# EXPERIMENTAL FISHING IN HIRAKUD RESERVOIR, ORISSA (1965-67)

P. SULOCHANAN*, V. C. GEORGE & R. M. NAIDU
*Central Institute of Fisheries Technology Sub-Station, Burla, Orissa.*

The comparative efficiencies of simple gill net, vertical line net and framed net in exploiting the fishery of Hirakud Reservoir in Orissa were studied. Though comparatively costlier to fabricate, the framed net gave better results than the other two.

## INTRODUCTION

Consequent on the increased importance envisaged in the successive five year plans, numerous river valley reservoirs have been formed. In addition to irrigation, power generation and flood control, these lacustrine water spreads sustain a rich fishery potential, which, if judiciously exploited could substantially contribute to an enhanced production of this much needed animal protien. Hirakud Reservoir, formed across the Mahanadi in Orissa State, has possibly the largest water spread of 74,592 hectares (288 square miles) with a shore line of 643.6 kilometres (400 miles) at the maximum water level of 192.15m (630′) from the mean sea level. Job and his collaborators (1955) have described in detail the Icthyofauna of the reservoir. The annual fish landings of the reservoir for the last five years are tabulated in Table I.

TABLE I

| Year | Weight in Kgs. |
|---|---|
| 1961–62 | 51,926 |
| 1962–63 | 32,400 |
| 1963–64 | 14,401 |
| 1964–65 | 15,092 |
| 1965–66 | 12,378 |

The presence of numerous underwater obstructions limits the use of active gear like the trawls, seines and drifting nets in the exploitation of the reservoir, while passive gear like the set gill nets are apparently the only types suitable. The Sub-Station of the Central Institute of Fisheries Technology at Burla, Orissa from its inception had been conducting systematic investigations on the utility of different designs of gill nets and the results of these experimental studies are incorporated in the present communication.

* Present address: Central Institute of Fisheries Technology, Cochin-5

## Gear and Method of Operation

The different types of gill nets used for the investigations were, Simple gill net, Vertical line net and Framed net. The design details of these types of nets along with diagramatic sketehes are given in Table II a, b, c and Text Fig. 1 a, b and c respectively. The nets were operated as surface set nets in various regions of the reservoir. Text Fig. 2 gives a plan of the reservoir along with the places where experimental fishing was conducted. Two to six shots in each of the different types of nets were operated in the reservoir, arranging the gear in such a way as to alternate one type with the other and to give equal chances to the different types. This alternating arrangement of the gear was maintained unless otherwise disturbed due to damages caused to a particular net by submerged objects in the reservoir.

The fish landed by the different nets were recorded seperately. Spatial distribution of fish caught in the nets, the number of meshes disabled by gilling or entangling and the morphometric data such as length, weight and girth of the different species of fishes were also noted.

## Results

The total area of nets operated during different months and the catches for the years 1965-66 and 1966-67 are given in Table III. The catches per unit area of 1,000 square metres of the Simple gill net, the Vertical line net and the Framed net during each month for the two year period are given in Table IV. The proportionate increase of catch observed for the three types of nets during different months are given in Table V. The vertical distribution of the two major species of fishes in the reservoir is reccorded in Table VI. The size compositions of *S. silondia* and *C. catla* captured by three types of nets and each net separately are given in Table VII. The length frequency curves of *S. silondia* captured by the three nets together and each net separately are shown in Text Fig. 3. The numbers of *silondia* caught by gilling and entangling from June, 1966 to March, 1967 are given in Table VIII and the meshes disabled in each case are indicated in Table IX.

## Disscussion

### *Selection of twine and mesh size*

The mesh sizes adopted and the twines selected for the gill nets in vogue are given in Table X. It would be apparent from the Table that the selection of the size of twine is not based on any scientific data but rather following age old practices or the rule of thumb method. Baranov (1960) has suggested the following relationship for cotton nets.

| Twine dia. in mm. | Mesh bar in mm. | Catch |
|---|---|---|
| 0.50 | 45 | 300 |
| 0.75 | 45 | 100 |

In the experimental nets tried during the present investigations the twine size selected was Nylon 210 D/2/3 having an average diameter of 0.453 mm and the mesh size 75 mm bar. The reduction of the thickness of the twine makes the net less visible as well as facilitates easy entangling of fish.

