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# Catch of tropical tunas from licensed foreign and local vessels landed in Mauritius from 2008 to 2011

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*ABSTRACT*

*Data on the catch of tropical tunas landed in Mauritius were obtained and compiled from logbooks submitted by licensed foreign and local longliners and purse seiners. Annual trends have shown a considerable increase in the catch of yellowfin (Thunnus albacares), skipjack (Katsuwonus pelamis) and bigeye tunas (Thunnus obesus) by purse seiners in the past four years with a total of 21 956 tonnes in 2011 compared to 3 116 tons in 2008. This is mainly attributed to a higher number of licensed purse seiners calling at the port with 10 licences issued to purse seiners in 2008 as compared to 33 issued in 2011. There were no sharp changes in the annual trends of bigeye tuna with catch levels varying between 2%-6%. The proportion of skipjack and yellowfin tuna in the total catch of purse seiners has changed over the years (2008-2011) such that in 2008, the most significant catches comprised skipjack tuna representing 73 % of the total catch followed by yellowfin tuna (25%) while in 2011, the catch levels of skipjack (49%) and yellowfin tuna (46%) were nearly the same. Moreover, most of the catches of tropical tunas (70%) were obtained from log schools, particularly from artificial logs. The landings of tropical tunas from foreign longliners have declined from 2 032 tonnes in 2008 to 924 tonnes in 2011 as most foreign vessels targeting tropical tuna were replaced by those targeting albacore (Thunnus alalunga). There was not much difference between the average annual catch of tropical tunas from the FAD fishery (32%) and the semi industrial pelagic chilled fishery (29%). However, the FAD fishery catch consisted of yellowfin and skipjack tunas as compared to the semi industrial chilled pelagic fishery catch, which consisted of yellowfin and bigeye tunas*

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## 1. Introduction

Tuna fishery is becoming an increasingly significant fishery in Mauritius. With a large Exclusive Economic Zone (EEZ) of approximately 1.9 million $km^2$ and a fully integrated logistics platform to cater for transhipment of the tuna fishing vessels, Mauritius attracts a considerable number of fishing vessels targeting commercially important tuna species. Moreover, export of tuna represents more than 90 % of Mauritian exports in fish and fish products due to the establishment of two tuna processing plants, and thus reflects its socio-economic importance in the Mauritian fisheries sector.

Tuna and tuna-like species fishing is carried out mostly by foreign longliners and purse seiners, which exploit the tuna resources in the EEZ of Mauritius and in other regions of the South West Indian Ocean. Licences are issued to foreign vessels to operate in the waters of Mauritius under a strict set of conditions so that these vessels have to comply with regional and international conservation and management measures. Licensed vessels are required to land their catch in Mauritius and submit duly filled logbooks to obtain authorisation for unloading.

The amount of tropical tunas landed by licensed purse seiners in Mauritius has significantly increased from 3116 tonnes in 2008 to 21956 tonnes in 2011. Purse seine licenses were issued mainly to European- flagged and Seychelles-flagged vessels to fish in the waters of Mauritius.

The foreign longline fleet consisted mainly of vessels from countries of the East and South East Asia. The majority of the catch of foreign longliners constituted mainly albacore (*Thunnus alalunga*) with a lesser amount of yellowfin (*Thunnus albacares*) and bigeye (*Thunnus obesus*). Moreover, the quantity of tropical tuna landed by licensed longliners, in Mauritius, has decreased from 23% in 2008 to 13% in 2011.

This paper provides an overview on the catch data collected on yellowfin, skipjack and bigeye tuna, landed in Mauritius by licensed purse seiners and longliners for the period 2008-2011. Information on the catch of the national semi industrial surface longline fishery and the tuna artisanal fishery operating around Fish Aggregating Devices (FADs) is also presented. All catch data used in this presentation are derived from the logbooks submitted by the licensed vessels, except for the FAD fishery where data were collected by enumerators.

## 2. The Fish Aggregating Devices (FAD) Fishery

An artisanal tuna fishery has been developed around anchored FADs (AFADs) in Mauritius since 1985. The AFADs are set at distances from 2-12 nautical miles from the coast and in 2011, 26 FADs were active. There are approximately 380 registered fishermen engaged in the FAD fishery. The fishermen use boats six to seven metres in length propelled by outboard motors. The fishing techniques are handline, trolling and the vertical longline.

