**Investigation Of The Socio-Economic Conditions And Entrepreneurial Index Of Fisher-Folks In Atlantic Coast Of Eastern Obolo Local Government Area, Nigeria**

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**Abstract:** Beach-seines have been used in small scale fisheries in many parts of the developing world for a very long time in recent years; the use of beach-seines has been banned in some countries because of perceived negative impacts on the environment and resources. The effects of the gears on the marine ecosystem as identified in the study were not limited to mortality of juveniles (environmental), trophic level destruction (biological) and fisher-folks food security (socio-economic) parameters. But also include reduction in urbanization and industrialization activities, destruction in downstream fishery and beaches/shores strewn with discards. Therefore, the aim of this research was to study the socio-economic conditions of the fisher-folks, examine the entrepreneurial Index and investigate the environmental impact of beach-seines operation in the coastline. The beach seine net deployed in the area were examine and measure using the design outline documented in the FAO catalogue of small scale fisher in Nigeria. Fish species caught near the coastline were compared. A relative paired T-test were used to test the hypothesis that there was no significant different between the total number of mature target and juvenile by catch species. These were because they both sizes occurred together and for every mature sorted were juveniles. The analysis showed an extremely significant results (P < 0.05, n = 20, df = 19), which leads to rejecting the H0 and accepting H1 meaning the hypothesis were statistically significant. The result of the socioeconomic research showed that 50% of the respondents were sampled from the main fishing settlement “Akasa”. Also revealed were 23% respondents from Emeroke and Iko community. The age of the fisher-folks (26-36+28.73) being 60%, while the marital status and religion respondent were (married = 73.3%) and (Christian = 93.3%) respectively. In terms of family size (Nuclear = 80%) with the best fishing season being dry (100%). Monthly income classes were (N26,000N31,000) and (N32,000 – N37,000) with 33.3% each. Fishing experience (x=7.33 +3.72) and fishing operation per day (27+1.96) showed 46.67% and 90.0% respectively. While members of corporative 36.7% each, occupational diversity to trading and farming reveals 33.3% and 23.3% respectively. Notably women between 20-30 years also go to fishing, but also reveal were active male than female in the beach –seining with 73.3% and 26.7% respectively. The assessment of impact of gear suggested that discards is not the major environmental problem, but rather changes and depletion in fish population, out migration and reduction in other developmental activities. The entrepreneurial index calculated were capital expenses (N318,960.00+ 64082.86) and recurrent expenditure (N1, 325.93+483.2).

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**Keywords**: Socio-economic conditions, Entrepreneurial Index, Fisher-folks, Beach-Seine operations and Environmental impact.

**Introduction**

FAO (2010) described bycatch as the total catch of that quantity taken by the fishing gear which reaches the deck of the fishing vessel. The ancient Phoenicians and Romans employed beach seining to catch fish in the Mediterranean. The reduction of food insecurity and rural poverty and the promotion of sustainable rural livelihoods and more equitable access to resources are major strategies which FAO’s strategies framework from 2000 – 2015. Small-scale fisheries are critical for food security and poverty reduction as highlighted again by the FAOs committee on fisheries at its twenty-fifth session. A high proportion of small scale fishers are poor including those involved in beach-seining. The general design of the beach-seines used and their mode of operation are similar in some countries. Beach-seine is also used to capture the smallest fish and shrimp. Beach seines, also called haul seines, are typically small mesh nets in the range of 100m in length that are set in shallow water parallel to the beach or back reef and are then hauled onto the beach or reef (Kailola *et al.,* 1993). Fishery surveys can include demography, income, living costs, fishing gear, and marketing structure. Socioeconomic information on status and usage of coastal marine resources is needed for management planning, especially when subsistence and small-scale fisheries are in question (Kronen*et al.,* 2007). The problem is much worse when there are no other opportunities outside of fisheries in which they could learn a basic living. Generally small scale (artisanal) fisher constitutes a group of very poor citizen (Moses, 2000). Mangi and Roberts (2006) and Mangi (2006) studied the environmental impact of artisanal fishing, gear on coral reef ecosystem in the multi gear fishery of southern Kenya. As an economic indicator that reflects how well an enterprise operate, in terms of gross revenue to produce a certain profit or net surplus. Therefore understanding the social characteristics and attitudes of fisheries are necessary for a complete fishery environmental assessment. This research is aimed at studying the design characteristics, bycatch mortality and socioeconomics of fisher-folks beach-seine operations in Atlantic coastline.

