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## Introduction

- Tuna is the major fishery resource of Lakshadweep Islands
- With an aim to help the fishermen to locate tuna fishing grounds, the Indian National Centre for Ocean Information Services based at Hyderabad developed the fishery advisories.

## Objective

The main objective of the study was to validate the tuna PFZ advisory for Lakshadweep



## Methodology

- The advisories were shared with fishermen of the island and validation was done from Minicoy, Androth, Kavarathi and Kalpeni during the period August 2015 to March 2017.
- The length of the major species landed from the PFZ area and the gut content of the tuna was analysed using standard methods.
- A survey was conducted to understand fishers opinion about usefulness of PFZ

## Validation

- The Tuna PFZ advisories released by the INCOIS were validated through 20 boats at Minicoy, 15 at Androth, 5 at Kavarathi and 6 at Kalpeni. Altogether 46 boats were involved in PFZ validation in Lakshadweep Islands during the reporting period.
- The catch composition, total number and weight and the price per kg of each resource and the total income per boat were noted from the boats which operated in the PFZ areas. Non-PFZ areas were also evaluated for comparisons

## Results

- Higher catch were obtained at PFZ during certain months. It was observed during August and October the catch was higher by 87 and 31 % respectively in PFZ areas than non PFZ areas.
- The profit was nearly 90% more in August, but in October the profit was at par with non PFZ area.
- During November to February, the catch was higher in the non PFZ area at Agathi, Minicoy and Androth.
- Sometimes at PFZ location dolphins, small fishes and other larger fishes which do not have good market value were more. During such occasions, there were no tunas in the fishing ground.

## Other tuna resources

- The second major resource was *Thunnus albacares* with catch rate ranging between **60kg in January and 475 kg in February 2016**.
- Common size in commercial catches - 50-150cm
- Euthynus affinis* was obtained in the fishery only during **October to December 2015** and the catch per boat ranged between **8.3 to 115 kg**.

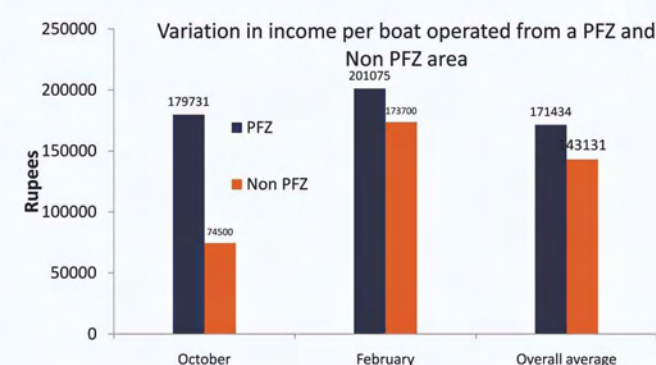
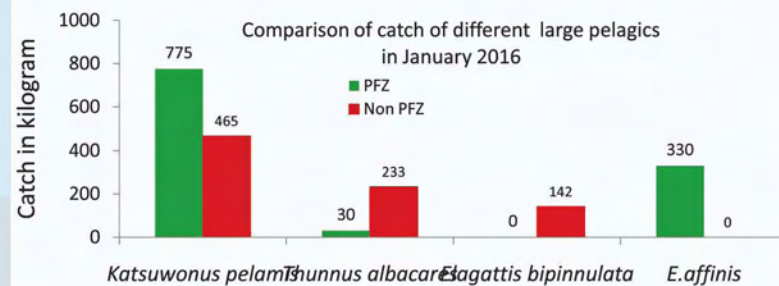
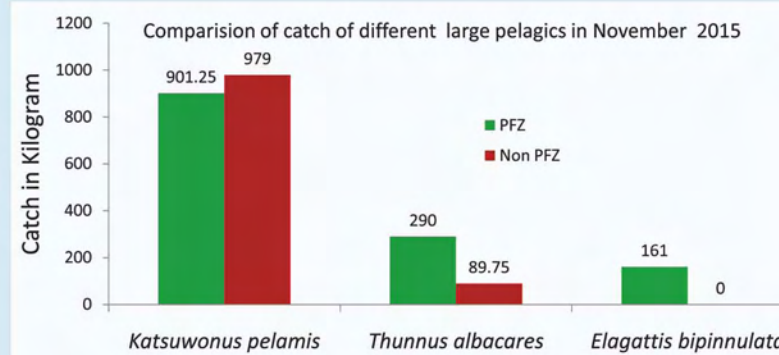
*Thunnus albacares* Yellowfin tuna



*Euthynus affinis* Kawakawa, Little tunny



Pictures from fishbase



- The average income per boat operated in a PFZ area was higher (**Rs 1,79,731**) than a boat which was operated in a Non PFZ area (**Rs 74,500**) in October indicating **58.5% more income**
- The difference in income was lowest in **February 13.6%**.
- The average difference in income during the period October 2015 to March 2016 was **16.5%**.

