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Input utilization and constraints of cotton production in Punjab

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ABSTRACT: An analysis was carried out to study the input utilization pattern and input used in cotton production in Punjab. A survey was conducted during 2010-2011 on 120 farm households having various sizes of land holdings *i.e.* marginal, small, semi medium, medium and large numbered 60 each from 2 cotton growing district of Punjab were selected. The study revealed that the total cost on cotton crop cultivation was Rs. 38377/ha. The returns over variable costs of the cotton growers came out to be Rs 62864.50 / ha in the Punjab state. It was further found that cotton growers facing large number of constraints in Punjab *viz.*, quality and high price of *Bt* seed (100 %), labor shortage (75.8 %) , availability and price of fertilizer (85.8 %), lack of knowledge about package of practices (65.0 %), inadequate irrigation facilities (52.0 %) , low availability of irrigation water (38.3 %), incidence of diseases and pests attack (100 %), lack of genuine plant protection chemicals (25.8 %), lack of capital resources (98.7 %), lack of credit availability from institutional sources (92.5 %) , high cost of credit (95.0 %). However, 100 per cent of the farmers are facing the problem of low price of farm produce at the time of harvesting, price fluctuation and lack of timely information on market prices. These problems are much severe among the small and marginal farmers due to their small land base and crunch of capital and other resources.

Key words: Cotton, constraints, productivity, land holding size

Cotton popularly known as 'White Gold' is one of the principal commercial crops in India. It sustains country's cotton textile industry which is perhaps the largest segment of organized industries providing employment to millions of people engaged in production, handling, processing, fabrication and marketing of cotton. Global economic significance of cotton is reflected by its 44 per cent and 10 per cent shares in world's fibre and edible oil production respectively. India has the largest area (26%) under this crop but due to low productivity (Singh and Singh, 2007) its contribution towards total world production is only 12 per cent. Although, there has been a significant growth in cotton productivity during the last five decades, but it is still much below the world average.

The northern zone (Punjab, Haryana and Rajasthan) produces about 35 per cent of total cotton production of India. In this zone, an over-view of cotton crop in Punjab shows that the state has been leading the country for several years in productivity as well as share in national production. In 1991-1992 cotton production in the state touched all time high (26 lakh bales) and subsequently significant decline in its area was noticed due to continuous extensive damage caused by the bollworm complex. The area under cotton declined from 701 thousand hectares in 1990-1991 to 452 thousand hectares in 2003-2004. During 2009-2010, Punjab produced about 1968 thousand bales of cotton from about 497 thousand hectares of area. The average yield of American cotton worked out to be 673 kg/ha, which was just 437 kg/ha during 2000-2001 (Annonymous, 2010). Although it is being outlined that of the major cause of its low productivity is the attack of innumerable insect pests, but certain other constraints become the hindrance in the cotton production and value output.

Punjab state has been divided into three agro climatic zones on the basis of cropping pattern, soil type and rainfall, *viz.*, sub mountainous, central and south western zones. The cultivation of cotton is mainly confined to south- western districts of the state which are Bathinda, Sangrur, Mukatsar, Mansa, Ferozepur and Faridkot. These districts accounted for about 96 per cent of total area under cotton during 2010-2011 in the state. To identify the various constraints the study was planned in two cotton growing districts of Punjab. In the first stage of

sampling Bathinda and Mansa districts were selected randomly. Further two blocks from each selected districts and two villages from the each blocks were selected randomly. Finally a sample of 120 farm households, 60 from each district was selected. In this way, a sample consisting of 20 marginal (<1ha), 19 small (1.01 to 2ha), 32 semi medium (2.01 to 4 ha), 43 medium (4.01 to 10 ha) and 6 large (> 10 ha) farm households were taken. The data was collected during the year 2010-2011. Multi stage random sampling technique was followed for the selection of the sample farm households. The detailed sampling design of the study is given in Table 1.

Utilization of various inputs is very important for optimum uses of scarce resources and quality of the product in changing economic environment of global economy. The input costs of crops are generally high in the developing economies which hamper competitiveness of the product in the international market. Table 2 shows inputs use and costs incurred/ha on cotton crop cultivation in the Punjab state. The total cost on cotton crop cultivation was Rs. 38377/ha out of which major share (56.64 %) was incurred on human labour. Cotton is a labour intensive crop, as the picking and weeding operations in this crop are being done manually. On an average, a total of 988 h (123.5 man days)/ha human labour were employed in all the operations of cotton cultivation. Tractor use was the next important input which accounted for 17.29 h and costs Rs 4757/ha. Cotton is the largest chemical consuming crop in the state. Although, the consumption of pesticides has been reduced due to *Bt* cotton cultivation but still farmers are making 5 sprays of chemicals costing Rs 3952/ ha which is 10.30 per cent of the total variable cost. Due to expensive *Bt* cotton seed it costs Rs 3339/ha which is 8.70 per cent of the total variable costs.

