



## **The Impact of *Bt* Technology on Cotton Cultivation on Farm Economy in Warangal District of Andhra Pradesh**

**Key words :** Bt technology, Cotton, Warangal

Technologies come with some concomitant and some consequential benefits, both of which should be taken together in assessing the total benefits that accrue. No technology is risk free. Benefits of a technology should hence be weighed against minimal and acceptable risks and a favourable cost-benefit ratio (*fbae.org*). *Bt* Technology is not an exception to this. The most direct and the most important benefit of *Bt* technology is the control of the most damaging pest of particular crop, such as the American cotton bollworm, stem borers of rice and corn, rootworm of corn, or Colorado beetle of potato. *Bt* cotton, developed for control of bollworms, the most destructive insect pests on cotton, continues to be the only agri-biotech product approved by the Government of India for commercial cultivation since March 2002. As it enters into its 10th year, *Bt* cotton has made tremendous progress as evident by an exponential increase in its cultivated area from 29,000 hectares in 2002, the first year, to over 10 million hectares in 2010, which accounted for a staggering 92 per cent of India's total cotton area. The number of farmers adopting this technology has also increased from 20,000 in 2002 to over 6 million in 2010. Further, India turned from an importer of cotton to an exporter, *Bt*-cotton being acknowledged as one of the major factors contributing to the progress ([www.knn24x7.com](http://www.knn24x7.com)).

India is one of the important cotton growing countries in the world. Cotton is cultivated in around 11m.ha in our country. The crop will have profound influence on the socio-economic conditions of the predominantly rain fed farming in India. Andhra Pradesh is occupying 3<sup>rd</sup> place area, production and productivity with Maharashtra occupying 1<sup>st</sup> place in area, Gujarat occupying 1<sup>st</sup> place both in production and productivity. Warangal district in Andhra Pradesh is a very important cotton growing district. Cotton farmers of the district were benefited by growing cotton during 2010-11 and

realized the maximum price up to Rs.7000 per quintal. Naturally the area response of the cotton by the farmers was phenomenal during 2011-12 registering a record 2.88 lakh ha in Warangal district.

The Andhra Pradesh Government moved the Monopolies and Restrictive Trade Practices Commission (MRTPC) act against Mahyco-Monsanto Biotechnology Company on the exorbitant<sup>7</sup> royalty being collected by it for *Bt* cotton (<http://www.thehindubusinessline.in/2006/01/03/stories/2006010301881200.htm>). There were allegations that farmers losing their rights for cultivation of the variety of their choice, safety and also the economic benefits of the *Bt* technology. Hence a study has been conducted to assess impact of *Bt* cotton cultivation in Warangal district on farm economy of Andhra Pradesh.

Warangal district of Andhra Pradesh was purposively selected as it is one of the most important cotton growing districts of Andhra Pradesh. The time series data of cotton production under various aspects from the important cotton producing villages in Warangal district were collected using pre tested well designed schedules. Details were collected regarding the expenditure incurred by farmers on aspects such as seed, fertilizer, plant protection chemicals (PPC), planting, picking, land preparation, transport and yield. Annual compound growth rates were calculated for the time series data of cotton production under various items to assess the impact of *Bt* cotton on farm economy in Warangal district of Andhra Pradesh. The study pertains to the period from 1998-99 to 2008-09.

The results of the cost of cultivation in Warangal district of Andhra Pradesh were presented in Table 1. The total cost of cultivation (Cost C) was worked out to be Rs. 61231. Out of this, the land rent contributed 30.88 per cent of the total cost of cultivation. Expenditure towards chemicals (7.58), insecticides (5.88) and weedicides (3.88) were the major items in the cost of cultivation of cotton crop in Warangal district.

Table 1. Cost of cultivation of Cotton crop in Warangal district (Rs/ha).

