

Type And Quantity Of Garbage Generated From Fishing Vessels In The Port Of Agadir (Morocco): Case Of Freezer Trawler Cephalopods

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Abstract—The content of fishing vessels waste was analyzed on two freezer trawler cephalopods. The results display a large quantity of unnecessary garbage pollution by ships. The disposal at sea of plastic materials, and of all garbage except food waste in certain special areas, is against MARPOL Annex V revisions entered into force in 2013. Fishing vessels are disregarding these regulations. The garbage can threaten Human life and wildlife, apart from being aesthetically unpleasant. It is recommended that more responsibility be put with the shipping companies, owners and suppliers to stop this pollution.

Keywords—*fishing; vessels; freezer trawler cephalopods; garbage; MARPOL Annex; waste*

I. INTRODUCTION

Marine pollution is an intergenerational and worldwide concern issue. It is well documented through studies around the world that the problem is increasing [1,2,3]. It is well known that land-based sources are a major contributor to marine pollution but currently a great interest is concerning ocean-based pollutants [4,5,6,7,8]. Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. It consists of items that have been made or used by people and deliberately discarded or unintentionally lost into the sea or coastline including such materials transported into the marine environment [9]. Marine litter originates from both land and ocean-based sources. Reference [9] estimated that approximately 6.4 million tonnes of litter are dumped in the oceans each year. So, marine litter accumulation and dispersal is a growing problem at a global scale, affecting all marine environments [10].

The majority (80 %) of marine litter is assumed to take origin from land-based sources [11], and plastics are appraised to make up 50 to 80 % of total marine litter [2]. Globally it is presumed that only around 27 % of all ship wastes are brought back to reception facilities, with the bulk of the rest either dumped or incinerated [5]. However, the data are variable and there are still information gaps about total land and ocean-based inputs of marine litter [3,5,11] and the studies are scarce about Moroccan inputs coming from both sources. This work was done in order to assess the quantity and the quality of waste generated by the deep-sea fishing segment operating at the port of Agadir, which is added each year to the seabed. The study excludes hydrocarbons and other liquid pollutants coming from engine rooms, even that they are also a major threat to the marine environment.

II. METHODS

One method of obtaining a measure of litter dumped at sea is to count the items in the stores. Two fishing vessels belonging to different companies were investigated. They are freezer trawler cephalopods with these characteristics: the first one is with 1050 HP; 37.16 m in length and 395.18 TJB and the second one is with 862 HP, 32.53 m in length and 150 TJB. The amount of metal, glass and plastic containers was counted from the lists of stores.

It is arguable whether analyzing the stores list accurately shows how much is dumped at sea. Not all the stores may be used up in the time planned: some, a very small amount, may be dumped ashore. The assessment only gives subjective percentage content. To obtain a true picture, the amount of litter in each category was counted over a period of 30 or 45 days.

It is obvious that the damage done to trawl nets during fishing activity generates losses which end up in

the sea. The repairs of these damages which are done on high seas require huge quantities of materials. These quantities are provided at the beginning of each fishing trip which illustrate directly the amounts of litter dumped into the sea. The supply of fishing materials is carried out twice a year after each biological rest period.

III. RESULTS AND DISCUSSIONS

The results from the stores lists "Tables 1 and 2" give an estimation of the maximum number of pollutants it is possible to dump at sea. There is little difference between the two ships in the usage of fishing materials and the general garbage generated.

As for fishing vessel survey, a total of 45 objects that were present at the store list were identified as commonly used household domestic products. From the shipborne objects perspective, 79.3% objects from the plastic category were present at all vessel samples which included CPB, food wrappers, plastic fragments, colored plastic bottles, and cardboard cartons "Table 1". The most numerous objects found on the vessels which contributed to the total shipborne items collected were CPB, plastic food wrappers, rubber (others), plastic fragments, cardboard cartoon, glasses and tin cans. Besides, a preliminary examination of the fishing material list show that the bulk (59% to 61%) of 43 fishing items provided during the fishing trip is made by the plastic and between 39% and 41% of metals "Table 1".

