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RESERVOIR FISHING

CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
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SHORE SEINES BRINGS MORE PROFIT*

A large number of shore seines came into existence since the introduction of the same in Hirakud Reservoir. Shore seines with small mesh landed more catch compared to those having large meshes. Therefore, the former were widely used. Since the catch by the above net was mainly constituted by juveniles of all varieties, continued operation of this gear adversely affected the fishery potential of the reservoir. This state of affairs necessitated the need for fixing the optimum mesh size for shore seines (*Varghese et al. 1983*). As a consequence, shore seines of recommened mesh size could only be operated. The present communication deals with the studies on the economics of shore seine on the basis of minimum number of operation required to attain the break-even point.

Shore seines operated in different localities were identified for the above studies and the data on various economic aspects, namely, detailed dimensions of the net and its cost, daily returns, average number of fishing trips per year, cost of the boat, share of the crew and other expenditures, were collected in respect of six nets for a period of 219 days.

The life of the boat and net were taken as five years and depreciation @ 20%. Repair charges for both boat and nets were estimated as Rs. 2500/per year. The interest rate was taken as 12% per annum. A royalty of Ps. 25 for every kg of fish caught had to be paid to the respective Co-operative society of the locality. The share of the crew accounted for 50% of the total sale proceeds. The percentage profitability on total expenditure worked out on the basis of 200 days of fishing operations amounted to 23%. The percentage of profit in relation to number of fishing days is given in the Table. The break-even-point for shore seines lies between 175 to 180 days of operation per year.

It is evident from the above that shore seines can attain a profit of 23% if it could perform 200 days of fishing and that they incur loss if the fishing days are less than 175. But almost all the shore seines attained this break-even point and their profits can further be increased if they get more reasonable price for the catch.

Table 1. ECONOMICS OF SHORE SEINE OPERATIONS AT HIRAKUD RESERVOIR (ON THE BASIS OF 200 FISHING DAYS IN A YEAR)

A.	CAPITAL		
	Cost of the net	:	Rs. 12,000.00
	Cost of the Boat	:	Rs. 2,000.00
	Capital cost	:	Rs. 14,000.00
B.	FIXED COST		
	1. Bank interest on Rs. 14,000/- @ 12% per annum	:	Rs. 1,680.00
	2. Loan repayment (in 5 years) per annum	:	Rs. 2,800.00
	3. Repairs and maintenance of boat and net per annum	:	Rs. 2,500.00
	4. Depreciation @ 20% (for boat and net)	:	Rs. 2,800.00
			Rs. 9,780.00
C.	VARIABLE COST		
	(i) To Society @ Rs. 0.25 per kg. of fish caught	:	Rs. 4,000.00
	(ii) To wages to crow (50%) of the total receipt - charge to society)	:	Rs. 13,000,00
			Rs. 17,000.00
	Total cost (B+C)	:	Rs. 26,780.00
D.	Total receipt	:	Rs. 30,000.00
	Net income = D—(B+C)	:	Rs. 3,220.00
	% profit on capital	:	23%

NOTE:

Total number of fishing trips per year	= 200
Total catch @ 80 kg of fish per trip	= 16,000 kg
Total receipt @ Rs. 150 per trip	Rs. 30,000/-

*M. D. Varghese, V. C. George, H. Krishna Iyer of CIFT Cochin and Anwar Ahammed Khan of Burla Research Centre of CIFT

Workshops on Instrumentation Technology Developed in CIFT

The Central Institute of Fisheries Technology, Cochin,conducted two workshops on Instrumentation for fisheries and environmental investigations in December 1984 for teachers and researchers in the respective fields. These new instrumentation technologies were developed in CIFT.

The workshop organised at A. V. V. M. Shri Pushpam College, Poomdi, was attended by 78 participants from 21 educational Institutions of Bharathidasa University and other nearby departments.

