

# Analysis of bt cotton and non bt cotton



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## **ABSTRACT**

Cotton production is important to Pakistan's agriculture and to the overall economy. Nearly 26 percent of all farmers grow cotton, and over 15 percent of Pakistan's total cultivated area is devoted to this crop, with production concentrated in two provinces: Punjab (80%) and Sindh (20%). Cotton and its intermediate and final products (such as, yarn, textiles and apparel) contribute significantly to the gross domestic product (8%), total employment (17%), and foreign exchange earnings (54%) in Pakistan. Pakistan is the fourth largest producer and the third largest consumer of cotton in the world. The cotton-textile sectors have important implications for national economic performance and poverty reduction. the purpose of study is to determine economic analysis of BT cotton and other conventional varieties that impact on the income level of the farmers. The primary data will be collected from the district Rahim Yar Khan and Bahawalnagar. The farmers will be divided into two groups BT and non BT varieties. Ordinary Least Square technique will be used to check the income level of farmers towards BT and non BT cotton.

### Introduction

Pakistan is the fourth largest producer of cotton after China, USA and India. Its Overall contribution to the world production of cotton in 2008-2010 was 8 percent. In terms of cotton consumption, Pakistan is ranked at 3rd position with an annual demand of 12. 2 million bales, after China and India with an annual demand of 52. 8, 18. 2 million bales respectively. It produces about 2. 3 million tons of cotton. Cotton is the main cash crop of Pakistan. It is second

in terms of area to wheat, which is the country's staple food. Area annually planted under cotton is around 3 million hectares and accounts for 15 percent of the total cropped area. Cotton accounts for 7.3 percent of the value added in agriculture and about 1.6 percent to GDP. (Government of Pakistan, 2009-10). Textiles, Pakistan's largest industry and a major source of employment in manufacturing, depends on cotton farming for its supply of raw material. Cotton and its made-ups contribute 65 percent of the foreign exchange earned from merchandise goods. It also supply feed for livestock and dairy farming. Cotton picking which is highly labor-intensive activity, is an important source of employment for rural women, providing supplementary income to rural farm and nonfarm households.

In view of its widespread forward and backward linkages, the cotton crop occupies a unique position in the rural economy of Pakistan. Its performance holds the key not only for the growth and development of agriculture sector but also for the healthy growth in the overall economy. A good cotton crop is vital for the sustainable development of agriculture, food security, and poverty alleviation efforts at the micro- and macro levels.

There are two major cotton producing provinces in Pakistan. Punjab accounts for about 80 percent of total cotton crop area and total cotton production in the country, while the Sindh province accounts for about 20 percent. The provinces of the North West Frontier Province (NWFP) and Balochistan have a joint share of less than 1 percent.

In Pakistan cotton area harvested is forecast at 2.96 million hectares in 2010, 4.2 percent higher than the last year. The larger area forecast is

based as enhanced competitiveness of the cotton crop relative to competing crops (e. g., rice and sugarcane). In spite of last year's low returns compared with the marketing year (MY) 2007/08, the increase in MY 2009/10 area harvested is largely due to even lower returns realized in rice and sugarcane production. Pakistan is facing an increasing shortage of irrigation water. Cotton is less water intensive than rice and sugar cane thus making it an attractive choice for the farmers. The production is estimated at 11819 thousand bales for 2008-09, higher by 1.1 percent over the last year's production of 11655 thousand bales. However, the cotton production was 14.5 percent less than the target of 14.11 million bales primarily due to the scarcity of irrigation water, less use of DAP to cotton crop, attack of Cotton Leaf Curl Virus (CLCV), mealy bug and white fly on the crop and last picking of cotton was affected due to higher prices of wheat announced by the Government (Government of Pakistan 2009-10).

In view of the leading shares of Punjab in area and production of cotton, its production performance has a major bearing on the overall situation in the country. The average area under cotton in the province over the period is 2.36 million hectares. Over the period 1991-2005, the average cotton yield in Punjab was 594 kilogram/hectare (Agricultural Statistics of Pakistan 2003-2004 (Government of Pakistan, 2006).

