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Short Communication

Out Line for the Reduction of Incidental Capture of Dolphins in Bonga Purse Seine Fishery in Nigeria

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Abstract

Dolphin is a charismatic fauna whose population is endangered due largely to incidental mortality in fishing gear targeting other species. Although at-shore community conservation efforts exist for dolphins, at sea fishers are out for business, hauling aboard both target bonga and dolphin. The report provide step by step out line for dolphin conservation through a research project that would involve physical and operational modifications of purse seine gear to release trapped dolphin. The research plan, when grant is obtained for implementation aimed at dolphin conservation in Atlantic Ocean.

Key Words: Dolphins, Incidental capture, Bonga, Purse seine, Nigeria.

INTRODUCTION

Dolphin belongs to a group of marine mammals known as cetacean. Other includes whales and porpoises. They inhabit the ocean and depend on the ocean for food. Cetaceans are thought to evolve from land dwelling ancestors and have common adaptive features for life at sea such as large size, modified appendages, hydrodynamic body shapes and various thermoregulatory adaptations. Dolphin is a charismatic mega fauna, its population is endangered due to commercial exploitation for meat, blubber and incidental mortality in fishing gears targeting other species. Naturally, its population is also threatened by the fact that it is long-lived species with low reproductive rate.

Scientific information on dolphin and other marine mammals' fishery interactions is scarce in the West African coast. The Atlantic hump-backed dolphin is a coastally distributed, endemic to Gulf of Guinea and is

considered most likely to be at risk from inshore fishing activities (Scialabba, 1989). Unknown number of bottlenose dolphin, *Turdiops truncate* and common dolphin, *Delphinus delphis* have been reported to be taken by foreign pelagic trawlers and in coastal gillnets (Scialabba, 1989).

COMMUNITY CONSERVATION EFFORTS VERSUS AT SEA OPERATION

In many African societies, cultural beliefs prohibited the consumption of dolphin meat; hence there is no target fishery for this species. Incidental capture taken home, and when reported to village chiefs, the culprit is summoned and requested to give a befitting burial to the animal considered as fishermen friend. This implies that there is already an existing community based conservation policy for the species. But at sea the story is different, fishers are not ready to let go their bonga fish catch because of dolphin which is not a commercial

species. The net is hauled faster to recover the target catch before escapement. This fast recovery of target catch in which dolphin is incidentally surrounded prevent dolphin from escaping leading to its drowness, skin mutilation and mortality before being released after 10-30 minutes hauling operation. Dolphins also die as a result of becoming trapped or entangled in the net. At peak bonga fishing season, it is estimated that about 2 dolphins died per three operational sets.

BONGA AND PURSE SEINE FISHERY

Bonga, *Ethmalosa fimbriata* is coastal shoaling pelagic clupeid of tropical West Africa. It constitutes 23% of artisanal fish landings and is the second most abundance fish caught in Nigerian coastal and inshore waters (PDF, 1995). Artisanal purse seine fishery in Nigeria is unreported, unregulated and open access fisheries. It is conducted by migrant Ghanaian and Nigerian fishers. The boats used, numbering about 510 are wooden half dugout canoes with length overall 15 to 18m and side bracket for 40-75 HP outboard engine attachment. The crew member ranges from 15 to 20. Fishing is daily, from 5am in the morning till 4pm in the afternoon when they are back to shore. Two or three operational sets are made per trip in inshore water with depth ranging from 50 to 100m. The purse seine nets used have a body mesh size of 25mm and bunt mesh size of 15mm. The net could surround the school of bonga with a wall of netting about 0.630 to 1.1km long and 50 to 100m deep, and when the circle is completed, a rope passing through rings at the bottom of the net is pulled aboard the vessel, closing the lower part of the net, forming a "purse". Apart from changes in water color which cannot be observed from a far distant, trailing of Bonga School by pod of dolphin and hovering over Bonga School by flock of sea birds are also clear signs of bonga availability from a far distant for the fisher to prepare for a set. This association of dolphins with shoaling bonga for prey makes dolphins vulnerable to incidental capture in purse seine targeting bonga fish.

