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Profitability and Factors Affecting the Mushroom Production in Savar Upazila of Dhaka

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Abstract

Mushroom is getting very popular in Bangladesh with serving notable nutritional components to the consumers. Nutritional components have been explored but yet not explored the socio-economic values and related factors affecting to the it cultivations. Thus, the major attempt of the present study was to assess the profitability and the factors affecting the production of mushroom (Oyster mushroom). Primary data were collected from 50 mushroom farmers of the selected four areas of Savar Upazila under Dhaka district. The area was purposively selected considering the concentration of different mushroom farmers. From the view point of Gross Margin and net return, mushroom is a profitable business that found in the study area**.** Gross cost, gross returns and undiscounted BCR per year of mushroom production per season was Tk. 284009.62, Tk. 463954.80 and 1.63 respectively. The Cobb-Douglas function was applied for analyzing the functional effect on mushroom production. The functional analysis indicated that per year gross returns were significantly influenced by the level of education, use of human labor and number of spawn (seed) packets of the farmers.

Keywords: Factors, Mushroom, Profitability

Introduction

Bangladesh is one of the most densely populated countries of the world. Agriculture is the dominate sector of the country where over 70% people are related to the agricultural work. In our GDP, agricultural sector contributes almost 14.79% (BBS, 2016). The growth rate of Bangladesh is about 7.1 and GDP is $1465 (FY-2016). But about 15 million people are ultra-poor and another 30 million people live under the poverty level (The Daily Sun, 2017). As a result government has to consider not only increasing food production in an intensive method but also to assure a balanced diet to the people at a lower price and fulfillment of SDGs goal 2. Mushroom production is getting a very popularity on the basis of nutritional point of view. Mushroom production comes into consequence as it has been considered as nutritious and delicious food since earliest time and recognized as distinct source of vegetable protein. Protein content of edible mushrooms ranges from 1.75 to 3.63% of their fresh weight and 20 to 35% as dry matter. Two essential amino acids that are deficit in cereals are rich in mushroom. It also provides significant number of vitamins (B_1, B_2, B_{12}, C, D and E). Different trace materials such as zinc or selenium are also provided by mushrooms (Banglapedia, 2004). Food And Agricultural Organization has recommended edible mushrooms as a source of protein nutrition of developing countries for rapid economic development (FAO, 2000). Besides, Mushrooms are benefitted for the treatment of different diseases like cancers, diabetes, blood pressure, immunity and weight management issues. Farming it requires no extra land and can be grown in room by racking vertically on locally available cheap substrate materials. The farming also requires little capital, short time, low technology and no chemicals. Thus, it is a lucrative and profitable cottage industry for low income rural households providing full and part time employment to rural and urban poor and marginal people in many developing countries (Easin *et. al.,* 2017).

The lack of research work in this sector is the main hindrance of the growth of mushroom production. Very little economic study on mushroom cultivation at farmers' level has been conducted in order to satisfy the demand of extension workers, policy makers, research personnel, Non-Government Organization officials and the farmers. This is a study on the economic potential of mushroom production particularly on the small and marginal farmers. This study is expected to reveal the economic potential and problems of mushroom cultivation in Bangladesh. Considering the above importance of mushroom this research aims to estimate the profitability of the mushroom farming; and to assess the major factors affecting the return of mushroom production.

Methodology

Data and sampling procedure

The data were collected using interview method through a well-structured questionnaire. A mixed sampling method was adopted for this study, where purposive and random sampling techniques were utilized to draw the study areas and respondents. The first stage involved the purposive selection of four areas- Radio colony, Jamsinghpur, Jalesshor, Ranishor in Savar Upazila of Dhaka district. On the next stage a total of 50 farmers were selected from these four areas following simple random sampling methods, whereas taking 15 farmers from each Radio colony and Jamsinghpur and rest 20 from other two areas. Data were collected during August-September 2017.