### *Spatial distribution of fish in the nets and determination of optimum fishing height of the net*

The spatial distribution of fish in the gill nets helps in the rational design of the gear particularly to determine the appropriate fishing height. The vertical distribution of fishes caught in the experimental gill nets operated in the Hirakud Reseavoir (Table VI) shows that the fishes are distributed almost uniformly in the entire height of the net and a fishing height of six metres may, therefore, be considered as desirable for the gear.

*Catch efficiency of the nets & the mechanism of capture*

Based on catch per unit area, Balasubramanyan *et. al.* (1960) have compared the efficiency of cotton nets with that of Nylon. The efficiencies of the three different nets were determined following the same method. Tables IV and V would show that the increase in catch of fish is more for the Framed nets when compared with those of the nets with vertical lines and the simple nets.

In fourteen out of nineteen months increase in catch is indicated in the case of Framed nets and the rate of inerease observed is tangible for cleven months, that is, June, September and November, 1965 and January through Juue, October and November, 1966. During these months, the proportionate increase in landings of thc Framed nets over the conventional simple gill net ranged from 1.4 times to 4.76.

The proportionate catch of the Framed net in comparison with that of the Vertical line net also showed similar increase.

The catching efficiency of the Vertical line net is also observed to be better than that of the Simple gill net. But in most cases the rate of increase in catch is not substantial and in eleven out of nineteen months the efficiency index of the Vertical line net was only on a par with that of the Simple gill net or even less.

From the foregoing it would be abundantly clear that the Framed net Is more effective than the simple gill net and the Vertical line net for the exploitation of Hirakud Reservoir Fishery.

Von Brandt (1964) has recorded that for relatively large fishes, mechanism of capture is more of entangling than of gilling. It would be clear from Table VIII that 23% of the fishes were captured by gilling, while 77% were by entangling. As such Framed nets having the maximum slackness of webbing (Vertical co-efficient 0.50) are more efficient in comparison with nets with vertical lines of lesser slackness (Vertical co-efficient 0.70) and the conventional Simple gill net having the minimum slackness (Vertical co-efficient 0.86). Slackness of webbing also reduces the reflection of swell (von Brandt, 1964) and thus enhances the efficiency of the net.

It may be stated that by gilling it is meant, the capture of fish by enmeshing in a single mesh, while entangling means, gilling and subsequent entangling or entangling alone, i e; rolling the various parts of the body or the entire body itself in the net during the struggle to escape. During the process of entangling, therefore, a number of meshes are disabled and are deprived of the gilling capacity in that particular operation. In the case of *S. silondia* about 60% of the entangled fishes disabled 10 to 80 meshes (Table IX). Even though this is an overall picture for the three types of nets, the number of meshes disabled is reduced by the interference of the Framing lines in the case of Framed nets and Vertical lines in the case of Vertical line nets. This factor also enhances the catching efficiency of the Framed and Vertical line nets as the fishes caught in these nets leave the adjoining compartments of the net in a better condition to catch fish subsequently.

In a simple gill net of 50 × 6 metres dimension, the total number of meshes is 31302. Of these the top, bottom, and side meshes by their very arrangements aae not able to catch fish Subtracting this number from the total meshes, there are only 29,880 meshes which can potentially catch fish. Considering that 90 meshes are required to

TABLE II a DESIGN DETAILS OF SIMPLE GILL NET

| | | |
|---|---|---|
| Name of Gear | ... | Simple Gill Net |
| Type | ... | Surface Set Net |
| *Webbing* | | |
| Material | ... | Nylon |
| Type of knot | ... | Double trawl knot |
| Twine size | ... | 210/2/3 |
| Breaking strength in kg. | ... | 7.7 |
| Mesh bar in mm. | ... | 75 |
| Upper edge | ... | 666 meshes |
| Lower edge | ... | 666 meshes |
| Depth | ... | 47 meshes |
| Horizontal co-efficient | ... | 0.50 |
| Vertical co-efficient | ... | 0.86 |
| Selvedge (upper) | ... | 666 meshes |
| -do- (lower) | ... | 666 meshes |
| -do- Depth | ... | 2 meshes at upper & Lower sides. |
| -do- Material | ... | Nylon |
| -do- Type of knot | ... | Double trawl knot |
| -do- twine size | ... | 210/4/3 |
| Breaking strength in kg | ... | 15.5 |
| Mesh bar in mm. | ... | 75 |
| *Lines and Ropes* | | |
| Material | ... | Kapron |
| Diameter of H. R. | ... | 3 mm. |
| -do- of F. R. | ... | 5 mm. |
| Breaking strength of Kapron 3 mm. dia. | ... | 171 kg |
| Breaking strength of Kapron 5 mm. dia. | ... | 342 kg |
| Length of H. R. | ... | 50 m. |
| -do- of F. R. | ... | 50 m. |
| *Floats* | | |
| Material | ... | Polythene |
| Number | ... | 6 |
| Shape | ... | Spherical |
| Diameter | ... | 15 cm. |
| *Sinkers* | | |
| Material | ... | Mild steel |
| Number | ... | 6 |
| Shape | ... | Ring of 15 cm dia. |
| Weight in air | ... | 1200 gm |