**Materials And Methods**

The research work was carried out in a fishing settlement of Eastern Obolo, of Nigeria. Situated in between Imo and Qua Iboe river estuaries with latitudes 4028” and 4053” North and longitudes 7050” and 7055” East respectively. It is bounded by the following areas of the state; Mkpat Enin Local Government, Onna, Ikot Abasi, Ibeno and by the Atlantic Ocean. (Fig. 1)

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**Fishery Survey;** was carried out in stages; reconnaissance and observer-based stage. The observer based survey incorporated both fishery dependent and independent survey. Dependently, oral interviews were conducted for the compositions of landed catch and estimation of the diversity of by catch (George *et al.,* 1982). Independent observation onboard the fishing vessel, net shooting, soaking, hauling, handling, fish sorting weighing and identifying of fish caught (Ambrose *et al.,* 2005).

**Data collection;** Organisms were sorted, into matured (target species) and juvenile fishes (bycatches). Juvenile category were identified, sorted according to species in 20 replicate landings. T- test analysis of catch data was used to pooled the landings from both 10 fishery dependent and 10 fishery independent landings. CPUE was calculated according to the method of stamatopoulous (2002).

**Socioeconomic Studies;** Questionnaires were administered to fishermen (crew), leader and focus group interview to collect data. Discussion and photographed were employed. Personal interviews and fisher folks were selected at random. Total numbers of 30 questionnaires were administered, collected and recorded for analysis**.** The collected information were accumulated, grouped and interpreted. Numeric data were codified into narrative facts and graphically analyzed for statistical studies. Relative T-test statistic technique was used to compare the relationship between the two set of responses, since it came from a particular stock.

**Results**

Accomplished in two (2) stages, namely; setting and pulling the trapped fishes ashore. The bycatch compositions of species as revealed by the study were identified and named accordingly as shore in the below table. The statistical method in use was relative T-test, because they organisms were from one population. The table also revealed that for every matured target fishes caught by the beach seine gear, three juveniles bycatch species are vulnerably exploited. Except for the less valued shell fish that mortality of matured specie are more than the juveniles.

**Socioeconomics of fisher-folks with beach-seine bycatch operations;** revealed that marital status and religion of the respondent was 26.7% (single) and 6.7% (Islam) indicating that beach seining was dominantly carried out by married and Christian fisher folk with 73.3% and 93.3% respectively (Table5). Figure 11 showed that the level of illiteracy was significantly higher, with a mean value of 13.1 ±2.76, pointing to 50% secondary level. As revealed also in the result were active male (73.3%) in beach-seining than female (26.7%) that were involved in other aspects of beach seining fisheries and shore-based activities (Figure 8). In terms of family type 80% were nucleated family (figure 12) and the best fishing season was dry season (100%) respondent as indicated by the analysis (Figure 5). There was a high rate of jelly fishes which contributed to the increasing weight of the haul. There were two dominate average monthly income classes in the study, namely N26,000 – N31,000 and N32,000 – N37,000 with a frequency size of 33.3% each. The mean income of the entire study sample was N33,333 while only 3.3% of the fisher folk households earned as high as N98,000 – N103,000 as income (Figure 17). Also the least mean value of fishing experience X = 7.33 ± 3.72 meaning most fisher folk experienced at least close to 4 years (Figure 13). Figure 16 reveals that 36.7% each were members of cooperative and also those who were about to join, while the fishing operation per day 27 ± 1.96 was 90%, meaning that fisher folks mostly goes out for beach seine fishing twice a day (Figure 15). The study proved that occupational diversity of beach-seining fishers to trading and farming with 33.3% and 23.3% respectively (Figure 14). The study also reveled composition/size of fishers household with age 15 – 24 (male = 111) and (female = 96) being the highest and age 45 and above (male = 30) and (female = 32) as the least. Notably, women between 20 – 30 years also go to fishing mostly with hooks and lines.