Cotton is a problematic crop due to attraction of large number of sucking and chewing pests which leads to heavy use of pesticides and other plant protection measures. In Pakistan pesticides are widely practiced which leads towards higher cost of production. Statistics show that the use of pesticide has increased substantially over the time. Before 1970, the pesticide use

was negligible. At present pesticide is the most important inputs in cotton production. It is estimated that around 70 percent imported pesticides are used in cotton production.

But now scenario has been changed after the development of transgenic seeds of various crops especially cotton. Technological innovations and technological developments, as in other fields, hold the key to improve productivity for increasing farm production as land and water resources face tough competition and encroachments from nonfarm uses. In the late 1980s transgenic seeds industry started to develop crops with built-in pest control from *Bacillus thuringiensis* (BT) genes, derived from soil bacteria that protects cotton crop against bollworm by producing a special protein. The bollworms feeding on BT cotton leaves become tired and lethargic, reducing damage to the crop plants. Hence Cotton was one of the first crops to benefit from biotechnology-abounding pest shelter, and BT cotton is now one of the most extensively used transgenic crops (commercially adopted in 1996) being adopted by many developed and developing countries. It is currently grown throughout the United States, China, India, Australia, Mexico, Argentina, South Africa and Colombia on commercial basis.

Pakistan has lagged behind in the development and adoption of BT cotton. Other major cotton producing countries-the United States, China, and India-have made significant progress in the development and cultivation of BT cotton varieties. BT cotton is not allowed by government of Pakistan to be practiced during previous years. Experimental work on the development of local BT varieties is in process. But as such no pure genetically modified seed has been released or introduced in the market except a few ones by the

government agency. There is no organization in Pakistan has got patent right of BT cotton seed, Thus the mostly practiced BT cotton seed are illegal and unauthorized.

A large number of studies were conducted showed strong advantage of adopting BT cotton over conventional cotton in terms of productivity and use of farm inputs like pesticide and water. Frisvold, et al. (1998), Gouse, et al. (2003), , Bennett (2005), Qaim and de Janvry (2005), Vasant P. et al. (2006) and Qaim, et al. (2006) analyzed that adoption of BT cotton have positive effect on per hectare yield, profitability and environment by less use of pesticides which also reduce the cost of production in adopting BT.

In spite of extensive work on the comparative study between BT and Non BT and on the production and resource use efficiency of various crops, limited separate studies were carried out in case of BT cotton in world especially in Pakistan. This study will be helpful to fill the gap in research related to performance of BT farmers. This study will focus on the productivity differences and resource use efficiency of BT farmers.

Specific objectives of the study will be

1. To estimate the production cost of BT cotton and conventional cotton varieties.
2. To determine relative profitability of BT cotton and conventional cotton varieties.
3. To estimate the extent of various factor causing variation profitability of BT cotton and conventional cotton varieties.

4 To estimate the change of income level of farmer on adopting the BT cotton.

## **V. Review of Literature**

Chaudhry and Khan, (2009) conducted study in Multan on cotton production and the factors effecting on its. Total 100 samples were collected in that sample 60 small farmers, 25 medium and 15 large farmers was randomly selected from two Tehsils namely Multan and Shujabad of district Multan. The Cobb-Douglas Production Function is applied to assess the effects of various inputs like cultivation, seed and sowing, irrigation, fertilizer, plant protection, inter-culturing / hoeing and labour cost on cotton yield. The Cost-Benefit Ratio for the large farmers was found higher (1. 41) than that of small (1. 22) and medium (1. 24) farmers.

Subramanian and Qaim ,(2008) these studies focused on insect resistant *Bacillus thuringiensis* (BT) crops, especially BT cotton, because this technology has been adopted by large no of farmer all over the world, The farmers got number of benefit from BT cotton these are insecticide savings, higher effective yields through reduced crop losses, and net revenue gains, in spite of higher seed prices. We show that BT cotton entails positive direct and indirect welfare effects in rural economy of India. Using a microeconomic modeling approach and comprehensive household survey data, we found that the technology increases aggregate employment with interesting gender implications. Furthermore, it increases household incomes. Our results demonstrate that BT cotton contributes to poverty reduction and rural development.