The second workshop organised at Vellalar College, Erode, was attended by 44 participants belonging to several colleges of Bharathiar University and other organisations, namely, Salem Institute of Experimental Biology, Salem, and Centre for Environmental Research and Action, Coimbatore.

The participants consisting mainly of professors, lecturers and research workers of zoology, botany, physics and engineering faculties engaged investigations connected with environment were given lecture classes and field demonstrations of the instruments and the related newer methodologies for solving field oriented problems with indigenously developed technology. The instruments demonstrated in fields (given in the list below) had applications connected with various investigations already taken up by the participants and sponsored by various agencies, namely, Department of Science and Technology, Department of Environment, UGC etc. for aquaculture engineering, ecosystem management, environmental studies, plantation studies etc.

INSTRUMENTS DEMONSTRATED

1 Salinity - Temperature - Depth meter for *insitu* measurement of salinity temperature and depth of estuaries and sea.

2 Direct reading current meter.

3 Solar radiation monitor and integrator for indicating radition of PAR and its integration over long durations.

4 Fish Activity Recorder for studies on the response of fishes to simulated environmental conditions.

5 Barnacle cirri cunter for studies on the response of barnacles to simulated environmental conditions.

6 Water turbidity meter for *insitu* measurement of water turbidity

7 Remote sodimentation monitor for *insitu* measurement of sodiments deposited in rivers.

8 Remote operated soil moisture meter for continuous monitoring of soil moisture from several remote points in soil.

9 Remote operated electronic multichannel thermometer for monitoring of temperature of cold storages, soil, water etc. from several remote points.

10 Environmental Data Acquisition system for automatic acqisition of environmental data from remote points, namely, water temperature, water level, water current, water salinity, water turbidity, air temperature, wind, wind direction, solar raditation, relative humidity, soil temperature, soil moisture and rain need for numerous fisheries and environmental investigations.

MESOPELAGIC FISH HOLDS PROMISING FUTURE

Dr. K. Gopakumar
Scientist S-4 & SIC Processing Division, CIFT

Lantern fish (Myctophidae) is perhaps the most important family of the mesopelagic fish. Since the exploitation of common species of marine fish is almost reaching a saturation point, man has to look into still untapped resources for future exploitation. Mesopelagic fish perhaps holds the most promising future in this regard.

A fish species can be called mesopelagic, if it spends its life span in the mesopelagic zone, of the sea that is, at a depth of 200 to 1000m. They are widely distributed throughout the oceans, from Arctic to Antarctic. However, they are abundant in sub-tropical seas. But, it should be noted that the exact role of the mesopelagic fish in the marine eco-system is not yet fully understood. They are characterised by a low fecundity and thereby making them very vulnerable to reproductive failures resulting in sudden stock collapse. Some of the most promising species available at large for commercial exploitation are listed below:-

1 Myctophidae
2 Gonostomatidae
3 Bathylagidae
4 Chisamodoutidae
5 Trichiuridae
6 Nomeidae

RESOURCES IN THE INDIAN OCEAN

The Indian Ocean contains 37% of the available total resources of the estimated stock, recording the highest fish density of 8-220 (Arabian Sea West) compared to the next highest, 10-60 (N.W. Atlantic, off Newfoundland). Arbian sea holds the largest stock of the mesopelagic fish assessed so far. The estimated biomass is given below (F.A.O., 1980).

Western Indian Ocean	Stock (Tonnes × 10)
	257
Eastern Indian Ocean	94

It is reported that the estimated availability of them in this region ranges from 60 to 150 million tonnes per year.

