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An economic analysis of *Bt* cotton production in Hisar and Sirsa districts of Haryana

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ABSTRACT : The present study was conducted to study the economics of *Bt* cotton production in Hisar and Sirsa districts of Haryana. A random sample of 120 *Bt* cotton growers from 8 randomly selected villages was taken. In Hisar district the average gross income/ac on medium farms were Rs. 36799.40 as compared to large farms (Rs. 36263.00) and small farms (Rs. 34380.57)/q cost of production in Sirsa found to be highest on small farms (Rs. 3139.75) followed by medium (Rs. 3100.77) and large farms (Rs. 2977.09)/ac net returns on total cost and return over variable cost were higher in Sirsa Rs. 10740.74 and Rs. 25962.62 as compared to Hisar Rs. 6712.89 and Rs. 18703.85, respectively.

The sufficient irrigation facilities reduced/ac cost of production incurred on irrigation to almost half in Sirsa district (4.32 %) as compared to Hisar (10.96%). The yield gap was observed in both districts due to inadequate crop stand, burning due to high temperature at emergence, sucking pests and wilting at maturity. The major constraints felt by farmers in Hisar district were inadequate irrigation facilities (94.44 %), non-availability of good quality insecticides (77.77 %), non availability of labour (72.22%), unfavourable climate condition (61.11 %) and non availability of timely fertilizers (55.56 %). There was a serious problem of non availability of labours in Sirsa district which was felt by 75.00 per cent farmers.

Key words : *Bt* cotton, constraints, cost of production, gross returns, net returns, labour, production, returns over variable cost

Cotton is the most important commercial crop of India often referred as the "White Gold" consumes about 54 per cent of the total insecticides used in our country. With the commercialization of agriculture the importance of cash crops like cotton has increased. Nevertheless farmers continue to use insecticides repeatedly as they have no option except to 'spray' or 'pray'. This had frustrated the farmers, scientists and policy makers alike. *Bt* cotton came at a time when they were desperately looking for an alternative and dependable control measure. India has the largest area under cotton cultivation with relatively low productivity primarily due to the large area under rainfed cultivation with inadequate supply of inputs. Area wise, India ranks first in world, whereas it ranks second in production with 27 million bales next to china with 33 million bales. Even though great strides have been made in cotton production in India but still there is a need to improve the yield levels further in order to meet the demand for cotton in the 21st century. In Haryana, cotton is mainly grown in Sirsa, Hisar, Fatehabad and Bhiwani districts. Wide fluctuations have been observed in both in area and production of cotton crop in the state. It is observed that with favorable weather conditions crop production increased into the double average production.

Bt cotton has increased yield by upto 50 per cent, reduced insecticide sprays by half, with environmental and health implications and increased income by upto US $250 or more/ha which has contributed to social benefits and alleviation of their poverty(Monga,2008). *Bt* cotton is playing immense role in enhancing the economy of the farmers in Haryana. Since the

Bt cotton is grown in Haryana there is substantial increase in production of cotton. As a consequence of the above comparative advantages of *Bt* over non *Bt*, there has been gradual and consistent replacement of non *Bt* cotton with *Bt* cotton. The present study was, therefore undertaken to study the economics of *Bt* cotton cultivation and to work out the index of yield gaps and economic losses in Hisar and Sirsa district of Haryana.

The Sirsa and Hisar districts with highest production of cotton in the state were selected for this study. These two selected districts accounted for about 64 per cent of total area and contributed about 65 per cent of total production of cotton in Haryana during the year 2010-2011. From these selected districts, two blocks from each district *i.e.* Barwala and Hisar II block from Hisar district and Sirsa and Ellenabad block from Sirsa district were selected randomly. A sample of two villages was selected randomly from each block. Thus, Panihari and Nezia Khera from Sirsa block and Talwara Khurd and Khari Sureran from Ellenabad block and Baddonpatti and Behbalpur from Barwala block and Kirtan and Dhobi from Hisar II block were selected, respectively.

Both primary as well as secondary data were collected for this study. A sample of 15 respondents including small, medium and large farmers from each selected village making a sample of 120 farmers was taken (Table 1). The survey method consisting of personal interview of selected respondents through specifically designed and pre tested schedule was followed for collecting the required primary data. The cost and returns from production of *Bt* cotton and yielding were computed by using simple tabular analysis, averages and percentages. The yield gap was also computed by using simple tabular analysis. The data relate to *kharif* 2012-2013 were collected from the selected respondents. Simple budgeting technique was used as analytical tool to analyze the data.

