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# Economics of cultivation of cotton in Adilabad district of Telangana state

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## Abstract
The study was conducted in Adilabad district of Telangana state. The study was based on primary as well as secondary data with major emphasis on primary data. These data were collected from 60 (sixty) cotton cultivators belonging to two villages situated in two blocks in the district. The reference year of the study was 2018-19 agricultural year. Objectives of the study were to estimate costs and returns in cotton cultivation and to find whether the farmers got the minimum support price of their output or not. In the study cost concept and cost structure were used at different stages. Cost of cultivation, cost of production, gross return and net return were worked out in the study. The study revealed that percentage allocation of land to cotton declined across the higher size classes of farm. As a whole, land area under cotton accounted for 61.73 per cent of the gross cropped area. Cost of cultivation (cost c) per acre was found to increase across the larger size classes. As a whole cost C per acre was estimated rupees 35487. Percentage share of fixed cost gradually increased across the higher size class. An opposite pattern of change was noted in case of variable cost. The study also revealed that yield, gross return and net return per acre increased across the higher size classes. In respect of these variables there were wide differences between the marginal & medium size classes of farms. As a whole, gross return and net return per acre were Rs. 53158 and Rs. 17671 respectively. Differences in cost/acre among various size classes were reflected on differences in yield per acre. Differences in selling prices of cotton among the various size classes of farm were negligible. These prices were slightly lower than its minimum support prices in the year under study. As a whole, these two prices were Rs. 5407/quintal and Rs. 5450/quintal respectively.

**Keywords:** Cost c, cost of production, gross return, net return, minimum support price

## Introduction
Cotton is one of the most important fiber and cash crops of India and plays a dominant role in the industrial and agricultural economy of the country. India has emerged as the second largest producer of cotton in the world and occupies the first position in terms of total area under crop production. Production in India during 2017-18 was 377 lakh bales from 122 lakh hectares with a productivity of 525 kg lint/ha (CAB) [1]. In India, the major cotton cultivating states are Gujarat, Maharashtra, Andhra Pradesh, Telangana, Haryana, Karnataka, etc. During the same year Gujarat, Maharashtra and Telangana were the major cotton growing states covering around 71 per cent (86.4 lakh hectare) in area under cotton cultivation and 65 per cent (246 lakh bales) of cotton production in India. In Telangana state, area of cotton in 2017-18 was 18.24 lakh ha, Production was 57.00 lakh bales and Productivity was about 531 kg/ha. Adilabad district of Telangana state referred as "White Gold City" had gross cropped area of 352262 lakh ha and the area under cotton crop was 2.92 lakh hectare. The commonly grown Bt-cotton varieties in the survey area were Mallika, Rashi, Tulasi, Bakthi etc. Climate and Soils in Adilabad district of Telangana are favourable to grow Bt-Cotton crop. Bt (Bacillus thuringiensis) cotton was introduced to India in 2002 and commercialized all over the country within two to three years (Geetha and Mahesh 2019) [3]. It is the most precious gift of nature to the mankind to cloth the people all over the world. Cotton accounts more than 70 % of the raw fiber used by the world textile industry. Cotton contributes not only fiber to the textile industry but also edible oil which plays an important role in meeting the ever-increasing demand of edible oil in the country. Cotton seed oil cake production during the first 6 months (oct-march) 2017-18 is estimated around 38 lakh tons (smctradeonline.com) [4]. In India, all the four cultivated cotton species viz., *Gossypium arboreum*, *G. herbaceum*, *G. hirsutum* and *G. barbadense* are grown on commercial scale (Singh and Kairon 2008) [6]. Being a cash crop, cotton is known for its intensive cultivation. The economy of our country is influenced by cotton through its production and processing sectors and by generating direct and indirect employment and income. Cotton provides direct livelihood to 6 million farmers. About 60 million people are employed in cotton trade & processing (NFSM at https: www.nfsm.gov.in) [5]. It is necessity for the government to protect the interest of cotton producers and increase in

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their production by assuring better price for the produce. In the study an attempt was made to estimate cost and returns in Bt cotton cultivation by different size classes of farm. Another important objective was to compare the prices of cotton received by the cultivators and Minimum Support Price declared by the Government.