Catch were landed at 61 prescribed fish landing stations scattered around the island and the average annual catch was 288 tonnes. The catches of yellowfin and skipjack tuna were low (Figure 1) as compared to albacore because the fishermen mostly use vertical longline targeting this species, at depth down to 300 m. The catch of yellowfin tuna remained fairly constant for the period 2008-2011 with an average of 73 tons per year, in contrast to catch levels of skipjack tuna, which has decreased by 56%.

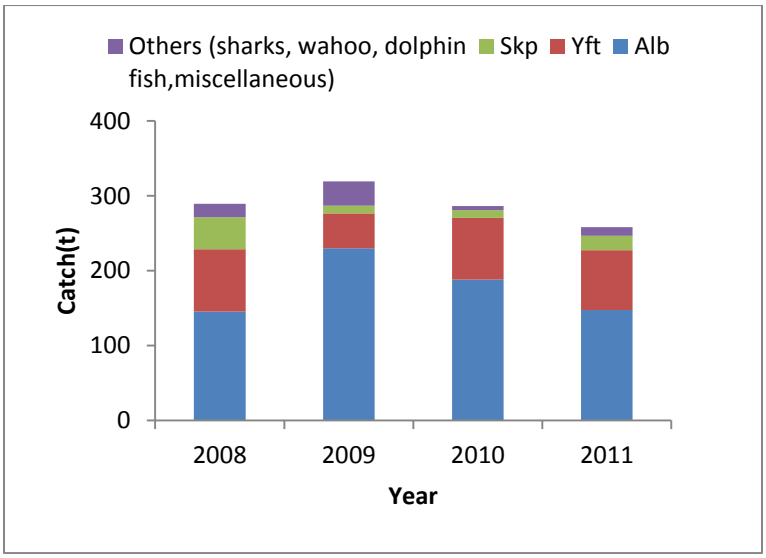


**Figure 1. Species composition of catch around AFADs from 2008-2011**

## 3. The national semi-industrial surface longline fishery

The national semi-industrial surface longline fishery consisted of boats less than 24 metres (16.3-22.9 metres), operating closer to Mauritius between latitudes 15°-20° S and longitudes 55°-60° E.

The fishing gear consisted of a monofilament mainline on which snoots were mounted and spaced at about 40 m. During each trip some 700 hooks were used and 113 trips were carried out during the four-year period under review.

The increase in total catch from 35 tonnes in 2008 to 89 tonnes in 2011 was due to a higher number of fishing trips carried out during 2011 (Figure 2). Even if the fishery targeted swordfish, tropical tunas, primarily yellowfin tuna, were often caught, with an increase of 55%

from 2008 to 2011. The proportion of bigeye tuna has also undergone an increase with a catch of 11 tonnes recorded in 2011 as compared to 0.6 tonnes in 2010. In 2009 the catch was nil as the boats targeting swordfish ceased fishing due to a problem in exportation of swordfish in the EU market.

