisheries aspects are not fully incorporated. Fisheries Act Cap 378 revised 2012 that envisages general fishery management principles, objectives and approach.

Management recommendations

Based on the estimated stock status parameters, we recommend that:

The fishing mortality on the prawns should be reduced from the current 1.99 to 1.05, a decrease of about 89.5% either by implementing mesh size regulations or reducing fishing pressure on the nearshore fishery.

The current PFMP of 2010 be revised to incorporate this currently available scientific information.

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