## Materials & methods
The study was conducted in Adilabad district of Telangana state. This district was purposively selected for the study. From two revenue divisions namely Adilabad & Utnoor, two blocks were selected on the basis of allocation of highest area to cotton crop. From each block one village was selected purposively. The agricultural households were completely enumerated in respect of allocation of land for cotton cultivation by the farmers. Among 550 cotton growers in two villages 60 number of agricultural households were selected by the technique of Simple Random Sampling Without Replacement. This study was based on mainly primary data collected from sixty agricultural households growing cotton crop. Secondary data were also used as and when necessary. Data were collected on area of land under this crop, quantity of different types of inputs used by the farmers, cost of inputs, production and productivity of cotton, price of the product, etc. The reference year of the study was 2018-19 agricultural year. Cost of cultivation of this crop was estimated on the basis of cost concepts & cost structure which are furnished below. In the study cost A1, cost A2, cost B, cost C and Fixed, Variable costs were estimated for different size classes of farms. Besides these, gross return and net return per unit area and per unit quantity were estimated.

Cost A1 = All actual expenses in cash and kind incurred in production by the producers.

## The items included in cost A1 are costs of
1. Hired human labour
2. Hired bullock labour
3. Owned bullock labour
4. Seeds
5. Plant protection chemicals
6. Manures (owned & purchased)
7. Fertilizers
8. Insecticides and pesticides
9. Irrigation
10. Depreciation on farm machineries, equipments, farm building and farm implements
11. Land revenue, cesses and other taxes
12. Interest on working capital and
13. Miscellaneous expenses
14. Cost A2 = Cost A1 + Rent paid for leased-in land
15. Cost B = Cost A2 + Interest on value of owned capital assets (excluding land) + Rental value of owned land
16. Cost C = Cost B + Imputed value of family labour.

## Cost Structure has been furnished below
**Fixed cost:** Costs that remains constant regardless of production level. It includes rental value of owned land, land revenue, depreciation on fixed resources, interest on fixed capital & rent paid for leased-in land.

**Variable cost:** Residual items of expenditures shown in the cost concept have been included in variable cost.

**Total cost:** Total fixed cost + Total variable cost.
Cost of Cultivation: It is total cost i.e. Cost C per unit area (acre in this study).
Cost of Production: It is also total cost (Cost C) for producing per unit quantity (quintal in this study) of commodity.

## Result and Discussion

**Table 1:** Operational holding of sample households across size classes

| Size class (Col.1) | No. of agricultural households (col.2) | Operational Holding (acres) | | | | Average size of operational holding (acre) (Col.7) |
| --- | --- | --- | --- | --- | --- | --- |
| | | Owned land (Col.3) | Leased-in land (Col.4) | Leased-out land (Col.5) | Total operated land (Col.6) | |
| Marginal (<2.5 acres) | 6 (10.00) | 11.50 (100.00) | - | - | 11.50 (100.00) | 1.91 |
| Small (2.5 to 5 acres) | 22 (36.67) | 96.70 (100.00) | - | - | 96.70 (100.00) | 4.39 |
| Semi-medium (5 to 10 acres) | 22 (36.67) | 186.00 (100.00) | - | - | 186.00 (100.00) | 8.45 |
| Medium (10 to 25 acres) | 10 (16.66) | 191.00 (100.00) | 6.00 (3.14) | 6.00 (3.14) | 191.00 (100.00) | 19.10 |
| Combined | 60 (100.00) | 485.20 (100.00) | 6.00 (3.14) | 6.00 (3.14) | 485.20 (100.00) | 8.08 (100.00) |

N.B i) Figure in parentheses under col.2 indicates percentage to combined figure.
ii) Figures in parentheses under column 3 & 4 indicate percentage to total operated land in the respective size class.

