

DOI No.: <http://doi.org/10.53550/EEC.2023.v29i06s.021>

An economic analysis of cost, return per quintal and Input-output ratio of prawn farming in district Rohtak (Haryana), India

Sonu¹, Sanjay Kumar² and Ajay Kumar Rai³

^{1,2}*Department of Agricultural Economics, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj 211 007, U.P., India*

³*Department of Agricultural Economics & Statistics, Kulbhaskar Ashram PG College, Prayagraj 211 001, U.P., India*

(Received 13 May, 2023; Accepted 10 July, 2023)

ABSTRACT

The study was to determine an economic analysis of prawn fish (Shrimp). The Multi-Stage Sampling Procedure was followed in sample. In first stage - selection of district, second stage - selection of block, third stage- selection of villages and fourth stage – selection of respondents. In district Rohtak; name of selected village's viz. Anwal, Bahuakbarpur, Kalanaur and Lahli. The primary data was collected through pre-determined questionnaire and secondary data collected from different sources related to study area. The sample was taken purposively for the present study on the basis of highest production. Collected data are summarized, analyzed, and tabulated that helped to find a significant mean of study. Statistical and analytical tools were also used in the study. The present study revealed that average variable cost was Rs.1157367.95/ha, average of overhead cost was Rs.115183.85/ha and average of total cost was Rs.1272551.35/ha. The average cost of production was Rs.1399806.48. An average cost A, cost B and cost C was Rs.1255659.83, Rs.1267454.91 and 1272551.35 per ha respectively. An average yields was 67 qtl. per ha. The average gross farm income was Rs.1876000 and average net farm return was Rs.476193.52 per ha. An average return per quintal was Rs.7078.90 per ha. An average of input – output ratio was Rs.1:1.34.

Key words: Cost of production, Return and input – output ratio.

Introduction

Aquaculture supplies not only dietary essentials for human consumption, but also provides excellent opportunities for employment and income generation, especially in the more economically backward rural areas. The fisheries sector has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a source of low cost animal protein to the people particularly to the economically weaker sections of the society and thereby it is an advanta-

geous position to ensure national food security. It is also a major source of foreign exchange in several countries including India. Fish culture is an age-old practice in many states of the country. There was 1.1% contribution of fisheries sector in Indian economy, contribution of economy of fisheries in agriculture was 6.72 in year 2020-2021.

Prawn is crustacean species farmed White shrimp (*Peanus vannamei*) is leading species farmed on commercial scale. Prawns are large swimming crustaceans that have commercial significance in the fishing industry. The prawn farming is done all over In-

dia. The major prawn producing states are Andhra Pradesh, Tamilnadu, West Bengal, and Gujarat etc.. Prawn farming in Haryana is done from March to November - December. In recent year prawn farming in areas and production has also increased. An average production per hectare 7000 kg which is higher than all India average production. In the year 2020; world consumption of aquatic food was 20.2 kg per capita per year. In India per capita consumption of fish was 6.31 kg. Annual growth rate of fish production was 10.34 %. In year 2020-2021 inland fish production was 121.21 lac tonnes; Haryana accounted 2.08 lac tonnes (Handbook on Fisheries & Statistic). Various central research institutes along with the aid from the government of Haryana have been taking up activities to strengthen the aquaculture system in the state. India exports fisheries product to USA, China and other countries. Shrimp (prawn) accounted more than 70% of fishery product in export quantity. It has been instrumental in sustaining the livelihoods of over 28 million people in India especially for marginalized and vulnerable communities and has contributed towards socio-economic development.

It is source of essential fatty acid, vitamin and protein (18-20%). It is also good source of omega-3 fatty acid, aid in healthy brain function, Alzheimer's disease and dementia. Due to presence of low fatty acid reduce the risk of arthritis. It also rich in calcium, phosphorus, iron, zinc, iodine and magnesium. The regular use as a part of diet reduces high blood pressure and reduces risk of heart disease like heart attack or stroke

Objectives of the study

To estimate the cost and return per quintal & Input-output ratio in different size farm groups.

Research Methodology

Multistage sampling design was adopted in selection of district, tehsils, villages and prawn fish farmers. Block Kalanaur was purposively selected as that has relatively large number of shrimp farms as compared to other block of the district. A list of shrimp farmers located in each of the selected villages in district Rohtak was prepared with the help of the staff of the department of District Fishery Office and Heads of selected villages. In this study total 60 farmers from village's viz. Anwal, Bahuakbarpur, Kalanaur and Lahli selected purposively. After col-

lection of data the selected fish farmers are categorized in to three groups as small (0-1 ha), medium (1-2 ha) and large (2 ha and it's above). A well-structured questionnaire was made to collect required information based on input cost, yields or production and return. The collected data were converted into standard form for further analysis. Collected data are summarized, analyzed, and tabulated that helped to find significant mean of data. Information collected from the field survey and secondary sources were coded and entered on Statistical Package for Social Science (SPSS 20). The data were collected for agriculture year 2021 -2022.

