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# BYCATCH AND DISCARDS IN COMMERCIAL TRAWL FISHERIES OF MALABAR REGION

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## Introduction

Increase in the commercial trawling in the last few decades has made direct impact on ecosystem and also on the biodiversity. Trawling kills a large quantity of non-targeted species and juvenile fishes. The fisherman after each haul discards a large quantity of unwanted fishes and shellfishes in to the sea. The discard rate varies in relation to the target species, season and area of operation. Trawl fisheries, are characterised by high discard rates of unwanted fish, and of juvenile or undersized commercial species. There is growing evidence that intensive fishing with trawls may alter the habitat, and affect biodiversity, community structure, species composition and abundance of both target and other species within the food web. The most recent FAO estimate sets global discards at about 25% of reported annual production from capture fisheries. The types and quantities of discards in fishing operations will depend on the species and size selectivity characteristics of the gear used in relation to the target species.

Studies on the assessment of discards, low value bycatch and fishery of juvenile fishes were carried out at Calicut region for assessing the quantity of these resources exploited and its impact on the marine ecosystem. There are two major fishing harbours in Calicut viz. Puthiappa and Beypore and a minor harbour at Chombala in the northern part of Calicut district. Calicut is the main centre of marine fisheries activities in the Malabar region, most of the fishing along this region is based at Calicut, hence the data on the catch, effort and species composition of trawl catch was studied based on the work at Calicut. For estimating the effort, total catch, and species composition the FRAD data for Calicut district was used.

The trawl catch estimated at Calicut during the period 2007-2011 ranged from 26452 t (2009) to 47184 t (2011). The trawl catch has shown a declining trend from 2007 to 2009. However, the catch has shown an increasing trend in 2010 with an estimated total catch of 34452 t by an effort of 0.76 million fishing hours and the increasing trend continued upto 2011. Average annual effort expended by trawlers for this period was around one million fishing hours.



The studies made on the yearwise bycatch during the period 2007-2011 showed that bycatch formed 34138 t in 2007, which declined to 20956 t in 2009. The bycatch landing showed an increase from 28468 t in 2010 onwards and reached 41052 t in 2011 t. Bycatch landing was highest in March (4291 t) and lowest in December (1778t). The bycatch rate ranged between 23.18kg/h (Jan) and 74.87 kg/h (August). Yearwise fluctuation in the bycatch rate has shown an increase from 27.83kg/h (2007) to 50.18.kg/h (2011) and the average catch rate for this period being 34.66 kg/h.

**Low value bycatch:** The contribution of low value bycatch ranged from 9116 t (2009) to 14118 t (2007) and average for this period was 12241 t. The catch rate of low value bycatch ranged from 11.57 kg/h (2007) to 15.62 kg/hr (2008). The monthly contribution of low value bycatch ranged between 730 t (August) and 1716 t (May) and the catch rate ranged 10.86 kg (September) - 19.59kg/h (October).

Among low value bycatch landed during this period, scads (20.57%) contributed highest and its monthly contribution varied between 12.01% (2008) and 33.70% (2011). Lizard fishes (14.88%) were the second dominant low value bycatch present in the commercial fishery. Soles (14.23%) also were a dominant component of low value by catch. *Thryssa* (4.29%), sciaenids (4.75%), other carangids (3.55%), silverbellies (3.48%) and stomatopods (0.67%) were other dominant low value resources present in the bycatch.

**Discarding of low value by catch:** The trawl discards varied between 1957 t (2011) and 6264t (2008) and the average discard landing estimated for this period was 3367 t. The discard rate was highest in November (570 t) and lowest in June (91 t). Analysis of data showed that the quantity of trawl discards has come down and now it is less than 9 % of the trawl catch in this region.

178 species of fishes and shell fishes were found in the discarded portion of the catch. Fin fishes comprising mainly low value and juvenile fishes were the main component of discards and it formed 63.15%. Higher contribution of fishes was noticed in February (86.18%) and lowest in November (29.2%). Among fin fishes 124 species were found in the discards. The contribution of crustaceans, molluscs and miscellaneous items were 22.35%, 7.28% and 7.22% respectively.