**Impact of beach seine on marine environments, aquatic resources and habitats;** The assessment carried out suggested that discards are not a problem in beach-seining. Changes and depletion in fish population, out-migration of the fisher folks and reduction in other socioeconomic activities showed the highest in ranking while reduction of sustainable fishery, marine species extinction and ecosystem simplification were the lowest in its effects on the environment (Table 7). The study also reveals the adverse effect remarked to be of greater degree from 2.31 (max) and 2.29 (min) are of lesser degree on the marine environment impacted upon (Table 7).

**Financial and economic performance of beach-seine bycatches;** Economic indices of the beach seining operation were investigated in terms of recurrent expenditure (cost/trip), capital expenditure (fixed cost) and revenue (viability). The total recurrent and capital expenditure incurred was between (N4000 – N34,000), and (N500,000 – N1,250,000) respectively. Gross margin implies that the Return on investment (ROI) was about 53% showing the percentage of investment cost subtracted from total revenue (Table 8).

**Table I:** Names, length and weight of fish species caught by nearshore beach seine

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Family/Names** | **Scientific Names** | **Common Names** | **Local Names** | **Min-Max Total Length (cm)** | **Min-max Total Weight** |
| 1. | Mugilidae | *Mugilcephalus* | Mullets | Okurukuru | 1.4 – 88.0 | 0.5 – 10.0 |
| 2. | Mugilidae | *Mugil falcipinus* | Sickle fin | Aseke | 1.3 – 19.5 | 0.19- 31.45 |
| 3. | Scieanidae | *Pseudotolithius typus* | Long neck croaker | Okpo | 1.0 – 16.2 | 0.34- 9.82 |
| 4. | Scieanidae | *Pseudotolithius elongates* | Bobo croaker | Broke marry | 1.7 – 44.2 | 0.34-2.2 |
| 5. | Scieanidae | *Pseudotolithius senegalensis* | Short neck croaker | Onna | 3.2 – 10.0 | 0.11 – 4.80 |
| 6. | Polynemidae | *Pentanemus quinquarius* | Royal threadfin | Ora | 1.7 – 18.2 | 0.28 – 1.80 |
| 7. | Polynemidae | *Galeoides decadactylus* | Shiny nose | Ora | 1.3 – 17.5 | 1.50 – 31.34 |
| 8. | Polynemidae | *Polydactylu squadrilifilis* | African threadfin | Ora | 1.9 – 31.4 | 2.05 – 3.50 |
| 9. | Clupeidae | *Illishaafricana* | African shad | Ebat | 1.6 – 57.0 | 3.50 - 56.07 |
| 10. | Clupeidae | *Ethmalosa fimbriata* | Bonga shad | Ebat | 1.0 – 172.5 | 3.55 – 30.50 |
| 11. | Ariidae | *Arius latisculatuIs* | Catfish |  | 1.5 – 46.1 | 0.21 – 43.11 |
| 12. | Carangidae | *Caranx carangus* | Color jack fish | Nnkukang | 1.3 – 20.5 | 11.0 – 25.33 |
| 13. | Carrangidae | *Caranx hippos* | Crevalle jack fish | Nkikang | 2.1 – 13.5 | 3.05 – 7.90 |
| 14. | Lutjanidae | *Lutjanus dentatus* | Red snapper |  | 2.5 – 18.5 | 10.50 – 17.50 |
| 15. | Lutjanidae | *Lutjanus goreensis* | Gorean Snapper |  | 2.0 – 8.8 | 5.20 – 8.16 |
| 16. | Pomadasyidae | *Pomadasys jubelini* | Grunters |  | 1.9 – 13.9 | 2.0 – 5.50 |
| 17. | Pomadasyidae | *Pomadasys peroteti* | Pigsnout grunt |  | 1.5 – 13.5 | 0.70 – 10.05 |
| 18. | Sphyraenidae | *Sphyraena sphyraena* | Barracuda |  | 1.1 – 28.6 | 4.50 – 56.50 |
| 19. | Sphyraenidae | *Sphyraena guachancho* | Senects |  | 2.0 – 25.8 | 0.35 – 15.8 |
| 20. | Tetraodontidae | *Lagocephalus laevigatus* | Smooth puffer |  | 1.5 – 12.7 | 18 – 2.70 |
| 21. | Tetraodontidae | *Sphoeroides senegalensis* | Blunthead puffer |  | 1– 10.52 | 1.5 – 15.5 |
| 22. | Serranidae | *Epinephelus aneus* | Grouper (white) |  | 1.6 – 17.0 | 4.50 – 7.50 |
| 23. | Dasyatidae | *Dasyastis margarita* | Sting Ray | Cover pot | 1.5 – 15.8 | 3.20 – 3.50 |
| 24. | Cynoglossidae | *Cynoglossus senegaslensis* | Tongue sole |  | 1.5 – 15.8 | 1.50 – 7.20 |
| 25. | Portunidae | *Callinectus amnicola* | Blue crab | Isob | 2cl – 10cl | 1.20 – 1.70 |
| 26. | Penaeidae | *Parapenaeopsis atlantica* | Guinea shrimp | Obu | 0.5mm – 125mm | 0.5 – 100g |

