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Financial profitability of green chilli production: a case study in Bogra district of Bangladesh

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Abstract

The study aims to assess financial profitability of green chilli. Fifty producers of green chilli from three upazila of Bogra district were selected for study purpose. A structured questionnaire was constructed for data collection. The results are as descriptive statistics and interpreted based on farmer feedbacks. Findings include that total cost (TC) for green Chilli is Tk. 128011.13; gross return (GR) of Green Chilli is Tk. 240864; gross margin (GM) for green Chilli is Tk. 137698. All the calculations are based on per hectare. Thus, producing green Chilli net return (NR) is Tk. 112852.87. The green chilli is attractive for farmers to produce as its benefit cost ratio (BCR) shows 1.88 in our study. Lack of agricultural credit, lack of farmer's association and lack of crop insurance were the major problems for green chilli cultivation. Farmers expect to avail sufficient credit facilities along with regular government extension services, strong market monitoring authority and better transportation facilities for assisting Chilli cultivation. Moreover, a farmers' association is needed to be formed in chilli production area.

Keywords: Yield, Costs, Returns, Benefit-Cost ratio and Problems

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I. Introduction

Agriculture is the key driver of the growth of Bangladesh economy. The overall contribution of the agriculture sector was 14.23 percent in GDP during the year 2017-18 (MoF 2018). Along with major crops, several minor crops are being cultivated to feed the huge population of Bangladesh. Apart from the dominant rice-based cropping systems of Bangladesh, wheat, maize, potato, pulses, oilseed and wide range of summer and winter vegetables are grown in the country. Inputs requirement (i.e., seeds, fertilizers, pesticides and insecticides, labour, water etc.), profitability, marketing and value chain studies of these crops are important for productivity and farm return (Hossain and Siddique, 2015; Sultana et al. 2015; Siddique et al. 2015). In this regard, chilli is a valuable spice and also an important cash crop in Bangladesh. People prefer and consume it (both dried and green) for its color, pungency and spicy taste (Mathukrishnan et al. 1993). It is a vitamin (both A and C) rich crop. Moreover, we get

iron, magnesium and potassium from chilli. It has medicinal values also. About 103381.49 ha of land of Bangladesh is under chilli cultivation in both Rabi (winter season) and Kharif (spring and summer season), the production is about 136,872 metric ton (Figure 01). Only 0.81 metric tons per hectare was the national yield per hectare for Chilli in Bangladesh in 2002-03 but now it's about 1.32 metric ton per hectare (BBS 2017).

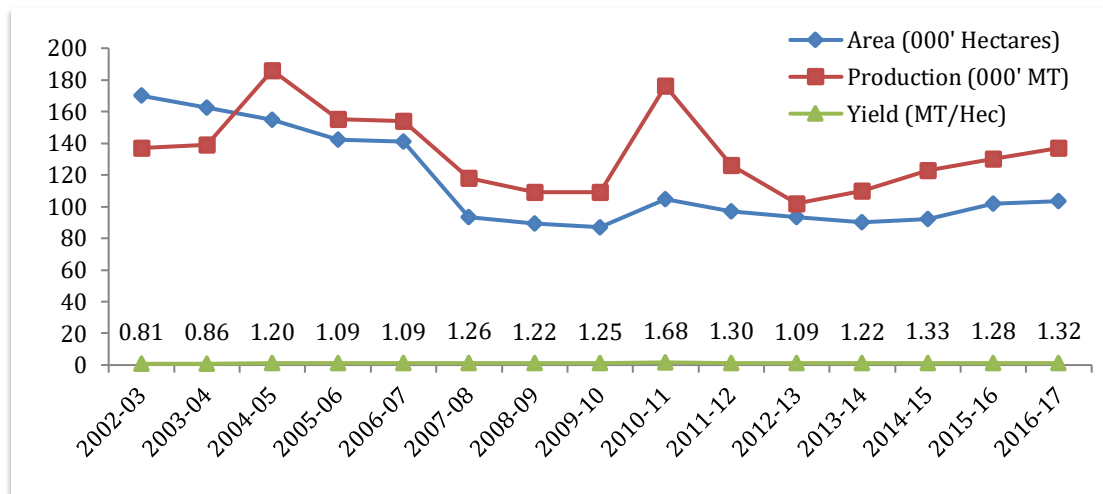


Figure 01. Area, production and yield of Chilli in Bangladesh (BBS 2017).

In Bangladesh, there are comparatively fewer number of studies related with chilli profitability. Among the few studies, [Sabur and Atiar \(1993\)](#) examined the trend, seasonal variability and relative profitability of spices in Bangladesh. The study revealed that the benefit cost ratio of green Chilli production was 1.55. The estimation of financial profitability by [Huda et al. 2008](#) ranked highly profitable spices as following order: ginger, chilli, turmeric, garlic and onion. While [Chowdhury et al. \(2012\)](#) mentioned that net profit margin for green Chilli was 7.26 tk/kg in local market whereas Tk. 13.42/kg for UK and Middle East countries. In addition, [Hoq et al. \(2014\)](#) reported economic studies in Bogra, the northern district where plenty of Chilli are produced by the smallholder farmers. It was observed that green chili cultivation was profitable and per hectare net return was Tk.92,250. Another study revealed that per hectare total cost of Chilli production for small, medium and large farmers were tk. 119909, 134222 and 123626 respectively ([Meoya 2011](#)). Therefore, it is important and justified to analyze the cost and return of green Chilli production in the Bogra District. Thus, the present study was designed to analyze the financial profitability of green chilli, to calculating costs and returns of green Chilli production and to identifying constraints of chilli production faced by farmers. This study hypothesized that green Chilli is a profitable crop to cultivate and chilli farmers of Bangladesh are subjected to the production, socio-economic and marketing barriers.