Analytical technique

A combination of descriptive and statistical techniques as demanded by the study was used to achieve the objectives and to get the meaningful results. The descriptive statistics were used to describe the socio-economic characteristics of mushroom producing farmers in the study area. The farm budget analyses which include revenue, cost, gross margin and net farm profit were utilized for the estimation of cost and return of mushroom production in the area. The Gross Margin which is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC) was utilized to estimate the profitability of mushroom production in the area. The gross margin model is expressed as:

$$GM = TR - TVC$$

Where,

GM = Gross Margin; TR = Total Return; and TVC = Total Variable Cost

Furthermore, Net return was calculated by deducting all costs (variable and fixed) from gross return. To determine the net return of wheat production, the following equation was used in the present study:

$$\prod = \sum P_m.Q_m - \Sigma (P_{xi}.X_i) - TFC$$

Where, $\prod$ = Net return (Tk/cycle); P_m = Per unit price of produce (Tk/kg); Q_m = Quantity of the production per hectare (kg); P_{xi} = Per unit price of ith inputs (Tk);

X_i = Quantity of the ith inputs per hectare (kg); TFC = Total fixed cost (Tk); and

i = 1, 2, 3,....., n (number of inputs)

After this, the BCR was estimated as a ratio of gross returns and gross costs. The formula of calculating BCR (undiscounted) is shown below:

$$\text{Benefit Cost Ratio} = \frac{Gross\ Benefit}{Gross\ Cost}$$

Functional analysis

In order to estimate the effects of key variables in mushroom cultivation, the Cobb-Douglas form of production function was used in the study. The specification of the Cobb-Douglas production function for wheat production was as follows:

$$Y_i = aX_1^{b1}\ X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} e_i$$

By taking log in both sides the Cobb-Douglas production function was transformed into the following form because it could be solved by the ordinary least squares (OLS) method.

$$\ln Y_i = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5$$

Where:

Y_i= Gross return (Tk./year); ln a= constant or intercept of the function; X_1= Age of farmer (year);; X_2=Level of education; X_3= Number of spawn packet (number/year); X_4= Human labor cost (Tk./year); X_5= Cost of poly-bags (Tk./year); b_1, b_2 ,é .., b_5 = Coefficient of respective variables; ln = natural logarithm; i= 1, 2, 3,é .., n; e_i= Error term.

Results and Discussion

Profitability analyze

Usually farmers of the study area produce mushroom mostly with the ready bag method. Farmers had to pay cash for the purchased inputs and it was easy to calculate the cost of these inputs but for home supplied inputs, the opportunity cost was used. The prices of the purchased inputs were taken as the true value of the family supplied inputs. The rate of purchased inputs, for the same item even, varied for different farmers and therefore, these prices were averaged for each item and the average market price was used. In mushroom cultivation, various input costs like human labor cost, cost of spawn packet, cost of paddy straw, cost of poly-bags and miscellaneous cost including transportation and electricity bill are considered as variable costs. Summation of the costs of variable inputs made total variable costs (on an average per farmer) which were Tk. 245966.622. It represents 86.60 percent of the total cost of production. Thakare, *et al.* (2004) found that variable cost was 66.42% of the total production cost in India. On the other hand, fixed cost of mushroom cultivation includes house of mushroom, shelves, bucket/drum, and sprayer. It was Tk. 38,043 on average per year per farmer. These occupied about 13.4 percent of total cost. Gross cost was

calculated by adding all the cost of variable and fixed inputs. In the present study per year average gross costs of mushroom cultivation were Tk. 284009.622. As a result, Gross return of per spawn packet (400-500 gm) was drawn Tk.664.69. Harvesting of mushroom started after 5-7 days of spawn preparation. Farmers can get mushroom maximum three months from the same spawn. After three months, the spawn packets are over mature for fruiting. The average per year mushroom (fresh) production from a mushroom cultivator is 2272.5 kg and per unit price is Tk. 187.80/kg. On the other hand, 10 kg fresh mushroom = 2.5 kg dry mushroom. So, average dry mushroom yield per year 29.04 kg and per kg price is Tk. 1655.68. Net return of per spawn packet (1 kg) was estimated BDT. 257.80. According to the study of Thakare *et al.* (2004) net return per kilogram was Rs. 24.04 in India. The finding further revealed that per year gross margin of mushroom production Tk. 240348.78. Furthermore, per year net return was calculated Tk. 179945.178. In this study, BCR of mushroom cultivation was calculated as a ratio of gross return and gross cost. Per year BCRs were estimated at 1.633. Salehi *et al.* (2014) studied the energy balance between the input and the output per unit area for button mushroom production in Isfahan province of Iran, where they obtained BCR 1.15.