**Source: *Field Survey, 2017.***

**Table II:** Number of mature and juvenile (bycatch) species caught per landings that was used in T-test analysis (N=20; SS=Statistically Significant; NS=Not Statistically Significant; ES= Extremely Statistically)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Month** | Monthly Species | Juvenile A | Matured B | Total A + B | Difference A - B | P-value | T-value | Degree of Freedom Df. | Error | Remark |
| 1. | 8/4/16 | 7 | 25 | 9 | 34 | 16 | 0.0428 | 2.5621 | 6 | 0.892 | SS |
| 2. | 22/4/16 | 6 | 29 | 5 | 34 | 24 | 0.0288 | 3.0382 | 5 | 1.317 | SS |
| 3. | 12/5/16 | 10 | 58 | 12 | 70 | 46 | 0.0025 | 4.1533 | 9 | 1.108 | SS |
| 4. | 20/5/16 | 8 | 51 | 7 | 58 | 44 | 0.0004 | 6.2048 | 7 | 0.886 | SS |
| 5. | 10/6/16 | 7 | 29 | 20 | 49 | 9 | 0.4354 | 0.8356 | 6 | 1.539 | NS |
| 6. | 24/6/16 | 6 | 24 | 11 | 35 | 13 | 0.1946 | 1.4971 | 5 | 1.447 | NS |
| 7. | 8/7/16 | 10 | 52 | 15 | 67 | 37 | 0.0726 | 2.0330 | 9 | 1.820 | NS |
| 8. | 22/7/16 | 8 | 55 | 11 | 66 | 44 | 0.0089 | 3.5824 | 7 | 1.535 | SS |
| 9. | 12/8/16 | 9 | 78 | 30 | 108 | 48 | 0.1114 | 1.7889 | 8 | 2.981 | NS |
| 10. | 26/8/16 | 9 | 62 | 9 | 71 | 53 | 0.0074 | 3.5611 | 8 | 1.654 | SS |
| 11. | 9/9/16 | 8 | 86 | 14 | 100 | 72 | 0.0048 | 4.0540 | 7 | 2.220 | SS |
| 12. | 23/9/16 | 8 | 58 | 7 | 65 | 51 | 0.0355 | 4.6364 | 7 | 1.375 | SS |
| 13. | 4/10/16 | 9 | 87 | 37 | 124 | 50 | 0.0279 | 2.5262 | 8 | 2.199 | SS |
| 14. | 28/10/16 | 9 | 98 | 41 | 139 | 57 | 0.0281 | 2.6803 | 8 | 2.363 | SS |
| 15. | 11/11/16 | 12 | 165 | 74 | 239 | 91 | 0.0153 | 2.5268 | 11 | 3.001 | SS |
| 16. | 25/11/16 | 12 | 181 | 79 | 260 | 102 | 0.0001 | 2.8686 | 11 | 2.963 | SS |
| 17. | 9/12/16 | 16 | 272 | 99 | 372 | 174 | 0.0001 | 5.3606 | 15 | 2.029 | ES |
| 18. | 23/12/16 | 16 | 293 | 110 | 403 | 183 | 0.0001 | 5.7611 | 15 | 1.985 | ES |
| 19. | 6/1/17 | 23 | 404 | 160 | 564 | 244 | 0.0001 | 6.7743 | 22 | 1.502 | ES |
| 20. | 20/1/17 | 23 | 405 | 154 | 559 | 251 | 0.0001 | 7.6125 | 22 | 1.405 | ES |
|  **Total** | **216** | **2513** | **904** | **3417** | **1609** | **0.0001** | **15.1856** | **215** | **0.494** | **ES** |