Cost and returns of *Bt* cotton production on small, medium and large farms : The cost and returns of *Bt* cotton production in Hisar district has been shown in Table 2. The cost/ac was divided into three categories *viz.,* operational cost, material cost and fixed cost. The cost of production on small farms was Rs. 27126.92/ac (Table 2). The rental value of land, irrigation, picking, plant protection and fertilizer use were the major items of total cost constituting 28.20, 11.63, 9.69, 7.95 and 7.79 per cent, respectively followed by management charges (5.85 %), risk factor (5.85 %), seed cost (4.76 %), hoeing/ weeding (4.10%) and preparatory tillage (3.23 %). In case of medium farms, the cost of production/ ac was worked out as Rs. 29366.27/ac . The rental value of land, picking, irrigation, fertilizer use and plant protection were the major items of total cost contributing 39.03, 12.56, 11.04, 7.46 and 7.28 per cent, respectively followed by management expenses (6.01 %), risk factor (6.01 %), seed cost (5.66 %), hoeing/weeding (4.43 %) and preparatory tillage (3.39 %). The cost of production on large farms was found Rs. 30811.20/ac, which was highest as compared to the cost of production on medium farms (Rs. 29366.27/ac) and small farms (Rs. 27126.92/ac).

Table 1. Category wise number of farmers selected from both the districts

District	Small (Upto 5 ac)	Medium (6-10 ac)	Large (above 10 ac)	**Total**
Hisar	23	17	20	**60**
Sirsa	8	24	28	**60**
Total	**31 (25.83)**	**41 (34.17)**	**48 (40.00)**	**120**

Note: Figures in parenthesis indicate percentage to total

The rental value of land, picking, irrigation, fertilizer use and plant protection were again the major items of total cost accounted for 42.15, 13.85, 10.27, 8.05 and 6.01 per cent, respectively followed by management expenses (5.78 %), risk factor (5.78 %), seed cost (4.34 %), hoeing/ weeding (3.86 %) and preparatory tillage (3.33 %). The comparative analysis of expenditure incurred on different item on small, medium and large farms shows that/ac expenditure incurred on picking, fertilizer use and rental value was highest on large farms as compared to that of medium farms followed by small farms. But in case of management expenses, risk factor, preparatory tillage, hoeing/weeding and interest, the/ac expenditure incurred on these items was highest in medium farms followed by small farms and large farms. Among all 3 categories farms/ ac expenditure incurred on seed cost and irrigation was found highest on small farms followed by medium and large farms. The average gross income/ac on medium farms was Rs. 36799.40 as compared to large farms (Rs. 36263) and small farms (Rs. 34380.57). This may be attributed to highest production (8.16q) on larger farms followed by medium farms (7.90q) and small farms (7.57q). Consequently/ac net returns over total cost was highest on medium farms (Rs. 7433.13) followed by small farms (7253.65) and large farms (Rs. 5451.80). Similarly, the return over variable cost was highest on medium farms (Rs. 19134.17) followed by small farms (Rs. 18536.69) and large farms (Rs. 18440.58). The costs of production /q on large, medium and small farms were Rs. 3775.88, Rs. 3717.24 and Rs. 3583.47, respectively (Dass *et al.,* 2014).

In Sirsa, district the cost and returns of *Bt* cotton production/ac on small, medium and large farms were Rs. 32088.26, Rs. 31472.87 and Rs. 29264.84, respectively (Table 3). On small farms, the rental value of land, picking, fertilizer, plant protection, seed, irrigation, risk factor and management charges were major items which accounted for 37.71, 11.98, 7.99, 7.21, 5.86, 5.13 and 5.13 per cent of the total cost, respectively. In case of the medium farms rental value of land, picking, plant protection, fertilizer, seed, risk factor, management charges, hoeing/ weeding and irrigation were again the major items of total cost constituting 39.72, 12.76, 7.21, 6.68, 6.09, 4.94, 4.94, 4.34 and 4.30 per cent, respectively. The same tempo was observed on large farms which accounted for 36.90, 13.56, 7.58, 7.23, 6.92, 5.18 and 5.18 per cent of the total cost in the items rental value of land, picking, fertilizers, plant protection, seed, risk factor and management charges, respectively. The expenditure incurred on different item on small, medium and large farm shows that/ac expenditure incurred on picking, plant protection and seed was highest on large farms as compared to that of medium farms. It was found that most of the large and medium farmers have their own tube wells, tractors and other operational equipments due to which/ac expenditure incurred on preparatory tillage, sowing and irrigation was less on medium and large farms as compared to that of small farms. The/ac net return on small, medium and large farms were Rs. 10211.74, Rs. 12857.13, and Rs. 9423.37 after deducting the total cost of Rs. 32088.26, Rs. 31472.87 and Rs. 29264.84 from the gross returns Rs. 42300 Rs., 44060 and Rs. 38688.21/ac, respectively. The cost of production/q was found to be highest on small farms (Rs. 3139.75) followed by medium (Rs. 3100.77) and large farms (Rs. 2977.09). Resultantly,/ac production on small farms was highest (10.22q) as compared to medium farms (10.15q) and large farmers (9.83q).

