Pak. J. Agri. Sci., Vol. 41(3-4), 2004

ECONOMICS OF FISH PRODUCTION AND MARKETING IN SALINE AREAS OF THE CENTRAL PUNJAB

Muhammad Qasim, A.D. Sheikh, Mazher Abbas and Muhammad Kashif
Technology Transfer Institute (PARC) AARI Faisalabad

Fisheries play an important role in Pakistan's economy and are considered to be an important source of livelihood for the coastal inhabitants. Apart from marine fisheries, inland fisheries are very important source of animal protein. A thorough and in depth study examining the economics of fish farming along with its impediments was needed. Therefore present study was conducted with the specific objective to investigate the cost structure, revenue and profit of fish farming in saline areas. Sample of 33 farmers was taken as study respondents at random. It was found that fish seed used were 2226 per hectare. In percentage terms Rohu and Grass Carp more than other species. The cost of establishing one-hectare fish farm was 41142. Mortality rate was 2.37 %. Fish production was 1524 kgs per hectare. It was also found that sale price was Rs. 55 per kg. Total variable cost per hectare and total revenue (Rs.87043 and Rs. 127531 respectively) of the fish farmers who raised fish on non saline soils was higher than those (Rs. 45513 and Rs. 73219) of saline soils. Profit (Rs. 40488 per hectare) of fish farms of non saline soils was high as compared to that of saline soils (Rs. 30029).
Key words: Economics, Fish, Farming and Saline Areas

INTRODUCTION

Per capita consumption of animal protein is lowest in Pakistan due to low availability and mal-distribution of quality proteins. It is only 28.2 grams per day as compared to 113.7 grams in U.S.A., 111.3 grams in Australia, 102.6 grams in New Zealand and 45.2 grams in Philippines (Hussain 2001). In fact there is a real deficiency of food of animal origin. The per capita availability of meat in Pakistan is 14.8 kg per annum (Govt. of Pak., 2002), which is far below the dietary standards recommended by international food agencies. According to joint group of FAO/WHO experts, protein intake for adults should not be less than one gram of protein per kilogram of body weight (Ahmad 1990). The people are suffering a slow insidious deterioration of their health and physique without even realizing it. To overcome the deficiency of proteins in addition to increasing cattle and poultry population, the development of fish farming is necessary.

Fisheries play an important role in Pakistan's economy and are considered to be an important source of livelihood for the coastal inhabitants. Apart from marine fisheries, inland fisheries (comprising of rivers, lakes, ponds and dams etc) are very important source of animal protein. Fisheries share in national income is substantial through export earnings.

During the period July-March 2001-02, 63.129 metric tones fish and fishery products valued at Rs. 5.9 billion were exported. During the same period, the total fish production was estimated at 654500 metric tones, of which, share of marine sector was 473000 metric tones and inland contribution was 181500 metric tones (Govt. of Pak., 2002).

Individuals engaged in fisheries during 2001-02 were 361000 as compared to 272240 during 2000-01 (Govt. of Pak., 2002). Out of which, 137000 persons (38 %) were engaged in marine sector and 224000 persons (62 %) in inland fisheries.

The fisheries sub-sector has great potential for its growth as a source of animal protein. Economics and marketing of fish farming culture plays an important role in its development.

Fish farming can also be practiced on abandoned land, unsuitable for agriculture and where ground water is brackish. This may include large areas of the central Punjab where proper production of field crops is difficult. Quality fish can be raised in these areas. Districts Faisalabad and Toba Tek Singh have large saline/waste lands along with suitable climatic conditions for fish farming. As a consequence, more farmers are expected to enter into fish farming. A thorough and in depth study examining the economics of fish farming along with its impediments was needed. Therefore present study was conducted with the specific objective to investigate the cost structure, revenue and profit of fish farming in saline areas.

MATERIALS AND METHODS

The study was based on primary data. A farm level survey was conducted in March 2003 in saline areas of districts of Faisalabad and Toba Tek Singh. Interview schedule was used for data collection. Randomly selected farmers were taken as study respondents,

representing all the geographical and soil conditions prevailing in both of the districts.

For the purpose of data analysis, fish farmers were divided into two categories i.e. small and large. The fish farmers with fish farm size less than or equal to 2 hectares were considered as small fish farms, whereas fish farmers having fish farm size larger than 2 hectares were placed in large fish farm. Cross tabs, percentages and means were used to analyze the data.