**Source: *Field Survey, 2017.***

**Table III:** Number of target (matured) catch and juvenile (bycatches) of twenty-six (26) species caught by nearshore beach seine that was used in percentage and ratio comparison. (Matured versus Juveniles) (N=20).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S/N | Species | Total No. of Juvenile (A) | Total No. of Mature (B) | Total No. of individual sp.­ (A + B) = C | Percentage % | Ratio (A:B) |
| 1. | *Mugil cephalus* | 144 | 40 | 184 | 5.38 | 3:1 |
| 2. | *Mugil falcipinus* | 59 | 14 | 73 | 2.14 | 4:1 |
| 3. | *Pseudotolithiu stypus* | 117 | 58 | 175 | 5.12 | 2:1 |
| 4. | *Pseudotolithius elongatus* | 253 | 91 | 344 | 10.07 | 2:1 |
| 5. | *Pseudotolithius senegalensis* | 36 | 18 | 54 | 1.58 | 2:1 |
| 6. | *Pentanemus quinquarius* | 37 | 12 | 49 | 1.43 | 3:1 |
| 7. | *Galeoides decadactylus* | 198 | 61 | 259 | 7.58 | 3:1 |
| 8. | *Polydactylus quadrilfilis* | 65 | 16 | 81 | 2.37 | 4:1 |
| 9. | *Illisha africana* | 99 | 25 | 124 | 3.63 | 3:1 |
| 10. | *Ethmalosa fimbriata* | 268 | 56 | 324 | 9.48 | 4:1 |
| 11. | *Arius latiscutatus* | 155 | 50 | 205 | 5.99 | 3:1 |
| 12. | *Caranx carangus* | 247 | 53 | 300 | 8.78 | 4:1 |
| 13. | *Caranx hippos* | 134 | 28 | 162 | 4.74 | 4:1 |
| 14. | *Lutjanus dentatus* | 111 | 23 | 134 | 3.92 | 4:1 |
| 15. | *Lutjanus goreensis* | 18 | 5 | 23 | 0.67 | 3:1 |
| 16. | *Pomadasys jubelini* | 68 | 21 | 89 | 2.61 | 3:1 |
| 17. | *Pomadasys peroteti* | 40 | 14 | 54 | 1.58 | 2:1 |
| 18. | *Sphyraena sphyraena* | 100 | 25 | 125 | 3.66 | 4:1 |
| 19. | *Sphyraena guachancho* | 55 | 12 | 67 | 1.96 | 3:1 |
| 20. | *Lagocephalu slaevigatus* | 47 | 18 | 65 | 1.90 | 2:1 |
| 21. | *Sphoeroides senegalensis* | 33 | 9 | 42 | 1.23 | 3:1 |
| 22. | *Epinephelu saneus* | 105 | 25 | 130 | 3.80 | 4:1 |
| 23. | *Dasyatis margarita* | 24 | 29 | 53 | 1.55 | 1:1 |
| 24. | *Cynoglossus senegalensis* | 7 | 34 | 41 | 1.19 | 1:4 |
| 25. | *Callinectu samnicola* | 63 | 162 | 225 | 6.58 | 1:2 |
| 26. | *Parapenaeopsi satlantica* | 30 | 5 | 35 | 1.02 | 6:1 |
|  | **Total** | **2513** | **904** | **3417** | **100.00** | **-** |
|  | Means | 96.65 | 34.76 | 131.42 | - | - |

