



# Engineering yields and inequality? How institutions and agro-ecology shape Bt cotton outcomes in Burkina Faso



Brian Dowd-Uribe \*

Department of Environment, Peace and Security, University for Peace, Costa Rica

## ARTICLE INFO

### Article history:

Available online 16 March 2013

### Keywords:

Bt  
Cotton  
Burkina Faso  
Poverty  
Institutions  
Agro-ecology  
Transgenic  
Africa

## ABSTRACT

The research presented in this paper assesses how four social and agro-ecological factors – credit, governance, seed price and pest dynamics – mediate Bt cotton outcomes for producers in Burkina Faso. It finds that the cotton sector's integrated credit provisioning scheme provides a mechanism for all socio-economic groups to adopt Bt cotton. High seed prices, however, are likely to dissuade resource-poor farmers from Bt cotton adoption, despite the presence of secure credit institutions. Governance issues, including corruption and late payments, demand greater attention since they are driving large numbers of producers to abandon all forms of cotton production. Bt cotton will control target pests, but secondary pests are likely to emerge shortening the benefits of the technology. These findings suggest that many issues with Bt cotton adoption in Burkina Faso lie in the social and agro-ecological context of adoption, which traditionally is not examined in farm-gate analyses of transgenic crop outcomes. An examination of relevant social and agro-ecological factors improves assessments of the likely outcomes of transgenic crops for producers, and allows for greater understanding of their differential impacts.

© 2013 Elsevier Ltd. All rights reserved.

## 1. Introduction

Transgenic crops are one of the most controversial contemporary tools to alleviate poverty in sub-Saharan Africa (SSA). This controversy centers on whether or not they can achieve improved nutrition, yields, risk-reduction and profits for the millions of smallholder producers in SSA who face enduring poverty and low comparative agricultural productivity. The performance of one transgenic crop in particular drives this debate – an insect resistant variety of cotton, Bt cotton.<sup>1</sup> As of 2013 it is the primary transgenic crop adopted by smallholders on the continent.<sup>2</sup> South Africa was first to introduce Bt cotton to smallholders in 1998. But the 2008 introduction of Bt cotton in Burkina Faso is much more significant since it reaches tens of thousands more smallholder producers, and it is the only adopting country in Africa where smallholders dominate the agricultural sector.<sup>3</sup> For the 2010/2011 growing season

it is estimated that over 80,000 producers in Burkina Faso grew Bt cotton on 275,000 ha, or roughly 66% of the total area devoted to cotton production (Dabire, 2010; ISAAA, 2011).

The rapid emergence of large-scale, smallholder-driven Bt cotton production in Burkina Faso comes at a pivotal time in our understanding of Bt cotton outcomes for smallholders in the global South. Many peer-reviewed articles have pointed to the success of Bt cotton at reducing pesticide use, boosting yields, and increasing profits for millions of smallholder producers in China, India and South Africa (Morse et al., 2004; Pray et al., 2002; Qaim and Zilberman, 2003). An emerging literature, however, questions this unmitigated success. Recent reviews demonstrate that though in many cases smallholder producers in the global South benefit from Bt cotton adoption, outcomes can be highly variable, and success depends on a mix of institutional, socio-economic, and agro-ecological factors (Glover, 2010a, 2010b; Smale et al., 2006; Tripp, 2009).

One key reason for these divergent views on the success of Bt cotton is methodology. Most evaluations of transgenic crops are grounded in the field of agricultural economics, focus at the farm-level, and fail to examine how the larger institutional, social and agro-ecological factors mediate the performance of transgenic crops for producers. These studies tend to aggregate data into averages drawn from a narrow set of metrics, primarily yields and profits, obscuring the longer term and differential impacts of the technology. Yet it is precisely the longer term and differential

\* Address: P.O. Box 138-6100, San José, Costa Rica.

E-mail address: [bdowd-uribe@upeace.org](mailto:bdowd-uribe@upeace.org)

<sup>1</sup> Bt, or *Bacillus thuringiensis* cotton produces a protein, or a series of proteins, fatal to many cotton pests, most notably the bollworm.

<sup>2</sup> South Africa smallholders have also adopted Bt and herbicide-tolerant maize with mixed results. See Gouse et al. (2009).

