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FINANCIAL ANALYSIS OF SESAME PRODUCTION IN SELECTED AREAS OF BANGLADESH

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Abstract

Sesame is very important in Bangladesh to ensure the self-sufficiency in oilseed production. The main purposes of this study were to explore the financial returns of sesame. The principal objectives of this study were to determine the level of input use, cost and return and major problems of sesame cultivation. In total 405 data were collected from three major sesame growing areas of Bangladesh through stratified random sampling technique. Descriptive statistics and profitability model were used to analyze the collected data. The study revealed that total variable cost of sesame cultivation was Tk. 33233 ha^{-1}. The total cost of production was Tk. 59621 ha^{-1} where 44% was fixed costs and 56% was variable cost. The average gross return and gross margin of sesame cultivation were found Tk. 90044 ha^{-1} and Tk. 56811 ha^{-1}, respectively. Per hectare average net return was Tk. 30423 which was found to be highest in Jashore (Tk. 36817) followed by Barishal (Tk. 28479) and Tangail (Tk. 25975). BCR was found 1.51, which was the highest in Jashore 1.57 and lowest was 1.47 in Tangail district. The first constraint to oilseed sesame variety in all areas was the lack of quality seeds at appropriate time. Other problems were insect infestation (37%) followed by water logging condition (22%), adulterated seed & fertilizer (13%), labour crisis at harvesting time (10%), lack of training facilities and low market price (9%). This study helps to formulate appropriate policy to stakeholders, researchers and policy makers for increasing oilseed production of the country due to its high yield potential and profitability.

Keywords: Financial profitability, sesame, constraints and Bangladesh.

1. Introduction

Sesame is one of the important oilseeds in Bangladesh. A lot of foreign exchange is spent every year for importing edible oils and oilseeds to meet domestic demand (Myint, 2020; Eleuch *et* al., 2021). We are producing only 20% oilseed and 80% are imported to meet the demand. The crop is now grown in a wide range of environments, extending from semi-arid tropics and sub-tropics to temperate regions (Islam *et* al., 2018; Raikwar and Srivastva, 2013). The world produces about 3 million metric tons of sesame seeds every year on average. The global

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sesame exports are estimated to be about 0.5 to 0.6 million m tons (Agro, 2016). World production of sesame was estimated to be 5,531,948 tonnes produced on 9,983,165 hectares of land in 2017. Asia is the major producers (56.4%) of sesame in the world, followed by Africa (39.3%) and America (4.4%). The largest producers of sesame is India (665,566.67 tonnes) followed by China (616,004.96 tonnes) while Nigeria (192,295.96 tonnes) ranks 8th out of the ten major producing countries in the world. As a result of its high demand, any quantity of the product offered to the market is easily sold. This increasing demand for sesame seed provides Bangladesh an opportunity to increase its production to meet the international demand for the commodity. The realization of the potential of sesame production in the acquisition of foreign currency for the country made production of the crop a prominent priority in the agricultural sector of Bangladesh.

Profitability measures the capability of farmers to cover their costs. It is defined as the total value of production less the total cost of production. Bangladesh government has given due importance for research and development (R&D) of oilseed crops and invests a lot for attaining self-sufficiency in edible oils. Bangladesh Agricultural Research Institute (BARI) and Bangladesh Institute of Nuclear Agriculture (BINA) have released a good number of improved varieties of oilseeds. The area, production and productivity of sesame at 2019-20 were 33656.89 hectare, 31786 m tons, and 944 kg per hectare, respectively (BBS, 2021). A study on financial analysis of sesame cultivation aimed at determining the input use and cost return to aid farmers improve/increase their profitability. Some relevant study were conducted to find out the profitability of sesame cultivation, but this study was conducted to estimate the cost and return data for major sesame varieties of Bangladesh specially for updating the database. The objectives of the study were **(**i**)** to determine the level of input use of sesame cultivation at farm level; **(**ii**)** to estimate the cost and return of sesame production; and **(**iii**)** to identify the major problems of sesame cultivation. An in-depth analysis is needed to explore the causes of low adoption and find out the ways for the expansion of oilseed cultivation. This study explores the challenges and opportunities in the oilseeds sector of Bangladesh.

2. Materials and Methods

The study was conducted in three intensively sesame growing areas of Bangladesh, namely Tangail, Barishal and Jashore district. In this study, stratified random sampling was used. From each district three upazila were selected randomly to conduct the study. The selected upazila were Sadar, Nagarpur and Bhuapur from Tangail, Mehendiganj, Muladi and Bakerganj from Barishal and Sadar, Bagharpara and Sharsha from Jashore district in sesame intensive growing areas. Total sample size was 405, 135 from each district and 45 from each upazila.