Factors affecting the mushroom production

Cobb-Douglas production function model has been chosen to determine the effects of selected inputs on mushroom cultivation. Production of mushroom was assumed to be influenced by five cost items namely: education (X_1), age (X_2), number of spawn packet (X_3), human labor cost (X_4) and cost of poly-bags (X_5).

Table 1. Estimated Values of Coefficient and Related Statistics of Cobb-Douglas Production Model

Explanatory variables	Estimated Coefficient	T-Values	Standard Error
Intercept	3.127*	2.017	1.550
Age (X1)	0.0806	0.808	0.099
Education (X2)	0.171**	3.079	0.055
Number of spawn packet (X3)	0.885**	3.205	0.276
Human labor cost (X4)	0.315**	3.952	0.079
Cost of poly-bags (X5)	-0.280	-1.073	0.261
Adjusted R^2	0.924	-	-
F-Value	120.415	-	-
Returns to Scale ($\times b_i$)	1.173	-	-

Source: Field Survey (2017), Note: * Significant at 1 percent level, ** Significant at 5 percent level

Among these variables, the coefficients of age (X_2) and cost of poly-bags (X_5) variables were found statistically insignificant which indicates that age of farmers and cost of poly-bags were not a main factor for playing an important on gross return of mushroom farms. On the contrary, the value of the coefficients of education (X_1), number of spawn packet (X_3) and human labor cost (X_4) were found statistically significant in Table1. Which indicates that education level of the farmers, number of spawn packets and human labor cost have significantly influences on mushroom production. It means that one percent change in education level, spawn packet and human labour that mushroom production will have increased by 0.17, 0.88 and 0.32%, respectively with *cetirus peribus*. Moreover, the value of the coefficient of multiple determinations (R^2) was 0.92. It indicates that about 92% of the variations of the gross return are explained by the explanatory variables included in the model. Besides, the summation of all the regression coefficients of the estimated production function of was 1.17. This implies that the production function exhibits increasing returns to scale. That is, the farmers were

operating their mushroom farming in the first stage of production function. In this case, if all the variables specified in the production function were increased by one percent, gross return would increase by 1.17%.

Problems faced by the mushroom farmers

For the simplifying of the study, the major problems were divided into different categories. The following financial, technical, marketing, social and govt. policy problems have found during the research time. The problems were ranked on the basis of the samples household perceptions:

1. Financial problems included: Credit problem; Scarcity of capital; High cost of production

2. Technical problems included: Non-availability of spawn; Control of environment; Attack by pest and diseases; Low quality of spawn packet

3. Marketing problems included: Market non-availability; High profit by middle man; Assurance of getting income; Market price instability; Price information; Transportation and road

4. Social problem included: Awareness; Social acceptance; Rich people food

5. Government policy problem included: No subsidy on input; Govt. interferes; Taxes imposed

Conclusions and Recommendations

On the basis of the findings of the present study it can be concluded that, significant scope apparently exists in the study area to increase the productivity of mushroom and to raise income, employment and nutritional status of the people. Mushroom cultivation improved the socioeconomic status of the respondents and showed positive results. It also showed that landless people can generate their income by cultivating mushroom and it proved to be a potential tool for poverty alleviation in the rural and urban areas. Though Bangladesh does not have enough land acreage to feed the people, she is blessed with a low cost labor, plentiful supply of raw material and other inputs, technical know-how suiting our favorable climate conditions. The marketing infrastructure of Bangladesh for mushroom is very poor which is not being taken care of. Besides, introducing different agricultural term loans to the mushroom cultivators, motivating and training the cultivators to produce not only the raw mushroom but also produce variety mushroom products, introducing advanced storage facilities are the recommendations of the study. All these can be viable through the strengthening of the Mushroom center development project. It is really urgent demand to promote mushroom cultivation as a weapon of poverty alleviation poverty through income and employment generation which are the priority areas in the government program.

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