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An exploratory study on production and economics of fishing in Pong Dam wetland of district Kangra

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Abstract

The Pong dam wetland is the largest man made wetland of district Kangra of Himachal Pradesh. This reservoir covers an area of 24,529 ha. The local people adjoining the Pong wetland exploit the wetland for food grain production and fishing. Thus, it provides significant role in their household system. The Department of Fisheries in Himachal Pradesh initiated commercial fishing soon after the emergence of the reservoir. Scanty attempts have been made in the past for estimation of economic benefits accrued from the wetland. The present study was carried out in Pong Dam wetland. The fishing households were randomly selected. The total cost of fish capture was INR 47,427 per fisherman. The fixed cost accounted for 14.44% of total cost. The total variable cost incurred on fishing was INR 40,579/fisherman/annum which accounted for 85.56% of the total cost. The gross income obtained by a fisherman from fishing was INR 96552 per annum. The net return over variable cost and total cost was positive indicating profitability of the fishing to the fishermen. The return on investment was 2.03. Season wise fish catch per fisherman was highest in winter (272.78 kg/fisherman) followed by rainy (163.24 kg/fisherman) and summer (137.61 kg/fisherman). The average production per day was about 2 kg per fisherman. The fishermen share in consumer's rupees was highest (75%) in winter. The per kg expenditure incurred by the contractor for marketing of fish was INR 11/kg. Since the fishing business is adopted by large population, therefore, the royalty and commission charged from the fishermen need to be reduced. The co-operative societies should provide facility of mechanized boating at subsidized rate to enhance the efficiency and income of the fishermen.

Key words: Wetland, fish production, return, return on investment, fishermen share in consumer's rupees

Wetlands are recognized as the most productive ecosystem on the earth for their vital role in sustaining a wide array of bio-diversity and providing goods and services to the society. These support millions of people not only living in their periphery but outside the wetlands as well (Katarina 2008). The Ministry of Environment and Forests, Government of India, has declared at least 21 wetlands of national importance in the country. Out of these, three wetlands- Pong Dam, Renuka and Chandertal are situated in Himachal Pradesh. The state of Himachal Pradesh has 27 natural wetlands covering an area of 15 km^2. Besides, there are 5 manmade wetlands covering an area of 712 km^2. The Pong dam wetland located in district Kangra, is one of the largest man made wetland in Himachal Pradesh. The catchment area of the wetland is 12560 km^2. This reservoir covers an area of 24,529 ha. The wetland portion is 15,662 ha. Pong dam wetland was declared a Ramsar wetland site on account of its rich waterfowl diversity and sustainable use of the wetland. The local people adjoining the Pong wetland exploit it for food grain production and fishing. Therefore, it provides significant role in their household system. The Department of Fisheries in Himachal Pradesh initiated commercial fishing soon after the emergence of the reservoir. The exploitation of wetland is done in common property resources regime. Due to the free ridership of wetlands, the pace of degradation is quite high. Scanty attempts have been made in the past for estimation of economic benefits from this wetland. Therefore, in the present study, an attempt has been made to study returns accrued to sample households from fisheries.

Materials and Methods

The present study was carried out in Pong Dam wetland located in Kangra district of Himachal Pradesh. It was purposively selected to examine the benefits accrued to the farmers of catchment area. Two-stage sampling design was employed for the selection of sample. At first stage eight villages were randomly selected from the Pong dam wetland. At the second stage the sample of ten households was randomly drawn from each selected village. The total sample consists of 80 households. Both primary and secondary data were collected in order to fulfill the specific objectives of the study. The primary data were collected on well designed pre-tested schedule. The study was undertaken during the agriculture year 2014-15. The suitable analytical tools were employed to analyze the data.

Results and Discussion

Fish production and revenue to Government

The fish production, fish value and revenue to the government have been presented in Table 1. It was observed that there was no definite trend in production of fish over the years. The production of fish ranged between 284 tonnes in 2008-09 to 391 tonnes during 2001-02. However the value of fish increased over the years. This may be due to increase in prices of the fish. The Himachal Pradesh government earns income from fishing in the form of royalty, license fee and fish auction. There was increasing trend in the income of state Govt over the years. The total revenue earned by the government increased from INR 30.79 lakhs during 2001-02 to INR 70.60 lakhs during 2013-14 showing an increase of 129.30%.