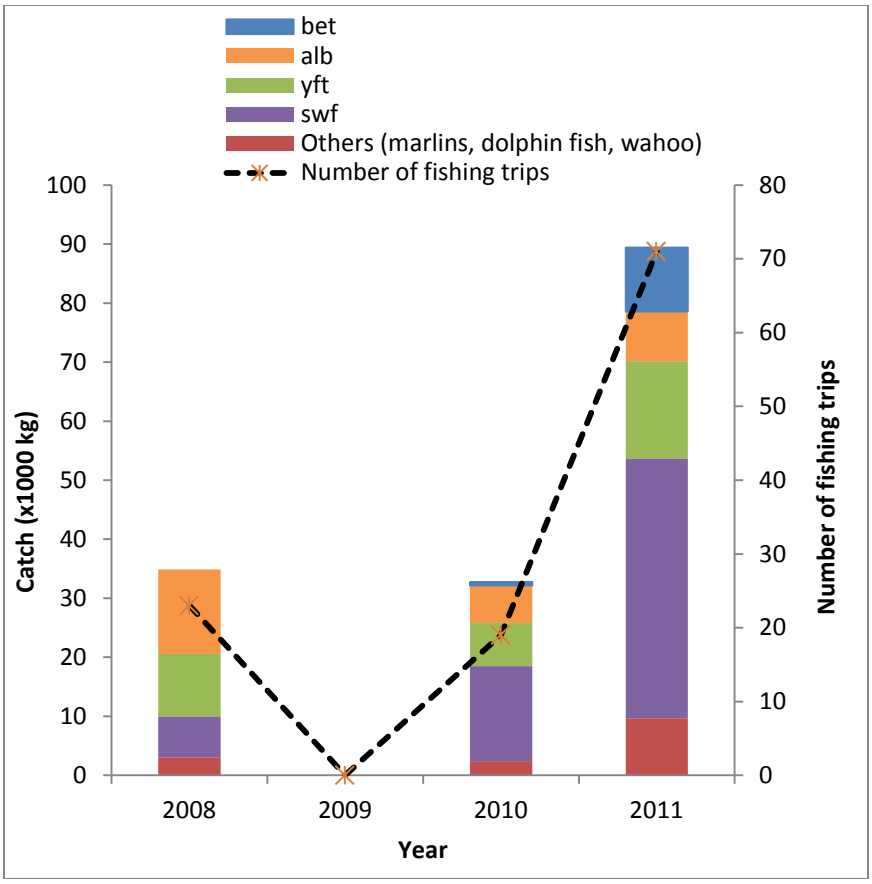


**Figure 2: Catch composition of the national semi-industrial surface longline fishery from 2008-2011**

## 4. The foreign longline fishery

An average of 120 licenses are issued yearly to foreign longliners, varying from 81 licenses in 2009 to a maximum of 161 licenses in 2010 (figure 3). 803 logbooks were received from 2008-2011 with a total catch of tropical tunas averaging to 1379 tonnes per year and fishing was mostly carried out between latitudes 10°-35° S and longitudes 40°-75° E.

The proportion of tropical tunas in the total catch of foreign longliners was low mainly because these vessels primarily targeted albacore tuna (Figure 3). Furthermore, the catch of tropical tuna by longliners has undergone a decrease from 34% in 2008 to 15% in 2011. This decline is mainly attributed to a shift of vessels targeting primarily yellowfin and bigeye tunas and an increase in the number of vessels targeting albacore tuna such that in 2011, 94 % of the licenses were issued to vessels targeting albacore tuna.