**Source: *Field Survey, 2017.***

**Table IV:** Different between target matured catch and juvenile bycatches of each species caught by nearshore beach seine that was used in T-test paired composition (N=20).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Species  | Total of No. of Juvenile (A) | Total No. of Mature (B) | Difference A- B = D | (A – B)2 | Calculated T-test values | Level of significant (0.05)  | Inference  |
| 1. | *Mugilcephalus* | 144 | 40 | 104 | 10816 | 4.36 | 2.060 | SS |
| 2. | *Mugil falcipinus* | 59 | 14 | 45 | 2025 | 4.19 |  | SS |
| 3. | *Pseudotolithiu stypus* | 117 | 58 | 59 | 3481 | 4.35 |  | SS |
| 4. | *Pseudololithius elongatus* | 253 | 91 | 162 | 26244 | 4.35 |  | SS |
| 5. | *Pseudotolithius senegalensis* | 36 | 18 | 18 | 324 | 4.35 |  | SS |
| 6. | *Pentanemus quinquarius* | 37 | 12 | 25 | 625 | 3.14 |  | SS |
| 7. | *Galeoides decadactylus* | 198 | 61 | 137 | 18769 | 4.36 |  | SS |
| 8. | *Polydactylus quadrilifilis* | 65 | 16 | 49 | 2401 | 4.36 |  | SS |
| 9. | *Illisha africana* | 99 | 25 | 74 | 5476 | 4.36 |  | SS |
| 10. | *Ethmalosa fimbriata* | 268 | 56 | 212 | 44944 | 4.36 |  | SS |
| 11. | *Arius latiscutatus* | 155 | 50 | 105 | 11025 | 4.36 |  | SS |
| 12. | *Caranx carangus* | 247 | 53 | 194 | 37636 | 4.36 |  | SS |
| 13. | *Caranx hippos* | 134 | 28 | 106 | 11236 | 4.36 |  | SS |
| 14. | *Lutjanus dentatus* | 111 | 23 | 88 | 7744 | 4.25 |  | SS |
| 15. | *Lutjanus goreensis* | 18 | 5 | 13 | 169 | 4.36 |  | SS |
| 16. | *Pomodasys jubelini* | 68 | 21 | 47 | 2209 | 4.36 |  | SS |
| 17. | *Pomadasys peroteti* | 40 | 14 | 26 | 676 | 4.36 |  | SS |
| 18. | *Sphyraena sphyraena* | 100 | 25 | 75 | 5625 | 4.36 |  | SS |
| 19. | *Sphyraena guachancho* | 55 | 12 | 39 | 1521 | 4.36 |  | SS |
| 20. | *Lagocephalus laevigatus* | 47 | 18 | 29 | 841 | 4.36 |  | SS |
| 21. | *Sphoeroides senegalensis* | 33 | 9 | 24 | 576 | 4.36 |  | SS |
| 22. | *Epinephelus aneus* | 105 | 25 | 80 | 6400 | 4.35 |  | SS |
| 23. | *Dasyatis margarita* | 24 | 29 | -5 | 25 | -4.35 |  | NS |
| 24. | *Cynoglossus senegalensis* | 7 | 34 | -27 | 729 | -4.36 |  | NS |
| 25. | *Callinectus amnicola* | 63 | 162 | -99 | 9801 | -4.36 |  | NS |
| 26. | *Parapenaeopsis atlantica* | 30 | 5 | 25 | 625 | 4.36 |  | SS |
| **Total** |  | **2513** | **904** | **1609** | **2588881** | **5.0** | **2.060** | **ES** |

