Original Research Article

Value Addition to Cotton in Telangana State: An Economic Analysis

ABSTRACT

Cotton is one such crop which undergoes multiple level of processing from ginning to garment manufacturing. The final product of one level serves as the raw material for the next level. The following study was taken up to quantify value addition to the seed cotton at various stages of processing in the Telangana state. A sample of 10 ginning mills, 10 spinning mills, 10 weaving mills, one dyeing and printing mill and one garment manufacturing unit were chosen for the study. Using a structured schedule, the required information was collected by the respondent by employing personal interview technique. The value addition during ginning, spinning, weaving, dyeing and printing and garment manufacturing was estimated at Rs 401.24/q seed cotton, Rs. 3,138.65/q lint, Rs. 5,292.79/q yarn, Rs. 5,573.52/q greige fabric and Rs. 11,082.35/q finished fabric respectively. It was also estimated that the total net value addition to one quintal of cotton at various stages was Rs. 6745.42.

Key words: Cotton, Value addition, Processing, Ginning, Fabric

1. INTRODUCTION

Cotton is one of the ancient crops cultivated on the earth and it is the most extensively grown commercial and non-food crop in the globe (Goud *et al*., 2018). Cotton production provides a means of livelihood for almost 250 million people globally. It offers millions of opportunities for employment in emerging nations (Sankar & Naidu, 2017). Additionally, the crop is important to India's economy, it serves as the foundation of the Indian textile industry, which dependent extensively on cotton as a raw material (Annual report, Ministry of Textile, 2020–21). According to the report of India Brand Equity Foundation, the country's textile industry, which is dominated by cotton, accounts for around 11 percent of overall export revenues, 5 percent to country’s Gross Domestic Product (GDP) and 14 percent to industrial production. India holds the distinction of being the world's largest producer of cotton and the country with the largest area under cultivation, accounting for around 40% of the global area under cultivation and 24% of the global cotton production. (Cotton Corporation of India, 2022). The major cotton producing states of India were Gujarat, Maharashtra, Telangana, Rajasthan, Karnataka, Haryana, Andhra Pradesh, and Madhya Pradesh.

Telangana is the third largest producer of cotton in India. It is a major crop of the state next to paddy, accounting 32.77 percent of total gross cropped area (74.78 lakh hectares) (Planning Department, Government of Telangana’s state statistical abstract, 2022). The Agricultural Department has set a target of cultivating the cotton crop in 30 lakh hectares in the succeeding years. It has decided to extend complete cooperation to cotton farmers besides, giving incentives to encourage ginning mills in the state to provide marketing for the surplus cotton produced from the increased area.

The number of ginning mills has increased to 300 mills since the state's creation. It is anticipated that there will be more ginning mills as cotton production rises. Another factor supporting this is the state's spinning sector, which has a total capacity of around one million spindles. (Guruprasad & Chattopadhyay, 2014). Telangana is also one of the important states in

the weaving industry. There are about 50,000 power looms, 17,000 handlooms and skilled labour force working in the state (invest.telangana.gov.in). The study has been undertaken to measure the value addition to cotton at each level of processing.

Cotton Value Addition/Processing: Processing of cotton takes place in five major steps namely ginning, spinning, weaving, dyeing and printing and garmenting. During these stages the cotton gets converted to cloth and available to the consumers in various forms.

Ginning: Separation of cotton fiber from the seed takes place at the ginning stage. It is the first stage of the cotton processing. The seed cotton is first dried to low moisture level before being cleaned with machinery to eliminate impurities during the ginning process. This technique simplifies processing and raises fiber quality (Suvagiya & Khunt 2020). The obtained fiber from the ginning process is called as lint. The percentage of lint obtained from the seed cotton is called as ginning out turn ratio, which ranges from 33-42 percent and it depends on cotton cultivar and environmental conditions (Feky, 2010)

Spinning: The spinning of the cotton yarn is the second stage of textile product processing. It is the process of making yarn from the extracted fibers/lint. In this process a mass of cotton wool fibers or lint is drawn out and twisted and wound onto a bobbin. By this, fibers come together to form a yarn (cottoncounts.net).