TABLE II b DESIGN DETAILS OF VERTICAL LINE NET

| | | |
|---|---|---|
| Name of gear | ... | Vertical Line Net |
| Type | ... | Surface Set Net |
| *Webbing* | | |
| Material | ... | Nylon |
| Type of knot | ... | Double trawl knot |
| Twine size | ... | 210/2/3 |
| Breaking strength in kg | ... | 7.7 |
| Mesh bar in mm. | ... | 75 |
| Upper edge | ... | 666 meshes |
| Lower edge | ... | 666 meshes |
| Depth | ... | 57 meshes |
| Horizontal co-efficient | ... | 0.5 |
| Vertical co-efficient | ... | 0.7 |
| Selvedge (upper) | ... | 666 meshes |
| -do- (lower) | ... | 666 meshes |
| -do- (depth) | ... | 2 meshes upper and lower sides |
| -do- (material) | ... | Nylon |
| -do- Type of knot | ... | Double trawl knot |
| -do- Twine size | ... | 210/4/3 |
| Breaking strength in kg | ... | 15.5 |
| Mesh bar in mm. | ... | 75 |
| *Lines* | | |
| Material | ... | Nylon |
| Twine size | ... | 210/15/3 |
| Breaking strength in kg | ... | 57 |
| Distance between two lines | ... | 1 m. |
| Length of each line | ... | 6 m. |
| No. of Vertical lines | ... | 51 |
| *Ropes* | | |
| Material | ... | Kapron |
| Diameter of H. R. | ... | 3 mm. |
| -do- of F. R. | ... | 5 mm |
| Breaking strength of Kapron 3 mm. dia. | ... | 171 kg |
| Breaking strength og Kapron 5 mm. dia. | ... | 342 kg |
| Length of H. R. | ... | 50 m. |
| -do- of F. R. | ... | 50 m. |
| *Floats* | | |
| Material | ... | Polythene / Alkathene |
| Number | ... | 8 |
| Shape | ... | Spherical |
| Diameter | ... | 15 cms. |
| *Sinkers* | | |
| Material | ... | Mild steel |
| Number | ... | 8 |
| Shape | ... | Ring of 15 cm dia. |
| Weight in air | ... | 1600 gm. |

TABLE II C DESIGN DETAILS OF FRAMED NETS

| | | |
|---|---|---|
| Name of gear | ... | Framed Nets |
| Type | ... | Surface Set Net |

*Webbing*

| | | |
|---|---|---|
| Material | ... | Nylon |
| Type of knot | ... | Double trawl knot |
| Twine size | ... | 210/2/3 |
| Breaking strength in kg | ... | 7.7 |
| Mesh bar in mm. | ... | 78 |
| Upper edge | ... | 666 meshes |
| Lower edge | ... | 666 meshes |
| Depth | ... | 80 meshes |
| Horizontal co-efficient | ... | 0.5 |
| Vertical co-efficient | ... | 0.5 |
| Selvedge (upper) | ... | 666 meshes |
| -do- (lower) | ... | 666 meshes |
| -do- (depth) | ... | 2 meshes at upper & lower sides |
| -do- Material | ... | Nylon |
| Type of knot | ... | Double trawl knot |
| Twine size | ... | 210/4/3 |
| Breaking strength in kgs. | ... | 15.5 |
| Mesh bar in mm. | ... | 75 |