Among high value fishes the dominant species found in the fishery were juveniles of *Nemipterus mesoprion* (15.8%), crabs (12.3%), *N. japonicus* (12.1%), *Loligo duvacelli* (7.9%), penaeid prawns (6.0 %), *Stolephorus* spp (5.2%), *Epinephelus diacanthus* (3.2%), *Lactarius lactarius* (2.4%), *Sphyræna obtusata* (2.1%), *Trachypenaeus curvirostris* (3.8%), *Sepia* spp. (2.6%) and others (26.6 %).

*Oratosquilla nepa* (15.6 %) was the major low value discards found in the trawl catch. This was present in the trawl catch during most of the months. The other major low value discards found in the catch was jellyfish (14.7%), *Platycephalus* spp (9.8%), *Priacanthus hamrur* (3.5%), eels (2.80%), *Saurida undosquamis* (1.3%), *S. tumbil* (3.9%), *Decapterus* spp (1.4%), silver bellies (0.9%), Terapon (1.8%), *Paraplagusia bilineata* (0.2%), pufferfish (2.4%), shells of molluscs (13.4%) and others (28.4%) .



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### **Reasons for discarding of low value bycatch:**

There are two main reasons for discarding at sea: economic and technical reasons. There is often a strong economic motivation for discarding. Some species have no commercial value locally or seasonally due to poor conditions while other species are caught in unmarketable sizes. After the majority of hauls, and especially during long trips, the catch is sorted to retain only that part of the catch which fetches good value. This is commonly referred to as high-grading and discards are made of part of the catch after taking into account the value of species, the processing time on board and the remaining storage space on board. Fish that are damaged during operations are often discarded as marketing is difficult. Catch is sometimes returned to the sea even before it reaches the deck. This can occur on some pelagic trawlers if the species composition in the catch is not deemed to be of sufficient value before hauling process to bring that catch of board is initiated. In some cases, a part of the catch is lost for technical reason before arriving on board. This induced mortality is an accidental discard, which can be estimated and can occur when catch is too heavy to be hauled on deck.

### **Impacts of discarding of low value bycatch**

*Biological and ecological:* Most of the discarded species is juveniles of fishes and shellfishes and therefore discards may be a significant part of the fishing mortality. The impact of discards on non target populations may differ significantly from the effects on target species and depends in part on the life cycle of the species concerned. Species having life history strategies similar to the target species may not suffer to the same degree as species with different life history features. Therefore, low discard numbers of some species may have a greater impact than high numbers of others and associated decline can be observed in some non target populations. Observed changes in the size composition of the target species landed are related to fishing pressure. The bottom trawling may result in a shift in the benthic community structure to the benefit of short-lived species with a high reproduction potential. There is an evident lack of knowledge on the effects of discarding on the marine ecosystem which requires further investigation of sub-surface food webs.

*Stock assessment:* Discard information does not exist for all combinations of species and gears primarily. However, it is important to determine the impact of discards on the stock assessment calculations. If discards are juveniles fish, then failure to account for them will result in underestimates of fishing mortality, especially of the stock size of young fish and therefore the recruitment estimate. There may not be such significant consequences for stock sizes and biomass at older ages. In contrast, the inclusion of discards volumes of adult fish will have a positive effect on estimates of stock biomass and variable effects on fishing mortality calculations.

### **Conclusions**

Bycatch and discards are the common problems found in all fisheries and it is a major component of impact of fisheries on marine ecosystem. Discard practices concern



a great number of species and vary between fisheries. Further desirable reductions are possible but some level of discarding will always be a feature of fisheries, regardless of the gear being used. There are many reasons for discarding and mainly economic reasons being the most prominent. Management has to be improved to reduce discards in fisheries to enhance their sustainability. There is a need to improve the selectivity of fishing operations by trawls by increasing the mesh size. The FAO Code of Conduct for Responsible Fishing operations should be applied and the introduction of selective gears by fishermen needs to be helped by the administration after positive experiments have been conducted on commercial vessels. However more information is required on discards as many fisheries have never been investigated. Research should be developed to ensure a better understanding of ecosystem interactions. There is a need also to assess the impact of regulations and marine policies and ability to lessen the waste of resources.

### References

FAO.1999. The State of World Fisheries and Aquaculture 1998.

Saila S B. Importance and assessment of discards In commercial fisheries. FAO Fisheries Circular: FAO; 1983



Low value fishes caught in trawl



Low value fishes deep sea fishes caught in trawl



Juveniles of lizardfishes caught by trawlers



Molluscan component found in trawl discards