Weaving: It is a method of textile production in which two distinct sets of yarns or threads namely warp and weft are interlaced at right angles to form fabric or cloth. The fabric obtained during weaving processing is called as greige fabric (cottoncounts.net).

Dyeing and printing: Dyeing and printing is the second last stage of the textile manufacturing process take place in dyeing mills. Dyeing and printing mainly focusses on color and appearance of the greige fabric which was produced during weaving stage. During this stage, greige fabric converted to finished fabric and ready for garment manufacturing (textileinfomedia.com).

Garment manufacturing: It is final stage of value addition to cotton where the finished fabric converted to readymade garments and make available to consumers in various forms and shapes (Dodamani & Kunnal, 2007).

2. MATERIAL AND METHODS

2.1 Sampling technique: India is largest producer of the cotton in the world. Telangana state is the third major producer of cotton in India among other cotton growing states in India. The two major cotton producing districts namely, Adilabad and Nalgonda were chosen for the current study.

Hence, a sample of 10 ginning mills, 10 spinning mills, 10 weaving mills, one dyeing and printing mills and one garment manufacturing unit were selected from the study area. To realize the objective of the research, the data on various costs and prices were carefully collected from all the processing units for the year 2021-22. Cost of processing of cotton and value addition done by the processing units were analyzed as follows.

2.2 2Tabular analysis: For ease of comparison, the data was presented in tabular format. The economics (cost and return structure) of the processing units were estimated using a simple tabular analysis. In the same way value addition to cotton at different stages was calculated using basic statistical techniques.

2.3 Costs and returns of cotton processing: The cost of processing of cotton was categorized into variable costs and fixed costs.

The variable costs such as value of raw material, electricity charges, cost of repair and maintenance, wages to casual labor, cost of marketing, interest on working capital *etc.,* were recorded. The fixed cost includes depreciation on building, plant and machinery, salary to

permanent employees, interest on fixed capital, license fee and insurance premium were recorded.

The cost function of cotton processing is defined as follows.

$$\text{Total cost (TC)} = \text{Variable Costs} + \text{Fixed costs}$$

The profit was calculated by,

$$\Pi = TR - TC$$

Where, Π= Profit, considered as value addition at each stage
TR = Total returns
TC = Total cost

3. RESULTS AND DISCUSSION

Value addition to the cotton at different stage of processing:

Cotton is processed in multiple stages, including ginning, spinning, weaving, dyeing, printing, and garment production. It is delivered to consumers in the form of clothes after undergoing final processing at a garment manufacturing stage. Below, there is description about cost of processing and value addition at each stage of processing and the same is presented in the Table 1 and Table 2 respectively.

3.1 Value-addition to cotton during ginning process (Conversion of kapas/seed cotton to lint):

An average of Rs. 9,954.94/q of seed cotton was spent on turning kapas/seed cotton into lint. In which total variable cost (Rs 9,844.47/q) (98.90%) accounted for a sizeable share. The proportion of fixed costs in the total cost was only 1.11 percent with Rs 110.47/q.

The price of seed cotton, which was Rs. 9,288.90/q, constituted the majority of the variable costs (93.31%), which was followed by the interest on working capital (307.21/q), which accounted for 3.09 percent. In the total fixed cost (Rs. 110.47/q), interest on the fixed capital Rs. 48.85/q found to be the major component and accounted for 0.50 percent.

During ginning process, one quintal of seed cotton yielded 65 kg of cotton seed, nearly 33 kg of lint and the remaining 2 kg of waste. The total revenue received during processing was Rs. 10,356.18. The raw material cost was Rs. 9,288.90/q and the value addition cost were about Rs. 666.04/q. As a result, value addition during the ginning was Rs. 401.24/q of kapas. The above results were in similarity with the Radhika & Kumari (2015) reported high variable cost during ginning process mainly due to high raw material cost.