The costs and returns on overall farms in Hisar and Sirsa district have been compared in Table 4/ac cost of production found to be less in Hisar district (Rs. 29101.43) as compared to that of Sirsa (Rs. 30941.99). In Hisar /ac cost of production incurred on major items rental value of land, picking, irrigation, fertilizer, plant production, risk factor, management charges, seed and hoeing/weeding were 27.68, 12.12,

Table 2. Costs and returns of *Bt* cotton production on small, medium and large farms in Hisar district (2012-2013) (Rs./ac)

Sr. No.	Particulars	Small			Medium			Large		
		Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost
	I. Operational cost									
1.	Preparatory tillage	2.50	875.00	3.23	2.80	996.78	3.39	3.16	1027.00	3.33
2.	Irrigational operational expenses	1.30	487.50	1.80	1.40	462.00	1.57	1.17	389.96	1.27
3.	Sowing	1.42	497.00	1.83	1.20	336.00	1.15	1.00	341.67	1.11
4.	Ridging	0.71	142.00	0.52	0.60	102.00	0.35	0.85	212.50	0.69
5.	Hoeing / weeding	3.42	1114.28	4.10	4.20	1302.00	4.43	3.66	1189.50	3.86
6.	Picking	2.42	2628.57	9.69	2.60	3685.00	12.56	2.16	4267.00	13.85
	Sub Total		**5744.35**	**21.17**		**6883.78**	**23.45**		**7427.63**	**24.11**
	II. Material cost									
1.	Seed (g)	739.28	1290.78	4.76	870.00	1662.67	5.66	675.00	1337.39	4.34
2.	Fertilizer (kg)									
	(a) Nitrogen	92.85	488.11	1.81	115.00	611.80	2.08	116.00	599.32	1.95
	(b) Phosphates	53.57	1174.25	4.32	55.00	1276.00	4.35	50.00	1062.50	3.45
	(c) Potash	14.28	228.48	0.84	10.00	160.00	0.54	25.00	350.00	1.14
	(d) Others (Zinc, Boron, NPK etc.)	4.85	221.42	0.82	4.4	144.00	0.49	5.20	466.67	1.51
	Total		**2112.26**	**7.79**		**2191.80**	**7.46**		**2478.49**	**8.05**
3.	FYM	21.30	496.99	1.83	28.8	562.50	1.92	32.50	567.00	1.84
4.	Plant protection (Insecticide/ Pesticide)	4.25	2157.14	7.95	4.75	2137.50	7.28	3.83	1851.15	6.01
5.	Irrigation	3.85	3157.14	11.63	4.6	3240.00	11.04	4.3	3165.00	10.27
6.	Interest @ 12 per cent for half of the growth period		885.22	3.26		986.98	3.36		995.76	3.23
	Sub total		**10099.53**	**37.21**		**10781.45**	**36.72**		**10394.79**	**33.74**
	Total working cost (I+II)		**15843.88**			**17665.23**			**17822.42**	
	III. Fixed cost									
1.	Risk factor		1584.38	5.85		1766.52	6.01		1782.24	5.78
2.	Management charges		1584.38	5.85		1766.52	6.01		1782.24	5.78
3.	Transportation charges		464.28	1.72		568.00	1.93		508.30	1.65
4.	Rental value of land		7650.00	28.20		7600.00	25.88		8916.00	28.94
	Sub total		**11283.04**	**41.62**		**11701.04**	**39.03**		**12988.78**	**42.15**
	Total cost (Rs) (I+II+III)		**27126.92**	**100.00**		**29366.27**	**100.00**		**30811.20**	**100.00**
	Production (q)									
	(a) Main	7.57	33632.42		7.90	36031.90		8.16	35631.00	
	(b) By product		748.15			767.50			632.00	
	Gross returns (Rs.)		**34380.57**			**36799.40**			**36263.00**	
	Return over variable cost (Rs.)		**18536.69**			**19134.17**			**18440.58**	
	Net returns (Rs.)		**7253.65**			**7433.13**			**5451.80**	
	Cost of production (Rs./q)		3583.47			3717.24			3775.88	