*Lines*

| | | |
|---|---|---|
| Material | ... | Garware Nylon |
| Twine size | ... | 210/15/3 |
| Breaking strength in kgs. | ... | 57 |
| Distance between two vertical lines | ... | 1 m. |
| Length of each vertical line | ... | 6 m. |
| No. of vertical lines | ... | 51 |
| Distance between two horizontal lines | ... | 1 m |
| Length of each horizontal line | ... | 50 m. |
| No. of horizontal lines | ... | 5 |

*Ropes*

| | | |
|---|---|---|
| Material | ... | Kapron |
| Diameter of H. R. | ... | 3 mm. |
| -do- of F. R. | ... | 5 mm. |
| Breaking strength of Kapron 3 mm. dia. | ... | 171 kg |
| Breaking strength of Kapron 5 mm. dia. | ... | 342 kg |
| Length of H. R. | ... | 50 m. |
| -do- of F. R. | ... | 50 m. |

*Floats*

| | | |
|---|---|---|
| Material | ... | Polythene / Alkathene |
| Number | ... | 10 |
| Shape | ... | Spherical |
| Diameter | ... | 15 cm |

*Sinkers*

| | | |
|---|---|---|
| Material | ... | Mild steel |
| Number | ... | 10 |
| Shape | ... | Ring of 15 cm dia. |
| Weight in air | ... | 2000 gm |

TABLE III THE MONTHWISE AREA OF NETS OPERATED AND THE CATCH FOR THE YEARS 1965–1966 and 1966–67.

| Month | 1965–66 | | 1966–67 | |
|---|---|---|---|---|
| | Area of nets in square meters | Catch in Kilogrammes | Area of nets in square metres | Catch in Kilogrammes |
| April | 32901 | 185.02 | 94050 | 391.70 |
| May | 37431 | 94.75 | 121752 | 467.65 |
| June | 21452 | 147.85 | 85668 | 725.35 |
| July | — | — | — | — |
| August | — | — | — | — |
| September | 24514 | 55.67 | — | — |
| October | 40900 | 94.67 | 93300 | 223.01 |
| November | 88050 | 130.62 | 141860 | 216.10 |
| December | 155707 | 183.33 | 148160 | 171.90 |
| January | 105091 | 184.80 | 143251 | 134.80 |
| February | 119523 | 287.80 | 100678 | 70.95 |
| March | 117140 | 358.15 | 135126 | 267.05 |

TABLE IV CATCH IN KILOGRAMS PER 1,000 SQUARE METRES OF NET

| Month | 1965–1966 | | | 1966–1967 | | |
|---|---|---|---|---|---|---|
| | Simple Gill net | Vertical Line net | Framed net | Simple Gill net | Vertical Line net | Framed net |
| April | 7.120 | 7.170 | 4.910 | 3.370 | 3.760 | 5.420 |
| May | 2.400 | 2.700 | 1.780 | 2.150 | 3.020 | 7.870 |
| June | 4.000 | 6.000 | 7.500 | 6.410 | 9.810 | 13.730 |
| July | — | — | — | — | — | — |
| August | — | — | — | — | — | — |
| September | 1.000 | 3.000 | 2.600 | — | — | — |
| October | 2.970 | 1.790 | 2.680 | 1.031 | 1.080 | 1.860 |
| November | 0.713 | 1.402 | 2.523 | 0.916 | 2.178 | 1.307 |
| December | 2.670 | 1.290 | 2.990 | 1.253 | 0.666 | 1.333 |
| January | 0.850 | 2.240 | 2.570 | 1.135 | 1.403 | 0.408 |
| February | 1.050 | 2.720 | 5.000 | 0.863 | 0.570 | 0.263 |
| March | 2.470 | 2.480 | 5.630 | 2.067 | 1.875 | 2.398 |

