Towards more sustainable use of fish aggregating devices

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Background

Sustainability science promotes the search for solutions to complex problems linked to major global issues. Sustainable Development Goal (SDG) 14 "Conserve and sustainably use the oceans" raises a major concern about waste discharged or abandoned in the environment. Although most of this waste originates on land, a significant proportion comes from maritime activities, particularly fishing, with harmful consequences for marine organisms and coastlines. Tropical tuna seine fishing contributes to this phenomenon by deploying thousands of drifting fish aggregating devices (FADs) every year, many of which eventually wash up on the shore. We therefore need to think about ways of preventing the loss and subsequent beaching of FADs, and thereby contribute to a more sustainable ocean.

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Further reading

Imzilen T. et al., 2021 – Spatial management can significantly reduce dFAD beachings in Indian and Atlantic Ocean tropical tuna purse seine fisheries. *Biological Conservation*, 254 : 108939.

Imzilen T. et al., 2022 – Recovery at sea of abandoned, lost or discarded drifting fish aggregating devices. *Nat. Sustain.*, 5 : 593-602. https://doi.org/10.1038/s41893-022-00883-y

Drifting FADs and the problems associated with their use

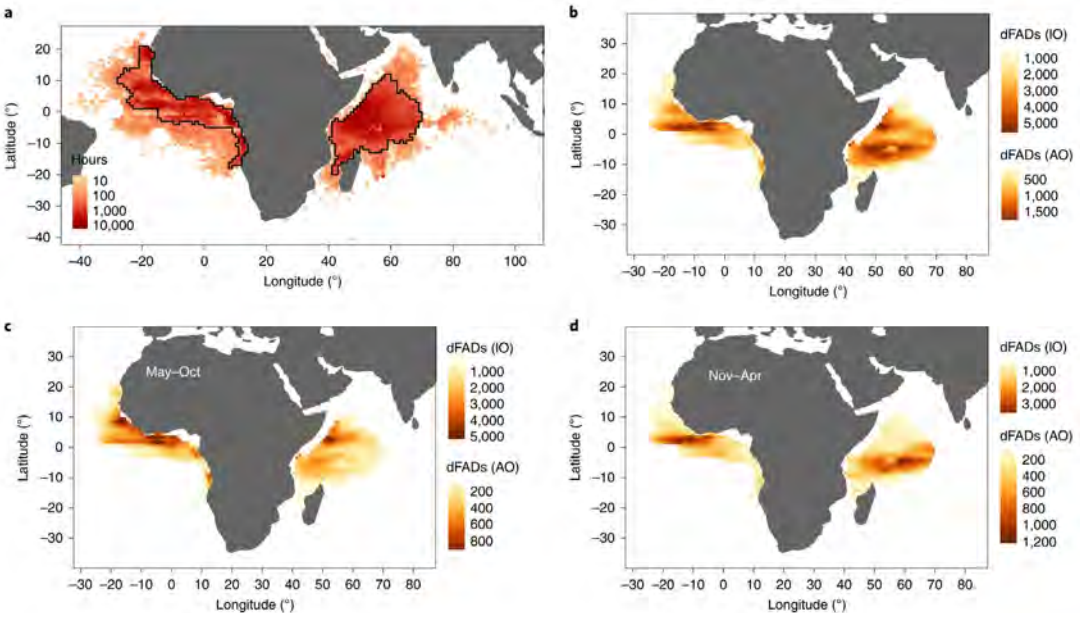
The drifting FAD is a piece of equipment that naturally concentrates fish and is used by fishermen to increase their catches. It usually comprises a rectangular raft measuring a few square metres, covered in fishing nets and attached to plastic floats. It also has a vertical structure comprising nets up to 80 metres deep, to which a weight is attached to anchor the net in the water column and make fish aggregation easier. A GPS buoy is attached to the FAD so that its position can be tracked remotely. Since the early 2010s, an echo-sounder integrated into the buoy has provided an estimate of the aggregated fish biomass. While the use of FADs has clearly increased the productivity of the tuna fishery, the practice has a number of negative consequences, including an increased risk of overfishing and accidental catches of species not targeted by the fishery. Furthermore, a significant proportion of FADs end up drifting away from fishing grounds and/or washing up on the shore, adding to the volume of marine litter.