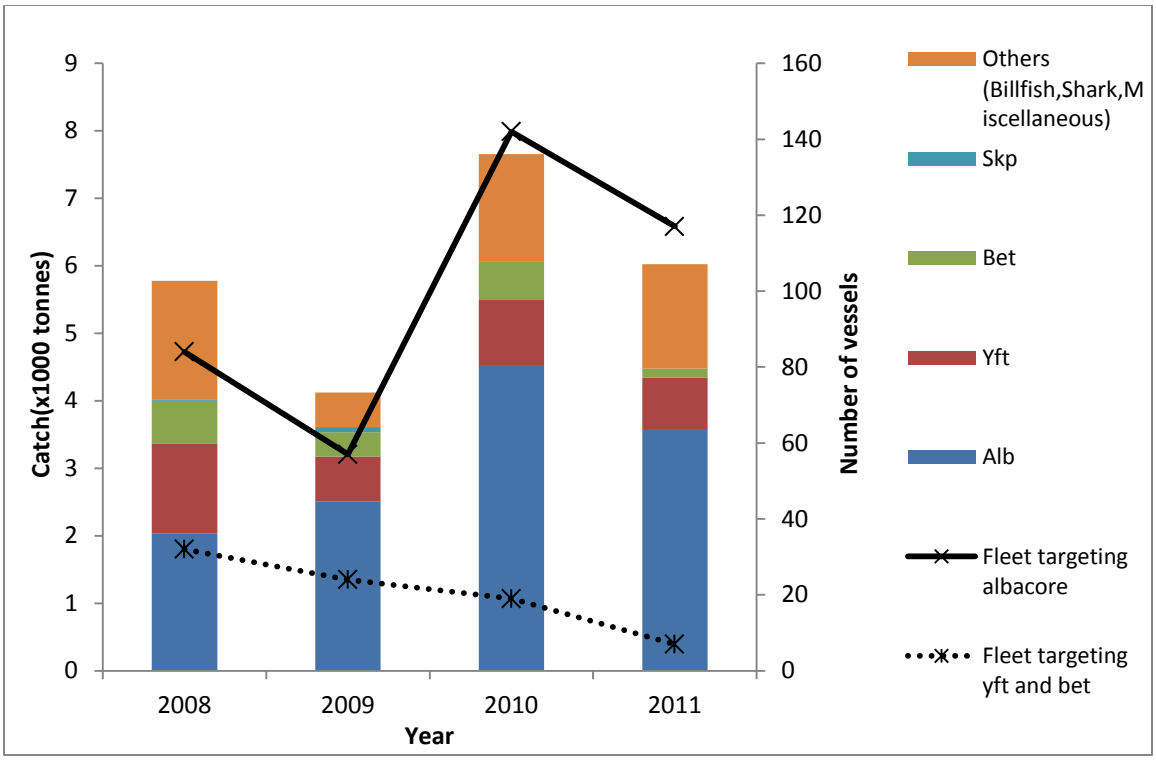


**Figure 3: Catch composition of foreign licensed longliner and number of foreign longliners fishing in the waters of Mauritius from 2008-2011**

The landings of tropical tuna increased from September, as foreign longliners fishing activities increased in the waters of Mauritius, and peaked from October to February (Figure 4). This seasonal trend in the landings of tropical tunas was mainly because of a higher number foreign longliners operating in the waters of Mauritius due to the abundance of albacore tuna during the summer months (October –March).

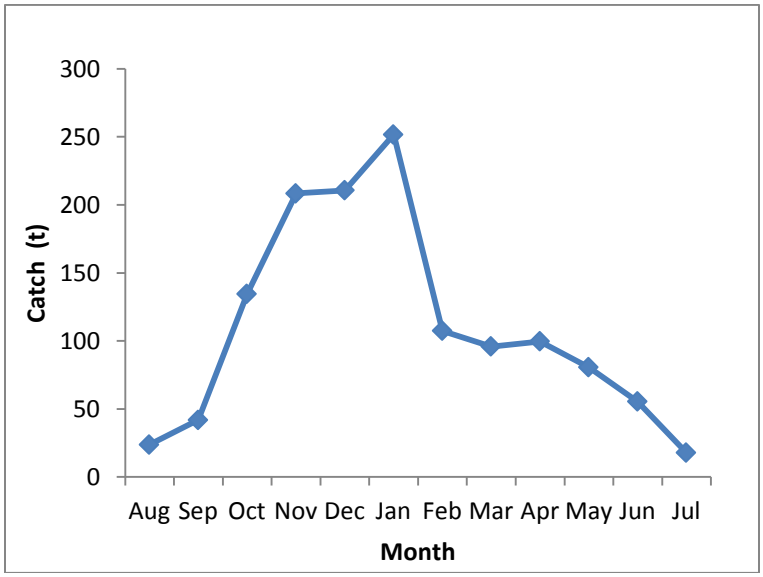


**Figure 4. Trend in mean catch of tropical tuna throughout the year based on 2008-2011 data**

# 5. Purse seine fishery

## 5.1 Catch levels and effort

Catch of tropical tuna landed by purse seiners in Mauritius have increased over the years with a catch of 3116 tonnes recorded in 2008 and 21956 tonnes in 2011 (Figure 5). The increase is due to higher number of licensed purse seiners calling at the port with only 5 calls registered in 2008 as compared to 35 calls in 2011.

The unit of effort used was the fishing day (fd), which corresponded to the time spent at sea for fishing and searching. The total number of fishing and searching days showed similar patterns from 2008-2011 with a major increase from 99 fishing and 51 searching days in 2008 to 604 and 339 fishing and searching days respectively in 2011(Figure 6).

The total annual number of fishing sets made by the purse seiners was 151 in 2008 and 984 in 2011. The number of positive sets was high varying between 66-85% (Figure 7).