Bennett, Ismael<sup>1</sup>, Morse And Shankar , (2004) BT cotton adoption of smallholder farmers over three seasons (1998/99, 1999/ 2000, 2000/01) following adoption. The analysis presents constructs and compares groupwise differences for key variables in BT v. non-BT technology and uses regressions to further analyse the production and profit impacts of BT adoption. BT cotton are monitored in terms of insecticide active ingredient (AI) and the Biocide Index. Results show substantial and significant financial benefits to smallholder cotton growers of adopting BT cotton over three seasons in terms of increased yields, lower insecticide spray costs and higher gross margins. sm, all holder oBTained more benefit as compare to large farmer. Analysis using the Gini-coefficient are used to compare the income inequality dvantage of BT cotton reduction in non-bollworm insecticide.

Subramanian and Qaim, (2009) the impact of genetically modified (GM) crops on the poor in developing countries is still controversy. The previous studies have examined direct productivity effects of *Bacillus thuringiensis* (BT) cotton, little is known about wider socio economic outcomes. We use a microeconomic modeling approach and comprehensive survey data from India to analyze welfare and distribution effects in a typical village economy. BT cotton adoption increases aggregate employment with interesting gender implications. Likewise, aggregate household incomes increases, including for poor and vulnerable farmers, highlighting that BT cotton contributes to poverty reduction and rural development.

Gouse, Kirsten And Jenkins (2003) the adoption rate of insect-resistant cotton in South Africa can oBTained of number of benefit. This article focuses on the reasons and effects of BT cotton adoption by large-scale and small-scale

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cotton farmers in South Africa and considers the impact of the adoption on yields, cost and profit. In addition the paper also analyses the production efficiency of adopters and non-adopters. both large and small farmer obtained high yield. who spot the potential benefits of the BT cotton seed.

Ismael And Piesse, (2003) The results of a two-year survey of smallholders in Makhathini Flats, KwaZulu-Natal show that farmers who adopted BT cotton in 1999-2000 get of benefit Higher yields and lower chemical costs, higher seed costs, giving higher gross margins. These measures showed negative benefits in 1998-99, which conflicts with continued adoption, but stochastic efficiency frontier estimation, which takes account of the labor saved, showed that adopters averaged 88% efficiency, as compared with 66% for the non adopters. In 1999-2000, when late rains lowered yields, the gap widened to 74% for adopters and 48% for non adopters.

Yilmaz and ozkan(2004) aim of this study was to examine the effect of land tenure systems on cotton production by using production functions. Data were collected from 64 cotton farms by face to face questionnaire method. Econometric analyses were carried out by using Linear, Cobb-Douglas, Semi Log, Exponential production functions. The data revealed that land tenure systems had no significant effect on cotton production. Moreover, the land tenure systems did not show any difference in cotton production technology pursued by farmers. Arshad, Suhail, Asghar, Tayyib And Hafeez.,(2007) data are collected from different disrict of punjab analysis showed that farmers were very eager to adopt BT cotton, but its poor performance in some areas damaged the confidence of farmers main factor that influence of adoption of BT cotton. Results indicated that there were many reasons for the non-

adoption of BT cotton, is higher irrigation and fertilizer requirements of the BT cotton cultivars. Most reasons given by the farmers related to agronomic and management practices, which were may have been due to a lack of knowledge and information on the genetically modified insect resistance of BT cotton. The higher seed cost was also a main factor in the non-adoption of BT cotton.