TABLE V PROPORTIONATE INCREASE IN CATCH OF FRAMED NETS AND VERTICAL LINE NETS DURING DIFFERENT MONTHS

| Month | Increase in catch of Vertical line net to that of Simple gill net | Increase in catch of Framed net to that of Simple gill net | Increase in catch of Framed net to that of Vertical line net |
|---|---|---|---|
| April, 1965 | 1.00 times | 0.69 times | 0.69 times |
| May, ,, | 1.13 ,, | 0.74 ,, | 0.66 ,, |
| June, ,, | 1.50 ,, | 1.88 ,, | 1.25 ,, |
| July, ,, | — | — | — |
| August ,, | — | — | — |
| September, ,, | 3.00 times | 2.60 times | 0.87 times |
| October, ,, | 0.60 ,, | 0.90 ,, | 1.50 ,, |
| November, ,, | 1.97 ,, | 3.56 ,, | 1.80 ,, |
| December, ,, | 0.48 ,, | 1.12 ,, | 2.32 ,, |
| January, 1966 | 2.64 times | 2.02 times | 1.15 times |
| February, ,, | 2.59 ,, | 4.76 ,, | 1.84 ,, |
| March, ,, | 1.00 ,, | 2.28 ,, | 2.27 ,, |
| April, ,, | 1·12 ,, | 1.61 ,, | 1.44 ,, |
| May, ,, | 1.41 ,, | 3.66 ,, | 2.61 ,, |
| June, ,, | 1.53 ,, | 2.14 ,, | 1.40 ,, |
| July, ,, | — | — | — |
| August, ,, | — | — | — |
| September, ,, | — | — | — |
| October, ,, | 1.05 times | 1.80 times | 1.72 times |
| November, ,, | 2.38 ,, | 1.42 ,, | 0.60 ,, |
| December, ,, | 0.53 ,, | 1.06 ,, | 2.00 ,, |
| January, 1967 | 1.24 times | 0.36 times | 0.29 times |
| February, ,, | 0.66 ,, | 0.31 ,, | 0.46 ,, |
| March, ,, | 0.91 ,, | 1.16 ,, | 1.27 ,, |

TABLE VI VERTICAL DISTRIBUTION OF FISHES IN THE NETS

| | Depth of net from surface to bottom | | |
|---|---|---|---|
| Species of fish | 0 to 2 metres | 2 to 4 metres | 4 to 6 metres |
| *S. Silondia* | 35.40% | 40.20% | 24.40% |
| *C. Catla* | 20.60% | 44.45% | 34.92% |
| Total of all fishes | 32.00% | 40.00% | 28.00% |

TABLE VII SIZE COMPOSITION OF *S. silondia* AND *C. catla* CAPTURED BY SIMPLE GILL NET, VERTICAL LINE NET AND FRAMED NET FOR THE YEAR 1965–1966 AND 1966–1967

| Length group in cms. | *S. silondia* | | | | | | | | *C. catla* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1965–66 | | | | 1966–67 | | | | 1965–66 | | | | 1966–67 | | | |
| | T. | S. G. N. | V. L. N. | F. N. | T. | S. G. N. | V. L N. | F. N. | T. | S. G. N. | V. L. N. | F. N. | T. | S. G. N. | V. L. N. | F. N |
| 21–30 | 5 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31–40 | 9 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 41–50 | 8 | 3 | 3 | 2 | 8 | 2 | 4 | 2 | 11 | 3 | 5 | 3 | 7 | 2 | 2 | 3 |
| 51–60 | 8 | 4 | 1 | 3 | 37 | 26 | 8 | 3 | 11 | 3 | 2 | 6 | 6 | 1 | 0 | 5 |
| 61–70 | 40 | 13 | 11 | 16 | 45 | 24 | 15 | 6 | 13 | 1 | 3 | 9 | 6 | 1 | 3 | 2 |
| 71–80 | 99 | 35 | 40 | 24 | 102 | 42 | 43 | 17 | 3 | 0 | 2 | 1 | 7 | 2 | 2 | 3 |
| 81–90 | 42 | 16 | 14 | 12 | 87 | 18 | 21 | 48 | 4 | 0 | 2 | 2 | 4 | 0 | 0 | 4 |
| 91–100 | 10 | 5 | 0 | 5 | 29 | 3 | 6 | 20 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 |
| 101–110 | 0 | 0 | 0 | 0 | 11 | 1 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111–120 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 121–130 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total: | 221 | 83 | 74 | 64 | 321 | 116 | 98 | 107 | 42 | 7 | 14 | 21 | 33 | 6 | 9 | 18 |

T = Total
S. G. N. = Simple Gill Net
V. L. N. = Vertical Line Net
F. N. = Framed Net

TABLE VIII NUMBER AND PROPORTION OF GILLING AND ENTANGLING OF THE TOTAL NUMBER OF *S. silondia* OF ALL THE NETS TOGETHER AND IN EACH NET SEPARATELY FROM JUNE, 1966 TO MARCH, 1967.