The catch per unit effort (CPUE) varied between 17.7 t/fd to 28.1 t/fd.(Figure 5) with a peak of 28.1 t/fd in 2010. The CPUE for 2010 (28.1 t/fd) was higher as compared to that of 2009 (17.7 t/fd) although their catch levels were nearly the same (10626 t and 10803t for 2009 and 2010 respectively). This is because effort (fishing and searching days) has decreased by 36% from 2009 to 2010 (figure 6). Moreover, the number of sets recorded in 2010 is lower (369 sets) as compared to 2009 (586 sets) (figure 7).

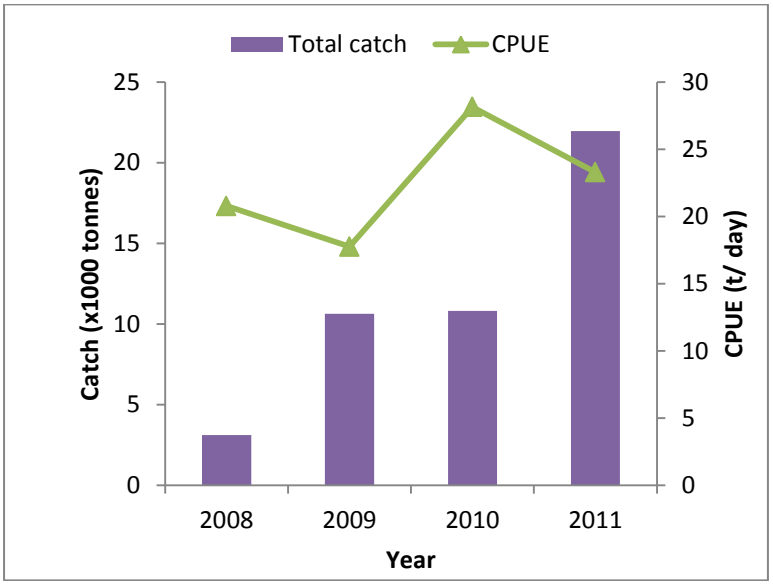


**Figure 5: Total catch of tropical tunas and CPUE of licensed purse seiners from 2008-2011**

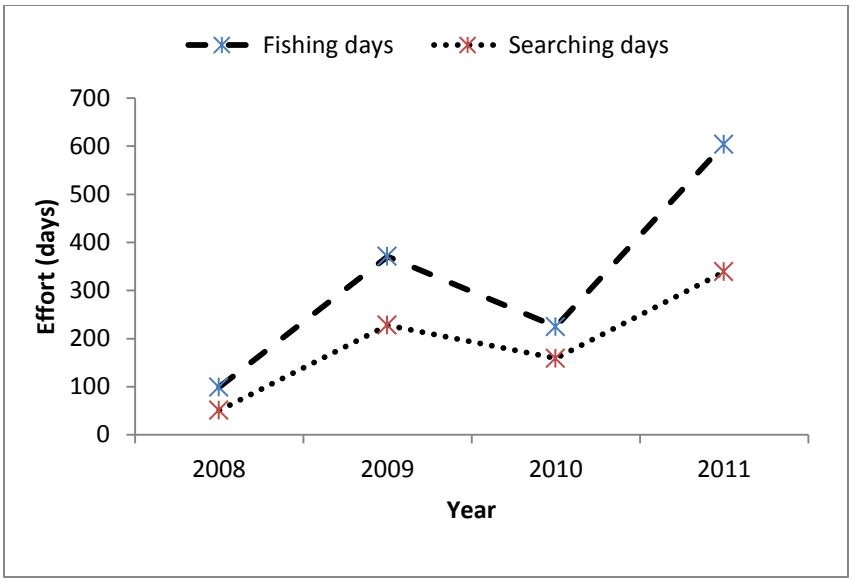


**Figure 6:Fishing days and searching days of purse seiners from 2008-2011**

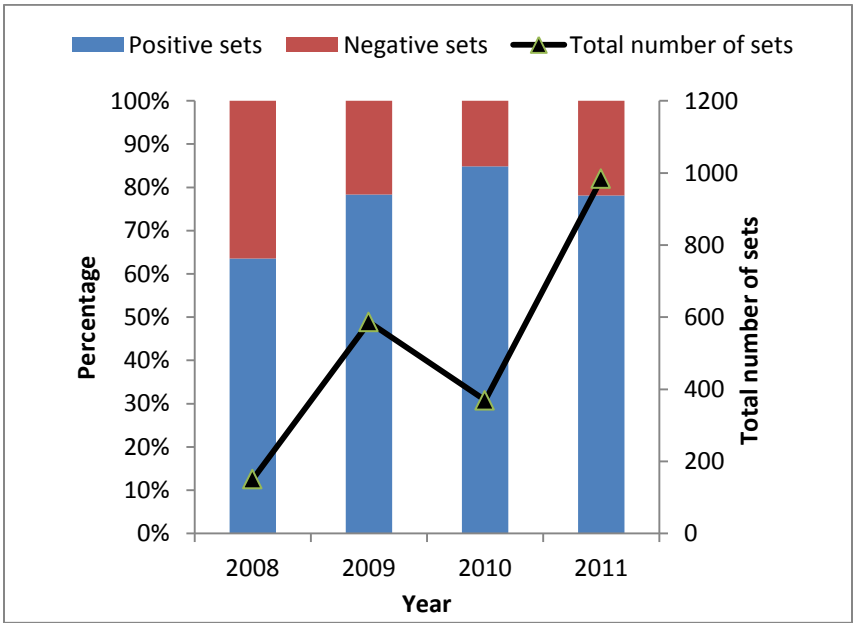


**Figure 7: Percentage of positive and negative sets made by purse seiners from 2008-2011**

## 5.2 Catch composition of purse seiners

There were no sharp changes in the annual trends of bigeye tuna with catch levels varying between 2%-6%. However, the proportion of skipjack, yellowfin has changed considerably from 2008 to 2011(Figure 8) such that in 2008, the most important catches were of skipjack tuna at 73 % of the total catch followed by yellowfin tuna (25%) while in 2011, there was not much difference between the catch levels of skipjack (49%) and yellowfin tuna (46%).

