# A survey analysis on advantages and constraints of Bt cotton cultivation in northern Karnataka*

Cotton is being cultivated in 70 countries of the world with a total coverage of 32.30 m ha (Anon., 2011b). Area wise, India ranks first in global scenario (about 33% of the world cotton area). However, in production it ranks second next to China. In India, cotton was cultivated in an area of 11.16 m ha with a production of 31.20 million bales of seed cotton during 2010-11. Average productivity of cotton in India is 494 kg lint/ha, which is low when compared to world average of 725 kg lint/ha (Anon., 2011a).The important cotton growing states in India are Maharashtra, Gujarat, Andhra Pradesh, Madhya Pradesh, Punjab, Haryana, Karnataka, Rajasthan and Tamil Nadu. In India, Bt cotton since its release in 2002 by Genetic Engineering Approval Committee (GEAC) replaced more and more conventional cotton area. There was an exponential increase in Bt cotton area from 29,000 ha in 2002 to 11.16 m ha in 2010 accounting for a staggering 92% of the total cotton area in India. It is estimated that Bt cotton would cover an area of 15.0 m ha by 2015 (Choudhary and Gaur, 2010). The production increased from 2.79 million bales (170 kg lint/bale) in 1947-48 to 31.20 million bales during 2010-11 (Anon., 2010). The major states growing Bt cotton in 2010 in order of hectarage, were Maharashtra (3.39 m ha) representing almost half, or 40%, of all Bt cotton in India in 2009, followed by Gujarat (1.68 m ha or 20%), Andhra Pradesh (1.04 m ha or 16%), Northern Zone (1.24 m ha or 15%), Madhya Pradesh (621,000 ha or 8%), and the balance in Karnataka, Tamil Nadu and other states (Choudhary and Gaur, 2010).

In Karnataka, the present cotton growing situation is showing improvement after release of Bt cotton and is cultivated on an area of 3.95 lakh hectare with a total production of 9.0 lakh bales of seed cotton with a productivity of 387 kg lint/ha. The increase in productivity from 229 kg lint/ha in 1996 to 387 lint/ha in 2010 was mainly due to cultivation of Bt cotton (Anon., 2011a). The most important reason for the adoption of Bt cotton is its resistance to pest, particularly boll worms which has been a devastating production constraint. Even though the performance of Bt cotton has been projected to be satisfactory but in some circles, there is a great discontent in different quarters with the variety. Some indicate that the variety is susceptible to the boll worm and the yield is below par (Venkateshwaralu, 2002). Some reports indicated that initially Bt cotton showed resistance to boll worms but as soon as the formation of bolls started, the worms started attacking them (Anon., 2002). Majority of Bt cotton growers in India and also in northern Karnataka have expressed that in the recent past, Bt cotton was very much prone to leaf reddening malady. Cotton cultivators have been approaching scientists and extension agencies for efficient control measures of leaf reddening. To quantify this problem a survey of 100 farmers was undertaken during May, 2007 in major cotton growing districts of northern Karnataka.

Survey on farmer's field was undertaken during May 2007 to know the advantages and the constraints of Bt cotton cultivation in Belgaum and Haveri districts. In order to gather the information on advantages and the constraints encountered while cultivating Bt cotton, about 100 sample farmers were selected from the Bailhongal, Belgaum, Hukkeri and Sankeshwar taluks of Belgaum district and Savanoor, Haveri and Byadagi taluks of Haveri district. The sample farmers were enquired individually regarding the advantages and various constraints faced by them in Bt cotton cultivation with the help of questionnaire which comprised the improved Bt cotton cultivation technologies vis-à-vis farmers practice. The data was collected by scoring while interrogating the farmer about the advantages and the constraints. The collected data was analyzed by adopting Garrets ranking technique (Garrett, 1952). Advantages (Table 1) and the constraints (Table 2) of Bt cotton cultivation as expressed by the farmers are listed based on Garret Scores.

To know the constraints of Bt cotton cultivation, the data was analyzed by adopting Garrett's ranking technique. Basically, it gives the change of order of constraints and advantages into numerical scores. The major advantage of this technique, compared to simple frequency distribution is that the constraints and advantages are arranged based on their importance from the point of view of respondents.

Garrett's formula for converting ranks into per cent was given by

Per cent position=100*(Rij-0.5)/Nj

Where, Rij= rank given for $i^{th}$ factor by $j^{th}$ individual

Nj= number of factors ranked by $j^{th}$ individual

Per cent position of each rank was then converted into scores referring to the table given by Garret (1952). For each factors, the scores of individual respondents were added together and divided by the total number of the respondents for whom scores were added.

These mean scores for all the factors were arranged in descending order, ranks were given and most important factors were identified.

The advantages of Bt cotton technology and the constraints encountered by the farmers in Bt cotton cultivation was analyzed by adopting Garrets ranking technique (Garrett, 1952). The survey analysis indicated that Bt cotton technology is accepted by the farmers in northern Karnataka (Table 1). It was observed that higher yield followed by lower pest attack, pesticide cost and lower insecticidal sprays (2-3) compared to non Bt version cotton (8-10) were the major motivating factors for adoption of Bt cotton. Gandhi and Namboodiri (2006) have reported that Bt cotton offers good resistance to bollworms as well as several other pests from a study which covered the important cotton

Table 1. Advantages of Bt cotton technology as expressed by the sample farmers

| Particulars | Garret's score | Rank |
|---|---|---|
| Higher yielding ability | 96.00 | 1 |
| Lower pest attack | 93.00 | 2 |
| Lower pesticide cost | 90.00 | 3 |
| Lower insecticidal sprays (2-3) compared to non Bt version cotton (8-10) | 81.00 | 4 |