Table 3. Costs and returns of *Bt* cotton production on small, medium and large farms in Sirsa district (2012-2013). (Rs/ac)

Sr. No.	Particulars	Small			Medium			Large		
		Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost
	I. Operational cost									
1.	Preparatory tillage	2.60	834.35	2.60	2.00	668.67	2.13	2.30	725.00	2.47
2.	Irrigational operational expenses	1.00	417.80	1.30	1.00	308.33	0.98	1.00	325.00	1.11
3.	Sowing	1.00	328.00	1.02	1.00	291.76	0.93	1.00	287.50	0.98
4.	Ridging	1.00	97.00	0.30	1.00	126.00	0.40	1.00	173.33	0.59
5.	Hoeing / weeding	3.87	1382.70	4.31	2.83	1366.67	4.34	3.16	1250.00	4.27
6.	Picking	2.92	3845.34	11.98	2.50	4016.60	12.76	2.8	3966.67	13.56
	Sub Total		**6905.19**	**21.51**		**6778.03**	**21.54**		**6727.50**	**22.98**
	II. Material cost									
1.	Seed (g)	927.00	1878.60	5.86	975.00	1916.60	6.09	1041.66	2025.45	6.92
2.	Fertilizer (kg)									
	(a) Nitrogen	119.00	642.60	2.00	116.00	614.00	1.95	100.00	495.66	1.69
	(b) Phosphates	41.50	1030.33	3.21	43.30	1015.00	3.23	46.66	1080.83	3.69
	(c) Potash	32.00	487.50	1.52	16.00	240.00	0.76	25.00	350.00	1.20
	(d) Others (Zinc, Boron, NPK etc.)	13.30	405.00	1.26	10.00	233.34	0.74	5.33	291.66	1.00
	Total		**2565.43**	**7.99**		**2102.34**	**6.68**		**2218.15**	**7.58**
3.	FYM	10.15	198.00	0.62	15.00	264.00	0.84	13.33	242.00	0.83
4.	Plant protection (Insecticide/ Pesticide)	4.08	2312.25	7.21	3.67	2267.00	7.21	3.83	2116.65	7.23
5.	Irrigation	4.47	1676.37	5.22	4.16	1356.87	4.30	5.16	975.00	3.34
6.	Interest @ 12 per cent for half of the growth period		919.38	2.87		869.02	2.76		846.52	2.89
	Sub total		**9550.03**	29.77		**8775.83**	**27.88**		**8423.77**	**28.79**
	Total working cost (I+II)		**16455.22**	**51.28**		**15553.86**	**49.42**		**15151.27**	**51.77**
	III. Fixed cost									
1.	Risk factor		1645.52	5.13		1555.38	4.94		1515.12	5.18
2.	Management charges		1645.52	5.13		1555.38	4.94		1515.12	5.18
3.	Transportation charges		242.00	0.75		308.25	0.98		283.33	0.97
4.	Rental value of land		12100.00	37.71		12500.00	39.72		10800.00	36.90
	Sub total		**15633.04**	**48.72**		**15919.01**	**50.58**		**14113.57**	**48.23**
	Total cost (Rs.) (I+II+III)		**32088.26**	**100.00**		**31472.87**	**100.00**		**29264.84**	**100.00**
	Production (q)									
	(a) Main	10.22	42025.00		10.15	43645.00		9.83	38256.21	
	(b) By product		275.00			415.00			432.00	
	Gross returns (Rs.)		**42300.00**			**44060.00**			**38688.21**	
	Return over variable cost (Rs.)		**25844.78**			**28506.14**			**23536.94**	
	Net returns (Rs.)		**10211.74**			**12587.13**			**9423.37**	
	Cost of Production (Rs./q)		3139.75			3100.77			2977.09	

Table 4. Costs and returns of *Bt* cotton Production on Over all farms in Hisar and Sirsa district of Haryana (2012-2013) (Rs/ac)