Justification

Artisanal purse seine fishery for bonga was started in 1970s by migrant Ghanaian fishermen and largely replaced the gill net fishery that had been operating for decades. The new fishery have much higher catch rates, a wider area of operations, and other characteristics that make it very successful from the point of view of increasing bonga catches. However, this new fishery has an unwanted outcome: often the schools of bonga are detected, and eventually encircled together with large pod of dolphins. As the fishers do not have any techniques needed to release the dolphins, many of them

are incidentally killed in the operations. Dolphins, by IUCN listing is an endangered species. There is no public awareness of the magnitude of this problem because of the nature of the fishery, being artisanal, unreported, unregulated and open access.

OBJECTIVES

- 1). To estimate the by-catch of dolphins in bonga purse seine fishery in Nigeria
- 2). To determine if there is any correlation between the numbers of dolphins caught in purse, seine and factors such as the area and depth fished, the fishing season and fishing effort.
- 3). To raise public awareness and educate fishers on: (a). the danger of incidental dolphin mortality and (b). design and operational modification of purse seine gear to release dolphin safely.

Expected Output

Conservation of cetacean biodiversity in tropical marine water.

MATERIALS AND METHODS

The project will be accomplished in two phases each will last for one year. The study site is James Town, in the estuary of Cross River (Latitude 4⁰ 30' to 5⁰N and longitude 8⁰ 10' to 8⁰ 30'E).

1). Observer Program

This will be carried out to collect fishery related information. It will incorporate both fishery dependent and independent studies with fishers (Ambrose *et al*, 2005). By catch of dolphins and other species compositions in bonga purse seine fishery will be studied at landing sites, oral interview will also be conducted to retrieve information on the effects of environmental factors form fishers. Fishermen will be accompanied by an observer to fishing ground to study in situ the operations, catches, fishing depth and distant. A research boat and fishing unit similar to fisher's fleet will also be hired and employed for an independent studies and the result pooled. Dolphin by-catch and targets bonga fish from conventional nets will be collected from both dependent and independent studies for comparison at rainy and dry seasons, low and high tides, shallow and deeper water. Upon landing, all organisms will be sorted into bonga and total by-catches. All organisms in the by-catches will further be sorted according to species and higher taxa, and identify using morphometric and meristic features. The following data will be collected from all landings: (1). No. and total weight of bonga fish, (2). No. and total weight of dolphins, (3). No. and total weight of other cetacean, (4). No. and

total weight of teleosts, (5). No. and total weight of elasmobranches, and (6). No. and total weight of sea turtle. Weighing balance and measuring board will be used to measure the weight and length of species caught.

2). Modification of fishing operations

During fishing operation, dolphin and bonga are herded and captured together in the net, but prior to retrieving the entire net and the bonga, certain manipulation of the operation can be incorporated to release the dolphin safely. These manipulations will include: haul – back delay fishing operations (Broadhurst *et al.*, 1996) and back down fishing operations (Bratten and Hall, 1996) that will involve the submerging of the cork line in water while retrieving the net to enable dolphins to swim out safely. It is believed that during haul back delay (the period between slowing down the boat and hauling of net aboard) fishes and other fauna swim away from the net. This work is to investigate the effect of haul back delay on the reduction of dolphin's mortality in bonga-purse fishery. Haulback delay periods (treatment effect, T) of: (i) No haulback delay, (ii). 5 minute (iii) 10 minutes, (iv) 15 minutes, (v) 20 minutes, (vi). 25 minutes and (vii) 30 minutes, will be done and the weight and number of dolphins compositions in the total landing (observation, Y) per treatment recorded. The catches per treatment will be sorted into dolphin and bonga. Their weight and number will be recorded. A one way ANOVA will be used to find out if there is any significant difference between the seven treatments.

STATISTICAL ANALYSIS AND HYPOTHESES

1). Descriptive statistics such as pie chart, bar chart and histogram will be used to represent the percentage weight or number compositions of various fauna encountered in the landings such as: target bonga fish, other teleosts, elasmobrache, dolphins, other cetacean and sea turtle.

2). Student T-test will be used test the hypotheses that:

- i). The total weight of bonga and dolphin caught do not differ
- ii). The number of dolphin caught during rainy and wet season do not differ.
- iii). The number of dolphins caught in near shore sea (depth, 20-50m and inshore sea (depth, 51-100m) do not differ

3). One way ANOVA will also be used to test the hypothesis that there is no difference in the number of dolphin released during back down fishing techniques incorporation hauling delay periods of 0, 5, 10, 15, 20,

25, and 30, minutes before all the catches are bail out into the fish hold.

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