

Comparative Profitability Analysis of Mustard and Sesame Production in some Selected Areas of Sirajganj District

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Abstract—The study was conducted in four upazilas of Sirajganj district to compare the profitability of mustard and sesame production. Sixty farmers from each upazila were purposively selected and thus a total of 240 mustard and sesame producing farmers were selected for the study from four upazilas. Primary data were collected from the respondents through well-organized structural questionnaire. The collected data were sorted, scrutinized and analyzed to achieve the objective of the study. Profitably were measured in form of Gross Return, Gross Margin, Net Return and on BCR basis. The results of the study revealed that the production cost in Mustard was higher (53932.00 Tk/ha) compared to sesame production as Tk. 39993.00. Gross return, Gross Margin, and Net Return from mustard production was estimated Tk. 60120.00, Tk.15827.00 and Tk. 6188.00 and those were Tk. 70400.00, Tk. 42046.00 and Tk. 30407.00 per ha, respectively in sesame production. The BCR was estimated from mustard (1.11) and from sesame (1.76). The result of the study revealed that sesame production is more profitable compare to mustard production in the study area. The result of the study clearly indicated the oil seed production is profitable.

Keywords: Oilseed crops, Gross Margin, Net Margin, BCR.

Introduction

Acute shortage of edible oil has been prevailing in Bangladesh during last several decades. This shortage has inherited from the past. Edible oils have crucial roles in human nourishment by providing calories and aiding in absorption of several fat soluble vitamins viz. vitamin A, D, E and K. Minimum 15% of the total calories must come from visible and invisible oils or fats for maintaining good health. Some oilseeds are also a source of good quality protein, vitamins, and fuel. Oilcake is also an important manure for crop production and livestock feed (Miah and Mondal, 2017). Bangladesh has suitable climate and soil conditions for the production of a variety of oilseed species all the year round. But since her independence

to current date there is continuous decline in both acreage and total production of oilseeds except some exceptional years (Rahman and Chowdhury, 2010). The areas under oilseed cultivation in Bangladesh are 420030 ha and production 901477 t (BBS, 2016). The requirement of edible oil is 1.4 million metric tons and a maximum 0.55 million metric tons of its requirement is being fulfill from domestic production (Salam et al., 2012). The shortage amount of edible oil is met through importing from foreign countries. The area of oilseed crop cultivation is decreasing day by day due to various economic and technical reasons (Miah and Mondal, 2017). However, area under mustard has started increasing from 2010 onwards (Miah et al., 2014). The nations have been deficit in oilseed for our requirement, so, needs to pay more attention how to achieve the required oilseed production through low cost technology. Nevertheless, oilseed crops have caught an attention as considerable subsector of the Department of Agricultural Extension (DAE) under the Ministry of Agriculture and planned as the title is “Pulse and oil crops Research and Development Vision: 2030” (Rahman and Chowdhury, 2010).

The agriculture sector and its development depend on farmer’s income, plan, technological support, communication and market price as well. In char land, farmers usually carry out production planning and management in their self-decision as per individual’s capability and relatives requirements. They absolutely can exploit their income by adopting cost-effective enterprises which handle the resource for maximizing the profits and minimizing expenses, ultimately improve the household’s income. It is major issue for all the institutions which are stakeholder the motivating of agricultural livelihood. The cost of production is a cumulative result of fixed and variable costs obtained in crop production.

Information on cost of production and benefit cost ratio are helpful to all the clients' viz. policy makers, agricultural scientist, researchers and farmers communities as well. The present study has been undertaken to compare the cost and benefit of different oilseed crops, using benefit cost ratio technique.

Materials and Methods

Study area and Sampling Technique

Among the oilseed crops, the first two major oilseed crops (mustard and sesame) were taken into consideration in this study. A three stage sampling procedure was followed to select sample farmers. In the first stage of sampling, study area Sirajganj district was selected purposively based on the area coverage of the aforesaid oilseed crops. In the second stage, four suitable Upazilas of Sirajganj district were purposively selected for each crop Sirajganj in terms of data availability, ease of data collection, accessibility and logistic supports. Finally, a total of 120 households (4 Upazilas×30HHs) for each type of crop (mustard and sesame) were purposively selected for interview to collect primary data. Thus, a total of 240 (120 HHs×2 crops) oilseed (mustard and sesame) cultivating farmers were interviewed for the study. The selected oilseed crops and study areas are shown in Table 1.

Table 1: Distribution of sample for the study

Name of Upazila	No. of mustard producing farmers	No. of sesame producing farmers	Total
Ullapara	30	30	60
Shahzadpur	30	30	60
Tarash	30	30	60
Belkuchi	30	30	60
Total	120	120	240

Method of Data Collection and Study Period

Data were collected personally from the respondents through well-developed pre-tested structured questionnaire for the study. The period of the study was considered from October to January 2018.

Analytical Techniques

Collected data were edited, summarized, tabulated and analyzed to fulfill the objectives of the study. Descriptive statistics using different statistical tools like averages, percentages and ratios were used in presenting the results of the study. However, the following analytical techniques were applied for analyzing the collected data.

