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Economics of Pulse Cultivation in Punjab

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Abstract

This study is an empirical analysis of economics of pulse cultivation in Bathinda and Fazilka districts of Punjab state situated in North West part of India. On the basis of gross return which is the best indicator of profitability, the results of the study shows that although pulse cultivation has been observed to be somewhat profitable in both Bathinda and Fazilka district but it lacks assured returns due to lack of government procurement as well as low and unstable productivity unlike cereal crops which are enjoying assured returns. Thus, in order to make pulse cultivation remunerative in sampled districts, it is recommended that the government should provide high yielding varieties of seeds at the subsidized rates to increase the level of productivity. Our research study also brings out the need for assured procurement of pulse crops like wheat and paddy in the state which is lacking presently.

Keywords

economics, procurement, assured returns, profitability, productivity

1. Introduction

Punjab, located in the north west part of India is one of the foremost states in the field of cereal crops, especially, wheat and paddy. There is a growing realisation about the degradation of land, environment and water due to the current pattern of agricultural production and its sustainability is under question. Though some concern has been raised by researchers about disquiet aspect of Punjab agriculture but lacks serious attention by the state. However, the rising dissatisfaction among the farming society due to their failure to get assured farm income, and problems like declining water-table, water logging, environment pollution, soil degradation and question of soil preservation have reached such proportion as to compel the state administration to make serious efforts to address these problems. Pulses which have a key role to play in agriculture and society for various factors like their nutritive value, predominantly vegetarian diet, potential to improve soil fertility, low resource and water requirement,

etc., have not received much attention. In this background, an attempt has been made to examine the economics of pulse cultivation in Punjab.

2. Method

Economics of pulse cultivation has been discussed with the help of cost and return structure of the sampled crops computed on the basis of the primary data regarding productivity, prices as well as cost of production. Two pulse crops, i.e., moong and gram with largest quantities grown and sold have been purposively selected for the study as moong crop ranked top with 64, 000 tons of production whereas gram occupied third largest place with production of 30,000 tons in the Punjab state during the year 2011-2012 when the study was planned. In order to obtain the primary data, the selection of districts Bathinda and Fazilka was made as on the basis of prominent position in the production of total pulses in Punjab state. Five villages from each district were sampled having maximum area under the crop. The sampled villages were Baikainwala, Dalmir Khera, Shergarh, Vriyam Khera and Khuian Sarwar from Fazilka district and Gurthari, Mal wala, Pathrala, Pucca Kalan and Kot Shamir from Bathinda district. From these selected villages, 401 farmers growing these crops; 188 from Bathinda district and 213 from Fazilka district were sampled. According to the information collected from sampled farmers the gram crop was further divided into two parts viz, gram leaflets and gram, the forms in which the crop was sold in the market. Keeping in view of significant difference in yield and use of modern agricultural practices, the farming in Bathinda district has been categorised into high yielding and low yielding farming. Such a significant difference was not observed in Fazilka district of Punjab. Therefore, no categorization has been made between high yielding and low yielding farming.

In order to calculate the gross value of the output (per acre) from the crop, total production was multiplied by its market price.

Gross Value of the Output (Rs.)=Total Produce×Market Price

In the next stage, to find out gross return/surplus over cost, total cost was deducted from gross value of the output.

Gross Return (Rs.)=Gross Value of the Output (Rs.)-Total Cost (Rs.)

In order to come to know about the input use efficiency the output-input ratio has been calculated.

$$\textbf{Output-Input Ratio}=\frac{Gross\ Value\ of\ the\ Output\ (Rs.)}{Total\ Cost\ (Rs.)}$$