| | Total number | No. of fishes gilled | % of gilling | No. of fishes entangled | % of entangling |
|---|---|---|---|---|---|
| Simple gill net | 63 | 14 | 23 | 49 | 77 |
| Vertical line net | 60 | 13 | 22 | 47 | 78 |
| Framed net | 64 | 16 | 25 | 48 | 75 |
| Grand total | 187 | 43 | | 144 | |

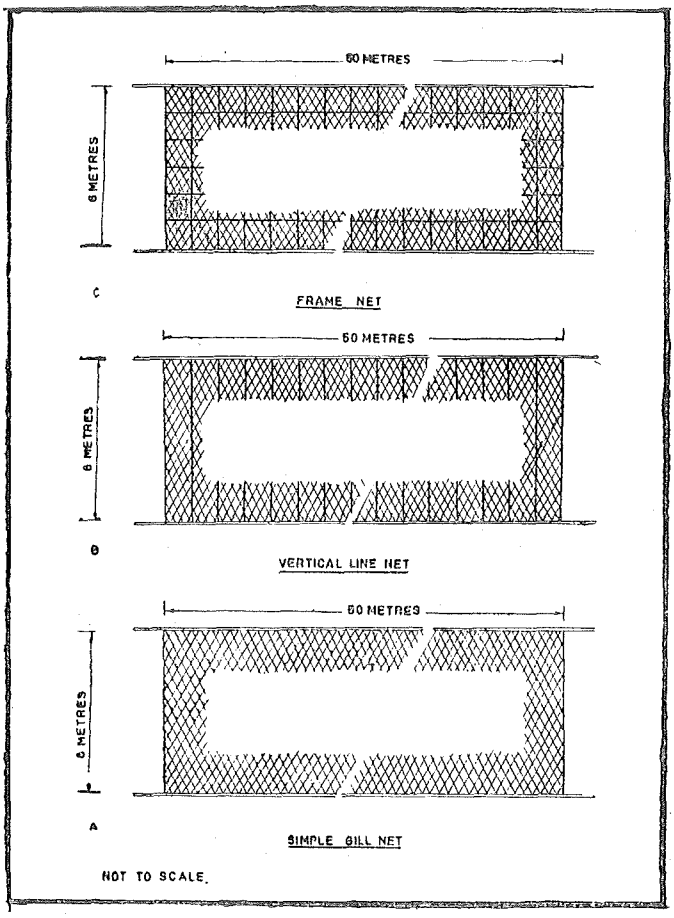


Fig. 1

TABLE IX NUMBER OF MESHES DISABLED IN DIFFERENT NETS BY *S. silondia* CAUGHT DURING JUNE 1966 TO MARCH 1967

| Type of net | Meshes disabled | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10-30 | 31-50 | 51-70 | 71-90 | 91-110 | 111-130 | 131-150 | 151-170 | 171-190 | 191-210 | 211-230 |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Simple Gill Net | 8 | 10 | 4 | 5 | 6 | 2 | 1 | 4 | 5 | 1 | 1 |
| Vertical Line Net | 8 | 10 | 8 | 6 | 5 | 1 | 1 | 0 | 3 | 0 | 3 |
| Framed Net | 12 | 5 | 8 | 3 | 4 | 0 | 1 | 5 | 2 | 1 | 0 |
| Total Number of *S. silondia* | 28 | 25 | 20 | 14 | 15 | 3 | 3 | 9 | 10 | 2 | 4 |

| Type of net | Meshes disabled | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 231-250 | 251-270 | 271-290 | 201-310 | 311-330 | 331-350 | 351-370 | 371-390 | 391-410 | 411-430 | Total |
| | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) |
| Simple Gill Net | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 |
| Vertical Line Net | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 |
| Framed Net | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 48 |
| Total Nnmber of *S. silondia* | 2 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 144 |

