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Fish Production in Nepal: Problems and Prospects: A Case Study of Krishnapur Village Panchayat of Siraha District

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INTRODUCTION

Fish culture is not a new activity for Nepal. Fishing is an ancient occupation in Nepal because Nepal is rich in water resources. Fish is quite welcome in the Nepalese diet because people have been conscious of its nutritional as well as its good taste. Fish-farming also plays an important role in the development of agricultural sector in developing countries like Nepal.

The present study deals with an economic analysis of fish-production and management in the Krishnapur Village Panchayat of Siraha district. According to Ministry of Agriculture, in Siraha district, there are 1062 fish ponds (410.36 hectares). On an average 158 kg fish is daily supplied to Kathmandu from Siraha district. Out of the total quantity of fish supplied to Kathmandu about 20 percent was from this district in the year 1983-84. East-West Highway links this district with Kathmandu. In Krishnapur Village Panchayat of Siraha district, there are 16 ponds and 2 rivers. The study of fish and fisheries of a particular area is very important to determine the potential capacity of the water resources and for better management and production.

OBJECTIVE

The major objective of this article is to develop a production function model or input-output relationship of fish produced in fresh water fish ponds of Krishnapur Village Panchayat, Siraha district. Five independent variables namely: Labour, food, capital investment, year experience in fish culture and land area of fish pond have been used for model building.

However, the specific objectives of this study are:

(1) To analyse the cost-benefit for fish production;

(2) To estimate the Cobb-Douglas production for dependent variable fish and other specified and explanatory variables; and

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(3) To find out the basic problems facing fish farmers of Krishnapur Village Panchayat of Siraha district.

The production inputs or explanatory variables are hypothesized to have positive relationship to fish production, and these variables will be tested for their significance in explaining variation in fish output.

In the present study, Model 1 have used a general linear form of production function because it gives more significant test than other forms and easy to compute. The production function is,

$$\ln O = \ln b_o + b_1 \ln L + b_2 \ln C + b_3 \ln F + b_4 \ln N + b_5 \ln A + e.$$

Where all the variables are measured in physical units:

O = Output of fish in kgs.
L = Labour inputs in mandays.
C = Capital investment in Rs.
F = Food for fish.
N = Year (experience in fish culture).
A = Area of land for fish pond in hectare
b_i = Parameters to be estimated; i = 0,1,2,3,4,5.
e = Disturbance term.

METHODOLOGY

Data Source and Limitations

The present study is based upon cross-sectional data collected from Krishnapur Village Panchayat of Siraha district in 1985. The data were collected by interveiws performing primary field survey. In this panchayat, 16 ponds are of the excavated type. These 16 ponds include all the sizes of ponds (i.e., big, medium, and small) owned by different communities. So, the sample of total 16 ponds are selected for the present study.

The concluding analysis of this study may not be generalized in the context of National aggregate level because of some limitations:

(i) The sample used here is taken from a single village under study of Siraha district which may not be generalized. The pattern of pond, technique of fish-farming and modern knowhow of fish farming differ from region to region of the country.

(ii) The variables used in the present study are few in number. To estimate a realistic production function all the relevant inputs should be included. Here, some inputs are excluded for several reasons, mainly due to unavailability of data and problem of computation. However, the conclusions drawn from the analysis can be helpful in policy making for development of fisheries in the regions.

Theoretical Framework

In this study, only five inputs have been considered. The main hypothesis is that there is significant statistical relationship between inputs, L,C,F,N,A and output of fish.

The main hypothesis can be expressed as follows:

Null	Alternative
$b_o = 0$	$b_o \neq 0$
$b_1 = 0$	$b_1 \neq 0$
$b_2 = 0$	$b_2 \neq 0$
$b_3 = 0$	$b_3 \neq 0$
$b_4 = 0$	$b_4 \neq 0$
$b_5 = 0$	$b_5 \neq 0$

RESULTS AND INTERPRETATIONS

In this study five different types of models have been considered and estimates of the constants and co-efficients are shown in Table 1.