- **Value-addition to lint during spinning process (Conversion of lint to yarn):**

The final cost for turning lint into yarn came out to be Rs. 30,861.35/q of lint, variable cost was (Rs. 29,140.26/q) the main component accounted 94.42 percent of total expenditure and the fixed cost was Rs. 1,721.08/q, merely accounted for 5.58 percent in total expenditure.

In variable cost, the cost of raw material (Rs. 24,882.35/q) took considerable share accounted 80.63 percent of total cost followed by working capital interest (Rs. 1,899.68/q) (6.16%). Whereas fixed cost (Rs. 1,721.08/q), predominated by the total depreciation (Rs. 735.51/q) accounted 2.38 percent succeeded by the interest on the fixed capital (Rs. 686.18/q).

During spinning process, a quintal of lint yielded 75.00 kg of first grade yarn and 25.00 kg of wastage *i.e.,* second quality yarn. The total revenue received from spinning processing was Rs. 34,000.00 in which main product (fine yarn) contributes Rs. 29,250.00 and returns from by-product (yarn wastage) were Rs. 4,750.00. The raw material cost was Rs. 24,882.35 /q of lint and the value addition cost was about Rs. 5,978.99/q. As a result, net value added during

spinning process was Rs. 3,138.65/q. The results are in concurrence with Mundinamani (2000).

Table 1: Cost of processing of cotton at different processing stages along the value chain (Rs/q).

Particulars	Ginning stage	Spinning stage	Weaving stage	Dyeing and printing stage	Garmenting stage
Variable cost					
Raw material cost	9,288.90 (93.31)	24,882.35 (80.63)	39,000.00 (83.80)	61,088.00 (89.80)	78068.58 (65.57)
Electricity charges	62.25 (0.63)	962.07 (3.12)	509.53 (1.09)	420.57 (0.62)	1,261.71 (1.06)
Repair and maintenance	27.57 (0.28)	668.87 (2.17)	353.95 (0.76)	168.23 (0.25)	788.57 (0.66)
Office maintenance	22.77 (0.23)	61.85 (0.20)	27.23 (0.06)	140.19 (0.21)	315.43 (0.26)
Wages to causal labour	32.69 (0.33)	431.90 (1.40)	554.26 (1.19)	1,151.31 (1.69)	13,800.00 (11.59)
Telephone charges	0.88 (0.01)	1.32 (0.00)	17.50 (0.04)	35.05 (0.05)	63.09 (0.05)
Cost of marketing	102.20 (1.03)	232.23 (0.75)	629.49 (1.35)	214.67 (0.32)	3,643.20 (3.06)
Interest on working capital	307.21 (3.09)	1,899.68 (6.16)	2,869.67 (6.17)	2,212.63 (3.25)	6,855.84 (5.76)
Total variable cost	9,844.47 (98.90)	29,140.26 (94.42)	43,961.63 (94.46)	65,430.65 (96.18)	1,04,796.41 (88.02)
Fixed cost					
Depreciation					
(a) Building	5.03 (0.06)	12.00 (0.04)	146.95 (0.32)	89.92 (0.13)	2,523.43 (2.12)
(b) Plant and machinery	32.89 (0.34)	723.51 (2.34)	455.36 (0.98)	420.57 (0.62)	2,365.71 (1.99)
Salaries to permanent employees	21.88 (0.22)	272.46 (0.88)	746.79 (1.60)	1,261.71 (1.85)	6,939.43 (5.83)
Licence fee	0.60 (0.01)	2.57 (0.01)	19.45 (0.04)	52.57 (0.08)	78.86 (0.07)
Insurance	1.23 (0.02)	24.37 (0.08)	158.50 (0.34)	70.10 (0.10)	52.57 (0.04)
Interest on fixed capital	48.85 (0.5)	686.18 (2.22)	1050.49 (2.26)	700.95 (1.03)	2,300.53 (1.93)
Total fixed cost	110.47 (1.11)	1,721.08 (5.58)	2,577.53 (5.54)	2,595.83 (3.82)	14,260.53 (11.98)
Total cost	9,954.94 (100.00)	30,861.35 (100.00)	46,539.16 (100.00)	68,026.48 (100.00)	1,19,056.94 (100.00)