Table 1. Sampling design of the study

Districts	Blocks	Villages	Marginal (< 1 ha)	Small (1-2 ha)	Semi medium (2-4 ha)	Medium (4-10 ha)	Large (> 10 ha)	**Total holdings**
Bathinda	2	4	10	8	16	22	4	**60**
Mansa	2	4	10	11	16	21	2	**60**
Total	**4**	**8**	**20**	**19**	**32**	**43**	**6**	**120**

Cotton crop is the main remunerative crop of the south western Punjab. The economic conditions of the farmers of this belt are significantly influenced by the cotton productivity. The cotton growers were pushed under heavy debt burden during late 1990s due to cotton crop failure. (Singh *et al.*, 2008) Table 3 depicts the returns over variable costs on cotton cultivation in Punjab state. The average yield of cotton crop was 20.69 q/ha and of byproduct (cotton sticks) was 29.64 q/ha. The average price received by the cotton

Table 2. Input use and costs incurred on cotton crop in Punjab, 2010-2011

Sr. No.	Variable	Cost/ha		
		Quantity	Value(Rs)	Percentage
1	Seed and seed treatment (kg)	1.98	3339	8.70
2	Fertilizers i) Urea (kg)	300	1590	4.14
	ii) DAP (kg)	66	657	1.71
3	Manures (Trolleys)	1.43	610	1.59
4	Spraying chemicals (Number)	5	3952	10.30
5	Irrigations (Number)	6	400	1.04
6	Human Labour (H)	988	21736	56.64
7	Tractor (H)	17.29	4755	12.39
8	Transportation and marketing charges	-	494	1.29
9	**Total costs [1+8]**	**-**	**37533**	**-**
10	Interest on variable cost @ 9% for half period	-	844	2.20
11	**Total variable cost [9+10]**	**-**	**38377**	**100.00**

Table 3. Returns over variable costs on cotton cultivation in Punjab, 2010-2011

Particulars	Value
Main product	20.69 q/ha
Byproduct (Cotton sticks)	29.64 q/ha
Price	Rs 4750/q
Price of byproduct	Rs 100/q
Gross returns	Rs. 101241.50 /ha
Total variable cost	**Rs 38377 / ha**
Returns over variable costs	Rs. 62864.50 /ha

growers was Rs 4750/q Due to the variation in price range of cotton the farmers sell the produce at different prices which ranges between Rs 3500 to Rs 6000/q. Due to the multiple use of cotton sticks and scarcity of other fuel wood the price of cotton sticks has been increased to Rs 100/q In this way returns over variable costs of the cotton growers was Rs 62864.50/ha in the Punjab state.

The cotton growers face large number of problems particularly of seed, labour and fertilizers (Table 4). High prices of quality *Bt* seeds and lack of pure and quality seeds were the major problems as all the 100 per cent sampled farmers irrespective of farm size complained these problem. Although Punjab agriculture is highly mechanized but still picking of cotton is being done manually. In the peak season of cotton harvesting there is always dearth of labour in the labour market. This problem was raised by 50 percent of the marginal farmers, about 58 per cent by small farmers, about 88 per cent by semi medium and 84 per cent by medium farmers. Being the large size of the farm, all the large farmers have complained this problem. Overall about 76 per cent of the Punjab farmers have faced the problem of shortage of labour during peak season. Availability and price of fertilizer is another important determinant of cotton cultivation. About 86 per cent of the sample farmers have faced the problem of high prices and availability of quality fertilizer. Although extension services in the Punjab state are quite efficient but still two third (65 %) of the farmers have faced the problem of lack of knowledge about recommended package of practices. This problem was severe with smaller farmers. There was not even a single large farmer in the sample who pointed out this problem. Overall, it can be concluded that the main problem in the cotton cultivation is quality and high prices of *Bt* seeds.

Although cotton is a less water requiring crop but for obtaining potential yield of it adequate and timely irrigation is pre requisit. About 43 per cent of the cotton growers sampled households pointed out the problem of inadequate irrigation facilities (Table 5). This problem was raised by 35 per cent of marginal, about 37 per cent of small, 44 per cent of semi medium, 51 per cent of medium and 33 per cent of large farmers. The problem of low availability of irrigation water was faced by 38.33 per cent farmers. However, high cost of irrigation power was faced by only one marginal farmer. The incidence of diseases and pests attack is the major factor responsible for low productivity of cotton in the state. To check the menace of diseases and pests, farmers adopt various plant protection measures and face large number of problems. All the sampled farmers

Table 4. Physical constraints of seed, labour and fertilizer by sample households, Punjab, 2010-2011

(Multiple response)

Farmer category	Sample size	High prices and lack of quality *Bt* seeds	Lack of agricultural labour during peak seasons	Lack of availability and high price of genuine fertilizers	Lack of knowledge about recommended package of practices
Marginal	20	20 (100.00)	10 (50.00)	18 (90.00)	12 (60.00)
Small	19	19 (100.00)	11 (57.89)	15 (78.95)	14 (73.68)
Semi medium	32	32 (100.00)	28 (87.50)	27 (84.38)	21 (65.63)
Medium	43	43 (100.00)	36 (83.72)	38 (88.37)	25 (58.14)
Large	6	6 (100.00)	6 (100)	5 (83.33)	6 (100)
All holdings	**120**	**120 (100.00)**	**91 (75.83)**	**103 (85.83)**	**78 (65.00)**