All the variables mentioned here are measured in physical units; output (O) in kgs per Katha in fish pond, Labour (L) in mandays per Katha, capital investment (C) in per Katha, fooding (rice bran) for fish (F) in kgs per Katha, experience in fish culture in year (N), and Area of land for fish pond (A).

$$\ln O = \ln b_o + b_1 \ln L + b_2 \ln C \qquad \ldots (1)$$

In the model (1) the co-efficients of L and C terms significant at 80 percent confidence level of significance are related with output positively. It means the co-efficients of labour and capital are positively significant showing the positive effects on output. From the analysis it is found that 22.52 percent of the total variation in output of fish is explained by the variation in inputs considered here. Adjusted co-efficient of determination is 16.99 percent. F-statistics is insignificant at 95 percent confidence level. Therefore, the Model 1 do not consider that there is a systematic and statistically significant relationship between output and inputs.

$$\ln O = \ln b_o + b_2 \ln C + b_3 \ln F + b_4 \ln N + b_5 \ln A \qquad \ldots (2)$$

Table 1
Production Function, Regression Constant & Coefficient

Model	b_0	b_0	b_2	b_3	b_4	b_5
Model (1)	-1.329	0.742 (0.451)	0.619 (0.669)			
	-1.25	1.64*	0.92			
Model (2)	-1.474	-0.159 (0.46)	1.419 (0.498)	0.412 (0.381)	-0.007 (0.166)	
	-1.33	-0.35	2.84**	1.08	-.04	
Model (3)	7 11	-0.195 (0.58)	0.695 (0.464)	0.116 (0.202)		
	1.67*	-0.034	1.49*	0.57		
Model (4)	-2.122	0.222 (0.336)	-0.145 (0.472)	1.335 (0.527)	0.299 (0.427)	0.037 (0.183)
	-0.45	0.66	-0.31	2.53**	0.7	0.2
Model (5)	-6.093	0.279 (0.303)	0.056 (0.441)	1.768 (0.391)		
	-1.7	0.92	0.12	4.52***		

*Significant at 80 percent confidence level.

**Significant at 95 percent confidence level.

***Significant at 99 percent confidence level.

Note: Standard errors are bracketed.

In the Model (2) the coefficients of two inputs F and N are showing positively related with output at 95 percent confidence level and the other coefficients of two inputs, C and A are showing the negative effect on output. In this model the coefficients do not play the significant role to increase the level of output but may be only slightly effective. The R^2 value is 0.74 which means 74 percent of the total variation in output of fish is explained by the variation in inputs mentioned here. The $\bar{R}^2$ value is 0.68. It means the adjusted coefficient of determination is 68 percent. F-statistics is highly significant at 95 percent confidence level. So, we accept that there is a systematic and statistically significant relationship between output and inputs.

$$\ln O = \ln b_o + b_2 \ln C + b_4 \ln N + b_5 \ln A. \quad \ldots (3)$$

In the Model (3), the inputs, N and A are positively related with output and significant at 80 percent confidence level. The coefficient of capital (C) is negative and shows the insignificant effect on output. The R^2 value is 0.56 which means 56 percent of the total variation in output of fish is explained by the variation in inputs considered here. The $\bar{R}^2$ value is 0.45 which means adjusted coefficient of determination is 49 percent. F-statistics is significant at 95 percent confidence level showing that there is a statistically significant relationship between output and inputs.

$$\ln O = \ln b_o + b_1 \ln L + b_2 \ln C + b_3 \ln F + b_4 \ln N + b_5 \ln A \ \ldots (4)$$

In the Model (4), the coefficient of L,F,N and A are positive and significant at 95 percent confidence level showing positive and significant effects on output. The coefficient of C is negative and insignificant at 95 percent significant level indicating negative, but insignificant effect on output. The R^2 value is 0.76 which means 76 percent of the total variation in output. The $\bar{R}^2$ value is 0.67 which means the adjusted coefficient of determination is 67 percent. F-statistics is significant at 95 percent confidence level showing that there is statistically significant relationship between output and inputs.

$$\ln O = \ln b_o + b_1 \ln L + b_2 \ln C + b_3 \ln F \quad \ldots (5)$$

In the Model (5), L,C, and F are positive and highly significant at 99 percent confidence level. The value of R^2 is 0.71 which means 71 percent of the total variation in output. The value of $\bar{R}^2$ is 0.67 which means adjusted coefficient of determination is 67 percent. F-statistics is significant at 95 percent confidence level. So, there is a systematic and statistically significant relationship between output and inputs.