- **Value-addition to yarn during weaving process (Conversion of yarn into greige fabric):**

In the total variable cost, the cost of raw material (Rs. 39,000 /q) was occupied the bulk of the total cost accounted 83.80 percent followed by interest on working capital (Rs. 2,869.67/q) (6.17%). In the total fixed cost (Rs. 2,577.53/ q), interest on the fixed capital (Rs. 1,050.49/q) found to be the major component accounted for 2.26 percent.

During weaving process, from a quintal of yarn, 97.00 percent of fabric and 3 percent of waste, were produced through the weaving process. 3.68 meters of cloth was produced from about one kg of yarn. A total revenue of Rs. 51,831.95 of which majority was contributed by main product (greige fabric) was obtained during weaving process. The raw material cost was Rs. 39,000.00/q and the value addition cost were Rs. 7,539.16/q. As a result, net value added in the weaving mills was Rs. 5,292.79/q of yarn. Bhavya *et al*. (2017) also reported similar findings.

- **Value-addition to greige fabric during dyeing and printing process (Conversion of greige fabric into finished fabric):**

The data in Table 1 makes it clear that a quintal of greige fabric required a total processing expense of Rs. 68,026.48 to convert it into finished fabric. The variable cost, which came to be Rs. 65,430.65/q, contributed 96.18 percent of the overall cost. The fixed cost was Rs. 2,595.83/q, or 3.82 percent of total cost.

Among the variable costs, the cost of raw material *i.e.,* greige fabric (Rs. 53,360.00/q) obtained highest share in the total cost followed by dye cost (Rs. 7,728.00/q). In the fixed cost, salaries to the permanent employees (Rs.1,261.71/q) took major share followed by interest on the fixed capital (Rs. 700.95/q).

Complete recovery of the product was observed in dyeing and printing stage. Processing of a quintal greige fabric yielded total revenues Rs. 73,600.00. The raw material cost was Rs. 53,360.00/q and the value addition cost were about Rs. 14,666.48/q. As a result, net value addition was Rs. 5,573.52/q of greige fabric.

Table 2: Value Addition to the cotton at different processing stages along the value chain (Rs/q).

Particulars	Ginning stage	Spinning stage	Weaving stage	Dyeing and printing stage	Garmenting stage
Returns from main product	8,211.18	29,250.00	51,759.20	73,600.00	1,30,114.29
Returns from by-product	2,145.00	4,750.00	72.75	-	25.00
Gross returns	10,356.18	34,000.00	51,831.95	73,600.00	1,30,139.29
Raw material cost	9,288.90	24,882.35	39,000.00	53,360.00	73,600.00
Processing cost	666.04	5,978.99	7,539.16	14,666.48	45,456.94
Net value addition	401.24	3,138.65	5,292.79	5,573.52	11,082.35

- **Value-addition to finished fabric during garment manufacturing (conversion of finished fabric to garment):**

The average cost of processing a quintal of finished fabric was Rs. 1,19,056.94, of which variable cost was around Rs. 1,04,796.41 per quintal. This is a sizeable component of the processing cost, accounting for 88.02 percent and fixed cost was estimated at Rs. 14,260.53, or 11.98 percent of the processing cost.

Among the variable costs, the cost of raw materials *i.e.,* finished fabric along with thread

and button cost was the major component accounted for (Rs. 73,600.00/q) 65.57 percent of the total cost. Wages to the causal labour (Rs.13,800.00/q) also occupied a considerable portion of total cost accounting 11.59 percent. In the total fixed cost (Rs. 14,260.53/q), salaries to the permanent employees (Rs. 6,939.43/q) found to be the major component, accounted 5.83 percent.