Profitability Analysis of Oilseed Cultivation

An attempt was made to estimate detailed cost and return, relative profitability of cultivating both mustard and sesame cultivation in Sirajganj district. The profitability oilseeds production was calculated using simple accounting

procedures. It was examined on the basis of gross return, gross margin, net return and benefit-cost ratio analysis. Besides, the opportunity costs of family supplied labour and cultivated land were taken into consideration in estimating total cost. Land use cost was calculated on the basis of per year lease value of land. Besides, data on outputs and their prices were also gathered for the study. Interest on operating capital was computed by taking all variable expenses incurred for various operations throughout the four months in mustard and sesame cultivation. Interest rate was assumed to be 9 percent per annum. It was assumed that if the farmer received loan from bank, he would have to pay interest at the above rate. Since mustard and sesame producers usually incur costs for different inputs throughout four months for cultivating mustard and sesame, to get an average figure of cost associated with invest, the interest rate was divided by 2. The following equations were used for estimating gross return, gross margin, net return and benefit-cost ratio.

Gross return (GR)

Gross return was calculated by multiplying the total volume of output of an enterprise by the average price in the harvesting period (Dillion and Hardaker, 1993). The following equation was used to estimate GR:

$$GR = \sum_{i=1}^n Q_i P_i$$

Where,

GR=Gross return from i-th product;

Q_i= Quantity of the i-th product;

P_i= Average price of the i-th product; and

i = 1, 2, 3.....n.

Gross margin (GM)

Gross margin is the difference between gross return and total variable costs. Thus Gross Margin was calculated through the following equation:

$$GM = GR - TVC$$

Where, GM = Gross margin;

GR = Gross return; and

TVC = Total variable cost

Net Return:

Net return was calculated by deducting total costs (Variable and Fixed) from gross return. Thus the formula for Net Return:

$$NR = GR - TC (TVC + TFC)$$

Where,

NR= Net Return

GR = Gross Rreturn

TVC = Total Variable Cost

TFC = Total Fixed Cost

Benefit cost ratio (BCR)

The undiscounted benefit cost ratio (BCR) is a relative measure which was used to compare benefit per unit of cost. Benefit cost ratio (BCR) was estimated as a ratio of gross returns and gross costs. The formula for calculating BCR was used:

$$BCR = GR/TC$$

Where,

GR = Gross return

TC = Total cost

Results and Discussions:

Description of the study area

The survey was conducted October to february/2018 on the crops of mustard and sesame were cultivated in four upzilas (Ullapara, Shahjadpur, Tarash and Belkuchi) of Sirajganj district. The soil of the area was covered Agro-Ecological Zone 4, 7, 12 and 25, predominantly sandy loam which is suitable for oilseed crop cultivation. In this periods temperature ranged from 6.50°C (January/2019) to 34°C (October/2018), the rainfall ranged from 103 mm (October/2018) to 2 mm (January/2019).

Socio-economic Characteristics of the sample household

Socio economic profile of the oil seed producing farmers are depicted in the Table-2. Highest portion of the mustard producing farmers was in the age group of 30-45 years (54%) where highest age group of sesame producing farmers was above 45 years (51%). Agriculture was the major occupation of both mustard and sesame cultivating farmers that was 100% for mustard cultivating farmers and 85% of sesame producing farmers. Education level of maximum mustard and sesame producing farmers were in 8 Class-SSC levels. Family member more than six were found among the mustard growing farmers 46% and in sesame producing farmer's major family size was 4-6 persons that was 44% of total sesame producing farmers. The maximum land holding size was 2-4 bigha (1 Bigha = 0.33 Acreages) per household in both mustard and sesame producing farmers that cover 50% for mustard producer and 54% for sesame producing farmers. Major of the mustard and sesame producing farmer's experience on mustard and sesame production was 5-10 years that was 74% of mustard producing farmers and 73% of sesame producing farmer.

Table 2: Socio economic profile of farmers

Particulars	Percent of total		Particulars	Percent of total	
	Mustard	Sesame		Mustard	Sesame
Age (Years)			Family member		
>30	-	10%	>4	30%	25%
30-45	54%	49%	4-6	24%	44%
<45	46%	51%	<6	46%	31%
Occupation			Land size (Bigha)		
Agriculture	100%	85%	>2	24%	45%
Business	-	9%	2-4	50%	54%
Others	-	6%	<4	26%	11%
Education			Experience		
>8 Class	-	5%	>5	26%	18%
8 Class-SSC	92%	80%	5-10	74%	73%
<SSC	8%	15%	<10	-	9%

Source: Field survey, 2019, (1 Bigha = 0.33 Acreages)