RESULTS AND DISCUSSION

Table 1. Fixed cost on establishing fish farm (Rs. per hectare) by farm size

Cost	Farm size categories		All
	Small	Large	
Excavation charges	34515 (80)	31483 (84)	33504 (81)
Construction of moga screen	862 (2)	873 (2)	866 (2)
Initial cost of water	7548 (18)	5221 (14)	6772 (17)
Total	42924 (100)	37577 (100)	41139 (100)

*The figures in parentheses are percentages.

Fixed cost on establishing fish farm

Rupees 41139 were spent for establishing one-hectare fish farm in the study area (Table 1). Fixed cost per hectare in small fish farm size was Rs. 42924. It was comparatively low in large farm size where the cost was Rs. 37577. In fixed cost, major share was of excavation charges (81 %).

Variable and total cost

Table 2 reveals that on the per hectare basis variable cost incurred was Rs. 53064 It was Rs. 41735 in large farm size and Rs. 58729 in small farm size. The reason of high variable cost in small farmers was the much higher cost of regular water supply and cost of seed. There was no provision of canal water specific for fish farming. Farmers have to run tubewell for filling their fish ponds. The costly electricity increases their cost of production too much. Consequently the highest cost among variable cost categories was cost of regular water supply. Its share was 71 % on overall basis. Its share in variable cost of small farms was 74 % and of large farms was 63 %. Quality seed was not available to fish farmers, especially small farmers.

Table 2. Variable cost of fish farms (Rs. per hectare) by farm size

Type of Cost	Farm size categories		All
	Small	Large	
Cost of regular water supply	43790 (75)	26204 (63)	37928 (71)
Cost of seed	4369 (7)	2109 (5)	3616 (7)
Cost on feed	6028 (10)	6746 (16)	6267 (12)
Labor cost	1207 (2)	1557 (4)	1324 (3)
Marketing cost	3334 (6)	5120 (12)	3929 (7)
Total variable cost	58729 (100)	41735 (100)	53064 (100)

*The figures in parentheses are percentages.

The seed available from private hatcheries is of poor quality and costly. This results in poor fish growth, less yield and ultimately low profitability. This problem is more severe to small farmers as most of them have no nursery ponds. They need large sized seed, which is not available at proper time.

Table 3 reveals that on overall basis per hectare cost was Rs. 92206. In large farm size it was low (Rs. 79313 per hectare) as compared to small farm size (Rs. 101653 per hectare). In total cost, share of fixed cost was 44 % while of variable cost was 56 %.

Table 3. Total cost (Rs. per hectare) by fish farm size

Cost	Farm size categories		All
	Small	Large	
Fixed cost	42924 (42)	37577 (47)	41142 (44)
Variable cost	58729 (58)	41735 (53)	53064 (56)
Total cost	101653 (100)	79313 (100)	92206 (100)

*The figures in parentheses are percentages.

Production and sale price

On overall basis mortality rate was 2.37 %. In case of large farm size it was 1.95 % and in case of small farm size it was 2.58 %. Table 4 reveals that on overall basis fish production was 1524 kgs per hectare. In case of large farm size it was 1604 kgs per hectare where as it was 1472 kgs per hectare in small farm size. It was also found that sale price was Rs. 53 per kg. The sale price (Rs. 62/kg) in case of large farms was much higher as compared to that (Rs. 51/kg)) of

small farms. The reason for this was that majority of small fish farmers contracted out their fish ponds to pre-harvest contractors who paid them less.

Table 4. Production and sale price by farm size

Item	Farm size categories		All
	Small	Large	
Production (kg/hectare)	1472	1604	1524
Sale price (Rs/kg)	51	62	53

Marketing of fish

Marketing methods and market cost of fish are presented in Table 5 and 6, respectively.

Marketing methods

Farmer adopted two methods for marketing of fish produce. First method is contracting out fish farms to pre-harvest contractors. In this method contractor visits fish farms. Here rate for different fish species of different weight is settled. Then contractor harvests the produce. It is weighed at the spot and payment is made. In few cases contractor estimates the production of pond by experimental netting and then offers price to fish farmer for the whole pond. In this way contract is finalized. Second method of marketing fish produce is self-marketing. In this method fish producer takes his produce to wholesale market and sells it in open bid.

Table 5 shows that on overall basis almost two third fish farmers sold fish to pre-harvest contractors whereas one-third farmers marketed themselves. Almost three-forth small farmers contracted out their fish farms. The reason for contracting out of fish farms by small farmers was lack of market information. Almost half of large farmers performed self-marketing. The reasons for this were adequate market information and commission agents do not charge any commission from them.