Analytical tools

For achieving the stated objective, the analytical tools such as tables, graphs, percentage method will be used. Tabular analysis was used to compare different data sets thereby bringing out the important aspect of data. It is used to simplifying the complex data. Percentage, simple and weighted average were used for tabular analysis. It also helps in presentation of data.

Weighted average

$$WA = \frac{\sum w_i x_i}{\sum w_i}$$

Where,

WA = Weighted average

X_i = variable

W_i = Weight of variable

Estimation of Cost Concepts

Cost concepts were used to estimate cost of production, return and input – output ratio. The cost of prawn fish has been worked out on per hectare basis from different categories of farm size groups. The cost concepts viz., Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂ and Cost C₃ were used in the present study and they are derived as follows:

Cost A1 = All the variable costs excluding family labour costs and including depreciation

- a. value of fish seed,
- b. value of fish feed,
- c. value of manure and medicine,
- d. water and electricity charges,
- e. value of hired labour,
- f. value of fishing and feeding,
- g. Interest on working capital,
- h. Depreciation on farm implements,
- i. Miscellaneous expenses.

Cost A₂: Cost A₁ + rent paid for leased in land.

Cost B₁: Cost A₂ + interest on value of own fixed capital assets.

Cost B₂: Cost B₁ + rental value of own land.

Cost C₁: Cost B₁ + imputed value of family labor.

Cost C₂: Cost B₂ + imputed value of family labor.

Cost C₃: Cost B₂ + 10 % of cost C₂ to account for managerial input of farmer.

Estimation of return

Total cost (Rs.) = Total variable cost + Total fixed cost

Gross income (Rs.) = Total yield × Sale price of the fish

Net income (Rs.) = Gross income – Total cost

Cost of production per qtl. (Rs.) = $\frac{\text{Total cost}}{\text{Yield}}$

Return per qtl. (Rs.) = Sale price – Cost of production.

Input – output ratio = $\frac{\text{Gross income}}{\text{Total cost}}$

Input- output ratio

Input - output ratio = $\frac{\text{Present values of benefit}}{\text{Present value of cost}}$

Results and Discussion

Table 1: revealed that average cost of pelleted feed was Rs.601733.17, highest cost of peeled feed incurred by large farm size group which was Rs. 610213.5 and lowest by small size farm group, Rs. 594776. Nearly 48% cost in incurred in pelleted feed. An average of fish seed cost was Rs.128440. The highest cost on seed given by large size group Rs.130910 followed by medium size group and lowest by small size group Rs.125790. An average of total variable cost was Rs.1091856. The total average of variable cost for small size farm was Rs. 1130184.4, for medium size group Rs.1093379.06 and large size group accounted Rs.1052004.7 which was smallest among all farms group. The highest interest on working capital given by small size group Rs.67811.06 and minimum interest incurred on large size group. Rs.63120. In overhead charges which include rental value of own land, interest and family labor. An average of overhead charges Rs.115183.85. minimum cost incurred on large size farmer Rs.107527.62 and maximum on small size farmer 122830.34, where medium size farmer accounted for Rs.115193.58.

In Table 2: shown various aspect of cost concepts,

Table 1. Cost of input among of different size group of fish farmers.

Sr. No.	Particulars	Categories of fish farmers			N= 60 Sample average
		Small	Medium	Large	
A Variable cost or working capital					
i	Pelleted feed	594776 (45.03)	600210 (47.11)	610213.5 (49.91)	601733.17 (47.29)
ii	Fish seed	125970 (9.54)	128440 (10.08)	130910 (10.71)	128440 (10.09)
iii	Manure and medicine	51919.4 (3.93)	52067.6 (4.09)	51623(4.22)	51870(4.08)
iv	Electric Charges	111942.87 (8.48)	94652.87(7.43)	74892.87 (6.13)	93829.54 (7.37)
v	Water charges	109492.63 (8.29)	92202.63 (7.24)	72442.63 (5.93)	91379.3 (7.18)
vi	Fencing and Equip. etc	8803.08 (0.67)	7568.08 (0.59)	6333.08 (0.52)	7568.08 (0.59)
vii	Land Preparation	22640.02 (1.71)	22393.02 (1.76)	16218.02 (1.33)	20417.02 (1.60)
viii	Hired labour cost	50053.4 (3.79)	48668.1 (3.82)	44788.1 (3.66)	47836.53 (3.76)
ix	Fishing and feeding	54587(4.13)	47177(3.70)	44583.5 (3.65)	48782.5 (3.83)
x	Total V.C (sum of i to ix)	1130184.4 (85.57)	1093379.3 (85.81)	1052004.7 (86.04)	1091856.13 (85.80)
xi	Interest @ 6% on working capital	67811.064 (5.13)	65602.76 (5.15)	63120.28 (5.16)	65511.37 (5.15)
	Total (sum of x to xi)	1197995.46 (90.70)	1158982.06 (90.96)	1115124.98 (91.21)	1157367.5 (90.95)
B Overhead charges					
i	Rental value of own land	67732 (5.13)	67732 (5.32)	67732 (5.54)	67732 (5.32)
ii	Depreciation on fixed assets	37020 (2.80)	30422 (2.39)	24239 (1.98)	30560.33 (2.40)
iii	Total fixed cost (sum of i & ii)	104752 (7.93)	98154 (7.70)	91971 (7.52)	98292.33 (7.72)
iv	Interest @ 12% on fixed capital	12570.24 (0.95)	11778.48 (0.92)	11036.52 (0.90)	11795.08 (0.930)
v	Family Labour	5508.1 (0.42)	5261.1 (0.41)	4520.1 (0.37)	5096.43 (0.40)
	Total (sum of iii to v)	122830.34 (9.30)	115193.58 (9.04)	107527.62 (8.79)	115183.85 (9.05)
C Grand Total (cost A+ cost B)					
		1320826	1274175.64	1222652.60	1272551.35