II. Materials and Methods

Bogra district is one of the leading zones in respect of chilli production in Bangladesh. Thus, three upazila (i.e., Sariakandi, Shibganj and Bogra Sadar) of Bogra district were selected as study area. Data were collected during November to December in the year of 2014. Fifty respondents who cultivate green chilli were selected through purposive or judgmental sampling technique. Interview schedules were prepared based on objectives of this study. After testing the draft schedule, final survey schedules were prepared for the collection of necessary data for the study. Primary data were collected by direct interview with a set of interview schedules prepared for the research. At the time of interview, the researchers asked questions systematically and explained the question whenever it was felt necessary to achieve the goals of this study.

Tabular technique was used to analyze the data. By using arithmetic means and percentages, different costs, gross margins and net profit were calculated in a tabular form. The following formula was used based on [Akter \(2012\)](#) for calculations.

$$GR = \text{Total Production} \times \text{unit price}$$

$$GM = \text{Total return} - \text{Variable cost}$$

$$NR=GR -TC$$

$$BCR=GR/ TC,$$

Where, GR=Gross Return, GM=Gross Margin, NR=Net Return, VC= Variable Cost, TC=Total Cost and Total Cost=Total Variable Cost + Total Fixed Cost.

III. Results and Discussion

Estimation of variable cost

Variable costs are incurred because of the costs of using the variable inputs. These costs vary with the level of production.

Cost of human labor

Human labor shared a large portion of total cost of chilli production. It requires several operations such as land preparation, seed sowing, planting, weeding, fertilizing, harvesting etc.; and was computed in terms of person days. Both women and men laborer worked in the Chilli production. In pricing, the labor no discrimination was made between the family and the hired labor. In the study area, the average wage rate was determined Tk. 200 per man-day. In the study area, women labors were used during the harvesting periods. Per hectare cost of human labor was calculated in the present study was Tk. 61700 which was 48.2 percent of the total cost.

Cost of land preparation

Power tiller is the time and labor-saving modern technology for land preparation. Most of the farmers use power tiller in preparation land, cost of land preparation was estimated Tk. 5430 per ha which was 4.24 percent of the total cost of chilli production.

Cost of seeds

Both home supplied and purchased seed of chilli are used. The average price of Chilli seed was found Tk. 200 per kg. Per hectare cost of seeds for Chilli production was calculated at Tk. 2962 which constituted 2.31 percent of the total production cost.

Cost of organic fertilizers

Usually farmers used cowdung as organic fertilizer in their chilli production. The average market price of cowdung was estimated at Tk. 0.33 per kg. Per hectare cost of organic fertilizer was Tk. 3048 which represents 2.38 percent of the total cost.

Cost of inorganic fertilizers

Different kinds of inorganic fertilizers were used to increase for higher yield of Chilli. The average prices that had to pay by the farmers for per kg of Urea, Triple Super Phosphate (TSP), Murate of Potash (MoP), Di-ammonium Phosphate (DAP), Zinc and Boron were Tk. 16, 22, 15, 25, 30 and 70 respectively. The [Table 01](#) shows per unit price, per hectare total cost and percentage of the total cost of inorganic fertilizer. Per hectare inorganic fertilizer cost for the farmers was Tk. 18056.73 which shared 14.11 percent of total cost.

Irrigation cost

The cost of irrigation water was estimated as the actual amount of money to be paid in cash. Irrigation cost of chilli production was Tk. 7527 per hectare ([Table 02](#)) which constituted 5.88 percent of the total cost.

Cost of insecticide and pesticide

Chilli growers used various insecticides and pesticides. Cost of insecticides per hectare was Tk. 4442.4 which covered 3.47 percent of total cost ([Table 02](#)).

Estimation of fixed cost

Fixed costs are costs that remain same irrespective to production ([Table 02](#)).

Operating capital interest

Operating capital interest was determined by including all cost incurred on various operations in the process of cultivation of Chilli not considering those for which interest was already calculated. As regards the production of Chilli, operating capital interest was calculated at Tk. 3250 which constituted 2.54 percent of the total cost.