**Source: *Field Survey, 2017.***

**Table V: Distribution Of Fisher-Folk Respondents**

|  | **Age**  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **Age Range (Year)** | **Frequency** | **Percentage (%)** | **Mean (**$X$**)** | **Sd** |
| 1. | 15-25 | 10 | 33 |  |  |
| 2. | 26-36 | 18 | 60 |  |  |
| 3. | 37-47 | 2 | 7 |  |  |
|  | Total | 30 | 100.0 | 28.73 |  |
|  | Sex |  |  |  |  |
| 1. | Male | 22 | 73.3 |  |  |
| 2. | Female | 8 | 26.7 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Marital Status |  |  |  |  |
| 1. | Single | 8 | 26.7 |  |  |
| 2. | Married | 22 | 73.3 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Religion |  |  |  |  |
| 1. | Christian | 28 | 93.3 |  |  |
| 2. | Islam | 2 | 6.7 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Level Of Education |  |  |  |  |
| 1. | Primary  | 2 | 6.7 |  |  |
| 2. | Secondary | 15 | 50.0 |  |  |
| 3. | Ond/Nce | 5 | 16.7 |  |  |
| 4. | B.Sc/HND | 6 | 20.0 |  |  |
| 5. | Msc | 2 | 6.7 |  |  |
|  | Total | 30 | 100.0 | 13.1 | 2.76 |
|  | Family Type |  |  |  |  |
| 1. | Nuclear  | 24 | 80.0 |  |  |
| 2. | Extended | 6 | 20.0 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Experience In Fishing |  |  |  |  |
| 1. | 1-5 | 13 | 43.3 |  |  |
| 2. | 6-10 | 14 | 46.67 |  |  |
| 3. | 11-15 | 1 | 3.33 |  |  |
| 4. | 16-20 | 2 | 6.67 |  |  |
|  | Total | 30 | 100.0 | 7.33 | 3.72 |
|  | Secondary Occupation |  |  |  |  |
| 1. | Trading | 10 | 33.3 |  |  |
| 2. | Faming | 7 | 23.3 |  |  |
| 3. | Boat Building | 2 | 6.7 |  |  |
| 4. | Crafts  | 6 | 20.0 |  |  |
| 5. | Others | 5 | 16.7 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Best Fishing Season |  |  |  |  |
| 1. | Wet Season | 0 | 0 |  |  |
| 2. | Dry Season | 30 | 100.0 |  |  |
|  |  Fishing Operation Per Day |  |  |  |  |
| 1. | 1 | 2 | 6.7 |  |  |
| 2. | 2 | 27 | 90.0 |  |  |
| 3. | 3 | 1 | 3.3 |  |  |
|  | Total | 30 | 100.0 | 1.96 |  |
|  | Membership Of Cooperative |  |  |  |  |
| 1. | Yes  | 11 | 36.7 |  |  |
| 2. | No | 8 | 26.7 |  |  |
| 3. | About To Join | 11 | 36.7 |  |  |
|  | Total | 30 | 100.0 |  |  |
|  | Income Range (~~N~~: K) |  |  |  |  |
| 1. | 20,000-25,000 | 10 | 33.3 |  |  |
| 2. | 26,000-31,000 | 10 | 33.3 |  |  |
| 3. | 32,000-37,000 | 4 | 13.3 |  |  |
| 4. | 44,000-49,000 | 4 | 13.3 |  |  |
| 5. | 68,000-73,000 | 1 | 3.3 |  |  |
| 6. | 98,000-103,000 | 1 | 3.3 |  |  |
|  | Total | 30 | 100.0 | 33,333 | 15,799 |