Table 2. Cost and Economics of different size groups of prawn fish farmers per ha.

Sr. No.	Particulars	Categories of fish farmers			Sample average
		Small	Medium	Large	
1	Cost A	1302747.46	1257136.06	1207095.98	1255659.83
2	Cost B	1315317.70	1268914.54	1218132.50	1267454.91
3	Cost C	1320825.80	1274175.64	1222652.60	1272551.35
4	Cost of Production	1452908.38	1401593.20	1344917.86	1399806.48
5	Yield (qtl.)	65	67	69	67
6	Sale Price/qtl	28000	28000	28000	28000
7	Gross farm income(in Rs.) / ha	1820000	1876000	1932000	1876000
8	Net farm income(in Rs.) / ha	367091.62	474406.80	587082.14	476193.52
9	Cost of production(Rs./qtl)	22352.44	20919.30	19491.56	20921.10
10	Return per quintal	5647.56	7080.70	8508.44	7078.90
11	Input-output ratio	1.25	1.34	1.44	1.34

production, gross farm income, net farm income, cost of production, return per quintal and input-output ratio per ha. An average of cost A was Rs.1255659.83, value of cost A founded maximum in small size farmer group and minimum in large size farmer group, while medium size farmer accounted cost A was Rs.1257136.06. An average of cost B was 1267454.91. An average of cost C was Rs.1272551.51, where small size farmer accounted for Rs.1320825.80, medium size farmer accounted for Rs.127475.64 and large size farmer had lowest value of cost C which was Rs.1222652.60. An average of cost of production was 1399806.48. The maximum value for cost of production accounted for small size farmer; Rs.1452908.38 and lowest accounted for large size farmers; Rs.1344917.86, where medium size farmer Rs.1401593. An average yield of fish farmer was Rs.67 qtl. per hectare. An average of gross income per ha was Rs.1876000. The maximum net farm income was accounted for large size farm group; Rs.587082.14 and lowest by small size farm Rs.367091.62. The cost of production for small medium and large farm group was Rs.22352.44, Rs.20919.30 and Rs.19491.44 while average cost of production per qtl. was Rs.20921.10. An average of input - output ratio was 1:1.34. The medium size farmer accounted input - output 1:1.25, medium size farmer accounted 1:1.34 and large size farmer accounted 1:1.44.

Conclusion

The study revealed that prawn farming is a profitable enterprise. It also provides employment to different area. The average of cost of production was Rs.1399806.48, minimum was Rs.1452908.38 and the maximum was Rs.1344917.86, followed by Rs.1274175.64. The average of net farm income was Rs.476193.52, minimum Rs.367091.62 and the maximum was Rs.587082.14 and followed by 474406.80. An average of input-output ratio was 1:1.34, minimum was 1:1.25 and highest was 1:1.44, followed by 1:1.34.

References

- Sharma, T., Dhakal, S.C., Kattel, R.R., Gharti, K. and Lamichhane, J. 2018. Economics of fish production at Chitwan district, Nepal. *Journal of Agriculture and Natural Resources*, Pp. 21 - 23.
- Sharma, H., Kalamkar, S.S. and Swain, M.N. 2020. Assessment the Cost and Return in Marine Fish Production in Gujarat, India. *International Journal of Current Microbiology and Applied Sciences*. 9(2): 173-180.
- Subedi, P., Pandit, N.P., Mahato, N.K. and Karki, Uprety, 2019. Economic analysis of fish production using different feed types practiced in Dhanusha district, Nepal. *Journal of Agriculture and Natural Resources*, Pp. 252-264.
- Edet, E.O., Udoe, P.O. and Uwah, E.D. 2018. Costs and return analysis of fish farming in calabar metropolis, cross river state Nigeria. *Global Journal of Agricultural Sciences*. 17(1): 23-31.