3. Result

3.1 Economics of Gram Leaflets Cultivation

The cost incurred in the cultivation of gram leaflets in Bathinda and Fazilka district has been shown in Table 1. The Table clearly revealed that on an average, a sampled farmer incurred cost Rs. 6256.69 per acre in the cultivation of gram leaflets in Bathinda district. Out of this, the highest cost has been incurred on purchase of seeds (20.98 percent) followed by wage payments to labourers (20.63 percent) and purchase of fertilizers (14.15 percent). Only these three costs constituted more than 55.00 percent of the total cost. Other miscellaneous expenses constituted the least proportion that was 0.35 percent of total cost. The results regarding high yielding and low yielding farming revealed that an average farmer under high and low yielding farming incurred cost Rs. 6624.86 and Rs. 5888.53 per acre in the cultivation of gram leaflets in Bathinda district, respectively. The high cost under high yielding farming is due to relatively greater use of modern inputs like pesticides, insecticides and modern agriculture practices like seed treatment etc. Among the components of cost, the farmers under high yielding farming category had to bear the highest cost, i.e., almost one fifth of the total cost on wage payments to labourers followed by purchase of seeds, i.e., 18.84 percent and fertilizers, i.e., 12.87 percent. These three costs constituted half of the total cost incurred in the cultivation of gram leaflets. The low yielding farmers had to bear the highest cost on purchase of seeds, i.e., 23.40 percent followed by wage payments to labourers, i.e., 21.34 percent and purchase of fertilizers, i.e., 15.58 percent. These three costs constituted 60.00 percent of the total cost incurred in the cultivation of gram leaflets.

In case of Fazilka district, on an average, a sampled farmer incurred cost Rs. 4425.60 per acre in the cultivation of gram leaflets. The farmer had to bear the highest cost on wage payments to labourers, i.e., 27.61 percent followed by purchase of seeds, i.e., 18.90 percent. The lowest cost has been incurred on other miscellaneous expenses, i.e., 0.43 percent. Only five costs, i.e., wage payments to labourers, purchase of seeds, value of owned and hired machine labour, farm tools and implements, purchase of diesel and fertilizers constituted about 80.00 percent of the total cost incurred in the cultivation of gram leaflets in Fazilka district.

Table 1. Cost Structure of Gram Leaflets Cultivation (Rs./Per Acre)

Sr. No.	Items	Bathinda			Fazilka
		High Yielding Farming	Low Yielding Farming	Total	
1.	Value of seed (Farm Produced and Purchased)	1247.88 (18.84)	1377.83 (23.40)	1312.85 (20.98)	836.47 (18.90)
2.	Value of seed treatment	143.67 (2.17)	0.00 (0.00)	71.84 (1.15)	0.00 (0.00)
3.	Value of fertilizers	852.96 (12.87)	917.41 (15.58)	885.18 (14.15)	422.39 (9.54)
4.	Value of pesticides	534.08 (8.06)	390.77 (6.64)	462.43 (7.39)	301.26 (6.81)
5.	Value of fungicides	338.89 (5.11)	204.16 (3.47)	271.52 (4.34)	106.35 (2.40)
6.	Value of insecticides	460.72 (6.95)	0.00 (0.00)	230.36 (3.68)	0.00 (0.00)
7.	Value of herbicides	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
8.	Value of weedicides	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
9.	Value of diesel used	508.31 (7.67)	498.61 (8.46)	503.46 (8.05)	493.50 (11.15)
10.	Value of human labour* (in wages and in kind)				
	a. During preparation of farm	114.78 853.34	125.33 840.00	120.05 846.67	127.26 913.15
	b. During mulching	356.10	291.67	323.89	181.30
	c. During spray	1324.22	1257.00	1290.61	1221.71
	Total	(19.99)	(21.34)	(20.63)	(27.61)
11.	Value of irrigation	55.55 (0.84)	13.89 (0.24)	34.72 (0.55)	0.00 (0.00)
12.	Value of owned and hired machine labour	547.75 (8.27)	490.65 (8.33)	519.20 (8.30)	508.44 (11.49)

13.	**Depreciation**	423.78	498.39	461.08	314.96
		(6.40)	(8.46)	(7.37)	(7.12)
14.	**Interest on working capital**	162.36	220.48	191.42	201.30
		(2.45)	(3.74)	(3.06)	(4.55)
15.	**Other miscellaneous expenses**	24.69	19.35	22.02	19.22
		(0.37)	(0.33)	(0.35)	(0.43)
16.	**Total**	6624.86	5888.53	6256.69	4425.60
		(100.00)	(100.00)	(100.00)	(100.00)

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

Note. Figures in parentheses are showing percentage.

*Included imputed value of family labour.