Operational holding of Sample agricultural households growing cotton in different size classes is presented in Table 1.
In the area under study it was found that the farm households existed in marginal, small, semi-medium & medium size classes. No farm household existed in large size class. A lowest percentage of farm household was found to exist in marginal size class. Farm households belonging to both small and semi-medium size class accounted for the highest percentage with equal existence of households. Average size of operational holding in small size class was 2.29 times higher than that of marginal size class of farms. Operational land holding of semi-medium size class was estimated (implicit) to be 1.92 times higher than that of small size class. Similarly average size of holding in medium size class was larger by 2.26 times as compared to the average size of holding in semi-medium size class of farms.
No incidence of leasing-in and leasing-out of land were found in marginal, small & semi medium size classes of farms. In medium size class of farms both leased-in & leased-out land accounted for 3.14 per cent of the total operational holding. Inter-size class difference in size of operational holding was very high. As a whole average size of operational was found to be 8.08 acre.

**Table 2:** Net sown Area in Kharif, Rabi and Gross cropped area

| Size class | Net sown area in Kharif (in acre) | | Net sown area in Rabi (in acre) | | Gross cropped area (in acre) |
|---|---|---|---|---|---|
| | Cotton | Soya bean | Ground nut | Chickpea | |
| Marginal | 11.00 (88.00) | 0.50 (4.00) | - | 1.00 (8.00) | 12.50 (100.00) |
| Small | 79.20 (69.35) | 17.50 (15.32) | 8.50 (7.45) | 9.00 (7.88) | 114.20 (100.00) |
| Semi- medium | 142.50 (60.38) | 43.50 (18.43) | 34.00 (14.40) | 16.00 (6.77) | 236.00 (100.00) |
| Medium | 148.00 (58.26) | 43.00 (16.92) | 41.00 (16.14) | 22.00 (8.66) | 254.00 (100.00) |
| Combined | 380.70 (61.73) | 104.50 (16.94) | 83.50 (13.53) | 48.00 (7.78) | 616.70 (100.00) |

N.B: Figures in parentheses indicate percentage to gross cropped area in the respective size class.

Area under different crops grown by the agricultural households in different size classes is furnished in Table 2. Agricultural households were reported to allocate their land holding to cotton and soya bean in kharif season. In Rabi season groundnut & chickpea were grown by the farmers. It was found that land allocated to cotton accounted for the highest percentage of gross cropped area in all the size classes of farms. It was also noted that percentage allocation of land to cotton crop gradually declined across the higher size classes. As a whole, area under cotton was noted to be 61.73 per cent of the gross cropped area. Other crops in descending order of allocation of land were found to be soya bean, groundnut and chickpea.

**Table 3:** Cost of Cultivation of Bt cotton across size classes (Rupees/acre)

| Particulars | Cost concepts | | | |
|---|---|---|---|---|
| Size class | Cost A1 | Cost A2 | Cost B | Cost C |
| Marginal | 20893.21 (70.21) | 20893.21 (70.21) | 24393.21 (81.97) | 29758.21 (100) |
| Small | 22915.49 (71.44) | 22915.49 (71.44) | 26929.13 (83.96) | 32075.49 (100) |
| Semi- medium | 26160.02 (73.98) | 26160.02 (73.98) | 30324.57 (85.76) | 35359.93 (100) |
| Medium | 29339.41 (77.49) | 29839.41 (78.81) | 33642.41 (88.86) | 37860.41 (100) |
| Combined | 26568.87 (74.87) | 26763.25 (75.42) | 30736.64 (86.61) | 35486.87 (100) |

N.B: Figures in parentheses indicate percentage to cost c.

