

Comparative Efficiencies of Mechanized Fishing Crafts introduced in India

By

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Introduction

India has a vast continental shelf of 121,000 square miles which amounts to one-tenth of the area of the entire country. Hence the marine products are as important as other foods like corn or grain. It is also a highly valuable export commodity.

Fisheries have always been a popular avocation of the people along the coastal line. With primitive tools and crude techniques, catch per man hour was low. Frequently the effort put in was unrewarding.

India started mechanization of fishing crafts in early 1950. The traditional craft were subjected to technical scrutiny and some of them were mechanized with good results. However, due to limitations inherent in traditional craft, it was found necessary to develop new series of craft suitable for the operation of modern fishing gears and in areas, hitherto unexplored. The impetus given to the development of infrastructure like freezing, canning and ice plants and quickly expanding export market, increased the demand for marine products. Hence craft for immediate, as well as long-term needs, had to be introduced.

Craft Designs

During the initial stages, it was felt that a smaller mechanized boat for in shore waters will be ideal because—

- (a) There was lack of experienced crew to man mechanized vessels.
- (b) To involve more traditional fishermen through co-operative sector by a loan/subsidy scheme of supplying the small craft.
- (c) To study the problems and prospects involved in large-scale operations in inshore area.
- (d) To knock off the initial resistance to mechanization from the traditional fishermen communities.

Initially, two designs were introduced viz. 7.62 M and 9.14 M open wooden vessels with 10 HP and 20 HP respectively. These were general purpose vessels and were engaged in gillnetting and trawling operations. The successful fishing accomplished with these boats resulted in a demand for bigger craft with more facilities to extend operations further.

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Craft design units were set up to go into the development of future craft to be introduced. It was necessary to study and choose carefully those designs, features and construction practices which were consistent with modern trends. Hence investigations were required on—

Choice of size and type of vessels.

Acceptable general arrangement plan incorporating essential features for safe and comfortable fishing operation.

Choice of propulsion machinery.

Choice of construction material and methods of construction.

Structural design and determination of scantlings.

Standards for speed power relationship, stability etc., requirement of electronic/mechanical equipment.

A number of basic designs (see Table I) in wood and steel between 9 and 18 M length were prepared. All these craft were equipped with winch and other equipments driven off the main engine. Electronic fishing aids and insulated fish holds were provided as desired. Crafts above 10 M were provided with adequate accommodation and other living facilities.

The designs in GRP (fibreglass) has been introduced with the help of British collaborators.

There are now more than 10,000 mechanized fishing craft in India. Almost all of them are built in India with indigenous materials and equipments.

Feed-Back Information

Changes in designs by way of improvements were attempted based on the information received from actual users. The problems were analysed and acceptable solutions found out. The following studies were also undertaken—

Model tests of prototype crafts.

Full-scale trials for determining the craft pull and efficiency of propulsion.

Studies to determine minimum scantlings.

Studies on economics of the designs over several years.

Studies on layouts of boat building yards.

Designs of Distant Water Vessels

Various studies were undertaken to assess the impact of mechanization programme in fishing industry. Organisations were formed to watch the development of marine expert and suggest ways and means of increasing production. Economic evaluations for respective designs were made by independent institutions representing research and technology and trade before considering financial assistance. National banks recognised these studies more often than individual entrepreneurial projections.

Productivity Studies

However very little work is done on assessing objectively a comparison between various sizes/types of crafts now existing in the Indian fishing industry. The present paper is to highlight the importance of productivity studies in aiding to assess the comparative economic viability of various sizes of boats engaged in the present fishing method, viz. bottom trawling.

TABLE II

Particulars	Values in Lakhs of Rupees					
	32 Ft. OAL G.R.P.	36 Ft. Wood	38 Ft. G.R.P.	43.5 Ft. Wood	57 Ft. Steel	72 Ft. Steel
Capital Costs						
(a) Hull and Accessories	1.50	1.50	2.10	1.50	10.00	22.00
(d) Engine and Accessories	0.75	0.85	0.90	1.20	3.00	8.00
(c) Fishing Gear	0.50	0.15	0.20	0.20	0.50	1.00
Total..	2.40	2.50	3.20	2.95	13.50	31.00
Running Costs						
Crew Wages	0.32	0.38	0.45	0.48	1.30	1.60
Running Charges	0.38	0.50	0.52	0.72	1.80	2.75
Total..	0.70	0.88	0.97	1.18	3.10	4.35
Catches						
Catch/Day (Tons)	0.50	0.50	0.60	0.75	2.20	2.86
Fishing Days	220	220	250	250	270	300
Catch/Year (Tons)	110	110	150	190	594	858
Value of Catch/Year (Lakhs)	1.60	1.60	2.25	2.85	9.50	13.73

TABLE III

Economic Values	32" GRP	36" Wood	38" GRP	43.6" Wood	57" Steel	72" Steel
Fishing Effort Man Days	880	880	1,000	1,500	2,160	2,400
Expenses (Total)	0.72	1.10	1.20	1.88	5.16	7.96
*Labour Wages	0.32	0.38	0.45	0.48	1.30	1.60
*Total Investment	2.4	2.5	3.2	2.95	13.5	31.00
*Output	1.60	1.60	2.25	3.55	9.50	13.73
*Profits	0.88	0.50	0.60	0.49	1.24	1.42

*Value in Lakhs of Rupees.