Table 2 highlighted that on an average a sampled farmer incurred cost Rs. 6256.69 per acre. The price at which a farmer disposed off his produce to the buyer has been observed to be Rs. 648.62 per quintal. By selling the produce at this price, an average farmer has gross value of the output Rs. 32482.88 and got gross return/surplus over cost Rs. 26226.20 per acre which was 80.74 percent of gross value of the output. The output-input ratio has been found to be 5.19 which is the indicator of efficiency.

Table 2. Gross Value of the Output, Gross Return and Output-Input Ratio of Gram Leaflets (Rs./Per Acre)

Sr. No.	Categories	F[1]	Yield	Weighted Price	Cost	Gross Value of the Output	Gross Return/ Surplus Over Cost	Output-Input Ratio
A.	Bathinda							
	1. High Yielding Farming	18	57.06	652.91	6627.51	37255.04	30627.53	5.62
	2. Low Yielding Farming	18	40.52	644.32	5888.74	26107.85	20219.11	4.43
	3. Total (1+2)	36	50.08	648.62	6256.69	32482.88	26226.20	5.19
B.	Fazilka	116	38.69	435.11	4425.60	16834.41	12408.81	3.80

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

The results regarding high yielding and low yielding farming explained that in case of high yielding farming, the cost of cultivation was Rs. 6627.51 whereas in case of low yielding farming it was Rs. 5888.74 per acre. But so far as the price is concerned, the high yielding farmer disposed off his produce at Rs. 652.91 per quintal whereas low yielding farmer disposed off his produce at Rs. 644.32 per quintal. In this process, the gross value of the output has been observed to be Rs. 37255.04 and Rs. 26107.85 under high yielding and low yielding farming, respectively. The gross return/surplus over cost has been found to be Rs. 30627.53 per acre under high yielding farming and Rs. 20219.11 per acre under low yielding farming which was 82.21 percent and 77.44 percent of gross value of the output. By comparing high yielding and low yielding farming, it has been found that the gross return/surplus over cost of gram leaflets cultivation was higher under high yielding farming than low yielding farming. Like gross value of the output, the output-input ratio also has been found to be higher, i.e., 5.62 in case of high yielding farming and 4.43 in case of low yielding farming. It means high yielding farmers are more efficient in using their inputs.

In case of Fazilka district, on an average, a sampled farmer incurred cost Rs. 4425.60 per acre. The price at which a farmer disposed off his produce to the buyer has been found to be Rs. 435.11 per quintal. By selling the produce at this price, an average farmer has gross value of the output Rs. 16834.41 and got gross return/surplus over cost Rs. 12408.81 per acre which was 73.71 percent of

gross value of the output. The output-input ratio has been found to be 3.80 which was 5.19 in case of Bathinda district. This indicates that farmers in Bathinda district are more efficient in using their inputs as compared to Fazilka district.

3.2 Economics of Gram Cultivation

The cost incurred in the cultivation of gram in Bathinda and Fazilka district has been shown in Table 3. The table clearly revealed that on an average, a sampled farmer incurred cost Rs. 7828.11 per acre in the cultivation of gram in Bathinda district. Out of this, the highest cost has been incurred on wage payments to the labourers (34.18 percent) followed by purchase of seeds (16.33 percent). Only these two costs constituted half of the total cost. Other miscellaneous expenses and irrigation charges constituted the lowest proportion that was only 1.00 percent of total cost. The results regarding high yielding and low yielding farming highlighted that an average farmer, under high and low yielding farming incurred cost Rs. 8220.95 and Rs. 7328.12 per acre in the cultivation of gram in Bathinda district, respectively.

The high cost under high yielding farming is due to relatively greater use of modern inputs and modern agriculture practices like seed treatment, insecticides and fungicides, etc. Among the components of cost, the farmers under high yielding farming category had to bear the highest cost, i.e., almost one third of the total cost on wage payments to labourers followed by purchase of seeds, i.e., 14.70 percent and fertilisers, i.e., 10.68 percent. Only these three costs constituted 58.35 percent of the total cost incurred in the cultivation of gram. The low yielding farmers had to bear the highest cost on wage payments to labourers, i.e., 35.92 percent followed by purchase of seeds, i.e., 18.67 percent. Only these two costs constituted 54.59 percent of the total cost incurred in the cultivation of gram.

