

## **An economic analysis of *Bt* cotton in Sirsa district of Haryana**

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**ABSTRACT :** A sample of 4 villages *i.e.* Mori Wala, Sikandarpur, Peer Khera and Jodhpuria were selected randomly with a sample of 120 farmers (59 small, 36 medium and 25 large). The study revealed that the total cost of cultivation of *Bt* cotton was calculated as Rs. 34924.91 and Rs. 35275.60/ha on small and medium farms, respectively. Among operational cost, picking charges have the major share *i.e.* Rs.4250.00/ha which accounted for 12.17 per cent of total cost on an average. Net returns of Rs. 5660.09 and Rs. 7061.90/ha were obtained from *Bt* cotton cultivation on small and medium farms after deducting total cost from gross returns which was Rs. 40585.00 and Rs. 42337.50/ha, respectively. Net returns were highest on large farms *i.e.* Rs. 8196.10/ha as compared to small and medium farms.

**Key words :** *Bt* cotton, gross return, material cost, returns, operational cost, production cost, net return

With the commercialization of agriculture, the importance of cash crops like cotton has increased. India has the largest area under cotton and ranks third in terms of cotton production in the world. Even though great strides have been made in cotton production in India, there is a need to improve the yield levels further in order to meet the demand for cotton in the 21<sup>st</sup> century. There is a wide gap between the attainable potential yield and the actual yield obtained by the farmers which need to be bridged. In Haryana, cotton is mainly grown in Sirsa, Hisar, Fatehabad, Jind and Bhiwani districts of the state. Visualizing the importance of the crop, the present study was undertaken to study the economics of *Bt* cotton cultivation in Sirsa district of the state.

**Selection of district :** The selection of district forms the first stage of sampling. Out

of the main cotton growing districts in the state Sirsa district was purposively selected for the present study. Sirsa district accounted for about 38.31 per cent of total area and contributed about 40.41 per cent of total production of cotton in Haryana during 2010-2011. Sirsa district stood first in the state with respect to production and area (Table 1).

**Selection of blocks :** From Sirsa district, two blocks were selected randomly *i.e.* Sirsa and Rania.

**Selection of villages :** Two villages were selected randomly from each selected block. Moriwala and Sikandarpur from Sirsa block and Peerkhera and Jodhpuria from Rania block.

**Table 1.** Distribution of villages and farmers selected under different categories

Name of blocks	Selected villages	Number of farmers selected			Total
		Small (<4.5ac)	Medium (4.5-8.8 ac)	Large (>8.8ac)	
Sirsa	(i) Moriwala	14	9	7	<b>30</b>
	(ii) Sikandarpur	13	10	7	<b>30</b>
Rania	(i) Peerkhera	15	9	6	<b>30</b>
	(ii) Jodhpuria	17	8	5	<b>30</b>
	<b>Total</b>	<b>59</b>	<b>36</b>	<b>25</b>	<b>120</b>

**Selection of farmers :** All the *Bt* cotton cultivators of 4 selected villages were pooled and arranged in ascending order according to their size of operational holdings. They were divided into 3 size groups, *viz.*, small, medium and large. In all, 120 farmers were selected from all 4 villages in the 2 blocks.

**Costs and returns :** Costs and returns of *Bt* cotton data were collected from the sampled farmers. It was analysed by using simple tabular analysis, average and percentages etc.

**Costs and returns :** Costs and returns of *Bt* cotton for 2005-2006 have been worked out.

**a) Small farms :** Cost and returns has been presented in Table 2. The cost/ha was divided into 3 categories *viz.*, operational, material and fixed cost. Per ha operational cost included preparatory tillage, irrigational operational expenses, sowing, ridging, fertilizer application, hoeing, picking etc was found Rs. 9256 accounted 26.50 per cent of the total cost (Rs. 34924.91/ha). Among the total operational cost, picking charges had the major share of Rs. 4250 (12.17%), followed by preparatory tillage Rs. 2047 (5.86%) and hoeing charges Rs. 1518 (4.35%) of the total cost.