TABLE IV

Particulars	32" GRP	36" Wood	38" GRP	43.6" Wood	57" Steel	72" Steel
Total Expenses Lakhs (Rs.)	1.04	1.48	1.65	2.36	6.46	9.56
Catch (Tons)	110	110	150	190	594	858
Production Cost per Kg. (Rs.)	0.95	1.35	1.10	1.24	1.08	1.11

TABLE V
Productivity

Productivity Basis	Value in Rupees					
	32" GRP	36" Wood	38" GRP	43.5" Wood	57" Steel	72" Steel
A. Based on Time : Output/M. Days	181.8	181.8	225	236.7	439.8	572
Profit/M. Days	100	56.8	60	32.7	57.4	59.2
B. Based on Investment : Output/Investment (Rs.)	0.67	0.64	0.70	1.2	0.70	0.44
Profit/Investment (Rs.)	0.37	0.20	0.19	0.17	0.09	0.05
C. Based on Labour : Output/Wages (Rs.)	5.0	4.2	5.0	7.4	7.3	8.6
Profit/Wages (Rs.)	2.75	1.32	1.33	1.02	0.95	0.88

DISCUSSION

Mr. Livera

I wish to know how successful been purse seining has been.

Mr. K. Vijayan Unni

The 43.5' vessel can use a net of 300 fathom long and 25 fathom deep. Value of catch is around 2.5 to 3 lakh/annum. Species like sardines and mackerel can be fished. When 4 to 5 vessels land their catch at the same point having inadequate distribution facilities, earnings will drop due to price reduction. Normally purse seine is done only for 4 to 5 months in a year.

Mr. Godwin Fernando

Is the Indian Government giving special incentives to investors ?

Mr. Unni

Concessions are given to investors. But there are restrictions in regard to fishing distances. Bigger vessels are not allowed to fish in areas where smaller vessels can operate. There is a subsidy available for diesel. In certain cases the price difference between the imported and indigenous craft is met, by Government.

Mr. Pietersz

There are subsidies available in Sri Lanka depending on the class of vessel.

Mr. Wijepala

What is the engine horse power (h.p.) of boats mentioned in the paper ?

What kinds of model testing is done on these boats ?

Mr. Unni

The modern trend is to go in for higher horse power engines. The idea is to increase catch/hour, and to make the boat flexible for different methods of fishing. Following table shows the changes :—

Boat length in feet	Original or started h.p.	Present h.p.
32	42	60
36	60	100
38	88	120
*43.5	100	120
57	220	300
72	300	375

Hull, size and diameter of propeller, pitch of propeller, stability criteria, type of fishing, r.p.m. utilization of power produced, efficiency, displacement etc., are the factors considered during model testing.

Mr. Laus Rodrigo

Fish hold capacity of the 38' boat is insufficient and it is difficult to carry sufficient ice in the hold. Therefore precautions should be taken to prevent spoilage of fish.

Mr. Unni

2.5 to 3-ton hold capacity was introduced originally but now 4-ton capacity hold is incorporated. It is not practicable to do freezing in this boat. It is possible to fix a refrigerating unit, even then ice is needed to maintain the required low temperature. Another possibility is to have a chill brine tank. External appearance of fish may be affected by keeping fish in chill brine. White fish authority recommends 4" thick insulation. Since we are near the equator 4" thick insulation is reasonable. Adequate quantity of ice should be taken at the beginning to meet the loss of ice and to keep the fish sufficiently cool. It is possible to land about 2 tons of quality fish using these boats.

Mr. Bertram Perera

Fishermen were not consulted before constructing this 38' boat. Now after purchasing alterations have been done. Therefore fishermen's view should be obtained hereafter.

Mr. Pietersz

This is a very good point. Communication during the past was insufficient.

Mr. Gomez

Is it practical to do pole and line fishing in 38' boat ?

M . R. A. de Silva

Pole and line fishing can be done seasonally as a subsidiary fishery. Addition of live bait tank occupies a portion of the limited space available in the boat.