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# Assessment of Trash Fish and By-Catch yield of Coastal Fisheries in Selected Landing Sites of Jaffna District

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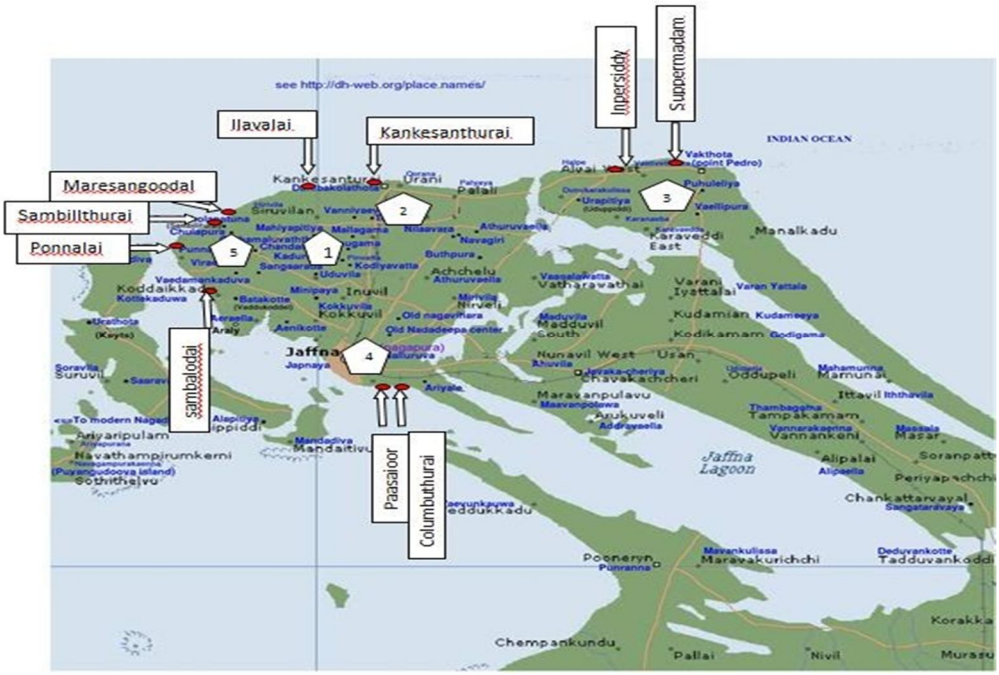
***Abstract:*** ***Jaffna fishery contributes a total fish production of 7% in Sri Lanka in 2016. The current study aims to collect recent updates on the Trash fish and By-catch yield concerning gears in selected landing sites of Jaffna from Dec 2018 to Mar 2019. Primary data were collected through direct observations and questionnaires and the Secondary data from the records of the Department of Fisheries, Jaffna. Total Catch, Species composition, and Fishing craft usage were collected weekly. A sum of 28 species, representing 22 families were identified. Outboard Fiber Reinforced Plastic Boats were primarily used. The highest total fish production was observed in Math gal with an average of 24.5 tons/month and lowest in Ponnalai with 9 tons/month. Higher target fish yield was observed from a ray net with 86.54% gear efficiency and lower in disc net with 38.72%. By catch was observed high in crab net with 41.625% and lower in ray net of 10.84%. Casting net and ray net yields higher and lower trash fish of 30.18% and 2.62% respectively. The results of the present study suggest a need for development in existing facilities.***
***Keywords: By- catch, Coastal fishery, Fishing crafts, Fish production, Gear efficiency***

## I. INTRODUCTION

Sri Lanka's total marine fish production was 456,990 Mt in 2017 and it's contribution in the National GDP was 1.3% (NARA 2016). Jaffna peninsula contains shallow continental shelf Pedro bank, pearl bank, prawns bank and brackish water of 11,917 hectare and mangrove areas of 7,070 hectares (Soosai, 2006). Jaffna District has 14 fishery inspector division and 100 landing sites (Statistical information of the Northern Province, 2014). Fishermen of this area engage various kind of fishing methods varies from gear, crafts and different fishing techniques (NARA. 2008). Fishing activities of these areas were regulated by the local fishing communities and fishermen societies (Raguparan, 2013). The marine resources are greatly varied in this areas from finfish, shellfish, cuttlefish, sea cucumber, sea pens, shrimp and sea weed.