Sampling design and data collection method: In this survey, both multi-stages and random sampling techniques adopted to select sample farm households for collecting primary data and information. Priority in selection of study areas was specified to the intensity of area coverage by respective crops and regional differences in Agro-ecological zones. In each selected location (district), 3 upazilas will be chosen randomly for the survey. The upazilas and villages were selected by respective scientists of BINA and consultation with local DAE officials. Sample size has designated for the survey and year wise distribution of samples.

Measurement of financial costs and returns

In this study, costs and returns an analysis was done on total cost basis. The following equation (Π) was used to assess the financial profitability of sesame cultivation (Burja, 2009).

$$\Pi = \sum_{i=1}^{n} P_i Q_i - TC = \sum_{i=1}^{n} P_i Q_i - (VC + FC) \text{ ----------(1)}$$

Where,

Π = Profit or value addition from sesame production

Q_i = Quantity of sesame of i^{th} farmers (kg ha^{-1})

P_i = Average price of sesame of i^{th} farmers (Tk. kg^{-1})

TC = Total cost (Tk. ha^{-1})

VC = Variable cost (Tk. ha^{-1})

FC = Fixed cost (Tk. ha^{-1})

i = 1, 2, 3, ……., n

Per hectare profitability of growing sesame from the viewpoints of individual farmers was measured in terms of gross return, gross margin and net return. Gross return was calculated by simply multiplying the total volume of output with it's per unit of price in the harvesting period. Gross margin calculation was done to have an estimate of the difference between total return and variable costs. The argument for using the gross margin analysis was that the farmers of Bangladesh are more interested to know their return over variable costs. The analysis considered fixed cost which included land rent and family supplied labour. Net margin was calculated by deducting total costs from gross return. According to Debertin (2012), the greatest or maximum profit will be attained when the difference between TR and TC is greatest.

3. Results and Discussion

Pattern of input use for sesame cultivation

Farmers in the study areas used various inputs for sesame cultivation. Farmers used on an average 75 man-days per hectare of total human labour for sesame

cultivation where family labour was 34 man-days and hired labour was 42 man-days. On an average, they sowed 11 kg seed per hectare of land. They applied Urea at the rate of 99 kg ha^{-1}, TSP 140 kg ha^{-1}, and MoP 65 kg ha^{-1}. It was observed that among the chemical fertilizer, farmers used highest amount of TSP for the studied districts (Table 1). In the study areas, farmers also applied Gypsum (35 kg ha^{-1}) and Boron (8 kg ha^{-1}) for sesame cultivation.

Table 1. Level of input use per hectare of sesame cultivation

Particulars	Districts			
	Tangail	Jashore	Barisal	All
Human labour (man-days)	69	82	75	75
Hired	38	46	42	42
Family	31	37	33	34
Seed (kg ha^{-1})	11	11	10	11
Urea (kg ha^{-1})	92	119	87	99
TSP (kg ha^{-1})	129	145	146	140
MoP (kg ha^{-1})	52	79	66	65
Gypsum (kg ha^{-1})	32	41	31	35
Boron (kg ha^{-1})	7	8	8	8

Source: Field survey, 2019-20

Cost of Cultivation

Total cost of Sesame production

The cost of production included all kinds of variable costs such as hired labour, land preparation, seed, manure, fertilizers, irrigation, pesticides, etc. used for the production of sesame. Both cash expenses and imputed value of family supplied inputs were included in the variable cost. The study revealed that total variable cost of sesame cultivation was Tk. 33233 per hectare which was 54% of total cost of production. The highest variable cost item was hired labour which accounted for about 25% of the total cost. Land preparation cost accounted for about 12% of total cost and ranked second variable cost item. Family labour and rental value of land was considered as fixed cost of production. The family labour and land use cost were Tk. 11732 and Tk. 14656 per hectare which was accounted for about 20% and 25 % of total cost respectively. Total cost of production included variable costs and fixed costs incurred for sesame cultivation. On an average, the total cost of production was Tk. 59,621 per hectare where 44% was fixed costs and 56% was variable cost (Table 2). Similarly it was found that the total cost of sesame production was Tk. 42,918 per hectare (Monayem *et* al., 2015).