Sr. No.	Particulars	Small			Medium			Large		
		Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost	Quantity	Value	Per centage of total cost
	I. Operational cost									
1.	Preparatory tillage	2.82	966.26	3.32	2.30	742.67	2.40	2.56	854.47	2.85
2.	Irrigational operational expenses	1.29	446.48	1.53	1.00	350.38	1.13	1.15	398.43	1.33
3.	Sowing	1.20	391.55	1.35	1.00	302.42	0.98	1.10	346.98	1.16
4.	Ridging	0.72	152.16	0.52	1.00	132.11	0.43	0.86	142.14	0.47
5.	Hoeing / weeding	3.76	1201.92	4.13	3.28	1333.12	4.31	3.52	1267.52	4.22
6.	Picking	2.39	3526.85	12.12	2.74	3942.87	12.74	2.56	3734.86	12.44
	Sub Total		**6685.22**	**22.97**		**6803.57**	**21.99**		**6744.40**	**22.47**
	II. Material cost									
1.	Seed (g)	761.42	1430.28	4.91	981.22	1940.22	6.27	871.32	1685.25	5.61
2.	Fertilizer (kg)									
	(a) Nitrogen	107.95	566.41	1.95	111.67	584.09	1.88	109.81	575.25	1.92
	(b) Phosphates	52.85	1170.92	4.02	43.82	1042.05	3.37	48.34	1106.49	3.68
	(c) Potash	16.42	246.16	0.85	24.33	359.17	1.16	20.37	302.66	1.01
	(d) Others (Zinc, Boron, NPK etc.)	4.82	277.36	0.95	9.54	310.00	1.00	7.18	293.68	0.98
	Total	**182.04**	**2260.85**	**7.77**	**189.36**	**2295.31**	**7.42**	**185.70**	**2278.08**	**7.59**
3.	FYM	27.53	542.16	1.86	12.83	234.67	0.76	20.18	388.41	1.29
4.	Plant protection (Insecticide/ Pesticide)	4.27	2048.59	7.04	3.86	2231.96	7.21	4.07	2140.28	7.13
5.	Irrigation	4.25	3187.38	10.96	4.59	1336.08	4.32	4.42	2261.73	7.54
6.	Interest @ 12 per cent for half of the growth period		955.99	3.29		878.30	2.84		917.15	3.05
	Sub total		**10425.25**	**35.83**		**8916.54**	**28.81**		**9670.90**	**32.21**
	Total working cost (I+II)		**17110.47**	**58.80**		**15720.11**	**50.80**		**16415.30**	**54.68**
	III. Fixed cost									
1.	Risk factor		1711.05	5.88		1572.01	5.08		1641.53	5.46
2.	Management charges		1711.05	5.88		1572.01	5.08		1641.53	5.46
3.	Transportation charges		513.53	1.76		277.86	0.90		395.69	1.32
4.	Rental value of land		8055.33	27.68		11800.00	38.14		9927.67	33.08
	Sub total		**11990.96**	**41.20**		**15221.88**	**49.20**		**13606.42**	**45.32**
	Total cost (Rs.) (I+II+III)		**29101.43**	**100.00**		**30941.99**	**100.00**		**30021.71**	**100.00**
	Production (q)									
	(a) Main	7.87	35098.44		10.07	41308.73		8.97	38203.59	
	(b) By product		715.88			374.00			544.94	
	Gross returns (Rs.)		**35814.32**			**41682.73**			**38748.53**	
	Return over variable cost (Rs.)		**18703.85**			**25962.62**			**22333.23**	
	Net returns (Rs.)		**6712.89**			**10740.74**			**8726.82**	
	Cost of production (Rs./q)		3697.76			3072.69			3346.90	

10.96, 7.77, 7.04, 5.88, 5.88, 4.91 and 4.13 per cent, respectively. But in Sirsa the rental value of land, picking, fertilizer, plant protection, seed, risk factor and management charges were major items which accounted for 38.14, 12.74, 7.42, 7.21, 6.27, 5.08 and 5.08 per cent of total cost, respectively followed by irrigation (4.32%), hoeing/weeding (4.31%) interest (2.84%) and preparatory tillage (2.10%). It may attributed to higher/ac production (10.07 q) in Sirsa as compared to that of Hisar (7.87 q), due to which, the/ac cost of production on picking was higher in Sirsa district (Rs. 3942.87) than Hisar (Rs. 3526.85).