HARVESTING

In the harvesting of the mesopelagic fish, several factors should be taken into consideration. Important factors for consideration are their schooling behaviour, diel-vertical migration and attraction to light. Based on their migration they are classified into three groups:-

1. Surface migrants
2. Mid-water migrants
3. Non-migrants

Most of the mesopelagic fish, particularly the myctophids, are

Sardines packed in retort pouches tested

There are no significant differences in fibrocity, succulence and toughness of sardines when packed in retort pouches and stored at three different temperatures,4°C, 30°C and ambient temperatures. However, investigations proved that the flavour of the samples kept at 4°C is significantly inferior to that of the other samples, says Dr. K. Gopakumar, Joint Director and Scientist S4 of CIFT. Dr. Gopakumar was on a 6-week visit to London from October 24 as part of the three year collaboration project on fish processing between CIFT and Tropical Development and Research Institute (TDRI) at Culham, U. K.

Twentyone panelists of Beverage Crops and Miscellancous Section, on the Sensory evaluation were asked to evaluate pouched sardines for organoloptic properties such as fibrocity, texture, succulence and over all acceptability. The majority of the panel members observed that the fish stored at 4°C showed development of rancid flavours.

Chemical analysis of the samples showed little difference between samples as regards proximate composition. Pouches stored at 30°C contained more fluid volume when it was measured. The solid contents were in good condition. Pouch to pouch variations due to the different composition of the fish may account for all the differences observed, says Dr. Gopakumar.

The sardines were packed in the Metal Box Research laboratory at Wantago, U. K. They are to be shipped to India for undertaking test marketing. O

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known to concentrate in the uppermost zone (10m or less) at sunset, and return to the upper pelagic zone below 200m at dawn. They love light and are usually attracted by the light of the fishing vessel. During day light, they migrate to deeper waters and hence are extremely difficult to catch.

The most widely used fishing gear for harvesting them is purse seines, generally 20 35 fathoms deep i.e. with an effective fishing depth of about 30-50m (Newman *et. al.* 1978).

Trawling is also an equally effective method for catching most species of mesopelagic fish. However, for catching at a depth of 100m at night suitable gears are yet to be designed.

PROCESSING OF MESO-PELAGIC FISH

The biochemistry of the mesopelagic fish is not fully understood. The most extensively studied species of the myctophids is the *Benthosema pterotum*. In a recent study conducted by the F.A.O.

(Frans Teutscher F. A. O. private communication 1980) almost clean catches of *B. pterolum* was obtained off the Gulf of Oman by R/v. Dr. FRIDJOF NANSEN. A sample of frozen *B. pterotum* obtained at Central Institute of Fisheries Technology has undergone extensive investigations for their amenability to processing.

It is reported (Yoshiro, H., 1979) that most of the mesopelagic fish are characterised by a high wax content in their body lipids and when eaten in quantity, these wax esters were found to produce diarrhea and seborrhea in animals. Many investigators are of the opinion that because of this wax content they cannot be utilized for direct human consumption. Lipid contents of the lantern fish species are given below:-

Table I

LIPID CONTENT AND WAX CONTENT OF LANTERN FISH

Species	lipid (% in whole fresh fresh)	wax esters (% of total lipids)	
Hyophum reinhareltic	3.34	1000	Nevenzell *et. al.* (1969)
Diaphus theta	15.80	trace	,,
Stenobrachius	15.60	90.90	,,
lancopsarns			
Triphotorus	14.50	82.20	,,
Mexicanus			
Lampanyetades	18.00	N. A.	Nachenius (1970)
Hectorius			
Benthosema	4.00	traces	Gopakumar *et. al.*
Bterotum			

It is seen from the Table 1 that lantern fish is characterised by a low fat content compared with most other members of the family of the myctophidae. The unsaponifiable matter is also about 4% which is within the limits seen in most marine species of fish. The lipids of lantern fish is also free of wax esters thus making it highly edible.

The proximate composition of lantern fish is given in Table II.

Table II

PROXIMATE COMPOSITION of B. PTEROTUM

Moisture	72.20%
Protein	16.10%
Fat	3.40%
Ash	3.30%

(Proximate composition as percentage of 100g wet tissue).