According to the survey carried out in the Agadir port; in absence of the facilities onboard to handle shipborne garbage, so far the national fleets dump them overboard. "Fig. 1" summarizes the number of active fishing vessels in 2018 for the Moroccan fleet divided into three categories: the coastal fleet, the small-scale fleet and the high seas fleet. Freezer trawler cephalopods concerned by this study are part of the high seas fleet which represents only 2% of the national fleet which mean that other fishing vessels are engaged in pollution activities and generate enormous quantities of food waste, household waste, packaging products and etc.... The pollution data analyzed in this report represent only a portion or snapshot of the actual total pollution produced by one type of fishing vessels occurring throughout the region.

In other hand, the captains questioned mentioned the frequent incidents of fishing gear losses that happen on some occasions but are far to give gears loss estimation in Moroccan marine waters. We can then deduce that these are alarming quantities of this waste that reaches the oceans.

TABLE I. ANNUAL TYPES AND QUANTITIES OF PRODUCED GARBAGE BY THE TWO FREEZER TRAWLER CEPHALOPODS

Type of provision	Garbage generated	Annual quantities	
		Vessel 1	Vessel 2
Fishing materials	Fishing net	1976 Kg	1680 Kg
	ropes	4490 Kg	4150 Kg
	Nylon thread	190 Kg	205 Kg
	Steel cables	3120 Kg	2890 Kg
	Metal items	1240 Kg	1360 Kg
	Plastic items	60 Kg	50 Kg
Foodstuffs	Tin can	2384 items	2384 items
	plastics	4022 items	4022 items
	Cardboard	410 items	410 items
	Glass	76 items	76 items
Domestic garbage	Cooking utensils	630 items	570 items
	Work clothes	310 items	280 items

TABLE II. DESCRIPTION OF POLLUTANTS ONBOARD OF FISHING VESSEL

Pollutants	Pollution description
Plastic	CBP, boxes, bags, wrappings, washing machines, strapping bands, sheets, cartons, pallets, foam, food wrappers, bottles, raincoats, plates, cups, cutlery
Metal	Empty oil drums, washing machines, cables, pipes, beverage cans, engine parts, oil filters, tanks, chains, air conditioning unit
General Garbage	Plastics, food wastes, metals, clothing, washing machines, containers, netting from fishing gear

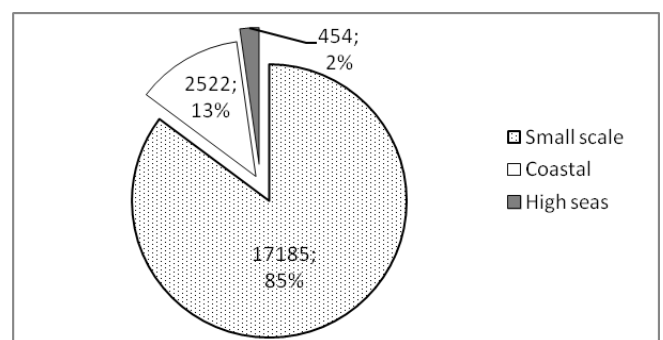


Fig. 1. Number and percentage of Moroccan active fleets registered in 2018

IV. CONCLUSION

It appears that the MARPOL Annex V regulations are not enough to stop pollution generated by fishing vessels. These latter generally do not have disposal units so the people on board have no choice but to dump rubbish at sea in addition to absence of port waste reception facilities to enable ports to receive fishing vessel wastes on shore.

It is clear that pollution from fishing vessels is a significant problem within Moroccan marine

environment. Accurate assessment of the true extent of pollution occurring is compromised by the limitations of the data caused by limited fisheries coverage.

Action is urgently needed to decrease the number and severity of pollutants entering to the sea by fishing vessels through increased monitoring, reporting, and enforcement of pollution violations by all types of fishing vessels operating in National marine waters.

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