Similarly, /ha material cost which included seed, fertilizer, insecticides, pesticide, irrigation, interest on working capital etc, was observed as Rs. 10167 which accounted for 29.11 per cent of the total cost. Seed was major items in which was recorded as Rs. 3799 /ha and accounted for 10.88 per cent of total cost. This was due to that farmers have spent much on seed as the seed of *Bt* cotton is much expensive. In the fixed cost items management charges, risk factor, transportation charges and rental value of land were considered and it was found that rental values had the major component of Rs.10875 /ha which was (31.14%) of total cost. Management charges and risk factor were

found 5.56 per cent each of total cost. The main production was observed to be 20.30 q/ha with the value of Rs. 45585 with the inclusion of the values of the product/ha gross returns for *Bt* cotton on small farms were observed to be Rs.40585. Per ha net returns for *Bt* cotton cultivation on small farms were Rs. 5660 and the cost of production was calculated to be Rs 1720/q. Gulab Singh *et al.*, (2011) found total cost of cultivation/ac to be Rs 13357 and gross returns was Rs 15468.

**(b) Medium farms :** Cultivation of *Bt* cotton for medium farms has been shown in Table 2. The total operational cost incurred on different operations on an average was Rs. 9491/ha which accounted for 26.91 per cent of the total cost. The major cost items in operations of *Bt* cotton was picking charges (12.30%), followed by preparatory tillage (6.18%) and hoeing (4.32%). The total material cost incurred was Rs. 10231/ha, which was 29 per cent of the total cost. Cost of seed was the major constituent (11.23%). Fixed cost calculated as Rs. 15552/ha among which rental value was 30.83 per cent of the total cost. Other important cost items in fixed cost were management charges and risk factor (5.59%). Total cost of cultivation of *Bt* cotton was calculated as Rs. 35275/ha. Singh *et al.*, (2011) reported that total cost of production/ac was found to be Rs 14121 and gross returns Rs.16361.10 Net returns of Rs. 2240/ac was obtained from *Bt* cotton in Hisar district. So, it was concluded that material cost and operational cost had little difference, but fixed cost was more than these costs. Net returns of Rs. 7061/ha were obtained from the *Bt* cotton and cost of production/q was Rs. 1622.

**(c) Large farms:** Cost incurred on different operations in the cultivation of *Bt* cotton on an average was Rs. 10021/ha which accounted for 27.41 per cent of the total cost. Main cost items were picking charges (12.44%) followed by preparatory tillage (6.18%) and hoeing. Rs. 10703/ha incurred on different

**Table 2.** Costs and returns from *Bt* cotton on small, medium and large farms in Sirsa district during 2005-2006 (Rs./ha)