ITEM	COTTON	PER CENT
Land preparation	4582	7.48
FYM	515	0.84
Chemical	4639	7.58
Seed	2647	4.32
Weedicide	2373	3.88
Irrigation	773	1.26
Insecticide	3598	5.88
Harvesting and Post harvesting	2535	4.14
Yield (kg/ha)	3221	5.26
Price (Rs./q)	2820	-
Transport	416	0.68
Rental	18906	30.88
Land Revenue	235	0.38
Family labour	11447	18.69
Hired labour	8800	14.37
Cost A1	30878	50.43
Cost A2	49784	81.31
Cost C	61231	100.00

## Appendix

## Trends Of Cost Cultivation In Warangal District (Case Of Cotton

Year	Land Pre paration	Seed & Sowing	Manures & Fertilizers	Weeding	Plant Protection	Irrigation	Harvesting	Threshing & Bagging	Total	Gross Returns	Net Returns
1998-03	1158.89	1006.8	2607.89	656.76	9138.89	633.33	1981.70	1900.63	4425.36	20576.90	11481.80
2003-04	786.00	934.5	2785.71	510.63	7700.00	412.50	692.50	190.00	1264.26	24000.00	12350.00
2004-05	1072.22	993.33	5166.67	673.75	7642.86	425.00	780.00	202.5	1522.84	26750.00	12700.00
2005-06	1210.00	1367.14	5785.71	861.11	5875.00	147.50	975.71	333.00	1702.77	34750.00	22040.00
2006-07	1600.00	1368.57	6000.00	1042.22	6444.44	160.00	1454.29	385.83	2001.28	34750.00	21390.00
2007-08	3276.92	1663.85	7600.00	1430.77	5863.64	186.67	2190.77	1467.92	3656.01	66500.00	38566.00
2008-09	3768.75	1852.94	458.10	1747.37	4000.00	260.00	3093.75	-	9686.58	51400.00	34640.00
2009-10	4582.00	2647.00	5154.00	2373.00	3598.00	773.00	2535.00	416.00	22078.00	90832.20	68754.00
Acgr	1.27	1.13	1.15	1.21	0.89	0.83	1.16	1.15	1.18	1.2	1.24
Percent	0.27	0.13	0.15	0.21	-0.11	-0.17	0.16	0.15	0.18	0.20	0.24

The results of the trends in various items of cost of cultivation of cotton crop such as land preparation, seed, sowing, manures and fertilizers, weeding, plant protection, irrigation, harvesting, threshing and bagging from 1998-2003 (pre *Bt* period) to 2008-09 (Post *Bt* period) were analyzed for their annual compound growth rates and the results were presented in Table 2.

Plant protection chemicals and irrigation registered negative growth rate among the inputs that constituted the cost of cultivation in Warangal district. Reduction in cost of protection was due to the *Bt* technology that was introduced during the study period. The short duration of the *Bt* hybrids might be the reason for reduction in expenditure towards the irrigation of the Cotton crop in Warangal district during the study period. Expenditure on plant protection chemicals and irrigation registered a negative growth rate of 11 and 17 percent respectively. Expenditure on all other items were increased that contributed towards increase of the cost of cotton cultivation in Warangal district. Land preparation and weeding contributed more when compared to seeds and sowing, manures and fertilizers, harvesting and threshing whose expenditure had increased in the

district during the study period. Land preparation and weeding witnessed a growth rate of 27 and 21 per cent respectively towards the cost of cultivation of cotton.

The positive impact of the *Bt* technology was reflected in the reduced expenditure of PPC and irrigation. The total cost of cultivation, gross and net returns had increased in the study area as witnessed in the case of Cotton. Similar results were reported by Kiresur and Ichangi (2011) where in the seed cost, yield of *Bt* cotton and cost of plant protection had been found to be greatly influenced the probability of adoption of *Bt* cotton in Karnataka. The relative higher percentage of growth in the gross and net returns when compared to growth in the total cost of cultivation reflected the positive impact of the *Bt* technology that was introduced in cotton cultivation during the study period.

#### LITERATURE CITED

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