## What does the tuna feed on?

- Almost all stomach of the skipjack tuna caught from Agathi Island had the bait fishes *Spratelloides delicatulus* and *Apogon* sp.
- While the gut of yellow fin tuna from Androth had *Spratelloides gracilis*, *Charybdis smithii* and *Decapterus russelli*. Some fishes had fully digested flesh in the gut

## Gut content analysis of tuna



digested squid and fish from yellow fin gut



Gut of skipjack tuna



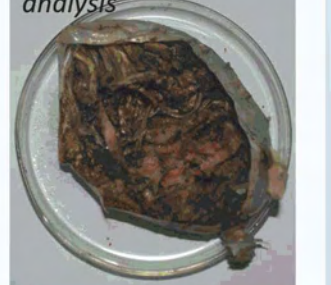
## Bait fishes -Spratelloides gracilis from gut of tuna



Squid from gut of tuna

Apogon

Gut of tuna -opened for analysis



## Post Harvest/Smoke drying of tuna

- 2016-17 - good landing of skipjack tuna. Major share was used for preparation of masmin (smoked tuna). The market price of masmin - approximately 450 - 550 INR depending on the size. Recently a firm from Sri Lanka has imported 600-700kg of masmin from Agathi.



## Fishers opinion

- Few fishermen follow the PFZ advisory but most of the times they get good catch at nearby grounds. They are reluctant to travel longer distance predicted by PFZ advisory for fishing since they get catch at nearer grounds.
- The seconds in latitude- longitude coordinate is not providing them the right direction to the fishing ground.
- Often they follow the traditional method of following the water current, the presence of bait fishes and information provided by the other fishermen.
- PFZ advisories are useful. Sometimes at PFZ location they find the presence of dolphins, small fishes and other larger fishes which do not have good market value. During such occasions, they don't get tuna catch at the fishing ground

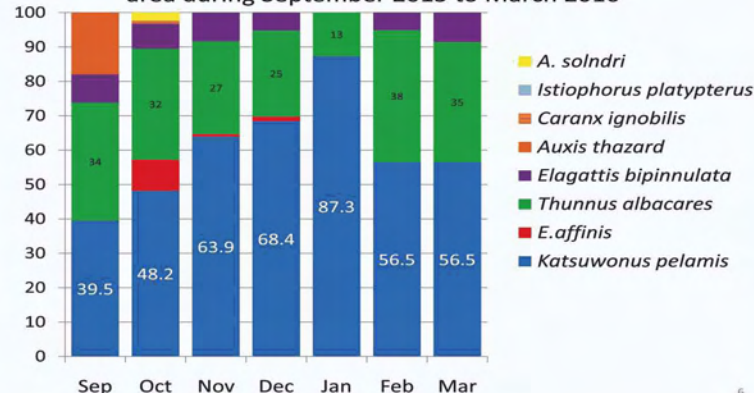
## Conclusion

- The tuna PFZ advisories of INCOIS indicate the occurrence of tunas in most instances. However, sometimes PFZ occur in distant areas and fishermen find it difficult to reach these spots.
- The research on this theme has to be continued and more details on tuna habitats and the hot spots have to be identified.

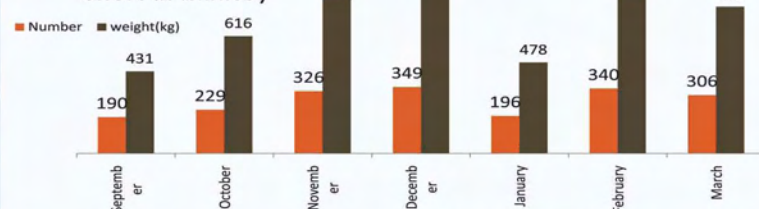
## Acknowledgement

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Percentage contribution by different species of tunas and other large pelagic fishes in the catch from PFZ area during September 2015 to March 2016



Average catch (in Kg) of *Katsuwonus pelamis* per unit effort at Minicoy

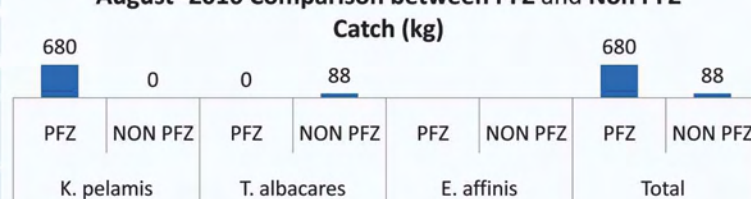


*Katsuwonus pelamis* (Skipjack tuna)



The maximum income from Skip jack tuna was during December (Average income per boat -Rs 1,30,688) and minimum (Rs 71,625) in January (2016)

August -2016 Comparison between PFZ and Non PFZ



August -2016 Comparison between PFZ and Non PFZ Price (Rs)