(Plate 1.0)

In this study , the total fish production, fishing craft and fishing gear were analyzed in selected landing sites and analyzed the target catch , by catch and trash fish of each selected gear in selected landing sites of this particular study period. These finding will give a brief idea about the economical and efficient usage of gear and also this study can support the Ministry of fisheries and Aquatic Resource Development by providing required information regarding the by-catch and wastage of fish related to gear and it will helps to develop a way to efficient usage of gears and support in developing fishery regulations.

## II. MATERIALS AND METHODS

### *A. Study Area*

The present study was carried out in selected DS divisions of Sandillipay, Tellipalai, Pointpedro, Chankanai, and Jaffna ,(Figure 3.1) in Jaffna district. Potential two landing sites were selected from each DS division such as Mathagal, Mareesankoodal, Urani, Senthankulam, Suppermadam, Inpersiddy, Chullipuram, Ponnalai, Paasaioor, and Columbuthurai based on past studies. For this study primary data were collected in fish landing site via questionnaire and face to face interview from the fishermen of selected areas during the period of December 2018 to March 2019. Additional information was collected through systematic field observations and FI records. The structured interview questionnaire were developed in order to gather information about features of fishery, seasonal variations, types of fishing gear , craft information, amount of common and target fish capture, amount of by-catch fish, amount of trash fish abundant of trash fish, the fate of trash fish and as well as general challenges faced by fishermen.

Secondary data were collected from Department of fisheries, Pannai, Jaffna district. Following data were extracted from the department records such as: number of operating craft per day, types of fishing crafts operated per day, number of fishing days for each type of craft per month, total fish production for each species per month, fishing population, fishing families, number of active fishermen. Following data were extracted from the department records on number of operating craft per day, types of fishing crafts operated per day, number of fishing days for each type of craft per month, total fish production for each species per month, fishing population, fishing families, number of active fishermen. Collected data were recorded and used for analysis.

## III. RESULTS AND DISCUSSION

According to the craft usage analysis, IMUL used for the multi-day purposes, IDAY, OFRP, MTRB, NTRB used for gill net, casting net, sirahu valai and traps gear, IMUL, IDAY, OFRP are modern craft rest are traditional crafts (Vallam, Thoni).

A higher total numbers of crafts usage was observed in Mathagal ,especially modern craft that Outboard fiber Reinforced Plastic Boat (OFRP). Whereas a high usage of Mechanized Traditional boat crafts and higher fishermen engage was seen from Paasaioor. A high usage of Non Mechanized Traditional Boat crafts was observed in Chullipuram and Multi-day boat craft usage was high in Inparuddy.

Table 1: Identification of total Number of fishermen and total types of crafts used in selected landing sites from Dec 2018 – March 2019

| | | Types Of crafts used | | | | | Total amount of vessels/ crafts |
|---|---|---|---|---|---|---|---|
| Landing Sites | Number of Fishermen | IMUL | IDAY | OFRP | MTRB | NTRB | |
| Mathagal | 295 | 1 | 0 | 196 | 12 | 20 | 229 |
| Mareesangoodal | 50 | 0 | 0 | 42 | 0 | 10 | 52 |
| Uurani | 15 | 0 | 0 | 16 | 1 | 9 | 26 |
| Senthankulam | 114 | 1 | 0 | 43 | 5 | 22 | 71 |
| Supparmadam | 201 | 1 | 0 | 51 | 1 | 8 | 61 |
| Inparuddy | 250 | 11 | 1 | 70 | 0 | 10 | 92 |
| Chullipuram | 300 | 0 | 0 | 30 | 1 | 57 | 88 |
| Ponnalai | 250 | 0 | 0 | 0 | 0 | 15 | 15 |
| Paasaioor | 788 | 1 | 1 | 18 | 124 | 21 | 165 |
| Columbuthurai | 201 | 0 | 0 | 8 | 9 | 1 | 18 |
| Total | 2464 | 15 | 2 | 474 | 153 | 173 | 817 |

Note: IDAY – Inboard Day boat; OFRP – Out board fiber Reinforced Plastic Boat; MTRB – Mechanized Traditional Boat; NTRB – Non Mechanized Traditional Boat

According to the gear type usage analysis , Hook and line were mostly used in all areas. Next to that Gill net , Disco net, Traps , Casting net and Sirahuvalai . Columbuthurai and Chullipuram are the area seems to have a diverse usage of gear than other areas. A moderate diverse usage of gears were observed in Supparmadam , Uurani , Mathagal, and Senthankulam. Even though Paasaioor has a higher fishermen engage , the least usage of fishing gears were observed and limited to Sirahuvalai and Hook and line. From the structured interview questionnaire analysis, we observed that seasonal changes and the fishermen desire were the basic determinant for the different gear type usage in these areas.

