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FINANCIAL APPRAISAL OF FISH PONDS IN HIMACHAL PRADESH (1990-91)

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FINANCIAL APPRAISAL OF FISH PONDS IN HIMACHAL PRADESH- A CASE STUDY.

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Himachal Pradesh has a number of streams and rivers which have a vital potential for the production of exotic Brown Trout and indigenous Asia(snow Trout). The State has also a number of lakes covering about 5,000 hectares of area at mid hill and high mountain elevation. The reservoirs created with the construction of multi-purpose Dams constructed on various rivers and streams have also added to the production potential of the inland fish. The State has also two large reservoirs viz. Govind Sagar and Pong and the fish production of these two reservoirs account for 80 to 90 per cent of the total production of the State.

In the State, Fish Farmers Development Agency has been set up since 1982-83 which have rendered a technical and financial assistance for excavating ponds and improving the existing water area. It has introduced the fish culture in the State by utilising the waste land swamps and deredlict water areas. The farmers in the State are adopting this profession as a supplementary occupation with the agriculture. The neglected impoundments have provided to be useful to increase their income and providing gainful employment opportunities in the different parts of the State.

This vocation is becoming more and more popular among the farmers in the rural areas and it was found necessary to apprise the Eco-nomic viability of the fish ponds so that the rational to invest the limited resources of the farmers could be established. However, the main objective of the Study are:-

(a) to work out the break even point of the ponds;

(b) to test the price sensitivity of the break even point;

(c) to work out the net income at the different level of cost;

(d) to work out the input and output ratio of the fish cultivation to ascertain the profitability of the farmers;

(d) to study the spread of the recurring costs of the fish pond.

METHODOLOGY:

Sharma and Shad(1989) have conducted sa study on the economies of fish ponds and found that the average utilisation of the fish ponds in the State is 63.49 per cent. They have established that the low utilisation of the fish ponds was the major reason for the low returns to the farmers in the State. But the study could not determine the profitability production levels and returns at different cost levels of the farmers.

SHARMA, D.K. and SHAD S.K., "Economics of Fish Ponds in Himachal Pradesh" A Report, Department of Planning, Himachal Pradesh, SHIMLA-171002.

It was, therefore, necessary to analyse the costs and returns of the fish ponds to estimate the break even levels of output and returns, so that the profitability levels of this vocation could be estimated.

For the present study, three ponds were purposively selected in Solan and Kangra districts to collect the data on the costs and returns of the fish ponds. The selected ponds were functional and were managed by the progressive farmers. The area of these ponds was as below:-

Name of the Pond	Size
(1) Bagguwala (Kangra)	0.22
(2) Haripur (Solan)	0.48
(3) Nangal Kuhal (Solan)	0.75

The data on these ponds was collected consecutively for three years preceeding 1989 to work out the normal level of costs and returns. The costs were further divided into Cost A, cost B and cost C with the following components:-

Cost-A:

The cost-A includes all the cost of the inputs viz:-

1. Material Inputs:
   - (a) Mahua Cake;
   - (b) Gingerlings;
   - (c) Lime;
   - (d) Mannuring;
   - (e) Food
2. Hired Labour;
3. Lease Rent;
4. Depreciation Cost of fixed assets @ 10 per cent;
5. Interest on the Working Capital @ 12 per cent;

Cost-B:

Cost-B= Cost A+ Imputed rental value of the owned land + Interest on the fixed capital

Cost-c:

Cost-c+=B+ Imputed Value of the family labour.
The break even point was calculated as:

$$BEP = \frac{FC}{SP-VC}$$

WHERE:

FC = Total fixed cost per hectare;
SP = Sale Price per kilogram of fish sold;
VC = Variable cost per kilogram of fish production
FC = and VC were deduced as

$$FC = \frac{\sum_{j=1}^{n} FC_{ij}}{\sum_{j=1}^{n} a_j}$$

$$VC = \frac{\sum_{j=1}^{n} C_{ij}}{\sum_{j=1}^{n} Y_{ij}}$$

WHERE:

FCij = Fixed cost of the jth pond;
Cij = Variable cost of the jth pond of the ith year
N = 3

To work out the costs and returns per kilogram of output, the estimation of production was necessary. The per hectare output was deduced as under:-

$$\bar{y} = \frac{\sum_{i=1}^{n} y_{ij}}{\sum_{j=1}^{n} a_j}$$

WHERE:

$\bar{Y}$ = Production of fish in kilogram per hectare;

Y_{ij} = Production of the ith year of the jth pond;

aj = Area of the jth pond;

J&I = 3.