Table 5. Irrigation and plant protection constraints faced by sample households, Punjab, 2010-2011

(Multiple response)

Farmer category	Sample size	Inadequate irrigation facilities	Low availability of irrigation water	High cost of irrigation power	High incidence of diseases and pests	Lack of availability of genuine plant protection chemicals
Marginal	20	7 (35.00)	10(50.00)	1(5.00)	20(100.00)	6(30.00)
Small	19	7(36.84)	10(52.63)	0(0.00)	19(100.00)	4(21.05)
Semi medium	32	14(43.75)	9(28.13)	0(0.00)	32(100.00)	7(21.88)
Medium	43	22(51.16)	16(37.21)	0(0.00)	43(100.00)	14(32.59)
Large	6	2(33.33)	1(16.67)	0(0.00)	6(100.00)	0(0.00)
All holdings	**120**	**52(43.33)**	**46(38.33)**	**1(0.83)**	**120(100.00)**	**31(25.83)**

(100%) irrespective of farm category underlined the problems of high incidence of diseases and pests in cotton crop. The lack of genuine plant protection chemicals is the major problem faced by about 26 per cent of the sample farmers. This problem was raised by 30 per cent of marginal, about 21 per cent of small, about 22 per cent of semi-medium and about 33 per cent of medium farmers. It is very interesting to know that not even a single large farmer who has more than 25 acres of land has raised the problem of lack of availability of plant protection chemical.

It is a well known fact that farmers of the cotton belt have been facing the problem of severe debt. In majority of the cases, they have ended their life by committing suicides due to high debt burden (Sidhu *et al.*, 2011). Due to the failure of cotton crop from 1997 to 2002, the cotton growers have faced capital constraints as no funding agency was ready to advance the loans to these farmers. Although the introduction of *Bt* cotton has improved the economic status of large number of farmers. However, they are facing the problem of resource crunch. All the sampled marginal and small farmers have faced the problem of lack of capital resource, lack of credit availability from institutional source and high cost of credit (Table 6). The credit constraint has not emerged as a determinant of cotton production in case of large farmers due to their large land base has sufficient owned capital.

In the wake of globalization, market is the key determinant of returns and profitability of any venture. This transaction is more important in case of agricultural produce in general and

Cotton in particular as there is fluctuation in prices of cotton in domestic and international market. In our field survey all the sampled farmers irrespective of the farm size have faced the problems of low price of farm produce at the time of harvesting, price fluctuation and lack of timely information on market prices (Table 7). The problem of lack of marketing facilities at the village level was raised by 40 per cent of the sampled farmers. This problem was overviewed by 45 per cent marginal, 47.37 per cent small, 37.05 per cent semi medium, 37.21 per cent medium and 33.33 per cent large farmers. The

Table 6. Credit constraints by sample households, Punjab, 2010-2011

(Multiple response)

Farmer category	Sample size	Lack of capital	Lack of credit availability resources institutional sources	High cost of credit
Marginal	20	20(100.00)	20(100.00)	20(100.00)
Small	19	19(100.00)	19(100.00)	19(100.00)
Semi medium	32	31(96.88)	31(96.88)	30(93.75)
Medium	43	40(93.02)	41(95.35)	40(93.02)
Large	6	0(0.00)	0(0.00)	5(83.33)
All holdings	**120**	**110(91.67)**	**111(92.50)**	**114(95.00)**

Table 7. Marketing constraints in cotton production, Punjab 2010-2011

(Multiple response)

Farmer category	Marginal	Small	Semi-Medium	Medium	Large	All Holdings
Sample size	20	19	32	43	6	120
Lack of marketing facilities at village level	9(45.00)	9(47.37)	12(37.05)	16(37.21)	2(33.33)	48(40.00)
Low price of farm produce at the time of harvesting	20(100.00)	19(100.00)	32(100.00)	43(100.00)	6(100.00)	120(100.00)
Lack of storage facilities	1(5.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(0.83)
Lack of grading and standardization	1(5.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(0.83)
Lack of cheap and efficient transport	2(10.00)	1(5.26)	0(0.00)	0(0.00)	0(0.00)	3(2.50)
Delay in payment by the marketing agencies	2(10.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	2(1.67)
Less payment by the marketing agencies	1(5.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	1(0.83)
Price fluctuation	20(100.00)	19(100.00)	32(100.00)	43(100.00)	6(100.00)	120(100.00)
Lack of timely information on market prices	20(100.00)	19(100.00)	32(100.00)	43(100.00)	6(100.00)	120(100.00)

other problems namely lack of storage facilities, lack of grading and standardization, delay in payment by the marketing agencies and less payment by the marketing agencies were faced by only few marginal farmers. The cotton growers face large number of marketing problems particularly of low prices and price fluctuations. Overall, it can be concluded that farmers of the Punjab have been facing large number of problems regarding production, protection and marketing of cotton. There are serious bottlenecks in input usage which need to be corrected to achieve higher output growth. Similar findings were also reported by Reddy *et al.*, (2011).These problems are much severe among the small and marginal farmers due to their small land base and crunch of capital and other resources.

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