The species composition for 2011 (skipjack 49%, yellowfin 46%, Bigeye 5%) differed from that observed in the French purse seine catches in 2010 (skipjack 38%, yellowfin 54%, bigeye 8%) made in the Atlantic Ocean, where the fishing technique was mostly concentrated on free school (Floch et al, 2012).

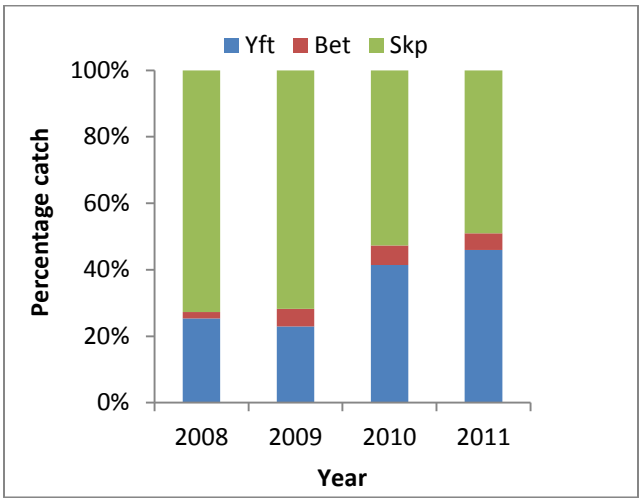


**Figure 8: Species composition of catch of licensed purse seiners from 2008-2011**

## 5.3 Free school and log school catch

An analysis of the log school and free school catch showed that the catch of tropical tunas from floating objects (log schools) has predominated from 2008-2011, representing on average about 74% of the total catch of purse seiners. The high catch obtained on log school is mainly attributed to a larger number of sets made on log schools as compared to those made on free schools (Figure 9). Moreover the rate of successful sets from log schools was high varying between 80%-91% in contrast to free school (29%-60%). The catch per set of free school and log school was 16.7 t/set and 25.6t/set on average, respectively (Figure 10).