Table 5. Marketing methods of the farmers by farm size (% farmers)

Marketing methods	Farm size categories		All
	Small	Large	
Contract	73	36	61
Self-marketing	27	46	33
Contract + self-marketing	--	18	6
Total	100	100	100

Marketing cost

Table 6 reveals that on overall basis Rs. 3929 were spent on the marketing of one-hectare produce. In small farm size it (Rs. 3334 per hectare) was low as compared to large farm size (Rs. 5120 per hectare). The reason was that mostly small farmers contracted out their fish produce. In this method they don't have to bear harvesting, transportation and commission costs.

Table 6. Marketing cost (Rs. per hectare) by farm size

Type Cost	Farm size categories		All
	Small	Large	
Harvesting cost	1560	3639	1919
Transportation cost	953	1294	1050
Commission	1321	237	960
Total marketing cost	3334	5120	3929

Total revenue and gross margins

So far as receipts of fish farms are concerned, Table 7 showed that on all fish farms (saline and non saline soils), revenue was Rs. 83094 per hectare and gross margins were Rs. 30029 per hectare. Revenue and gross margins in large farm size (Rs.99883 and 58148 per hectare) were much higher than those of small farm size (Rs.74699 and 15970 per hectare). These results show that as the fish farm size increased economies of scale started working.

Table 7. Total variable cost, total revenue and gross margins (Rs. per hectare) of fish farms by farm size

Item	Farm size categories		All
	Small	Large	
Total revenue	74699	99883	83094
Total variable Cost	58729	41735	53064
Gross margins	15970	58148	30029

Comparison of total variable cost, total revenue and gross margins by land types

Fish farming was being carried out on saline as well as on non-saline soils in the study area. Only few farmers established fish farms on non-saline soils due to their personal interest. Table 8 shows that total variable cost and total revenue (Rs.87043 and Rs. 127531 per hectare respectively) of the fish farmers who raised fish on non-saline soils was higher than those of saline soils (Rs. 45513 and Rs. 73219 per hectare respectively). Thus in the study area gross margins of fish farms on non-saline soils were high (Rs. 40488 per hectare) as compared to saline soils (Rs. 27705 per hectare).

Table 8. Comparison of total variable cost, total revenue and gross margins (per hectare) by land types

Item	Land types		All
	Saline	Non-saline	
Total revenue (Rs.)	73219	127531	83094
Total variable cost (Rs.)	45513	87043	53064
Gross margins (Rs.)	27705	40488	30029

CONCLUSION

- In initial establishment of fish farms, the highest cost is of excavation charges. Overall fixed cost on establishing fish farms was Rs. 41142 per hectare. There is no provision of canal water for fish farmers. The tubewell water is too costly and it significantly increases the cost of production of fish farming.
- On overall basis mortality was 2.37 % and fish production was 1524 kgs per hectare, which is low. The potential production mentioned by fisheries department, is 2411 kgs per hectare.
- The sale price was Rs. 53 per kg. In case of large farmers it is too much high (Rs. 62/kg) as compared to that (Rs. 51/kg) of small farmers. The reason was that small farmers mostly contract out their fish ponds to pre-harvest contractors who pay them less. On overall basis marketing cost was Rs. 3929 for marketing, produce of one hectare.
- Total revenue was Rs. 83094 and variable cost was Rs. 53064 per hectare while gross margins were Rs. 30029 per hectare. Gross margins (Rs. 58148 per hectare) were much high in case of large farms as compared to that (Rs. 15970 per hectare) of small farms. This shows that at 2-hectare fish farm size the economies of scale start working.
- A few farmers established fish farms on non-saline soils due to their personal interest. In the study area gross margins (Rs. 40488) per hectare of fish farms non-saline soils were high as compared to that of (Rs. 27705) saline soils.
- Overall fish farming was a profitable activity at saline soils as well as non-saline soils. Costly water and poor quality seed are main hindrances in the profitability of saline fish farming. The fish farming profitability in saline areas can be increased further by providing cheap water and quality seed at reasonable price, to fish farmers.

REFERENCES

Ahmad, Z. 1990. Economics of fish farming in district Sahiwal. M.Sc. Thesis, University of Agriculture, Faisalabad.

Hussain, A. 2001. Marketing of fish in district Lahore. M.Sc. Thesis, University of Agriculture, Faisalabad.

Government of Pakistan. 2002. Economic Survey of Pakistan. Economic Advisor's Wing. Finance Division Islamabad.

Instructions for fish farming. Fisheries Department, Punjab.