TABLE X DETAILS OF THE TWINE USED, MESH SIZE, FISHING HEIGHT AND FISHES CAPTURED IN THE VARIOUS INLAND RESERVOIRS

| Place | Material | | Mesh bar in mm | Fishing height of the net m | Catch |
|---|---|---|---|---|---|
| Jaisamand Lake, Rajastan | Terylene | 250/2/3 | 70 | 2.44 | *C. catla, L. rohita, S. silondia, C. mrigala* |
| Thungabhadra Dam, Mysore | Terylene | 250/2/3 | 31 | 2.15 | *B. colus, L. Calbasu, S. silondia, C. catla* |
| ,, | ,, | 250/2/3 | 52 | 5.77 | |
| ,, | ,, | 250/2/3 | 62.5 | 3.22 | |
| ,, | ,, | 250/3/3 | 104 | 5.36 | |
| ,, | ,, | 250/4/3 | 80 | 4.12 | |
| ,, | ,, | 250/5/3 | 125 | 5.37 | |
| Mellandur Tank, Mysore | Terylene | 250/3/3 | 95 | 3.80 | *C. catla* |
| Mettur Dam, Madras | Terylene | 250/2/3 | 65 | 3.91 | *C. cirrohsa, C. catla, W. attu, L. calbasu, B. colus, M. aor* |
| ,, | ,, | 250/4/3 | 130 | 3.97 | |
| Nizamsagar, Andhra Pradesh | Terylene | 250/6/3 | 50–60 | 6.00 | *T. sandkhol, B. tor, M. seenghala, C. catla, S. silondia, L. fimbriatus* |
| Hirakud Dam, Orissa | Nylon | 210/2/3 | 75 | 6.00 | *S. Silondia, C. catla, M. aor, M. seenghala, W. attu, L. rohita, C. mrigala, L. calbasu.* |

TABLE XI THE DETAILS OF THE COST OF SIMPLE GILL NET, VERTICAL LINE NET & FRAMED NET

| Details | Simple gill net | Vertical Line net | Framed net |
|---|---|---|---|
| Material for webbing in kg | 1.700 | 2.000 | 2.900 |
| Material for lines in Kg | 0.000 | 0.400 | 0.800 |
| Material for rope in Kg | 1.000 | 1.000 | 1.000 |
| Total in Kg | 2.700 | 3.400 | 4.700 |
| Cost of materials @ Rs. 38/- per Kg | 102.60 | 129.20 | 178.60 |
| No. of floats required | 6 | 8 | 10 |
| Cost in Rs. @ Rs. 0.50/ sinker | 3.00 | 4.00 | 5.00 |
| Total cost of materials in Rs. | 141.60 | 181.20 | 243.60 |
| Labour charges in Rs. for the fabrication of webbing @ Rs. 0.75 per 1000 meshes | 23.47 | 29.13 | 39.96 |
| Assembling charges in Rs. | 29.47 | 41.13 | 57.96 |
| Total cost of finished net in Rs. | 171.07 | 222.33 | 301.56 |