Table 3. Cost Structure of Gram Cultivation (Rs./Per Acre)

Sr. No.	Items	Bathinda			Fazilka
		High Yielding Farming	Low Yielding Farming	Total	
1.	**Value of seed (Farm Produced and Purchased)**	1208.35 (14.70)	1367.22 (18.67)	1278.25 (16.33)	804.08 (15.49)
2.	**Value of seed treatment**	142.82 (1.74)	0.00 (0.00)	79.98 (1.03)	0.00 (0.00)
3.	**Value of fertilizers**	877.76 (10.68)	574.44 (7.84)	744.30 (9.51)	377.75 (7.28)
4.	**Value of pesticides**	546.36 (6.64)	447.73 (6.11)	502.96 (6.43)	269.19 (5.19)

5.	**Value of fungicides**	450.89	237.49	356.99	84.31
		(5.48)	(3.23)	(4.56)	(1.62)
6.	**Value of insecticides**	458.90	0.00	256.98	0.00
		(5.58)	(0.00)	(3.28)	(0.00)
7.	**Value of herbicides**	0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
8.	**Value of weedicides**	0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
9.	**Value of diesel used**	550.79	539.32	545.74	501.44
		(6.70)	(7.36)	(6.97)	(9.66)
10.	**Value of human labour***				
	(in wages and in kind)				
	a. During preparation of	113.93	122.13	119.23	122.79
	farm	838.93	835.00	838.27	840.01
	b. During mulching	357.50	300.68	330.19	146.68
	c. During spray	856.43	829.09	843.96	627.58
	d. During harvesting	544.10	543.63	543.88	408.62
	e. During threshing	2710.89	2630.54	2675.53	2145.68
	Total	(32.97)	(35.92)	(34.18)	(41.34)
11.	**Value of irrigation**	53.57	56.81	55.00	0.00
		(0.65)	(0.77)	(0.70)	(0.00)
12.	**Value of owned and hired**	698.06	714.32	705.22	513.91
	machine labour	(8.50)	(9.75)	(9.01)	(9.90)
13.	**Depreciation**	222.00	522.93	354.41	288.44
		(2.70)	(7.14)	(4.53)	(5.56)
14.	**Interest on working capital**	279.53	207.21	247.71	188.32
		(3.40)	(2.83)	(3.16)	(3.63)
15.	**Other miscellaneous**	21.04	30.10	25.03	17.16
	expenses	(0.26)	(0.41)	(0.31)	(0.33)
16.	**Total**	8220.95	7328.12	7828.11	5190.28
		(100.00)	(100.00)	(100.00)	(100.00)

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

Note. Figures in parentheses are showing percentage.

*Included imputed value of family labour.

In case of Fazilka district, on an average, a sampled farmer incurred cost Rs. 5190.28 per acre in the

cultivation of gram. The farmer had to bear the highest cost on wage payments to labourers, i.e., 41.34 percent followed by purchase of seeds, i.e., 15.49 percent. The lowest cost has been incurred on other miscellaneous expenses, i.e., 0.33 percent. Only four costs, i.e., wage payments to labourers, purchase of seeds, value of owned and hired machine labour, farm tools and implements and purchase of diesel constituted three fourth of the total cost incurred in the cultivation of gram in Fazilka district.

The Table 4 indicated that on an average, a sampled farmer incurred cost Rs. 7828.11 per acre. The selling price of the produce has been found to be Rs. 3830.00 per quintal. By selling the produce at this price, an average farmer has gross value of the output Rs. 32018.80 and got gross return/surplus over cost Rs. 24190.69 per acre which was 75.55 percent of gross value of the output. The output-input ratio has been found to be 4.09 which indicate the efficient use of inputs.