In few models, the explanatory power is high and that of other is low but the F-statistics is highly significant at 95 percent confidence level. So, we accept the alternative hypothesis $B_i \neq 0$ (where, i = 0, 1,2,3, 4 and 5) showing statistically significant relationship between output and inputs. The coefficient of correlation has been given in the

Table 2, marginal physical products of the inputs has been given in the Table 3 and the average output and inputs are given in the Table 4.

Table 2
Coefficient of Correlation and Determination

Model	R^2	$\bar{R}^2$	R	F-statistics
Model (1)	0.2252	0.1699	0.4746	1.8898
Model (2)	0.7452	0.6815	0.8632	8.0450
Model (3)	0.5577	0.4897	0.7468	5.0446
Model (4)	0.7559	0.6671	0.8694	6.1941
Model (5)	0.7134	0.6693	0.8446	9.9575

Table 3
Marginal Physical Products (Kgs)

Model	L	C	F	N	A
Model (1)	5.8425	0.4458	-	-	-
Model (2)	-	-0.1145	3.1068	96.7813	-0.4698
Model (3)	-	-0.1404	-	163.4949	7.7855
Model (4)	1.7488	-0.1044	2.2298	70.2369	2.4833
Model (5)	2.1968	0.0403	3.8709	-	-

Table 4
Average Production and Average Inputs
(Physical unit per Katha)

Models	$\bar{Y}$ Kgs/Katha	$\bar{L}$ Man-days/Katha	$\bar{C}$ Rs/Katha	$\bar{F}$ Rice bran/Katha	$\bar{N}$ Year exp/ Katha	$\bar{A}$ Pond area/ Katha
Model (1)	1409.44	179.00	1956.88	643.75	6.00	21.00
Model (2)	1409.44	179.00	1956.88	643.75	6.00	21.00
Model (3)	1409.44	179.00	1956.88	643.75	6.00	21.00
Model (4)	1409.44	179.00	1956.88	643.75	6.00	21.00
Model (5)	1409.44	179.00	1956.88	643.75	6.00	21.00

RECOMMENDATIONS

The conclusion derived from the analysis may be helpful in designing policy for the area covered by the present study. The following recommendations are made for the fishery developments.

The study reveals that labour, capital investment, food (rice bran) and fish culture experience were significant factors in fish production and have not yet reached the optimum level. This implies that fish output could possibly be raised by increasing inputs to the optimum level.

Fish could be fed rice bran every day at least once in the morning based on recommended rate or percentage of forthnightly body weight. Feeding of rice bran should be made considering the fish body weight and the growth rate as well.

Fish farmers are facing some basic problems. The major problem encountered by fish farmers are lack of credit facilities, extension services and technical supports. There is an urgent need to upgrade the present level of credit scheme, technical and extension services support programme for the fish farmers. The government can lend support to the industry by extending more credit, technical and extension services support and by implementing a price support programme for the major production inputs.

Fishery industry should be developed on a commercial basis rather than subsistence purposes. For this, raw material (i.e. fingerlings, inorganic fertilizer) and credit should be made available promptly. Such industries could contribute substantially to the household incomes as well as national income it run on commercial lines.

Financial resources for the development of fishery industry should be made available at more concessional rates. There should be provision for operational and development credit schemes based on the feasibility design for the individual fish farms. Extension agents should be posted at regional, district and village level, developing the number of fish farms and area coverage.

The government policies should confine to provide training facilities, seminar and study tour of model fish-farms to the farmers. Fish grower's association or fish farmer's cooperatives should be established in order to aim at better production and harvesting schedule, thereby ensuring appropriate input use and marketing of product. If there is a government subsidy for inputs and price support for fish, producers may be encouraged to intensify their production.

SELECTED REFERENCES

Augusthy, K.T. (1979), Fish Farming in Nepal, Archana Printers, Kottayam (India).

Department of Agriculture Information Section (1985), A Glimpse of Fisheries Development in Nepal, Lalitpur, Nepal.

