

Project 1. TEST OF BIODEGRADABLE FADS WITH THE SENEGALESE FLEET – For the Eastern Atlantic Pole and Line FIP

Context

Drifting FADs (dFADs), which are comprised by a surface raft and a submerged appendage, are most often made of plastic (nylon nets, buoys and polypropylene ropes). The submerged appendages are mostly made of old netting material, reaching up to 80 m depth for some fleets. Due to the complexity of FAD fishing strategy, in which FADs are left drifting with a geo-locating buoy, it is estimated that around 20% of FADs are lost or abandoned every year (Moreno *et al.* 2018). Impacts caused by lost and abandoned dFADs are ghost fishing (Filmatier *et al.* 2013), accumulation of plastic at sea, damage on coral reefs and interference with other economic activities, such as tourism.

Objectives

The present project aims at defining and testing innovative, biodegradable FAD structures. The new FAD structures would achieve the following:

- (i) eliminate the use of netting;
- (ii) degrade as fast as possible once their useful lifetime for fishing ends; and
- (iii) minimize the use of plastic by replacing it with plant-based or other natural materials.

New biodegradable FAD designs will reduce: (a) ghost fishing by dFADs when they are lost and drifting at sea or end up sinking or stranding; (b) the impact of dFADs on the habitat (by degrading at a relatively faster rate); and (c) marine pollution due to the reduction in the amount of plastic used to build dFADs.

Project description

Task 1. Defining materials and experimental designs for Biodegradable FADs

At an early stage, ISSF, the Senegalese Pole and Line fleet (4 vessels) will organize a workshop in Bermeo/Donostia to design the biodegradable FADs (bio-FADs) and the protocols to test them at sea.

Task 2. Trials at sea to test biodegradable FADs

Deployment strategy: After the workshop, ~20 experimental jelly-FADs will be constructed and deployed in pairs, along with ~20 conventional dFADs for comparative purposes. Ideally, each vessel will deploy ~5 bio-FADs and ~5 traditional dFADs.

Monitoring of experimental FADs: The 20 jelly-FADs will be monitored through (i) forms filled out by fishers regarding any activity related to experimental FADs (deployment, visit, set, retrieval etc.); forms will include a questionnaire on the status of the different biodegradable components and (ii) via satellite, through the geolocating echo-sounder buoys fishers attach to dFADs (Moreno *et al.* 2016). The monitoring period of these experimental dFADs will last 6-8 months.

Task 3. Data analysis on experimental FAD's performance and final report

A comparative analysis on the performance (e.g., their capacity to aggregate fish and lifespan at sea) of both bio-FADs and conventional FADs will be conducted following statistical approaches that use: catch data (biomass and species composition), experimental bio-FAD's drift (speed and direction), data filled by captains on the status of the different biodegradable materials and echo-sounder buoy data (acoustic biomass estimates). Analysis will be conducted in relation to the specific bio-FAD designs and the time spent at sea.

Efficiency on the capability to aggregate tuna will be measured through several indicators, e.g. presence/absence of tunas, maximum and average amount of tuna and non-tuna aggregated under bio-FADs vs conventional FADs, time trends on aggregated tuna and non-tuna biomasses and the ratios between aggregated tuna and non-tuna biomasses.

ISSF will provide a short final report with recommendations including i) results of the assessment of new biodegradable materials and bio-FADs designs tested by the Senegalese fleet and ii) results of bio-FADs behavior and performance (e.g., efficiency in aggregating tuna and non-tuna species).

Task 4. Final workshop to discuss results

Results obtained in the previous task (Task 4) will be used and discussed in a final workshop with fishers in Bermeo/Donostia. The results presented at this workshop will help to inform the discussion on possible, viable bio-FAD designs.

Budget

Task 1. Workshop to design bio-FADs and protocols at sea

Two-days workshop in Bermeo/Donostia, 2 experts attending: **0€¹**

Task 2. Trials at sea

Cost for the construction of 20 jelly-FADs of 80 meters depth: **10,000€** (500 € per FAD depending on the design). The final cost of each FAD will depend on the type of design agreed in Task 1.

Shipping the biodegradable materials to Dakar: **3,000€** (estimated budget, would depend on the origin of the materials selected – this should be arranged by the fleet)

Approximate total budget Task 2: **13,000€**

Task 3. Data analysis and final report

Development of database, data collection, analysis: **2,000€**

¹ If the workshops are organized in a different location, the budget associated to the workshops should be adjusted

Task 4. Final workshop

One-day workshop in Bermeo/Donostia, 2 experts attending: **0€¹**

Summary of the budget:

Task #	Task name	Cost (€)
Task 1	Workshop for bio-FAD designs	0
Task 2	Trials at sea ²	13,000
Task 4	Data analysis and report	2,000
Task 5	Final workshop	0
Total project		15,000

² Purchase of jelly biodegradable FADs and shipping to be directly organized by the FIP