The net returns and input-output ratio have been worked out as;

$NR = (\bar{Y} x p_n) - Cn$

WHERE:

$\bar{Y}$ = Average production of fish in the pond of the hectare;

P_n = Price situation of one kilogram of fish; and

P_1 = Rs. 10

P_2 = Rs. 12

P_3 = Rs. 15

Cn = Cost situation of one hectare of pond, i.e. Cost A, Cost B and Cost C

$$\text{Input-Output ratio} = \frac{(Y x p_n)}{Cn}$$

RESULTS AND DISCUSSIONS:

The break even analysis of the sample ponds is presented in the table-I:-

TABLE-I

Per hectare Break-Even Production Levels of Fish on the Sample Ponds

Price Level (In Kgs.)

Cost Level	Rs. 10	Rs.12	Rs.15
Cost-A	1,762	1,333	976
Cost-B	2,167	1,552	1,099
Cost-C	7,246	3,118	1,681

From the analysis, it reveals that at Cost-A, the break-even production level is 1,762 kilogram per hectare, if the sale price of the fish is Rs. 10 per kilogram. The break-even level of production decreases, if the sale price increased. If the fish is sold at Rs. 12 per kilogram, the break even output level will be 1,333 kilogram per hectare and it will further decreased to 976 kilogram per hectare if the fish is sold at Rs. 15 per kilogram.

If the farmer wants to recover the cost, i.e. rental value of the owned land and the interest of the fixed capital alongwith the cost-A, then the farmer must produce 2,167 kilograms of fish if the sale price is Rs. 10 per kilogram. Similarly, if the sale price is

available as Rs. 12 per kilogram, the farmer should produce the fish upto the level of 1,552 kilogram per hectare. If the sale price of Rs. 15 is available, then the break even production level will be 1,089 kilogram of fish per hectare.

In order to recover the cost-C, the farmer should produce the fish to the break-even level of 7,246 kilogram per hectare of the pond at the sale price of Rs. 10 per kilogram. At the sale price of Rs. 12 per kilogram, the break-even level of production is 3,118 kilogram. The break-even output level decreases to 1,681 kilogram per hectare, if the sale price increases to Rs. 15 per kilogram of the fish in the market.

Cost and Returns of fish ponds:

The analysis of the cost-A, cost-B and cost-C was done to work out the net income of the pond of one hectare at different sale prices of the fish. The results of the analysis are presented in table-2.

NET INCOME AND INPUT/OUTPUT RATIO OF THE FISH POND OF ONE HECTARE IN HIMACHAL PRADESH

Price Level/ Cost Level	Net Returns at Rs.10	Input-Output Ratio	Net Returns at Rs.12	Input-Output Ratio	Returns at Rs.15	Input-Output Ratio
1.	2.	3.	4.	5.	6.	67.
Cost-A	7,838.66	2.79	10,283.12	3.35	13,950.31	4.18
Cost-B	6,525.70	2.15	8,970.36	2.57	12,637.35	3.22
Cost-C	2,525.66	1.26	4,970.32	1.70	8,637.31	1.89

From the analysis, it reveals that the income of the pond of one hectare at Cost-A at the sale price of Rs. 10 per kilogram is Rs. 7,838.66 and the input-output ratio is Rs. 2.79. The net returns at cost-A at the sale price of Rs. 12 per kilogram comes above as Rs. 10.283.12 and the input ratio is Rs. 3.35. The net income at the sale price of Rs. 15 per kilogram is Rs. 13,950.31 and input-output ratio is Rs. 4.18.

The net income at cost-B is Rs. 6,525.70 at the sale price of Rs. 10 per kilogram and the input-output ratio is Rs. 2.15. At the same cost, if the sale price available to the farmers is Rs. 12, then the net return from the one hectare is Rs. 8,970.36 and the input-output ratio is Rs. 2.57. The net income of the farmer from the pond of one hectare at the sale price of Rs. 15 per kilogram is deduced as Rs. 12,637.35 and the input-output ratio is Rs. 3.22.

If the farmers want to recover the cost-C,i.e. the imputed value of family labour, then the net income from one hectare pond at the sale price of Rs. 10 is Rs. 2,525.66 and input-output ratio is Rs. 1.26. At the SALE price of Rs. 12, the net income of the pond of one hectare is Rs. 4,970.32 and the input-output ratio will be Rs. 1.70. At the same cost level, if the sale price of Rs. 15 is available to the farmers, the net income from the pond of one hectare is deduced as Rs. 8,637.31 and the input-output ratio is Rs. 1.89.