Cabanilla, Abdoulaye, and Sanders.,( 2004). This paper provides estimates of the potential benefits from BT-cotton if introduced in West Africa. Our result shows significant farm-level benefits. Aggregate benefits depend on adoption rate and yield advantage of BT-cotton. These range from a low of US\$7 million to a high of US\$67 million in Mali; US\$4 million to US\$41 million in Burkina Faso; US\$5 million to US\$52 million in Benin; US\$4 million to US\$38 million in Cote d'Ivoire; and, US\$1 million to US\$7 million in Senegal. The reduction in insecticide use is an added environmental benefit. Non-adoption of BT-cotton in the region will ultimately result in non-competitiveness in the world market.

Hofsa, Fokband and Vaissayre., (2006) The study analysis that The adoption of BT cotton led to a decrease in pyrethroid use, but the level of insect resistance of this cultivar was not sufficient to completely drop this pesticide from the spraying programme. On the other hand, organophosphates were still being applied in substantial amounts,. BT cotton adoption did lead to labour savings, but the extent of this gain was not as high as expected. In conclusion, cropping BT cotton in Makhathini Flats did not generate sufficient income to expect a tangible and sustainable socioeconomic improvement due to the way the crop is currently managed. Adoption of an innovation like <https://assignbuster.com/analysis-of-bt-cotton-and-non-bt-cotton/>

BT cotton seems to pay only in an agro-system with a sufficient level of intensification.

Arshad and Suhail (2010) Cotton jassid, whitefly and thrips are important sucking insect pests in cotton fields in the Punjab, Pakistan. The seasonal dynamics of these pests were compared on transgenic BT cotton line, There was no significant difference in population densities of these pests in BT and non-BT cotton, when nothing was sprayed. However, insecticide application effectively controlled these pests in both BT and non-BT cotton. In conclusion, there is no difference in transgenic BT and non-BT cotton for jassid, whitefly and thrips attack and application of suitable insecticide is required to these pests on transgenic cotton.

Huang , Hu, Pray, Qiao, Scott and Rozelle, (2003) The overall goal of this study is to determine the extent by which genetically engineered (GE) crops in China can lead to reductions of pesticide use. One of the first studies of the effect of plant biotechnology on poor farmers, the study is based on a data set collected by the authors in 2000 in North China. The paper's descriptive, budget and multivariate analysis find that BT cotton significantly reduces the number of sprayings, the quantity of pesticides used and the level of pesticide expenditures. All BT cotton varieties are equally affected in this study. reduction of pesticide can also save the labour, more efficient overall production, as well as positive health and environmental impacts.

## **VI. Methodology**

A very important and significant thing in conducting any analytical study is to adopt a systematic and appropriate technique. After formulating the study

and specific objectives, devising an appropriate methodology to conduct and complete the study is very important step. Data collection, various related values and trends present in any type of data (quantitative and qualitative) should carefully be applied and practiced. Presentation of data and dissemination lead to successful completion of study. (Akhtar, 1999)

The study will be confined to the District Rahim yar khan and Bahawalpur Nagar of the Punjab. A sample of about 120 Cotton growers will be used in this study. I will take sample from two district of the three Tehsil of Sadiq Abad, Khan Pur and chestian 40 sample from each. A suitable functional form will be used to determine Economic analysis of comparison between BT cotton and non BT(conventional cotton) and that impact on the income level of the farmer.

## **Data Analysis**

A number of techniques will be used to cover up the objectives of the study such as, I will use descriptive statistics to determine the socio-economic characteristics of the growers. CB analysis will be used to determine the benefit cost ratio of growing the BT and non BT cotton.

$$\text{CB Ratio} = \text{Benefit/ Cost} * 100$$

Suitable functional form will be used to analyze the yield of cotton on various type of input. That impact the farmer income level.

$$\text{Yield of cotton} = f(\text{input variables})$$

Cotton yield is dependent variable and other variables like inputs will be independent variables.

The input variables include seed rate, cultural practices, fertilizer-use, Pesticide use, Machinery, irrigated area and labour cost etc. The major independent variable will be the use of cotton.

## **Data Consideration**

Primary data will be on the basis of a well structured, comprehensive interviewing schedule will be used for the collection of detailed information on quantities of output and various inputs used by the farmers.

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