*Source: Field Survey, 2017*

**Table VII: Beach-Seine Operation Impact on Marine Environment, Aquatic Resources and Habitat**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Effects** | **Mean (X)** | **Rank** | **Remark** |
| 1. | Changes and depletion in fish population (increase CPUE) | 3.00 | 1 | Maximum |
| 2. | Distortion in ecosystem food chain (trophic level) | 2.80 | 4 | Maximum |
| 3. | Out migration of the fisher folks | 2.87 | 3 | Maximum |
| 4. | Disruption of other fisheries activities  | 2.47 | 6 | Maximum |
| 5. | Reduction of sustainable fishery (irresponsible fishery) | 2.27 | 10 | Minimum |
| 6. | Migration of fish species to other location | 2.60 | 5 | Minimum |
| 7. | Marine species extinction strip mining (overfishing) | 2.20 | 11 | Minimum |
| 8. | Ecosystem simplification (evolutionary success/future recruit failure) | 1.83 | 12 | Minimum |
| 9. | Biodiversity loss/mortality of vulnerable marine non-fish species | 2.43 | 7 | Minimum |
| 10. | Description in downstream fishery activities (resource utilization, processing/marketing) | 2.37 | 8 | Minimum |
| 11. | Reduction in other socio-economic activities (urbanization & industrialization) | 2.87 | 3 | Maximum |
| 12 | Beach/shores strewn with discards (Environmental Health Impact Assessment (HIA). | 2.33 | 9 | Minimum |

***Source: Field Survey, 2017.***

**Table VIII: Cost Structure Of Beach-Seine Bycatch Operations In Marine Environment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Minimum**  | **Maximum**  | **Mean (X)** | **S. D** |  |
|  | N: K | N: K | N: K |  |  |
| Fuel | 2500 | 6000 | 3860:00 | 1407.5 |  |
| Feeding | 1000 | 25000 | 2685:17 | 4240.9 |  |
| Miscellaneous  | 500 | 3000 | 1325:93 | 483.2 |  |
| **Total** | **4000** | **34,000** | **7871:10** | **5073.45** |  |
| Boat (5 years) | 250,000 | 450,000 | 310,000.00 | 50854.76 |  |
| Gear (2 years) | 150,000 | 350,000 | 227,083.30 | 41479.46 |  |
| Engine (10 years) | 100,000 | 450,000 | 318,960.00 | 64082.86 |  |
| **Total** | **500,000** | **1,250,000** | **856,043.30** | **109644.9** |  |
| Fish | 30 | 150 | - | - |  |
| Quantity | 15 | 50 | 26.03 | 11.14012 |  |
| Price | 5000 | 50,000 | - | - |  |
| **Total** | **5045** | **50,200** | **-** | **-** |  |

**Figure VII**: Distribution of fisher folks respondents by age

**Figure VIII**: Distribution of fisher folks respondents by sex

**Figure IX**: Distribution of fisher folks respondents by marital

**Figure X**: Distribution of fisher folks respondents by religion

Status

**Figure XI**: Distribution of fisher folks respondents by education

**Figure XII**: Distribution of fisher folks respondents by family type

**Figure XIII**: Distribution of fisher folks respondents by experience in fishing

**Figure XIV**: Distribution of fisher folks respondents by secondary occupation

**Figure XV**: Distribution of fisher folks respondents by number of operation

**Figure XVI**: Distribution of fisher folks respondents by membership of cooperative

**Figure XVII**: Distribution of fisher folks respondents by income range

**Discussion**

The depth of the beach seine 1.3 to 1.5 fatton is used, because it does not reach the mud bottom. The aim is to keep the head line on the bottom and the float line at the same time remaining at the surface while the net is pulled to shore (FAO, 2014). Shahjahan (2000) studied on the economic condition of fishermen of the Jamune River in terms of religion, family size and composition, education status and income, which this study showed consistency of such parameters. As an economic indicator that reflects how well an enterprise operate, in terms of gross revenue to produce a certain profit or net surplus; the Return on investment (ROI) of fifty-three percent (53%) for beach-seining operation needed to be improved upon.

**Conclusion/Recommendations**

Understanding the social characteristics and attitudes of fishes are necessary for a complete fishery-environmental assessment. However, using this non-biological information together with biological warning can be effective instrument in preventing bycatch. Finally, Economic of financial data need to be collected on a regular basis over periods of time to cover the entire fishing seasons. This would assist policy-makers and operators to better understand the socio-economic impacts of fishing operation and particular, beach-seines.

Therefore, I recommend below:

* The use of fisher’s ecological knowledge in resource management and opportunities for value addition and post-harvest improvements.
* Government and NGOs involvement in micro financing support and micro enterprising development.
* The use of socio-economic indicators for the monitoring of the impact of management measures on the livelihoods of the fishing community.

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