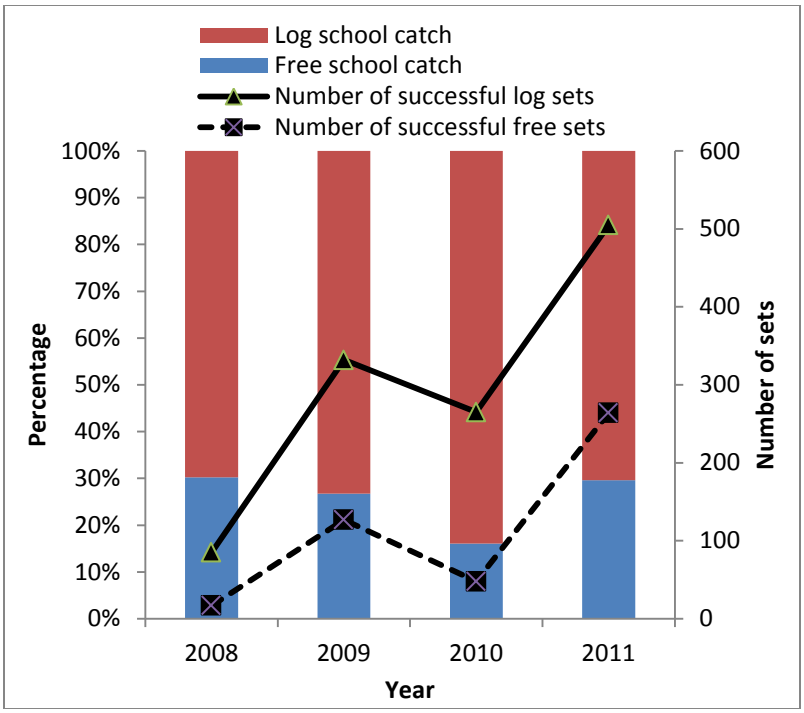


**Figure 9: Free school and log school catch and their corresponding number of sets from 2008-2011**

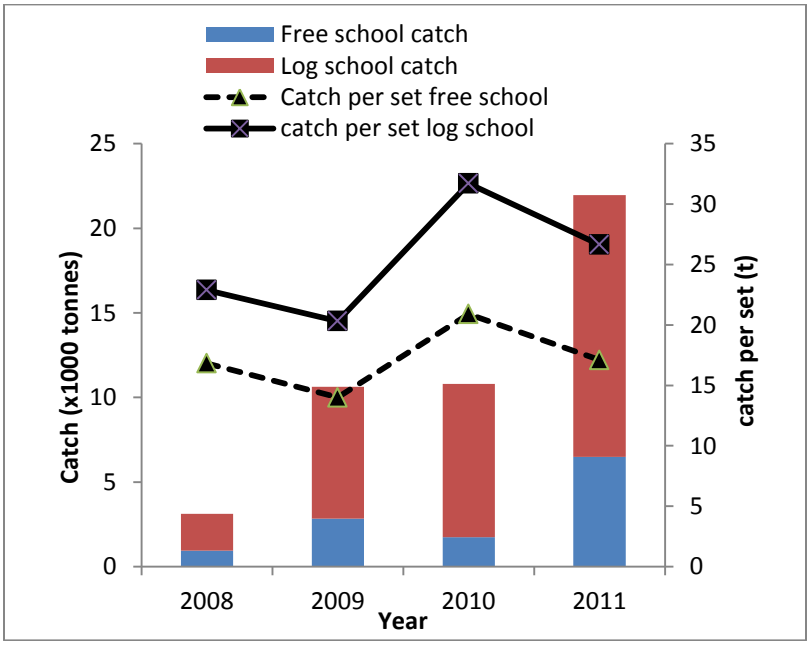


**Figure 10: Log school and free school catch rates from 2008-2011**

## 5.4 Species composition of log school and free school catch

The species composition for log school and free school catches are completely different since log-school catch composition averaged 66% skipjack, 29% yellowfin and 5% bigeye as compared to free school catch composition 67 % yellowfin, 29% skipjack and 4% bigeye.

Skipjack appears to be the predominant species in log school catch (Figure 11) followed by yellowfin and bigeye tuna, which were mostly juvenile fish since log fishing by purse seiners changes species catch composition towards smaller yellowfin and bigeye tuna, caught in association with skipjack tuna (IOTC-SC14, 2011).. Catches on free swimming schools were largely dominated by yellowfin tuna (Figure 11) accounting for the fact that purse seine fishery on free swimming schools catches larger yellowfin tuna

Since the majority of fishing was done on log school (figure 9), the variation in the species composition of log school as shown below shows similar trend to that of the total catch (figure 8).

