

Economic Analysis of Indian Pompano -A case study of cage culture in back waters

S. S. Raju, Sekar Megarajan and Ravi K. Avadhanula

ICAR-CMFRI, Visakhapatnam Regional Centre, Pandurangapuram, Andhra University Post,
Visakhapatnam - 530003

Introduction

In view of the opportunities for increasing aquaculture production in India, cage culture offers the fishermen and entrepreneurs with the scope to position the marine resources for a productive use. Rational use of resources by application of mariculture practices can ensure food and nutritional security, increased employment opportunities and improved socio-economic conditions of the fishermen. However, the adoption of any new technology depends upon its economic performance. The rate of return per rupee invested is the economic indicator that guides the investor to invest in the particular activity (Narayana Kumar, 2009 and Riteshet *al.*, 2014). In this connection, we evaluated the economic performance of cage culture for Indian Pompano (*Trachinotus mookalee*) in back waters of Krishna district of Andhra Pradesh.

Materials and Methods

The economic performance of setting up of cage culture in back waters is worked out by calculating the annual fixed cost, variable cost, and return in terms of harvest from cage and revenue generated from these sales. Fixed costs are costs that are independent of the level of production and have to be paid whether or not production occurs in a particular year. An expenditure on a resource whose quantity is not varied during the production period is a fixed cost. This includes cage frame, nets, chains, ballast, floats, bouys, mild steel anchors, wooden plat form and fabrication and installation charges. Generally fixed costs are spread out over the expected life of the production input involved. This allows the producer to consider the long-term view of profitability. The variable costs are costs that are dependent on the level of production and have to be paid for every cycle of culture such as cost of fish seed, feed, labour wages, watch & ward and regular maintenance charges. Returns from

cage culture is the revenue realized from sale of harvest (Total Production in Kg x Price in Rs/Kg). Using the costs and returns figures, the following economic indicators are estimated to test the economic viability and financial feasibility of cage culture in back waters.

**Table 1: Indicators of Economic Performance of
Cage culture in back waters**

S.No.	Economic Indicators
1	Initial investment of the Galvanised Iron (G.I) cage (Rs.)
2	Fixed Cost (Rs.) a) Depreciation b) Interest on fixed capital @ 7 % per annum.
3	Variable Costs (Rs.) a) Cost of seed b) Cost of feed c) Labour charges d) Watch and ward charges e) Other Maintenance charges
4	Total cost of production (Rs.) (2 + 3)
5	Total Production of Fish (Kg)
6	Gross revenue (Rs.) (5 * price per kg)
7	Net operating income (Rs.) (6-3)
8	Net income / profit (Rs.) (6-4)
9	Cost of production (Rs. /Kg) (4 /5)
10	Price realized (Rs. /Kg) (6/5)
11	Capital productivity / operating ratio (3/6)
12	Rate of return to capital (%) ((8/1) *100)

The different economic indicators of the economic performance of Galvanised Iron (G.I) cage culture is worked out to assess their performance in Table 1. This will serve

as the guidelines to the institutional agencies that are extending the financial support to the G.I. cage culture.

Results and Discussion

The detailed economic analysis of the All-India Network Project - SCSPexperimental cage practice demonstrated in Nagayalanka, Krishna district of Andhra Pradesh is given below to indicate how the economic analysis of a cage culture is done in back waters.

Table 2: Initial Investment of G.I Cage Culture of 5 M x 5 M

S. No.	Items	Investment (Rs.)	% to total investment	Economic Life in Years	Depreciation / annum (Rs.)
1	G.I Cage frame	42,000	30.79	6	7,000
2	Nets	30,000	21.99	6	5,000
3	G.I Chains	9,000	6.60	10	900
4	Shackles	1,800	1.32	6	300
5	Mild Steel Anchors	7,000	5.13	10	700
6	Bouys, Painting and Labour charges	12,600	9.24	3	4,200
7	Inner and Outer Ballasts	15,000	11.00	10	1,500
8	Wooden plat form	3,000	2.20	3	1,000
9	Nuts, bolts and others	2,000			1.47
10	Cage Fabrication and Installation Charges	14,000	10.26		
Total Initial Investment			1,36,400	100	20,600

Table 3: Details of Annual Fixed Cost of G.I Cage Culture

S.No	Details	Amount (Rs.)	% to total fixed cost
1	Depreciation	20,600	68.33
2	Interest on Fixed Capital (7 % of initial investment)	9,548	31.67
Total Fixed Cost		30,148	100

**Table 4: Details of Variable Cost of G.I. Cage Culture
(for a crop duration of eight months)**

S.No	Details	Cost (Rs.)	% to total variable cost
1	Seed cost	14,600	7.55
2	Feed Cost	1,37,700	71.24
3	Labour Charges	12,000	6.21
4	Watch and ward Charges	24,000	12.42
5	Other Maintainence Charges	5,000	2.59
Total Variable Cost		1,93,300	100