Dhondyal, S.P. and G.N. Singh (1968), C.B.A. of Fish Culture India, Journal of Agriculture Economics.

DFAMS (1981), Handbook of Agriculture Statistics of Nepal, an additional information from DFAMS, 1982.

HMG/Nepal, Ministry of Agriculture (1985), A Study on Demand and Supply of Fish in Kathmandu, Department of Food and Agriculture Marketing Services.

National Planning Commission (1975), Evaluation of the Fisheries Development Programme, National Planning Commission.

Peace, Crops/Nepal (1983), Fish Culture in Nepal: An Introduction, Kathmandu.

Pokharel, C.M. (1985), Community Fish Farming System in Nepal Terai, A Case Study of Bhawanipur and Hanumanagar Village Panchayat, Siraha District (M.A. Thesis, Anthropology, T.U.).

Sharma, B.P. (1984), Input-Output Relationship of Tilapia Production in Freshwater Ponds, Central Luzon, Philippines (M. Sc. Thesis, Aquaculture).

Shrestha, R.N. (1969), Commercial Fish-Farming in Nepal, (M. Com., Thesis, T.U.).

BOOK REVIEW

Shrestha, B.R. (1990): Managing External Assistance in Nepal (Kathmandu: Jamuna Shrestha), pp. IV + 128, Price Rs. 40.00 (N.C.).

The formal external assistance programme in Nepal, commenced with the "Point Four Programme" of the United States, signed on January 23, 1951. These days, foreign assistance contributes over 60 percent of the official development budget of Nepal. Over the last three decades foreign assistance has been the mainspring, the "driving force" of Nepal's development efforts. The ambitions reflected in each development plan have largely been fuelled by foreign aid. As the magnitude and content of foreign assistance to Nepal have snow-balled, foreign aid has penetrated a wide range of economic and social sectors of the country. In recent years foreign assistance to Nepal has attracted a lot of attention in terms of its utility, and efficacy. The prime reason has been tnat despite increasing quantum of foreign assistance (mostly in the form of grants, though the proportion of loan to grant is on the rise) - and Nepal does not receive the chunk of foreign assistance that is "due" to it relative to other UDCs - the performance of the Nepali economy has remained dismal and the intra-state relationships have become more tenuous.

The book under review is an attempt to analyse the performance of foreign aid in Nepal. The book is informative, comprehensive and critical to understand foreign assistance from different angles. The focus of the book is on the way that foreign aid is managed for effective policy measures to help the economy to develop.

There are ten chapters in this book. Starting with a very brief review of historical background of foreign aid and emergence of bilateral and multilateral assistance in first chapter, the book ends at chapter ten with some remarkable conclusions that Nepal has extremely low absorptive capacity of external resources; and the institutional shortcomings in the administration has disrupted the whole development effort and has caused impediments to the effective utilization of the financial and physical resources.

The second chapter deals with the changing trend of donor agencies. Chapter three and four are on the general review of foreign aid in the Nepalese economy and institutional arrangement for aid mobilization. Chapter five and six are concerned with the evaluation of the performance of external assistance in Nepal's development. Chapter seven focuses on the essence of external assistance in the Basic Needs Programme. Chapter eight and nine deal with the critical review of foreign aid policy and aid management. Suggestions given by the author regarding aid management include improvements in administration and budget procedures, decentralisation of power in practice and control of commission agents etc.

The book is an useful work to identify the role of foreign aid in the process of development. Foreign aid can be an engine of development if it is not mismanaged. The book is useful to planners, policy makers and also to students of international economics.

While going to the other side, some errors can easily be pointed out. There is no publishing (publisher's) date in the book. The due date is found only in the introductory note by the author. The book would have been rated differently had the author throw some light on the impact of foreign aid in socio-economic structure of Nepal. Some scholars of this area are of the view that if anything, foreign aid has camouflaged the contradictions inherent in the Nepali economy and made the traditional status-quo-viable, thus requiring more foreign assistance to maintain itself through time. Nepal therefore presents a rather fascinating case, for the study of foreign aid as it has affected the class structure as exists in Nepal. An analysis of foreign assistance in as much as it is conditioned by the prevailing relations of production and vice-versa would provide a significantly new perspective to the unfolding development scenario in Nepal.

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