Table 01. Per hectare cost of inorganic fertilizers in study area

Name	Quantity (Kg)	Per unit price (Tk.)	Cost (Tk.)	% of total cost of inorganic fertilizers
Urea	302.33	16	4837.28	26.79
TSP	268.395	22	5904.69	32.7
MP	70.96	15	1064.4	5.89
DAP	197.44	25	4936	27.34
Zinc	22.212	30	666.36	3.69
Boron	9.257	70	648	3.59
Total	870.594		18056.73	100

Table 02. Per hectare total cost of green chilli production in study area

Cost Items	Cost (Tk.)	% of TC
A. Variable cost		
Human Labor	61700	48.2
Land preparation	5430	4.24
Seed	2962	2.31
Organic fertilizer	3048	2.38
Inorganic fertilizer	18056.73	14.11
Irrigation	7527	5.88
Insecticides & Pesticides	4442.4	3.47
Total Variable cost	103166.13	80.59
B. Fixed cost		
Operating capital interest	3250	2.54
Cost of land use	21595	16.87
Total Fixed Cost	24845	19.41
Total Cost (A+B)	128011.13	100

Land use cost

It was estimated based on cash rental value of land per hectare. Cost of land use was estimated for the cropping period of one year as per the prevailing rate in the study area. This amount was Tk. 21595 which covered 16.87 % of the TC.

Total cost (TC) of chilli production

Total cost of Chilli production for the present study was calculated by combining both variable and fixed cost. To get the average per hectare cost of all the resources used in the production process of Chilli by the farmers the previous mentioned costs have been summed up in the [Table 03](#). The TC of Chilli production per hectare was estimated at Tk. 128011.13.

Gross return (GR) of chilli production

The average yield of Chilli per hectare was 7527 kg and its respective value was calculated at Tk. 240864 ([Table 03](#)). It may be noted here that the price of chilli was reported to be Tk. 32 per kg which was the average farm gate price in the study area.

Gross margin (GM)

Gross margin is the return over variable cost (VC), subtracting VC from gross return (GR), we computed the GM. Per hectare GM was estimated Tk. 137698 for the green chilli farmers of study area.

Net return (NR)

NR was calculated by subtracting TC from GR. NR was estimated at Tk. 112852.87 per hectare for green chilli farmers. From [Table 03](#) it was clear that green chilli production is profitable for the farmers of the study area.

Table 03. Costs and returns of green chilli production in study area

Particulars	Unit/ Hectare
Yield (kg)	7527
Price (Tk./kg)	32
Gross return	240864
Total variable cost	103166.13
Total fixed cost	24845
Total Cost	128011.13
Gross margin	137698
Net return	112852.87
BCR	1.88
Cost of green Chilli (Tk./kg)	17.01

Benefit cost ratio (BCR)

This study found that average per hectare BCR of green Chilli was 1.88 which signifies its profitability and per kg cost became Tk. 17.01 for green chilli.

Barriers of Chilli farmers

The challenges of chilli farmers were facing are shown in [Table 04](#). Most of the farmers were facing the problem of lack of high yielding varieties. Farmers were also facing the problem of lack of labor availability and extreme weather. One of the important problems of Chilli production is the disease. About eighty percent of all farmers reported about the problem of lack of operating capital and not getting any credit support during the production period of Chilli. Lack of farmers association and crop insurance problems were also crucial for the chilli producers. According to seventy-two percent farmers, Chilli market is controlled by some dominant traders who used to cheat them while buying produce from them and lack of proper market monitoring authority was the main reason behind that.

Table 04. Production, socio-economic and marketing constraints faced by the farmers

Reported constraints	No of respondents	Percentage
Production constraints		
Lack of High Yielding Varieties	35	70
Lack of labor availability	32	64
Extreme weather or flood	28	56
Disease problem	30	60
Socio-Economic constraints		
Lack of crop insurance	38	76
Lack of operating capital/Agricultural Credit	40	80
Lack of farmer's association	39	78
Lack of Public and private sector extension services in the remote areas like chars	33	66
Marketing constraints		
Lack of market monitoring authority	36	72
Lack of market information	31	62
Poor transportation & communication system	37	74

IV. Conclusion and recommendation

The study estimates the financial profitability of green chilli. The principal finding revealed from the study is that green chilli production in the Bogra district was profitable, where per hectare net return was Tk. 112852.87. Though the farmers get profit, they had to face some barriers. Capital shortage problem, lack of farmers association and crop insurance, poor transportation and communication system, lack of marketing monitoring authority were major barrier for the chilli producers. These problems should be addressed properly to make this crop more profitable. Based on our findings, the following suggestions can be considered:

- ✓ Necessary financial assistance and others facilities for production of chilli need to be made available in the region.
- ✓ Roads and communication system should be improved so that medium of transportation can move easily and promptly. Focus to be given to water transport to move cheaply.
- ✓ Market monitoring authority should come forward to take proper actions against the dominant traders.
- ✓ Initiatives should be taken to form farmer association where the farmers can easily share the problems and ideas to each other.
- ✓ Further studies suggested with current market price of necessary variables, with larger sample size/participants to formulate definitive conclusion on profitability of chilli.

Author contribution

Author I.M.I.A., S.S. and M.A.Z.A. collected data; perform data coding, data inputting for analysis and interpretation and the final manuscript writing. Author S.S. contributed in literature review, constructing questionnaire and data analysis and supervising the study. Author M.A.Z.A edited the final manuscript. Authors are grateful to anonymous reviewer for their contribution in this article.

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