Table 2: Types of gear used in selected landing sites during Dec 2018 – March 2019

| Landing sites | Gill net | Disco net | Casting net | Sirahuvalai | Hook and line | Brush park | Traps |
|---|---|---|---|---|---|---|---|
| Mathagal | ✓ | ✓ | - | - | ✓ | - | - |
| Mareesangoodal | ✓ | - | - | - | ✓ | - | - |
| Uurani | ✓ | - | ✓ | - | ✓ | - | - |
| Senthankulam | ✓ | - | - | - | ✓ | - | - |
| Supparmadam | ✓ | ✓ | - | - | ✓ | - | - |
| Inparuddy | - | - | ✓ | - | ✓ | - | - |
| Chullipuram | ✓ | ✓ | - | ✓ | ✓ | - | ✓ |
| Ponnalai | - | - | - | - | ✓ | - | ✓ |
| Paasaioor | - | - | - | ✓ | ✓ | - | - |
| Columbuthurai | ✓ | ✓ | - | - | ✓ | ✓ | ✓ |

According to the average monthly production analysis , Mathagal possess monthly highest average total production nearly 240,730 kg (23.66%) and Ponnalai has monthly lowest average total production nearly 9, 250 kg( 0.91%). It is observed that the harvesting ability of the gears are very high compared with other gears as well as involvement of many youngsters in fishing were the reason for the monthly average highest total production in Mathagal . solely based on the monthly average total production we can't determine the potential harvest site, because it depends on total amount of harvested target catch species and by-catch type.

Table 3: Average monthly total fresh fish production (kg) of selected landing sites during Dec 2018 – March 2019

| Landing Sites | December | January | February | March |
|---|---|---|---|---|
| Mathagal | 276,654 | 269,454 | 225,366 | 191,445 |
| Mareesangoodal | 183,750 | 225,750 | 330,750 | 50,960 |
| Uurani | 31,250 | 46,000 | 58,000 | 12,670 |
| Senthankulam | 186,750 | 229,590 | 34,2500 | 54,260 |
| Supparmadam | 46,140 | 64,500 | 86,420 | 42,600 |
| Inparuddy | 87,540 | 72,150 | 66,320 | 46,200 |
| Chullipuram | 42,020 | 31,000 | 28,900 | 24,600 |
| Ponnalai | 14,400 | 7,020 | 8,640 | 6,980 |
| Paasaioor | 183,000 | 158,800 | 136,200 | 113,400 |
| Columbuthurai | 30,900 | 21,400 | 19,500 | 14,560 |
| Total | 1,082,404 | 1,125,664 | 1,302,596 | 557,675 |

According to the comparison of gear for selected landing sites from December 2018 to March 2019, Ray net shows the is highest (86.54% ) target catch and disco net (38.72%) shows the lowest . Whereas by-catch was obtained highest in crab net (41.62%) and lowest was obtained in ray net (10.84%) . The amount of trash fish catch observed highest in casting net (30.18%) and again lowest in ray net (2.62%), This shows that ray net seems to be an effective fishing gear in this region.

Table 4: Percentage comparison of gear according to Total Target catch, Total By catch and Total Trash yield in Dec 2018 – March 2019.

| Gear type | Target catch(%) | By catch (%) | Trash(%) |
|---|---|---|---|
| 0.125 inch net | 84.43 | 10.89 | 4.66 |
| Crab net | 48.03 | 41.62 | 10.34 |
| Ray net | 86.54 | 10.84 | 2.62 |
| Disco net | 38.72 | 36.78 | 24.48 |
| Casting net | 40.37 | 29.44 | 30.18 |
| Modified wing net | 49.90 | 36.57 | 13.52 |
| Trap | 69.94 | 13.19 | 16.68 |

## IV. CONCLUSIONS

When fishing activities are solely considered, the two factors, the fishing method, and seasonal effect have a higher contribution to fish production. Fishing gear is the main component having a significant contribution to the variations of by-catch and trash fish. The amount of highest target catch shows the economically effective of fishing gear .On the other hand higher by-catch and trash fish yield shows economical reduce and low effectiveness of gears that considered as produces high wastage , undersized fish and juvenile fish which leads to the reduction the production.