A quintal of fabric produced 99 percent of the finished product after being transformed into garment. One shirt (final good) requires approximately 1.4-2.0 meters of fabric. During garmenting stage, a total profit of Rs. 1,30,139.29 was obtained of which Rs. 1,30,114.29 came from the main product. The cost of the raw materials was Rs. 73,600.00/ q, while the cost of adding value was roughly Rs. 45,456.94/q. As a result, net value added in the processing of fabric to garment was Rs. 11,082.35/q of finished fabric. The above estimations were in conformity with Dodamani and Kunal (2007).

- **Total net value addition to one quintal of cotton at different processing units:**

The processing of the cotton has taken place in five different stages, viz., ginning, spinning, weaving, dyeing and printing and garment manufacturing to reach the consumers. During ginning process, one quintal of cotton yielded 33.00 kg lint, 65.00 kg seed and 2.00 kg waste. The 33.00 kg of lint further processed in spinning mills and yielded 24.75 kg of fine yarns and 8.25 kg of wastage. The 24.75 kg of yarn was further processed in the weaving mills and yielded 88.35 m fabric. It was further processed in dyeing mills to impart good appearance to the fabric. Finally, 62.47 shirts were made from 88.35 m of fabric in the garment manufacturing unit.

Table 3 and Figure 1 show the overall value added to one quintal of cotton at various processing stages. According to the findings, one quintal of cotton gained approximately Rs. 6,745.62 in value. The breakdown of this amount at different stages of cotton processing was as follows: ginning Rs. 401.24 accounted for 5.95 percent, spinning Rs. 1,035.75 contributed 15.35 percent, weaving Rs. 1,309.97 accounted 19.42 percent, dyeing and printing Rs. 1,338.06 worked out to be 19.84 percent, and garment manufacturing Rs. 2,660.60 which contributed 39.44 percent to the total net value addition to one quintal of seed cotton. It is apparent that the stage of garment production showed the greatest value addition to cotton. It is crucial to notice that value addition to cotton increase as it moves through the value chain.

Table 3: Total net value addition to one quintal of cotton at different processing units

S. No	Stage of processing	Quantity obtained	Value addition	Percent
1	Ginning	33.00 kg lint and 65.00 kg seeds from 1 quintal cotton	401.24	5.95
2	Spinning	24.75 kg fine yarn and 8.25 kg wastage *i.e.,* second grade yarn from 33 kg of lint	1,035.75	15.35
3	Weaving	24.01 kg fabric *i.e.,* 88.35 m and 0.74 kg wastage from 24.75 kg yarn	1,309.97	19.42
4	Dyeing and printing	Dyeing and printing of 24.01 kg or 88.35 m fabric	1,338.06	19.84
4	Garmenting	23.77 kg garment (62.47 shirts) and 0.24 kg waste from 88.35 m fabric	2,660.60	39.44
Total net value addition to one quintal cotton			6,745.62	100.00

Figure 1 Net value addition to one quintal of cotton in different processing unit

CONCLUSIONS

Cotton undergoes multiple level of processing starting from ginning, spinning, weaving, dyeing and printing and finally garment manufacturing. The cost incurred towards processing and value addition per unit was increased along different stages of the processing. Highest value addition was seen in garment manufacturing unit followed by dyeing mill, weaving mills, spinning mills and ginning mills. The total net value addition to one quintal of seed cotton was estimated at Rs 6,745.62. in which the highest contribution was made by the garment industry accounted 39.44 percent.

It was observed that the major problems confronting the processors were high cost of machinery, lack of subsidies and grants by the government, high cost of raw material and lack of technical human resource. Therefore, the study recommend that the government should give subsidies for purchase of advanced machineries and provide training facilities to youth to develop the necessary skillset which are in accordance with the requirement of the processing units.

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