Measures to reduce these problems

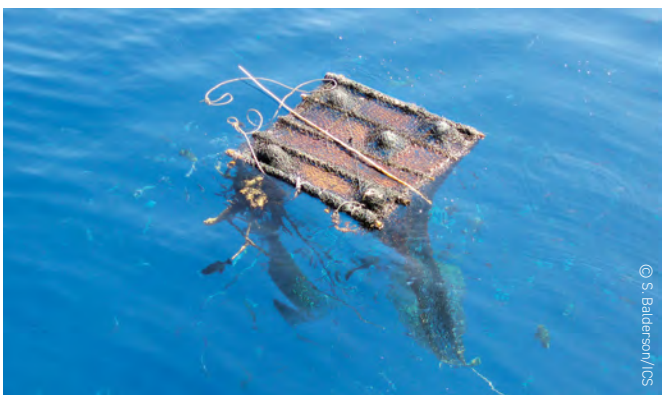
Regional management organisations for tropical tuna fisheries have put in place measures to reduce the problems associated with the use of drifting FADs, in particular limiting the total number of buoys used per boat, banning fishing with FADs in certain areas and at certain times, or requiring the use of "non-entangling" FADs (i.e. without open nets underwater to avoid killing sharks that become entangled in these nets). For example, current regulations limit the number of active buoys to a maximum of 300 simultaneously per boat and 500 in total per boat per year in the Indian Ocean. However, these measures do not specifically address the issue of reducing the beaching and loss of FADs. One solution would be to ban the deployment of FADs in areas where there is a high risk of beaching. By analysing the tracking data of tens of thousands of FADs, our research has shown that banning the deployment of FADs south of latitude 8° South in the Indian Ocean and in the coastal zone of the Gulf of Guinea in the Atlantic Ocean could reduce the FAD beaching rate in these two oceans by 20% to 40% (Imzilen et al., 2021; see illustration). As these areas are not heavily fished, this measure could be implemented with relatively little impact on fishing. However, such a ban regulation does not appear to offer the same protection for all the areas studied. The south-west of the Indian Ocean would benefit greatly from this measure, but the north-west would not, mainly because of the high variability of currents in this area. Here, implementing complementary programmes to recover FADs at sea might be effective.

FAD recovery programmes at sea and the associated challenges

With a view to proposing sustainable solutions to the FAD problem, we explored the possibility of setting up FAD recovery programmes in the Indian and Atlantic oceans (Imzilen et al., 2022). We examined the movements of more



a) Main fishing areas with the total number of purse seine fishing hours from 2012 to 2018.
b-d) Density of FADs and how far they drift in the Indian Ocean (IO) and Atlantic Ocean (OA).
(Imzilen et al., 2022).



On the right, a FAD caught on a coral reef on Alphonse Atoll in the Seychelles; on the left, a FAD deployed in the Indian Ocean.

than 100,000 FADs in these two oceans to see what happens to them. Our analysis showed that more than 40% of FADs drift away from fishing grounds and end up lost in the middle of the ocean or beached in coastal areas. In the Indian Ocean, FADs leaving the fishing zone from the east end up either beached in the Maldives or pass through the archipelago, drifting even further eastwards. In the Atlantic Ocean, FADs mainly leave fishing grounds along their north-west (10°-20°N) and south-west (2°-5°S) edges. Of these lost FADs, 20% pass relatively close (<50 km) to a port. Setting up programmes to recover these FADs from these ports could be an effective measure for reducing the loss and beaching of FADs. However, there are a number of major challenges to overcome if programmes of this type are to be successful. The equipment required to carry out a recovery operation (e.g. the size of boats), the type of collaboration to be put in place (e.g. collaboration with local fishermen and purse seiners and/or non-governmental organisations) and financing solutions (e.g. the development of a polluter-pays system applied during the deployment or manufacture of FADs) will all need to be defined if a programme is to recover as many FADs as possible while minimising costs and impacts on the fishery.

KEY POINTS

Recent studies carried out by IRD have proposed solutions to mitigate the risk of FADs being lost or beached: closing areas in which FADs are deployed and setting up programmes to recover FADs at sea. Implementing these solutions will, however, require political will and prior consultation between the scientists, managers, industry representatives and decision-makers involved in tropical tuna seine fishing. These various aspects are currently being actively discussed within the regional management organisations for tropical tuna fisheries in the Atlantic and Indian Oceans, in close collaboration with the authors of this article and other IRD colleagues.

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