The percent change in fish catch and revenue over 2001-02 has been presented in Table 2. It was observed that there was no definite trend in the decrease of production over 2001-02. The per cent decrease varied from -27.45 (2008-09) to -21.37 (2013-14). Over the years the value of fish showed an increasing trend upto 2013-14. The value of fish during 2013-14 has increased by 137% over 2001-02. This may be due to increase in the prices of the fish in the market. The total revenue which included royalty, license fee and fish auction fee also showed increasing trend over 2001-02.

Socio-economic characteristics of sampled farms

Socio-economic characteristics of agricultural farmers and fishermen according to gender, age, education and occupation are presented in Table 3. About 53% sampled farms were in the working age group in case of agricultural farmers and 44% in case of fishermen. The average family size was estimated at 6.43 and 5.35, respectively. The literacy rate of the sampled agricultural farmers and fishermen

Table 1. Total fish catch, value and revenue from Pong reservoir

Particular	Year				
	2001-02	2005-06	2008-09	2011-12	2013-14
Total fish catch (t)	390.90	306.40	283.60	286.00	307.36
Value of fish (Lakh INR)	181.81	173.82	201.63	373.00	431.00
Royalty (Lakh INR)	27.31	26.07	30.23	55.91	64.66
License fee (Lakh INR)	1.75	1.75	1.88	2.39	2.62
Fish auctioned & other fees realized (Lakh INR)	1.47	1.54	2.23	2.13	3.29
Total revenue (Lakh INR)	30.79	30.93	35.36	61.93	70.60

Table 2. Per cent change in production value and total revenue over 2001-02

Particular	2005-06	2008-09	2011-12	2013-14
Fish catch	-21.62	-27.45	-26.84	-21.37
Value of fish	-4.39	10.90	105.16	137.06
Total revenue	0.45	14.84	101.14	129.3

was 82.46 and 74.25%, respectively, which was found to be higher among agricultural farmers compared to fishermen. Agricultural farmers (0.5 ha) have higher average size of holdings as compared to fishermen (0.07 ha). Similarly, total number of livestock in terms of standard animal units (SAUs) was found to be higher in agricultural farmers (4.67 SAU) as compared to fishermen (1.31 SAU). The total income of INR 2,92,166 per farm for agricultural farmer was higher than fishermen (INR 1,41,802). The data clearly revealed that the different socio-economic parameters were better for agricultural farmers than fishermen indicating the need for improvement of socio-economic parameters of fishermen. Similar trend was noted from the studies conducted by Balachandran *et al*. (2005) and Kalpana *et al*. (2007).

Table 3. Socio- economic profile of the sample farms

Particular	Agricultural farmer	Fishermen	Total
Age group (years)			
<15	72	20	92
	(18.60)	(18.69)	(18.62)
15-30	103	38	141
	(26.61)	(35.51)	(28.54)
30-45	109	21	130
	(28.17)	(19.63)	(26.32)
45-60	70	21	91
	(18.09)	(19.63)	(18.42)
Above 60	33	7	40
	(8.53)	(6.54)	(8.10)
Total	387	107	494
	(100.00)	(100.00)	(100.00)
Average family size	6.43	5.35	6.18
Literacy rate (%)	82.46	74.25	80.34
Av. land holding (ha)	0.50	0.07	0.39
Livestock size (SAU)	4.67	1.31	3.84
Income /farm	2,92,166	1,41,802	2,54,575

Figures in parentheses indicate percentage

Benefits from fisheries

Prior to the impoundment of the river Beas, a subsistence fishery of inconsequential nature existed in the river and adjoining streams. The average catch hardly exceeded 2-4 kg per fishermen daily. But with the formation of the reservoir, a lucrative fishery started attracting large number of fishermen, who had no other viable means of livelihood. The fishermen accounted about 30% of the total population of catchment area. The fisheries department initiated training course for operating gears in the deeper waters for fishermen. This, inspired a large number of outsees of various communities to adopt fishing as a profession.