There was sufficient irrigation facility in Sirsa district which reduced/ac cost of production incurred on irrigation to half (4.32%) as compared to Hisar (10.96 %). The good source of irrigation in Sirsa district leaded to enhance the rental value of land which accounted for 38.14 per cent of the total cost as compared to that of Hisar (27.68%). The average gross income/ac in Sirsa were Rs. 41682.73 as compared to Hisar (Rs. 35814.32). /q of *Bt* cotton realized by the farmers in Hisar and Sirsa was reported as Rs. 3697.76 and Rs. 3072.69, respectively. The/ac net returns over total cost was higher in Sirsa (Rs. 10740.74) as compared to Hisar (Rs. 6712.89). Similarly, the net returns over variable cost were higher in Sirsa (Rs. 25962.62) as compared to Rs. 18703.85 in Hisar.

Yield gaps analysis and economic losses in cotton production : There have been always yield gaps on the farmer's field. There exist some factors responsible for low yields compared to potential yield and the highest yield attained *on par*ticular farms. The yield gap I is denoted by gap between potential yield and average actual yield and yield gap II is denoted by gap between highest yield and average actual yield on the farms. A wide gap existed in the cotton productivity in both the districts (*i.e.* Hisar and Sirsa) are given in Table 5. The/ac magnitude of yield gap I was found 5.13 q in Hisar district where as it was 3.93 q/ac in Sirsa district. Similarly yield gap II for *Bt* cotton in Hisar and Sirsa district was noticed as 4.13 and 2.93 q/ac. The index of yield gap I and II for *Bt* cotton were found 0.39 and 0.34 and 0.28 and 0.22 in Hisar and Sirsa district (Ashok *et al.,* 2012). The economic losses were found very high as presented earlier through yield gaps 4.53 q/ac overall in case of *Bt* cotton in both the districts. The yield gap was observed due to inadequate crop stand, seedling burning due to high temperature at emergence, late rainfall coinciding with flowering and fruit setting, sucking pests especially the whitefly, mealy bug, cotton leaf curl virus (CLCuV) disease and wilting at maturing.

Table 5. Attainable yield gap in *Bt* cotton production in Hisar and Sirsa district of Haryana

(q/ac)

Particulars	HISAR	SIRSA	**OVERALL**
Potential yield	13.00	14.00	**13.50**
Actual average yield	7.87	10.07	**8.97**
Highest yield	12.00	13.00	**12.50**
Yield gap I	5.13	3.93	**4.53**
Yield gap II	4.13	2.93	**3.53**
Index of yield gap I	0.39	0.28	**0.34**
Index of yield gap II	0.34	0.22	**0.28**

Constraints in *Bt* cotton production : Gradually farming has become more and more commercialized with passage of time. Now, it aims at increasing/unit productivity of land, labour and other scarce farm resources. An attempt was made to analyze the constraints responsible for lower yields in the farmers' field. In Hisar district 94.44 per cent of farmers felt the problem of inadequate irrigation facilities followed by non availability of good quality insecticides (77.77 %), non availability of labour (72.22 %), unfavourable climate condition (61.11 %) and non availability of good quality seed (55.56 %) as shown in Table 6 (Radha and Chowdry 2005). Similarly in Sirsa district there

Table 6. Constraints faced by farmers in production of *Bt* cotton in Hisar and Sirsa district in Haryana

Sr. No.	Constraints	HISAR		SIRSA	
		Number of farmers (N = 60)	Respondent's response (%)	Number of farmers (N = 60)	Respondent's response (%)
1	Non availability of adequate good quality seed	33	55.56	15	25.00
2	Non availability of labour	43	72.22	45	75.00
3	Lack of technical knowledge	30	50.00	40	66.67
4	Unfavourable climatic condition	37	61.11	12	20.00
5	Non availability of good quality insecticides/ pesticides	47	77.77	30	50.00
6	Non availability of good quality weedicide	17	27.78	15	25.00
7	Non availability of timely fertilizers	33	55.56	28	46.67
8	Inadequate irrigation facilities.	57	94.44	10	16.67

was a serious problem of non availability of labour which was felt by 75 per cent farmers. It was observed mainly after commencement of Mahatma Gandhi National Rural Employment Guarantee Assurance Scheme

(MGNREGA). Most of the labours were diverted towards MGNREGA scheme covering various kind of work. In Sirsa district technical knowledge with respect to varieties, time of sowing, dose and type of pesticides and chemical, fertilizer and various cultural operations were found inadequate among 66.67 per cent of the farmers followed by non availability of good quality insecticides (50%). Non availability of timely fertilizers was felt among 46.67 per cent farmers in Sirsa district. The other constraints were non availability of adequate good quality seed (25%), non availability of good quality weedecide (25%) and inadequate irrigation facilities (16.67%).

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