Table 4. Gross Value of the Output, Gross Return and Output-Input Ratio of Gram (Rs./Per Acre)

Sr. No.	Categories	F[1]	Yield	Weighted Price	Cost	Gross Value of the Output	Gross Return/ Surplus Over Cost	Output -Input Ratio
A.	Bathinda							
	1. High Yielding Farming	28	8.36	3791.07	8220.08	31693.34	23473.26	3.85
	2. Low Yielding Farming	22	7.21	3834.09	7322.58	27643.79	20321.21	3.77
	Total (1+2)	50	8.36	3830.00	7828.11	32018.80	24190.69	4.09
B.	Fazilka	87	3.90	3764.67	5190.28	14682.21	9491.93	2.83

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

The results regarding high yielding and low yielding farming revealed that in case of high yielding farming, the cost of cultivation was Rs. 8220.08 whereas in case of low yielding farming it was Rs. 7322.58 per acre. But as far as the price is concerned, the high yielding farmer disposed off his produce at Rs. 3791.07 per quintal whereas low yielding farmer disposed off his produce at Rs. 3834.09 per quintal. In this process, the gross value of the output has been found to be Rs. 31693.34 and Rs. 27643.79 per acre under high yielding and low yielding farming, respectively. The gross return/surplus

over cost under high yielding farming has been found to be Rs. 23473.26 and Rs. 20321.21 per acre under low yielding farming which was equivalent to 74.06 percent and 73.51 percent of gross value of the output. By comparing high yielding and low yielding farming, it has been observed that the gross return of gram cultivation was higher under high yielding farming than low yielding farming. The output-input ratio has been found to be higher, i.e., 3.85 in case of high yielding farming and 3.77 in case of low yielding farming. This indicates the higher efficiency on per rupee invested in gram cultivation in case of high yielding farming in Bathinda district.

In case of Fazilka district, on an average, a sampled farmer incurred cost Rs. 5190.28 per acre. The selling price at which farmer disposed off his produce has been found to be Rs. 3764.67 per quintal. By selling the produce at this price, an average farmer has gross value of the produce Rs. 14682.21 and got gross returns/surplus over cost Rs. 9491.30 per acre which was equivalent to 64.64 percent of gross value of the output. The output-input ratio has been found to be 2.83 which was 4.09 in case of Bathinda district. Higher value of output-input ratio indicates that farmers in Bathinda district are more efficient compared to Fazilka district in using their inputs.

3.3 Economics of Moong Cultivation

The cost incurred in the cultivation of moong in Bathinda and Fazilka district has been shown in Table 5. The Table vividly revealed that on an average, a sampled farmer incurred cost Rs. 7500.85 per acre in the cultivation of moong in Bathinda district. Out of this, the highest cost has been incurred on wage payments to the labourers (30.37 percent) followed by purchase of seeds (12.65 percent) and fertilizers (11.82 percent). Only these three costs constituted 54.84 percent of the total cost. Other miscellaneous expenses and cost on seed treatment constituted the lowest proportion that was less than 1.00 percent of total cost.

The results regarding high and low yielding farming revealed that an average farmer under high and low yielding farming incurred cost Rs. 8195.49 and Rs. 6858.65 per acre in the cultivation of moong in Bathinda district, respectively. The high cost under high yielding farming is due to relatively greater use of modern methods and techniques like F.I.R treatment, i.e., Fungicides, Insecticides and Rhizobium culture, etc. Among the components of cost, the farmers under high yielding farming category had to bear the highest cost, i.e., 31.60 percent on wage payments to labourers followed by purchase of fertilizers, i.e., 11.78 percent and seeds, i.e., 11.05 percent. These three costs constituted 54.43 percent of the total cost incurred in the cultivation of moong. The low yielding farmers had to bear highest cost on wage payments to labourers, i.e., 29.02 percent followed by purchase of seeds, i.e., 14.41 percent and fertilizers, i.e., 11.88 percent. Only these three costs constituted more than 55.00 percent of the total cost.

Table 5. Cost Structure of Moong Cultivation (Rs./Per Acre)

