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## The Role of Farmer Training in the Diffusion of Biotechnology in Cotton in China: A Multi-period Analysis

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### Abstract

This paper applies a “difference in difference” model to analyse the combined medium term effect of the introduction of genetically modified cotton varieties and farmer training using the farmer field school approach. The model uses a combination of cross section and time series data to measure the direct and indirect (exposure) impact of farmer field schools (FFS) on major economic indicators such as yield and insecticide use. Particular emphasis is given to explore the interaction between farmer education and Bt-cotton. Data were collected from over 1000 farmer households in three provinces in China, namely Anhui, Hubei and Shandong with the first two representing the Changjiang Cotton Region and the last one representing the Yellow River Cotton Region.

The empirical results demonstrate significant impact of FFS on both yield increase and insecticide reduction for trained farmers. Those impacts developed shortly after the training took place and well sustained up to medium term. Substantial exposure effect on pesticide use is also identified in the short term but found to have diminished to some extent with the passage of time. No significant exposure effect on yield can be concluded in this case. Another informative finding is the favourable interaction between the farmer education and biotechnology. As an alternative to chemical pesticides, Bt-cotton per se is found to contribute to a modest reduction in insecticide use but no yield gains. When the FFS dimension was added to Bt-cotton cultivation, the substitution of engineered Bt-trait to agrochemicals was catalyzed. Furthermore, considerable productivity gains were achieved in the Bt-cotton plots managed by those farmers who ever undertook FFS education.

**Keywords:** Bt-cotton, china, DD model, Farmer Field School