An examination of the proximate composition shows that lantern fish has the range of important basic constituents; protein, fat, moisture and ash. This clearly shows that the fish can be commercially exploited for processing, particularly for fishmeal manufacture. Considering the vast resources of this highly protein-rich fish in the Indian Ocean attempts have to be intensified for its fuller harvesting and processing.

Cultural Programmes

The CIFT Recreation club presented a cultural programme
on November 29, 1984
at CIFNET open auditorium, Cochin.

Sitar recital
by Dr. P. N. Kaul

Classical Music
by K. Mahadeva Iyer

Light Music
by A. V. Shenoy

CIFT RECREATION CLUB CELEBRATES CHILDRENS' DAY

The CIFT recreation club celebrated the Childrens' Day with various events on Nov. 14, 1984. Dr. E. G. Silas, Director of CMFRI, inaugurated the celebrations and released the house magazine, 'UPASANA'. Cine Artist Unni Mary distributed prizes.

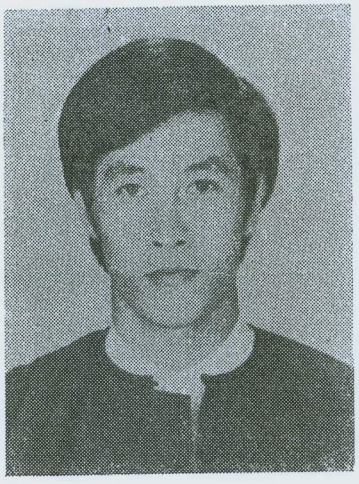
Shri M. R. Nair, Director of CIFT and patron of the club welcomed the gathering.

Dr. Silas

Unni Mary

A group song by children

FAO Fellow in CIFT



Mr. Khin Maung Win, Instructor, Fish processing & Quality control, Institute of Fisheries Technology, People's Pearl and Fisheries Corporation of Rangoon (Burma) left CIFT on Oct. 20, 1984 on completion of two-week training in quality control of seafoods. Sponsored by FAO, Mr Win spent another two week in Integrated Fisheries Project, Cochin. He was in Bankok for three months and in Penang for one month before his visit to India.

NATIONAL CONSULTATION MEET

The Department of Science and Technology, Govt. of India, organised a National Consultation Meet for formulation of an integrated study on the Deep sea Fans of the Bay of Bengal on Oct. 26 and 27, 1984 at the India International Centre, New Delhi.

Shri R. Balasubramanyan, Senior Scientist, represented the CIFT.

The discussions and advice centered round topics like geological studies, biological studies, geophysical aspects, studies on physics and chemistry, and data base and simulation studies.

CIFT SCIENTIFIC TALK

Under the programme of the Institute on 'Scientific Talks' Dr. T.K. Sivadas, Scientist-in-Charge, Electronics and Instrumentation Division, gave an illuminating talk on Instrumentation for craft and gear research-points on methology range of application and limitation on September 9, 1984.

CIFT Appointments, Promotions etc.

APPOINTMENTS

1.	Shri E. Damodaran	Supporting Staff
2.	Shri N. M. Radhakrishnan	Supporting Staff
3.	Shri A. K. Mathew	Electrician
4.	Shri P. T. Viswambaran	Electrician
5.	Shri A. Ramachandran	Scientist S-1
6.	Smt. R. Vasantha	Stenographer
7.	Shri T. V. Shankar	Scientist S-1
8.	Shri Ramadas Kurup	Instrument maker
9.	Shri P. N. Sudhakaran	Net making Supervisor
10.	Shri Tommy Rebello	Boilerman
11.	Shri M. Sankara Paniker	Carpenter
12.	Shri M. M. Prasad	Scientist S-1

TRANSFER

1.	Shri M. Ravindran	Senior clerk, Transferred to Calicut Research Centre
2.	Smt. V. S. Aleyamma	Junior Clerk, Transferred from Calicut Research Centre.

RELIEF

1. Smt. T. L. Hemaletha, Hindi Translator resigned.
2. Shri P. C. Chacko, Supporting staff resigned.

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