Sr. No.	Items	Bathinda			Fazilka
		High Yielding Farming	Low Yielding Farming	Total	
1.	Value of seed (Farm Produced and Purchased)	905.84 (11.05)	988.14 (14.41)	948.60 (12.65)	498.62 (11.48)
2.	Value of seed treatment	84.32 (1.03)	0.00 (0.00)	40.51 (0.54)	0.00 (0.00)
3.	Value of fertilizers	964.07 (11.78)	814.70 (11.88)	886.46 (11.82)	485.26 (11.17)
4.	Value of pesticides	638.95 (7.80)	422.55 (6.16)	526.51 (7.02)	77.65 (1.79)
5.	Value of fungicides	338.87 (4.13)	326.79 (4.76)	332.60 (4.43)	230.95 (5.32)
6.	Value of insecticides	499.10 (6.09)	0.00 (0.00)	239.76 (3.20)	0.00 (0.00)
7.	Value of herbicides	0.00 (0.00)	149.92 (2.18)	77.90 (1.04)	0.00 (0.00)
8.	Value of weedicides	201.17 (2.45)	0.00 (0.00)	96.64 (1.29)	0.00 (0.00)
9.	Value of diesel used	656.12 (8.01)	608.67 (8.87)	631.46 (8.42)	533.50 (12.28)
10.	Value of human labour*				
	(in wages and in kind)	145.32	128.69	136.68	107.66
	a. During	827.34	794.44	810.25	306.46
	preparation of farm	382.85	289.53	334.36	233.76
	b. During mulching	809.69	525.98	662.27	594.50
	c. During spray	424.28	251.59	334.55	397.64
	d. During harvesting	2589.49	1990.23	2278.11	1640.02
	e. During threshing	(31.60)	(29.02)	(30.37)	(37.75)
	Total				
11.	Value of irrigation	100.00	84.91	92.16	0.00

		(1.22)	(1.24)	(1.23)	(0.00)
12.	**Value of owned and hired machine labour**	758.18 (9.25)	612.34 (8.93)	682.40 (9.11)	474.82 (10.93)
13.	**Depreciation**	276.65 (3.37)	379.41 (5.53)	330.04 (4.41)	217.62 (5.01)
14.	**Interest on working capital**	163.07 (1.99)	458.00 (6.68)	316.32 (4.22)	164.91 (3.80)
15.	**Other miscellaneous expenses**	19.66 (0.24)	23.00 (0.33)	21.39 (0.29)	20.56 (0.47)
16.	**Total**	8195.49 (100.00)	6858.65 (100.00)	7500.85 (100.00)	4343.91 (100.00)

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

Note. Figures in parentheses are showing percentage.

*Included imputed value of family labour.

In case of Fazilka district, on an average, a sampled farmer incurred cost Rs. 4343.91 per acre in the cultivation of moong. The farmer had to bear the highest cost on wage payments to the labourers, i.e., 37.75 percent followed by the purchase of diesel, i.e., 12.28 percent, seeds, i.e., 11.48 percent and fertilizers, i.e., 11.17 percent. Only these four costs constituted 72.68 percent of the total cost incurred in the cultivation of moong in Fazilka district. The lowest cost has been incurred on other miscellaneous expenses, i.e., 0.47 percent.

Table 6 highlighted that on an average, a sampled moong farmer in Bathinda district incurred cost Rs. 7500.85 per acre. The price at which a farmer disposed off his produce to the buyer has been observed to be Rs. 5595.63 per quintal. By selling the produce at this price, an average farmer has gross value of the output Rs. 27194.76 and got gross return/surplus over cost Rs. 19693.91 per acre which was equivalent to 72.42 percent of gross value of the output. The output-input ratio has been found to be 3.63 which is the indicator of input use efficiency. The results related to high yielding and low yielding farming revealed that in case of high yielding farming, the cost of cultivation was Rs. 8193.85 whereas in case of low yielding farming it was Rs. 6852.17 per acre. But so far as the price is concerned, the high yielding farmer disposed off his produce at Rs. 5640.61 per quintal whereas low yielding farmer disposed off his produce at Rs. 5554.06 per quintal. In this process, the gross value of the output has been observed to be Rs. 28428.67 and Rs. 23327.05 under high yielding and low yielding farming, respectively. The gross return/surplus over cost under high yielding farming has been observed to be Rs. 20234.82, i.e., 71.18 percent of gross value of the output and Rs. 16474.88 per acre under low yielding farming, i.e., 70.63 percent of the same. By comparing high yielding and low yielding farming, it has

been found that the gross return/surplus over cost of moong cultivation was higher under high yielding farming than low yielding farming. Like gross value of the output, the output-input ratio also has been observed to be higher, i.e., 3.47 in case of high yielding farming than 3.40 in case of low yielding farming which shows better input use in case of high yielding farming.