Season wise production

Season-wise fish production has been given in Table 4. The fish catch per fisherman was highest in winter (272.78 kg/fisherman) followed by rainy (163.24 kg/ fisherman) and summer (137.61 kg/fisherman) seasons. The average production per day was about 2 kg per fisherman. The value of fish catch season-wise varied between INR 21,330 to INR 49,919. The total income per fisherman earned during the year was INR 96,552. Chauhan (1995) also reported similar results.

Table 4. Season wise fish production and income of sample fishermen (per fisherman)

Particular	Summer	Winter	Rainy	Total
Fish catch	1.50	1.80	2.67	1.99
Total (kg)	137.6	272.7	163.2	573.6
Income (INR)	21330	49919	25303	96552

Cost and returns from fishing

Cost and returns from fishing are presented in Table 5. The fixed cost was INR 6898, which accounted for 14.44% of the total cost. The variable cost includes labour, repair, royalty and commission. The royalty and commission on fish production was paid to government by fishermen. The labour cost was 74% of the variable cost followed by repairs (14.78%) and commission (7.46%). The total variable cost incurred on fishing was INR 40,579. The gross income obtained by a fisherman from fishing was INR 96, 431 per annum. The net return over variable cost and total cost was positive indicating profitability of the fishing business. The return on investment was 2.03. This showed that fishing in the Pong dam reservoir was a profitable venture.

Table 5. Costs and returns from fishing by sample fishermen (INR/fisherman)

Particular	Value (INR)	Percentage
A. Total fixed cost		
Depreciation	4748	10.01
Interest on fixed capital 8%	2100	4.43
Sub total	6848	14.44
B. Variable cost		
Repairs of boats and gill nets	6000	12.65
Labour	30000	63.26
Royalty to the government	1549	3.27
Commission to the co-operative society	3030	6.39
Sub total	40579	85.56
C. Total cost	47427	100
D. Gross Income	96431	-
E. Net Income over		
i. Total cost	49004	
ii. Variable cost	55852	-
iii. Returns on investment	2.03	-

Marketing costs, marketing margins and price spread

Table 6 shows that the net price received by the fishermen during summer and winter season was INR 127 and INR 150 per kg of fish, respectively. The fishermen share in consumer's rupees was highest (75%) in winter. The expenses incurred on marketing of fish include commission to co-operative society and fishery department. The amount of expenses on these activities varied from INR 4.65 per kg in summer to INR 27.50 per kg in winter. The contractors selling price at markets was INR 175 and 200 per kg in summer and winter, respectively. The expenses incurred by contractor for marketing of the purchased fish include labour charges for weigh men, transportation, market fees, ice and other charges. The per kg expenditure incurred by the contractor for marketing of fish was INR 11 per kg in both seasons. The higher expenditure was on transportation followed by ice charges.

Conclusion

The total cost of fish capturing was INR 47,427 per fisherman. The gross income per fisherman was INR 96552 per annum. The net return was positive. The return on investment was 2.03. Fish catch was highest in winter. The average production per day was about 2 kg per fisherman. The royalty and commission charged from the fishermen need be reduced. There was need to provide mechanized boats to enhance the efficiency and income of fishermen.

Table 6. Marketing costs, marketing margins and price spread

Functionary	Summer		Winter	
	INR/kg	Per cent of total	INR/kg	Per cent of total
Net price received by the fishermen	127.00	72.50	150.00	75.00
Expenses incurred by fishermen	28.00	16.00	33.00	16.50
i. commission to co- operative society @3%	4.65	2.65	5.50	2.75
ii. commission to fisheries department @15%	23.35	13.34	27.50	13.75
Contractors purchase price	155.00	88.57	183.00	91.50
Expenses incurred by contractor	11.00	6.29	11.00	5.50
i. Ice	2.00	1.14	2.00	1.00
ii. Labour charges for weigh men	1.50	0.86	1.50	0.75
iii.Transportation cost	5.00	2.86	5.00	2.50
iv. Market fees	0.50	0.29	0.50	0.25
v. Misc. charges	2.00	1.14	2.00	1.00
Contractors sale price	175.00	100.00	200.00	100.00

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