Cost of cultivation of Bt cotton across the size classes is presented in table 3. There was no difference between cost A1 & cost A2 in different size class excepting in medium size class of farm. This happened due to non-existence of cultivation of this crop in leased-in land in marginal, small and semi-medium size classes of farms. Only in medium size class this crop was cultivated by the farmers in leased- in land, besides in owned land. Owing to addition of some items of expenditure to cost A2, cost B was recorded to be higher than A2 in each of the size classes of farms. Cost C per acre was found to increase across the higher size classes of farms. Cost /acre was found to be highest in medium size class which was the largest size class of all in this study. This result was also similar to the findings of Gamanagatti, P.B (2012) [2]. This indicated a higher level of capability of larger size classes of farms. It was also found that rate of increase from cost A2 to B was more or less same in small & semi-medium size classes of farms. A lowest rate of increase was recorded in medium size class. The rate of increase from cost B to cost C was noted to decline across the higher size classes of farms. As a whole, there was a slight difference between percentage share of cost A1 & A2. Cost B was observed to be 11% higher than cost A2 and cost C was recorded to be 13.39% higher than cost B. As a whole, cost C per acre was estimated to be Rs.35487.

**Table 4:** Fixed cost and operational cost per acre in cotton cultivation (Rupees/acre)

| Size class | Fixed cost/acre | Operational cost/acre | Total cost/acre | Fixed cost/qtl | Operational cost/qtl |
|---|---|---|---|---|---|
| Marginal | 4078.38 (13.71) | 25679.82 (86.29) | 29758.21 (100.00) | 556.40 | 3503.39 |
| Small | 4917.63 (15.33) | 27157.86 (84.67) | 32075.49 (100.00) | 581.97 | 3213.95 |
| Semi- medium | 5806.10 (16.42) | 29553.83 (83.58) | 35359.93 (100.00) | 599.80 | 3053.08 |
| Medium | 6482.66 (17.12) | 31377.75 (82.88) | 37860.41 (100.00) | 594.74 | 2878.69 |
| Combined | 5834.36 (16.44) | 29652.50 (83.56) | 35486.87 (100.00) | 593.50 | 3016.38 |

N.B. Figures in parentheses indicate percentage share of fixed cost & operational cost to total cost in each of the size classes.

Fixed cost and operational cost (variable cost) in cotton cultivation are displayed in table 4. It was found that fixed cost which was incurred even in the absence of production accounted for 13.71 per cent to 17.12 per cent. Percentage share of fixed cost was observed to change positively across the higher size classes. The percentage share of variable cost was noted to decline across the higher size classes. The percentage share of this cost in total cost was noted to range from 82.88 per cent to 86.29 per cent. It was also observed that fixed cost per quintal in cotton cultivation was highest in semi-medium size class. It was found to be lowest in marginal size class. It may be mentioned that with increase in volume of output fixed cost goes on declining. There is no scope for finding this phenomenon in individual size classes in the study. However, variable cost per quintal of cotton was noted to decline across the higher size classes. As a whole, fixed cost was found to account for 16.44 per cent and variable cost accounted for 83.56 per cent of the total cost. Variable cost per quintal was noted to be rupees 3016.38.

**Table 5:** Cost and return per acre in cotton cultivation across different size classes. (Rupees)

| Particulars | Cost of cultivation/acre | Yield (quintal/acre) | Price /quintal | Gross returns/acre | Net returns/acre | Cost of production /quintal | Gross returns/ quintal | Net returns/quintal |
|---|---|---|---|---|---|---|---|---|
| Marginal | 29758.21 | 7.33 | 5432.00 | 39816.56 | 10058.35 | 4059.78 | 5432.00 | 1372.22 |
| Small | 32075.49 (7.79) | 8.45 (15.28) | 5400.90 | 45637.61 (14.61) | 13562.12 (34.83) | 3795.92 | 5400.90 | 1604.98 |
| Semi-medium | 35359.93 (10.23) | 9.68 (14.55) | 5391.09 | 52185.75 (14.34) | 16825.82 (19.39) | 3652.89 | 5391.09 | 1738.20 |
| Medium | 37860.41 (7.07) | 10.90 (11.63) | 5423.00 | 59110.70 (13.27) | 21250.29 (26.29) | 3473.43 | 5423.00 | 1949.57 |
| Combined | 35486.87 | 9.83 | 5407.48 | 53158.22 | 17671.35 | 3609.88 | 5407.48 | 1797.61 |

N.B. Figures in parentheses indicate percentage increase of variables across the size classes.