Cultivation Cost of mustard and sesame

Oilseed production requires different inputs, such as human labor, seed, fertilizers, pesticides and land preparation etc. The estimated total variable costs per hectare was Tk, 44293.00 for mustard and Tk. 28354.00 for sesame cultivation that were 82.13% and 70.90% of total of production cost respectively, in mustard and sesame production (Table 3). Among the cost items, hired human labor cost was highest in both mustard and sesame cultivation which shared 49.48% and 50.61% of the total cost, respectively for mustard and sesame production. Plowing cost was accounted 13.75% of total cost for mustard cultivation and 9.27% for sesame cultivation. Fertilizer cost for mustard was estimated 14.48% of total cost and for sesame it was estimated 6.70% of total cost. The findings of the study indicated that the farmers of the study area used less amount of fertilizer in sesame production compared to mustard. Calculated family labour costs were 4.12% of total cost for mustard and 10.56% for sesame production. Rental value of land costs were estimated 13.75% of total cost for mustard and 18.54% for sesame cultivation. Total cost of production included variable costs (summation of all cash and non-cash expenses) and fixed costs incurred for selected oil seed production. On an average per hectare cost of production was Tk 53932.00 for mustard and Tk. 39993.00 for sesame. It was observed that per hectare total production cost of mustard was higher compared to sesame due to use of high amount of inputs, especially human labour and fertilizers. On the basis of total cost, the cost of production per kilogram mustard was Tk. 58.18 and sesame was Tk. 40.00.

Table 3: Cost estimation of Mustard and Sesame production (Tk./ha)

Cost Item	Mustard		Sesame	
	Cost (Tk.)	% total cost	Cost (Tk.)	% total cost
Seed	988.00	1.83	567.00	1.42
Fertilizer	7809.00	14.48	2680.00	6.70
Pesticides	741.00	1.37	741.00	1.85
Labor (Hire)	26687.00	49.48	20240.00	50.61
Plowing	7413.00	13.75	3707.00	9.27
Interest on operating capital (@ Tk. 9%, for 4 month)	655.00	1.21	419.00	1.05
A. Variable cost	44293.00	82.13	28354.00	70.9
Labor (Family)	2224.00	4.12	4224.00	10.56
Land use	7415.00	13.75	7415.00	18.54
B. Fixed cost	9639.00	17.87	11639.00	29.10
Total cost (A + B)	53932.00	100	39993.00	100
Production cost per kg (Tk.)	58.18		40	

Source: Field survey, 2019

Yield performance of Mustard and Sesame cultivation

The average yields of main product mustard and sesame were 927 kg, and 1000 kg per hectare respectively in the study areas (Table 4). By-product was produced from mustard cultivation 1500 kg and from sesame cultivation was 1800 kg per ha. Total production per ha was 2427 kg from mustard cultivation and 2800 kg from sesame cultivation in the study area. The byproduct of the oil seed was used mainly as fuel and organic matter in the Sirajganj area.

Table 4: Yield performance of Mustard and Sesame cultivation per ha

Item	Yield (kg/ha)	
	Mustard	Sesame
Main product	927	1000
Bi product	1500	1800
Total	2427	2800

Source: Field survey, 2019

Profitability of mustard and sesame cultivation

On an average gross return were Tk 60120.00/ha for mustard and Tk 70400.00 for sesame cultivation (Table 5). Higher gross return per ha was obtained from sesame cultivation compared to mustard cultivation. Gross margin was obtained by deducting total variable cost from gross revenue/return. Gross margin was estimated Tk. 15827.00 per hectare for mustard cultivation and Tk. 42046.00 for sesame cultivation. Net return per hectare was found Tk. 6188.00 for mustard production and was Tk. 30407.00 for sesame cultivation.

Salam et al. (2012) observed that gross returns of mustard crop was 36771.00 Tk./ha, net returns 7369.00 Tk./ha and BCR 1.25. Miah and Mondal (2017) found that gross returns of mustard crop was 80105.00 Tk./ha, net returns 28859.00 Tk./ha and BCR 1.56. Gross returns of sesame crop were 56796.00 Tk./ha, net returns 13878.00 Tk./ha and BCR 1.32. The results of the present study differ with the result of Salam et al. (2012) and the result of Miah and Mondal (2017). It is observed from study that both gross margin and net return were higher in sesame production compared to mustard cultivation. The benefit cost ratio (BCR) was also higher in sesame (1.76) cultivation compared to mustard cultivation in the study area. So it is proved that sesame cultivation is more profitable compared to mustard cultivation.

Table 5: Per hectare return in producing mustard and sesame in the study areas

Items	Tk./ha	
	Mustard	Sesame
A. Gross return (GR)		
Value of main product	55620.00	65000.00
Value of bi product	4500.00	5400.00
Gross return (A)	60120.00	70400.00
B. Gross margin (GR-TVC)	15827.00	42046.00
C. Net return (GR-TC (TFC+TVC))	6188.00	30407.00
D. Undiscounted Benefit cost ratio (BCR) on full cost basis	1.11	1.76

Source: Field survey, 2019

Conclusion

Oil crops occupied a vast area in Sirajganj district. It shows that the production of oilseeds is profitable in the study area. Profitability was examined on the basis of gross return, gross margin, net return and benefit-cost ratio analysis. The result of the study showed that sesame cultivation is more profitable compare to mustard in terms of gross return, gross margin, net return and benefit cost ration.

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