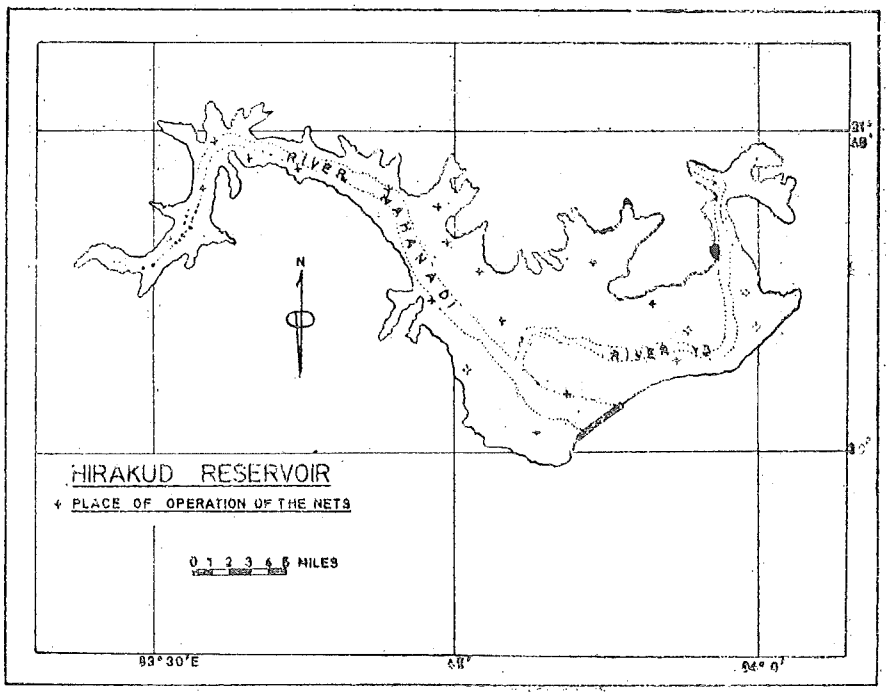


Fig. 2

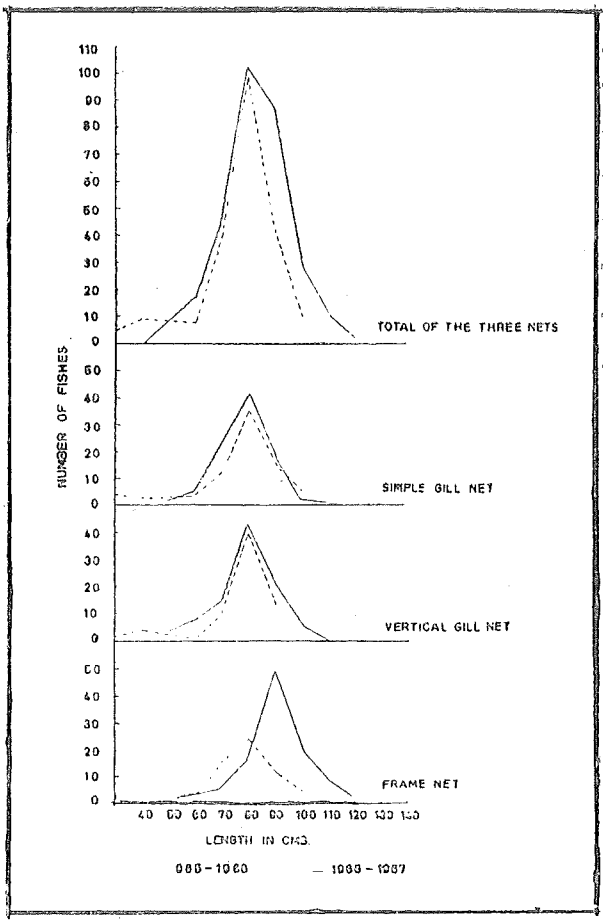


Fig. 3

capture one *Silondia*, a simple gill net can catch at best a maximum of 322 fish. Granting even the same rate of disabling of meshes for the Vertical linc net and Framed net of 50 × 6 metres the number of *Silondia* that could be captured are 374 and 498 respectively. This also further substantiates the superiority of the Framed nets over the Vertical line and Simple nets.

From graph I (Fig. 3) it would be seen that model value is 80 cms for *S. silondia* for the year 1965–66 and 1966–67 and the model value of the size group of individual nets for 1965–66 is also 80 cms while for the year 1966–67, the model value of Framed net is 90 cms. The reason for this is not clear and hence needs further investigations. The limited number of observations of *C catla* do not lead to any conclusion regarding the selectivity of nets.

The details of the cost of each net are given in Table XI. From this Table, it would be evident that a Framed net is 76.89% costlier than a Simple gill net. It may therefore be argued that Framed nets and Vertical line nets in view of their increased cost compared to Simple gill net, may not be economical. Considering the normal life of a net to be three years and for a fleet of Framed nets operating a standard length of 1,250 metres (7,500 square metres area) the net income at the end of the third year can be expected to be many times more than that of the Simple gill net.

The parameter of one square metre frames of the Framed nets was arbitrarily fixed and the optimum parameters framing of the net is yet to be ascertained. Some trials made in this respect making use of Framed nets of 2 square metre frames gave encouraging results. A substantial saving in the cost of the Framed nets can be effected as substitution of one square metre Frames with two square metre ones can reduce the requirement of framing lines as well as the cost of labour for framing to nearly 50%.


## SUMMARY

A study of the comparative efficiency of the three different types of set gill nets indicates that the Framed nets are more effective than the Veatical Line net and Simple gill net in the exploitation of the Hirakud Reservoir Fishery. The catch per Unit area of 1,000 square metres of Framed net showed substantial increase over those of the Vertical line net and the Simple gill net of the conventional type. Even though the cost of Framed net is more than that of the Vertical line net and Simple gill net, the returns are observed to be tangible. Probable line in furthering the investigations to determining the optimum parameters in framing the net are also indidated.



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