Component wise variable costs of fish ponds:

The component-wise variable cost of production of fish pond of the size of one hectare, deduced from the analysis, is presented in the table below:-

TABLE-3

COMPONENT-WISE VARIABLE COST OF PRODUCTION OF FISH POND OF ONE HECTARE ON SAMPLE PONDS

Cost Component	First year	Second year	Third year	Average
1.	2.	3.	43.	5.4.
Cost-A	3,829.83 (4.48)	4,578.44 (4.07)	4,745.66 (2.81)	4,384.64 (3.79)
Cost-B	5,142.83 (6.02)	5,891.44 (5.24)	6,058.66 (3.59)	5,697.64 (4.95)
Cost-C	9,142.83 (10.71)	9,891.44 (8.79)	10,058.66 (5.96)	9,697.64 (8.49)

Note: Figures in the parenthesis denote the cost per kilogram.

From the table-3, it reveals that the cost-A in the first year of the pond of one hectare is Rs. 3,829.83 and the cost of one kilogram of fish is Rs. 4.48. This cost increased to Rs. 4,578.44 in the second year and the cost of production of one kilogram of fish is Rs. 4.07. This cost becomes Rs. 4,745.66 in the third year with the per kilogram cost of Rs. 2.81. The average cost-A over the three years is deduced as Rs. 4,384.64 and the per kilogram average cost of production of fish is Rs. 3.70.

The cost of production of fish pond of one hectare is Rs. 5,142.83 at cost-B and the per kilogram cost of production comes out as Rs. 6.02. In the second year, the cost-B of one hectare pond comes out as Rs. 5,841.44 and the per kilogram cost-B of the fish production is Rs. 5.24. In the third year, the cost of B, the production of the pond of one hectare is Rs. 6,058.66 and per kilogram cost of production is Rs. 3.59. The average cost-B over the three years is Rs. 5,697.64 and the per kilogram cost of production comes out as Rs. 4.95.

The total cost of production of one hectare of pond is deduced as Rs. 9,142.83 and the per kilogram cost of production is Rs. 10.71. In the second year, the cost-C of the production of fish of the pond of one hectare is Rs. 9,891.44 and the per kilogram cost of production is worked out as Rs. 8.79. Similarly, in the

third year, the cost-C reaches the level of Rs. 10,058.66 and the per kilogram cost of production is Rs. 5.96. The average cost-C of the pond of one hectare is Rs. 9,697.64 with the per kilogram cost as Rs. 8.49.

From the analysis, it is obvious, that the per hectare cost of production of fish increases over the years, this is because of the nature of the variable costs which increased at an increasing rate at the initial years, thereafter at a decreasing rate, and then increases at very slow rate. The per kilogram cost trend over the three years also presents the nature and shape of the average cost curve. The per kilogram cost of production of fish is decreasing over the three years because of the increasing the production of the fish pond due to the increase in the size of the fish over the three years.

The cost spread of the Fish Production:

In order to study the cost spread and also to estimate the productions of different components of costs over the different input uses, the analysis of costs was carried out and the results, thus, obtained are presented in the table-4.

COMPONENT-WISE COST SPREAD OF THE FISH POND OF ONE HECTARE OF THE SAMPLE PONDS

Cost Component	First year	Second year	Third year	Overall Average
1.	2.	3.	4.	5.
I. COST-A:				
a) Mahua Cake				
1. Material Inputs	21.13	26.20	27.33	24.92
a) Mahua Cake	3.80	5.33	4.69	4.61
b) Fingerlings	11.77	14.74	14.84	13.78
c) Lime	0.72	0.84	0.83	0.80
d) Mannuring	0.53	0.49	1.24	0.75
e) Feed	4.31	4.88	5.73	4.00
2. Hire Labour	12.03	11.12	10.94	11.36
3. Lease Rent	3.04	2.81	2.76	2.87
4. Depreciation	1.20	1.11	1.09	1.13
5. Interest on Working Capital	4.49	4.96	5.06	4.84
TOTAL COST 'A'	41.89	46.29	47.18	45.12
II. COST-B:				
COST-'A' PLUS				
1. Imputed Rental Value of owned land	-	-	-	-
2. Interest on fixed capital	14.36	13.27	13.05	13.56
TOTAL COST'B'	56.25	59.56	60.23	58.68
III. COST-C:				
COST-'B' PLUS				
1. Imputed value of family labour	43.75	40.44	39.77	41.32
TOTAL COST:	100.00	100.00	100.00	100.00

From the results of the analysis, it reveals that the cost-A of the pond of the one hectare is 45.12 per cent of the total cost and, the average cost-B of the pond is 58.68 per cent of the total cost of production of the pond of one hectare.