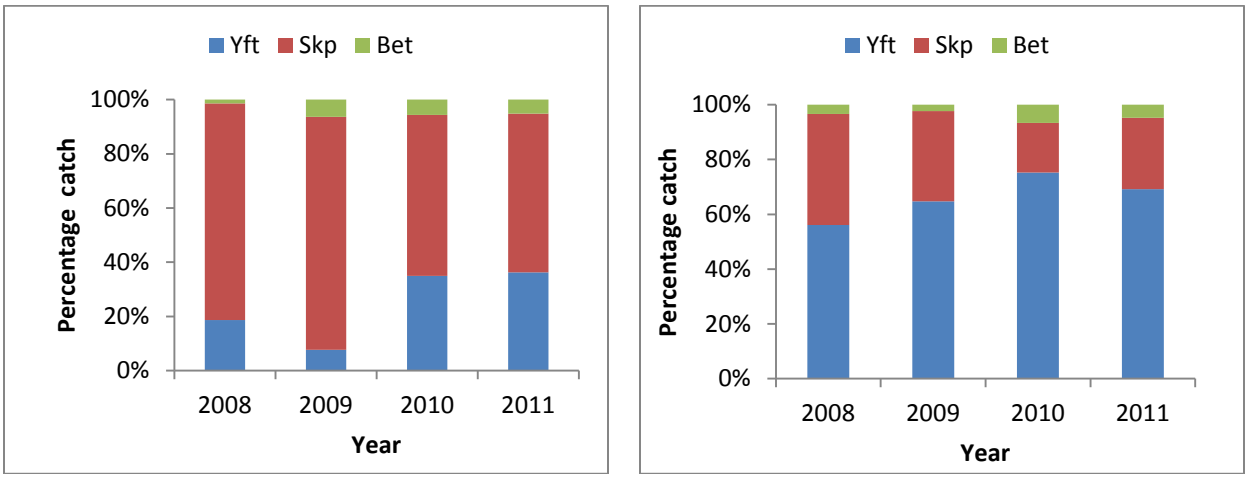


**Figure 11: Species composition of catch associated with log school (left) and free school (right) for the period 2008-2011**

## 5.5 Natural logs and artificial logs

A quantitative assessment of the catch made on artificial (Fish Aggregating Devices-FADs) and natural logs has shown that most of catch of tropical tunas are obtained on artificial logs (Figure 12). Moreover, the catch distributed between natural logs and artificial log has remained fairly constant (72%-74% artificial log, 25%-27% natural log) over the years except for 2009 (54% artificial log, 45% natural log). The fishing zones of the purse seiners being mostly located between latitude 2°N and 8°S can partly explain the high catch on artificial logs since artificial logs are more abundant in the northern part (north of 7°S) of the Indian Ocean as compared to natural logs, which are mostly concentrated south of 7°S (Fauvel et al, 2009).

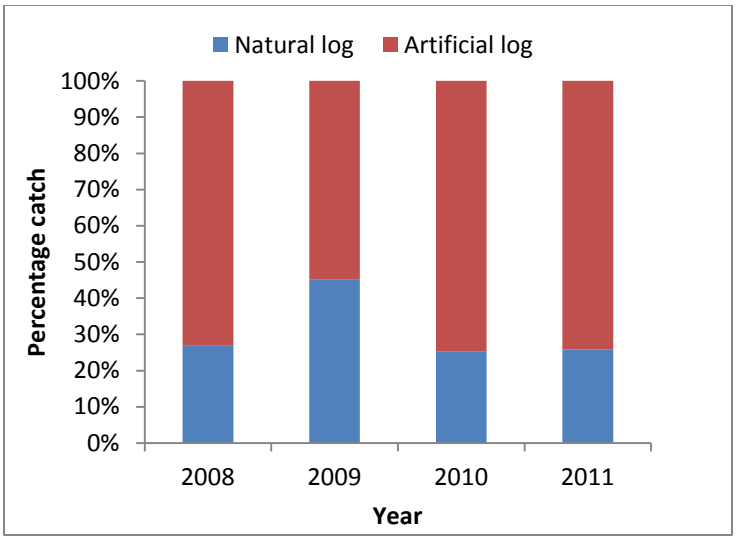


**Figure 12: Catch obtained on natural and artificial logs from 2008-2011**

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