Table 2. Per hectare cost (Tk. ha^{-1}) of Sesame cultivation

Particulars	District				
	Tangail	Jashore	Barisal	All	
	(Tk/ha)	(Tk/ha)	(Tk/ha)	(Tk/ha)	%
Variable Cost					
Cost of land preparation	6835	7315	6739	6963	12
Hired labor	13397	15977	14626	14667	25
Seed	781	783	679	747	1
Cowdung	-	500	700	600	1
Urea	1559	2028	1485	1691	3
TSP	2845	3191	3215	3084	5
MoP	1142	1732	1442	1439	2
Gypsum	509	660	488	552	1
Boron	1253	1476	1379	1369	2
Cost of insecticide pesticide	980	1140	1010	1043	2
Sub-total	29301	34801	31764	31955	54
Interest on operating capital	1172	1392	1271	1278	2
Total variable cost	30473	36193	33034	33233	56
Fixed Cost					
Family labor	10828	12882	11485	11732	20
Land use cost	14159	15883	13925	14656	25
Total fixed cost	24987	28765	25410	26387	44
Total cost	**55460**	**64958**	**58444**	**59621**	**100**

Source: Field survey, 2019-20

Financial Profitability of Sesame

Financial profitability (FP) is based on calculation of market prices of inputs and outputs that farmers actually pay or receive for producing a crop, along with the quantities used of each. Farmers allocate land and other resources in the production of different crops on the basis of relative financial profitability.

Table 3. Per hectare return (Tk. ha^{-1}) of Sesame

Particulars	Districts			
	Tangail	Jashore	Barisal	All
Yield (Ton)	1.25	1.44	1.33	1.34
Price (Tk./kg)	60	65	61	62
Return from Sesame	74600	93917	80625	83047
Return from by-product	6834	7858	6298	6997
Gross Return	81434	101775	86923	90044
Total variable cost (TVC)	30473	36193	33034	33233
Total fixed cost (TFC)	24987	28765	25410	26387
Total cost (TC)	55460	64958	58444	59621
Gross Margin	50961	65582	53888	56811
Net Return	25975	36817	28479	30423
BCR over total cost	**1.47**	**1.57**	**1.49**	**1.51**

Source: Field survey, 2019-20

Financial profitability for sesame

Per hectare average yield of sesame was 1.34 ton. The average gross return and gross margin of sesame cultivation were found Tk. 90044 ha^{-1} and Tk. 56811 ha^{-1} respectively. Per hectare average net return was Tk. 30423 which was found to be highest in Jashore (Tk. 36817) followed by Barishal (Tk. 28479) and Tangail (Tk. 25975). BCR on total cost basis was found 1.51 which was the highest in Jashore 1.57 and lowest in Tangail districts 1.47 (Table 3). On the other hand, it was found that the BCR of sesame production was 1.32 (Monayem *et* al., 2015).

Problems faced by the farmers in sesame cultivation

Sesame is a profitable crop in all of the studied areas. But Farmers faced various problems to sesame cultivation (Islam *et* al., 2018; Islam *et* al., 2021). In table 4, the first constraints to oilseed sesame variety in all areas were the lack of quality seeds at appropriate time. Other problems were insect infestation (37%) followed by water logging condition (22%), adulterated seed & fertilizer (13%), labour crisis and high price at harvesting time (10%). They also mentioned about lack of training facilities and low market price at harvesting time (9%).

Table 4. Problems faced by the farmers in sesame cultivation (%)

Particulars	Tangail	Barishal	Jashore	All
Lack of quality seeds at appropriate time	53	35	25	37
Insect infestation (Cutter piller)	45	34	33	37
Water logging condition	10	30	25	22
Distance of Market is high	10	25	6	14
Adulterated seed	15	11	12	13
Adulterated fertilizer	19	6	16	13
Labour crisis & high price in harvesting time	21	6	4	10
Lack of training facilities	14	6	8	9
Low market price at harvesting time	12	9	5	9

Source: Field survey, 2019-20

The government should ensure the supply of quality seed at the proper time with a reasonable price, and should control the supply and availability of adulterated fertilizer from the market. More emphasis should be given on developing new varieties with short-duration, stress-tolerance and other characteristics. Frequent interaction was needed among farmers, extension personnel and sesame growers. Hand-on training on improved sesame cultivation and crop management practices for the sesame growing farmers is also important. Ensuring timely supply of labour to sesame growers during cultivation and harvest time is suggested to reduce yield loss.

4. Conclusion

It can be concluded that sesame production in the study areas are profitable which has positive implications for investment for farmers, NGOs and corporate organizations. Also adjustment in the production inputs such as seed, labour and efficient use of fertilizers and their cost of acquisition could lead to increased sesame production as well as profit. Noticeable gaps in profit could be improved upon if problems such as inadequate supply of quality seed at the proper time, problem of insect infestation, high cost of labour, thereby contributing to the wellbeing of sesame farmers as well as their standard of living. Increasing yield as well as productivity of sesame cultivation is urgent as a part for ensuring the self-sufficiency in oilseed production in Bangladesh.

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