Cost, yield and return per acre in cotton cultivation are furnished in table 5. Cost of cultivation per acre was found to increase across the higher size classes. Yield of the crop was noted to expand across the higher size classes of farms. This was attributed to higher level of cost of cultivation across the larger size classes of farms. As a whole, cost of cultivation was found to be rupees 35486/acre. No wide difference in prices of this crop was found among various size classes of farms. Price per quintal was noted to range from Rs. 5391.09 in semi-medium size class to Rs. 5432.00 in marginal size class. As a whole, it was Rs.5407.48/quintal. Both gross return & net return were recorded to be higher in larger size classes of farms. For gross returns similar results were found in the study of Vaidkar *et al*. (2010) [8]. The gradual increase in gross return across the larger size classes was found to be caused by higher level of yield across the same size classes. Net return per acre which was estimated by substracting cost per acre from gross return per acre was also noted to increase across the higher size classes. This positive change in net return/acre was attributed to the gradual increase in gross return across larger size classes of farms. Obviously, effect of gross return/acre on net return/acre was found to be greater the effect of cost/acre. As a whole, gross return & net return were estimated to be Rs. 53158/acre and Rs. 17671/acre respectively. Similarly a gradual decrease in cost of production across the higher size classes was attributed to the positive change in yield/acre across the same size classes of farm. Here also increase in yield of cotton across the size classes was found to suppress the cost/acre. No wide difference in gross return/quintal was observed across the size classes of farm. A higher level of net return/quintal was earned by the farmers belonging to larger size classes. As a whole, gross return and net return per quintal were estimated to be Rs. 5407 and Rs. 1798 respectively.

**Table 6:** Comparison of cotton prices received by the farmers and its minimum support prices.

| | Selling price/quintal | Minimum support prices/quintal | |
|---|---|---|---|
| | | 2017-18 | 2018-19 |
| Marginal | 5432.00 (0.33) | 4320 | 5450 |
| Small | 5400.90 (0.90) | 4320 | 5450 |
| Semi-medium | 5391.09 (1.08) | 4320 | 5450 |
| Medium | 5423.00 (0.49) | 4320 | 5450 |
| Combined | 5407.48 (0.78) | 4320 | 5450 |

N.B.: Figures in parenthesis indicate difference between selling prices of cotton and its minimum support price in 2018-19 in the respective size class.

The table 6 displays a comparison of cotton prices received by the farmers and its minimum support prices pertaining to 2017-18 and 2018-19 agricultural years. It was observed that the selling prices of cotton of the farmers belonging to various size classes were higher than the minimum support price of cotton relating to 2017-18 agricultural year.
The minimum support prices of cotton in 2018-19 (the reference year of the study) were recorded to be slightly higher than the prices received by the farmers in the same year. The differences between minimum support price & selling price of cotton ranged from 0.33 percent to 1.08. As a whole this difference was estimated as 0.78 per cent. More or less the cotton cultivators could sell their crop at minimum support price.

**Conclusion**
The study indicated a wide difference between expenditures incurred by lower and higher size classes of farms in cotton cultivation. This resulted in low levels of productivity of this crop in lower size classes as compared to those of higher size classes of farms. The marginal and small farmers could not afford to make more outlays in the cultivation of this crop owing to deficiencies in their fund capacities. Lending agencies particularly institutional credit agencies might play an important role in advancing agricultural credit to the cultivators in marginal and small size classes.

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