Table 6. Gross Value of the Output, Gross Return and Output-Input Ratio of Moong (Rs./Per Acre)

Sr. No.	Categories	F[1]	Yield	Weighted Price	Cost	Gross Value of the Output	Gross Return/ Surplus over Cost	Output-Input Ratio
A.	Bathinda							
	1. High Yielding Farming	49	5.04	5640.61	8193.85	28428.67	20234.82	3.47
		53	4.20	5554.06	6852.17	23327.05	16474.88	3.40
	2. Low Yielding Farming	102	4.86	5595.63	7500.85	27194.76	19693.91	3.63
	Total (1+2)							
B.	Fazilka	89	3.22	5533.48	4343.91	17817.81	13473.90	4.10

Source: Calculated on the basis of the data obtained through field survey, 2011-2012.

Note. F indicates frequency.

In case of Fazilka district, an average sampled farmer incurred cost Rs. 4343.91 per acre. The selling price at which farmer disposed off his produce has been found to be Rs. 5533.48 per quintal. By selling the produce at this price, an average farmer has gross value of the output Rs. 17817.81 and got gross returns/ surplus over cost Rs. 13473.90 per acre which was 73.71 percent of gross value of the output. The output-input ratio has been found to be 4.10 which was 3.63 in case of Bathinda district. It demonstrates the higher efficiency of Fazilka district farmers in using their inputs.

A comparison of Bathinda and Fazilka district clearly shows that among all the sampled crops, i.e., gram leaflets, gram and moong, per acre cost of cultivation has been observed to be higher in Bathinda district as compared to Fazilka district. Among the two major components of cost of all sampled crops, i.e., cost incurred on wages and purchase of seeds, the proportion of cost incurred on wage payments to labourers is higher in Fazilka district as compared to Bathinda district. Whereas, the cost incurred on purchase of seeds is found to be higher in Bathinda district as compare to Fazilka district. But overall

cost has been found to be higher in Bathinda district. Among all the three crops, the comparative benefits are in favour of Bathinda district except moong crop. This may be due to higher per acre productivity and price in Bathinda district in case of gram leaflets and gram. This provides for the possible explanation for the observed increase in profitability. But in case of Fazilka district, both per acre yield as well as price has been observed to be comparatively lower. Moong cultivation has been observed to be more profitable in Fazilka district. This is mainly due to lower cost (about 50 percent of the cost of cultivation in Bathinda district), though the yield has been observed to be comparatively low. The majority of farmers in the Fazilka district grow moong crop as mixed crop with kinnow orchard, this may be the possible explanation for less cost of production and quick additional returns to the farmers.

4. Discussion

Overall, among all crops, i.e., gram leaflets, gram and moong, the highest cost is incurred under gram cultivation in Bathinda and Fazilka district, i.e., Rs. 7828.11 and Rs. 5190.28 per acre, respectively. This is followed by the cost Rs. 7500.85 and Rs. 4343.91 per acre under moong cultivation in Bathinda and Fazilka districts, respectively. The cost of cultivation has been found to be lowest, i.e., Rs. 6256.69 and Rs. 4425.60 per acre under gram leaflets cultivation in Bathinda and Fazilka districts.

It is concluded that although pulse cultivation has been observed to be somewhat profitable in sampled districts but it lacks assured returns unlike cereal crops which are enjoying assured returns as well as stable productivity. Research studies by Singh et al. (1995), Singh et al. (2005), Pawar and Pawar (2007), Banerjee and Palke (2010), Reddy and Reddy (2010), Grover and Bhullar (2015) and Tiwari and Shivhare (2016) also reached at the same conclusion that the pulse crops were not much profitable due to low yield, less area allocated to the crop, use of traditional methods, less use of improved production technology and number of marketing bottlenecks.

On the basis of above findings, our research study also brings out the need for assured procurement of pulse crops like wheat and paddy in the state which is lacking presently. It is recommended that the state government through its various agencies like MARKFED, FCI, PUNSAP, etc., should enter in the market to guaranteed procure pulse crops to enhance marketing efficiency and ensure remunerative prices to the farmers. The government should also provide high yielding varieties of seeds at the subsidized rates to increase the level of productivity.

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Note

Note 1. F indicates frequency.