The cost-C of the pond, i.e. the value of the imputed family labour is 41.32 per cent which is very high, it is because of the labour intensive nature of this vocation.

Cost Realisation Time Schedule:

An attempt has also been made to project the production of the pond of one hectare by assuming the average life of the pond as 10 years and maximum production level of 3,000 kilograms of the pond of one hectare as estimated by the Fisheries Department of the State for the three years the actual production as estimated through the sample ponds, have been taken into the third year. The level of production of the third year to the 10th year have been worked out of the compound growth rate of 1.10 per annum to reach the level of maximum production capacity of the pond of one hectare, i.e. 3,000 kilograms. The estimated production level have been presented in the table-5.

TABLE-5

Projected production and sales of the sample ponds at different price levels.

Year	Production	Sale Revenue		
		Rs. 10	Rs. 12	Rs.15
1.	2.	3.	4.	5.
1.	Nil	0	0	0
2.	854	8,540	10,248	12,810
3.	1,125	11,250	13,500	16,875
4.	1,688	16,880	20,256	25,320
5.	1,857	18,570	22,284	27,855
6.	2,045	20,450	24,540	30,675
7.	2,250	22,500	27,000	33,750
8.	2,477	24,770	29,724	37,150
9.	2,726	27,260	32,712	40,890
10.	3,000	30,000	36,000	45,000

From the table-5, the year of the realisation of sale at the break-even level of output is presented in the table-6.

TABLE-6

Cost Realisation Time Schedule at Break-even Level of Output of the sample ponds:

Cost level	Rs. 10	Rs. 12	Rs. 15
Cost-A	5th year	4th year	3rd year
Cost-B	7th year	4th year	3rd year
Cost-C	Not possible	11th year	4th year

From the Study of table-6, it reveals that the farmers will be able to recover the cost-A in the Fifth year, if the sale price of the fish is Rs. 10 per kilogram. At the same price, the farmer can achieve the sale level to recover the cost-B in the Seventh year and the realisation of Cost-C is not possible at the sale price of Rs. 10 per kilogram at the break-even level of output during the life span of the pond.

With the sale proceeds at the break-even level of output at the rate of Rs 12 per kilogram of fish, the farmer can recover the cost-A and B in the Fourth year and the sale proceeds of the eleventh year can only recover the cost-C of the farmer.

The break-even level of output at cost-A at the sale price of Rs. 15 per kilogram of fish occurs in the third year. The sale proceeds of the third year will be able to recover the cost-A and B of the farmer at the sale price of Rs . 15 per kilogram. At Cost-C, the break-even level of production will be achieved in the fourth year.

From the analysis, it is evident that the price level of Rs. 10 per kilogram of fish not economical in view of the securing costs of the fish ponds. The rate of Rs. 12 per kilogram is marginally economical because it can recover the cost-A and B during the life span of the fish pond. It is established from the analysis that the price of Rs. 15 is most economical

as it will recover the cost A,B and C in the fourth year of the production of the pond of one hectare.

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SUMMARY:

With the establishment of Fish Farmers Development Agency in Himachal Pradesh i in 1983, the fish culture in the State is developing. The farmers are being given various incentives and technical support to develop waste lands, swamps and derelict water areas to adopt the fish culture as a supplementary occupation with agriculture to increase their income by utilising the disguised human labour in the rural economy of the State.

In view of the increasing response of the farmers for excavating new ponds for fish culture, it was found necessary to work out the economics of the fish ponds in the State. In the present study, the break even level of output at different levels of the cost and prices

have been worked out by applying the tools of financial analysis. An attempt has also been made to work out the net returns and input-output ratios at the different price situations.

From the analysis, it has been found that at the sale price of Rs. 10 per kilogram of fish, thebreak- even level of output is 1,760 kilogram whereas the average production of the fish pond is 1,222 kilogram . The break-even output level at the sale price of Rs. 12 at cost-A is 1,333 kilogram which indicates that cost-A the price structure of Rs. 12 is Economically viable. The study shows that the fish culture is only a profitable venture if the sale price available to the farmer is anything between Rs. 12 to Rs. 15 per kilogram of the fish at the prevailing input use and prices of the inputs in the State.

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