**Table 5:Economic Indicators of the G.I Cage culture of
Indian Pompano in Back Waters**

S.No	Details	Amount (Rs.)
1	Annual Fixed Cost	30,148
2	Variable cost	1,93,300
3	Total Cost of Production	2,23,448
4	Gross Revenue	2,97,000
5	Net Income (Profit)	73,552
6	Net Operating Income	1,03,700
7	Cost of Production (Rs. /Kg)	248.28
8	Price Realized (Rs. /Kg)	330
9	Capital Productivity / Operating Ratio	0.65
10	Annual Rate of Return to Capital (%)	53.92

The initial investment for a 5 m x 5 m Galvanized Iron (G.I) Cage worked out to Rs. 1,36,400 (Table 2). The G.I cage frame accounted for the maximum share of investment (31%) followed by nets (22%), ballasts (11%), cage fabrication and installation charges (10%), bouys (9%), chains (7%), anchors (5%) and others (5%). The annual fixed cost for the G.I cage was calculated at Rs.30, 148 (Table 3). The operational costs for the culture period of eight months worked out to Rs. 1, 93,300. Feed cost alone accounted 71 per cent of the total operating cost (Table 4). Thus, the total cost of production to the fishermen worked out to Rs. 2, 23,448. The culture of Indian Pompano produced 900 kg during the harvest at the end of eight months, thus earning gross revenue of Rs.2, 97,000 to the fishermen. The culture of Indian Pompano earned a net operating income of Rs.1, 10,800 at the end of eight months and a net profit of Rs. 73,552 at the end of the same period. The cost of production per kg of Indian Pompano worked out to Rs. 248.28 against the price realization of Rs.330 per kg. The capital productivity measured through operating ratio worked out to 0.65 (Table 5). These economic parameters indicate that this open sea G.I cage culture of Indian Pompano in high back saline waters is economically viable.

Financial assistance for open sea cage culture in India

The National Fisheries Development Board (NFDB), Hyderabad is the primary funding agency for sea cage culture in India. NFDB has a scheme on mariculture aimed at increasing the marine fish production of the country. A principal component of this scheme is open sea cage culture and its popularization among fishermen of India. NFDB will provide financial assistance for setting up of a sea cage for mariculture as well as for model cage culture demonstration to traditional fishermen. The eligibility criteria for assistance for setting up of sea cage culture are:

- ◆ Entrepreneurs/companies with a previous record of undertaking large-scale aquaculture operations and having on-shore facilities for seed rearing.
- ◆ Sea going fishermen groups who will operate the scheme through Fisheries federations/corporations.
- ◆ Availability of necessary Clearances for undertaking the cage culture activity in the coastal areas.
- ◆ Commitment of state fisheries federation/corporation, entrepreneur to bear the cost less of NFDB subsidy.



- ♦ The entrepreneurs / companies willing to set up open sea cage culture in a big way shall be supported by NFDB through equity participation @ 20% of the investment.

Proposal for setting up of open sea cage culture should be submitted in form which should be filled by the applicant and counter-signed by the Implementing Agency. Funds will be released in two equal installments by NFDB. The first installment will be released after approval of proposal and after applicant has utilized 50 per cent of his/her investment in the open sea cage culture. The second installment will be released after the applicant utilizes his/her remaining 50 per cent investment in the venture and also after receipt of the Utilization Certificate (U.C) regarding this first installment of NFDB fund from the Implementing Agency. All subsidy installments will be deposited to the applicant's bank account only. U.C should be submitted in on half-yearly basis i.e., during January and July of each year. The project monitoring committee of NFDB periodically reviews the progress of the activities like physical, financial and production targets.

Conclusion

It is seen from the above results that the economic analysis of the cage culture in back waters has worked out successfully with higher net operating income and net income in a crop period of eight months. It is to be noted that once the practice is further expanded to many cages, farms and areas, the cost will decline due to economies of scale of operation. Thus, it could be concluded that the cage farming in back waters is a viable alternative and economically & financially feasible mariculture operation for the stake holders to make use of. The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, New Delhi; Andhra Pradesh State Fisheries Department, Vijayawada and the Developmental organisations like National Fisheries Development Board, Hyderabad can promote the concept of cage culture on a large scale with their institutional and financial support availing the technical expertise developed at ICAR-Central Marine Fisheries Institute.

References

Narayanakumar, R (2009). *Economic analysis of cage culture of sea bass*. In: Course manual: National training on cage culture of seabass. Imelda, Joseph and Joseph, V Edwin and Susmitha, V(eds.) CMFRI & NFDB, Kochi, pp. 120-122.

Raju, S. S, MukthaMenon and PhalguniPattnaik (2016). *Economics and Policies for open sea cage culture in Andhra Pradesh*. In : Training manual on Cage Culture of Marine Finfishes, SekarMegarajan, RiteshRanjhan, Biji Xavier & ShubhadeepGhosh (eds.) VRC of CMFRI, Visakhapatnam, pp.68-93.

RitishRanjhan, MukthaMenon, Loveson Edward and Biswajit Dash (2014). *Economics of open sea floating sea cage culture of finfishes*. In: Training manual: Cage Culture of Marine Fisheries, VRC of CMFRI, Visakhapatnam. pp 41-44.