Particulars	Quantity				Value				Total cost (%)			
	Small	Medium	Large	Mean	Small	Medium	Large	Mean	Small	Medium	Large	Mean
<b>I. Operational cost</b>												
Preparatory tillage	4.25	4.5	4.75	<b>4.5</b>	2048	2180	2259	<b>2162</b>	5.86	6.18	6.18	<b>6.08</b>
Irrigational expenses	1.41	1.5	1.62	<b>1.51</b>	666	615	770	<b>684</b>	1.91	1.74	2.11	<b>1.92</b>
Sowing	1.08	1.1	1.25	<b>1.14</b>	546	548	619	<b>571</b>	1.56	1.55	1.69	<b>1.6</b>
Ridging	0.58	0.5	0.75	<b>0.61</b>	77	109	103	<b>96</b>	0.22	0.31	0.28	<b>0.27</b>
Fertilizer	1.25	1.4	1.37	<b>1.34</b>	151	178	179	<b>169</b>	0.43	0.5	0.49	<b>0.47</b>
Hoeing / weeding	3.83	3.8	3.88	<b>3.84</b>	1519	1525	1544	<b>1529</b>	4.35	4.32	4.22	<b>4.3</b>
Picking	2.92	3	3.12	<b>3.01</b>	4250	4338	4547	<b>4378</b>	12.17	12.3	12.44	<b>12.3</b>
<b>Sub total</b>					9256	9492	10021	<b>9589</b>	26.5	26.91	27.41	<b>26.95</b>
<b>II. Material cost</b>												
Seed (kg)	2.15	2.24	2.35	<b>2.24</b>	3800	3960	4281	<b>4014</b>	10.88	11.23	11.71	<b>11.28</b>
Fertilizer (kg)												
(a) Nitrogen	156.25	150	168.75	<b>158.32</b>	748	997	822	<b>856</b>	2.14	2.83	2.25	<b>2.4</b>
(b) Phosphates	116.65	115	125	<b>118.87</b>	1062	1046	1136	<b>1081</b>	3.04	2.96	3.11	<b>3.04</b>
(c) Potash												
FYM	18.75	20	16.87	<b>18.55</b>	583	675	672	<b>643</b>	1.67	1.91	1.84	<b>1.81</b>
Plant protection	6.02	5.25	4.67	<b>5.33</b>	942	820	787	<b>850</b>	2.7	2.32	2.15	<b>2.39</b>
Irrigation	3.67	3.6	3.75	<b>3.67</b>	1933	1618	1833	<b>1795</b>	5.53	4.59	5.01	<b>5.04</b>
Interest					1099	1116	1173	<b>1130</b>	3.15	3.16	3.21	<b>3.17</b>
<b>Sub total</b>					10167	10232	10703	<b>10368</b>	29.11	29	29.28	<b>29.13</b>
Total working cost (I+II)					19424	19723	20725	<b>19957</b>				
<b>III. Fixed cost</b>												
Risk factor					1942	1972	2072	<b>1996</b>	5.56	5.59	5.67	<b>5.61</b>
Management					1942	1972	2072	<b>1996</b>	5.56	5.59	5.67	<b>5.61</b>
Transportation					742	733	813	<b>762</b>	2.12	2.08	2.22	<b>2.14</b>
Rental value					10875	10875	10875	<b>10875</b>	31.14	30.83	29.75	<b>30.56</b>
<b>Sub total</b>					15501	15552	15832	<b>15629</b>	44.38	44.09	43.31	<b>43.92</b>
<b>Total cost (Rs.) (I+II+III)</b>					<b>34925</b>	<b>35276</b>	<b>36557</b>	<b>35586</b>				
<b>Production (q)</b>												
(a) Main					39585	41450	43846	<b>41627</b>				
(b) By product					1000	888	906	<b>931</b>				
<b>Gross returns (Rs.)</b>					<b>40585</b>	<b>42338</b>	<b>44753</b>	<b>42559</b>				
Return over variable cost (Rs.)					21161	22614	24029	<b>22601</b>				
<b>Net returns (Rs.)</b>					<b>5660</b>	<b>7062</b>	<b>8196</b>	<b>6973</b>				
Cost of production (Rs./q)					1720	1622	1602	<b>1646</b>				

materials was 29.28 per cent of the total cost. Cost of seed was major constituent which was 11.71 per cent of total cost and Rs. 4281/ha in real terms fixed cost calculated was Rs. 15832/ha among which rental value of land was the major component which accounted 43.31 per cent of the total cost. Other important cost items were management and risk factor 5.67 per cent. Each of the total cost of cultivation was calculated as Rs. 36557/ha Net returns of Rs. 8196/ha was obtained on large. After deducting total cost from the gross returns which was Rs. 44753.12/ha. The cost of production/q was Rs. 1602. Singh *et al.*, (2011) and Dass *et al.*, (2014) studied that total cost of production/ac as Rs. 14317 and 25911. The net returns was calculated to be Rs. 2675 and 10147. The reason for more returns was due to more use of quality inputs and more and better quality seed than small and medium farmers

**(d) Overall farms :** Operational cost incurred on different operations was Rs. 9589/ha, which accounted for 26.95 per cent of the total cost. Main cost item in operations of *Bt* cotton were picking charges (12.30%). Rs. 4378/ha incurred on different material used for cultivation of *Bt* cotton which was 29.13 per cent of the total cost. Cost of seed was major constituent which was 11.28 per cent of the total cost and Rs. 4013/ha in real terms. Fixed cost calculated as Rs. 15628/ha among which

rental value of land was the major component accounted for 30.56 per cent of the total cost. Other important cost items were management charges and risk factor 5.61 per cent. Total cost of cultivation was Rs. 35585/ha. Singh *et al.*, (2011) , Dass *et al.*, (2014) and Nandal *et al.*, (2009) also reported that total cost of production /ac were Rs.13932, 25672, 13850 and net returns were found Rs.2341, 9143 and 3461. Net returns of Rs. 6972/ha were obtained on overall farms. After deducting total cost from the gross returns was Rs. 42558/ha. The cost of production/q was calculated to be Rs. 1646.

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