According to the studies, Mathagal is the major fish landing site consisted of good potential and high production for fishing activities when comparing to others especially in the usage of modern craft that Outboard fiber Reinforced Plastic Boat (OFRP). Whereas a higher number of fishermen engagement was observed in Paasaioor which is more than double the time of other sites. The usage of effective gears such as gill nets and hook and line are highly observed in all selected sites. Based on the monthly average total target catch ray net showed a highest of 86.54 % and lowest of 38.72%, in disco net. Highest by-catch was obtained in crab net of 41.62% and lowest in ray net of 10.84%. A highest total amount of trash fish harvested observed in casting net of 30.18% and lowest in ray net 2.62%.

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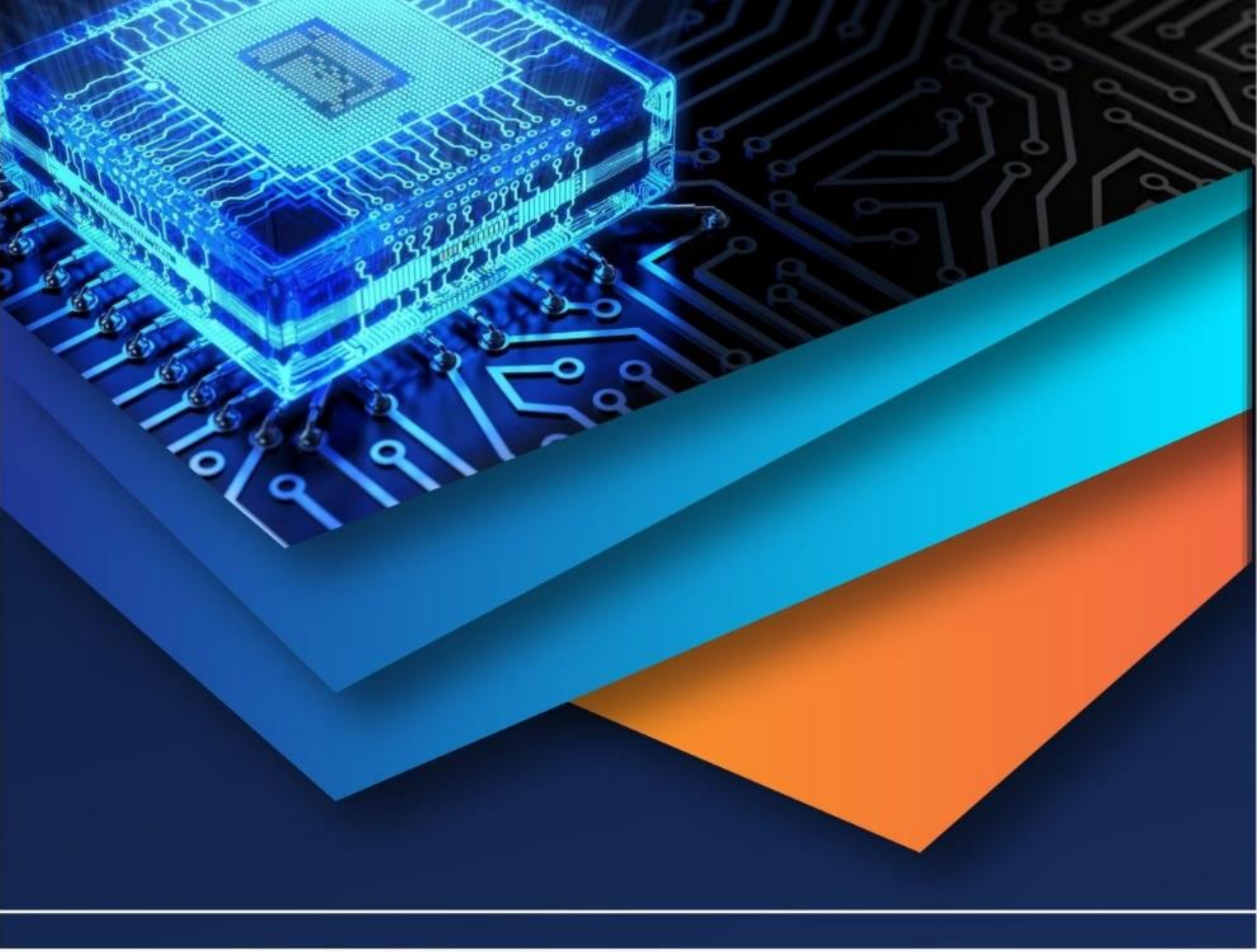

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