<sup>3</sup> According to the UN FAO (2010) at least five other African countries, Ghana, Kenya, Malawi, Uganda, and Zimbabwe are currently experimenting with transgenic crops in the field trial stage.

impacts that are important to assess when considering whether and how Bt cotton may contribute to poverty alleviation.

The case of South Africa is illustrative. Initially researchers hailed the adoption of Bt cotton by smallholders in the Makhathini Flats area as a great success; farm gate surveys of Bt and non-Bt cotton farmers demonstrated that Bt cotton boosted yields and profits, particularly for smaller producers (Bennett et al., 2006; Ismael et al., 2002; Thirtle et al., 2003). Two key institutional components drove the initial success of Bt cotton: (1) comparatively good extension services, and (2) the availability of credit, which gave smallholders the ability to afford both the expensive transgenic seeds and the fertilizer and pesticide inputs needed to secure a good harvest (Ismael et al., 2002; Thirtle et al., 2003). But the institutional factors that drove the success of Bt cotton suddenly came to a halt when the cotton company that provided extension services and credit to producers, VUNISA, shut its doors in 2003. A rival gin had opened breaking VUNISA's monopsony on the purchase of cotton and effectively ending its ability to provide credit and stay in business (Witt et al., 2006; Schnurr, 2012). As a result, Bt and conventional cotton production collapsed and have never completely recovered (Glover, 2010b). Now only wealthy smallholder producers and/or those with substantial non-farm incomes continue to grow Bt cotton, with variable success (Morse and Mannion, 2009). The number of independent smallholder farmers growing Bt cotton dropped from 2260 in 2007/2008 to 210 in 2009/2010 (Schnurr, 2012). Nonetheless, as Schnurr (2012) notes, the Makathini case continues to be regarded as largely positive, and is used as a marketing tool to advance the adoption of Bt cotton in other African countries.

This brief review demonstrates how initial farm-gate surveys often underexplore the critical determinants of Bt cotton outcomes for producers, while failing to examine the longer term community and ecological dimensions of these introductions, including, for example, their potential contribution to rising inequality. To address these analytical shortcomings, what is needed are analyses that examine the broader historical, institutional and agro-ecological context of transgenic cotton adoption (Stone, 2011).

This research takes a methodological approach grounded in the fields of political ecology and agro-ecology. It views outcomes at the farm-level as embedded in social and agro-ecological processes that reach far beyond the farm-gate. Broadening transgenic crop evaluations to include this context draws attention to a different set of drivers of outcomes. Rather than focusing on the "average" individual farmer, this methodological approach emphasizes how institutions, as the social systems of production and delivery of transgenics, and agro-ecology, as the biological system of interactions in which transgenics are introduced, shape outcomes at the farm-level. This context is not to be controlled for, but rather is a site for study in order to understand the mechanisms that produce farm-level outcomes. Such analyses can, in principle, avoid some of the shortcomings associated with earlier farm-gate analyses. Moreover, such analyses draw attention to the distributional impacts of the technology, which are otherwise masked in the reporting of average profits in farm-gate surveys. Drawing attention to distributional impacts is important in order to assess claims about the technology's potential to alleviate poverty.

The research presented in this paper critically analyzes four social and agro-ecological factors – credit, governance, seed price and pest dynamics – that mediate Bt cotton outcomes in Burkina Faso. These four factors were chosen based on a literature review of transgenic crop evaluations in the global South and a careful analysis of key areas of concern in the Burkinabè cotton sector. This research draws principally from (1) over 100 interviews of key actors involved in the introduction of Bt cotton in Burkina Faso from

2007–2012,<sup>4</sup> and (2) a survey of seventy heads of household in three villages in the cotton growing region of southwestern Burkina Faso conducted in 2009.<sup>5</sup>

The paper is organized as follows. The next section examines the historical and political foundations of the institutional structure governing Burkina Faso's cotton sector, with a specific focus on how the introduction of Bt cotton shapes this structure. This provides a framework for Section 3, which explores in detail how four key factors mediate the success and evenness of Bt cotton outcomes for producers – credit, governance, seed price and pest dynamics. The last section offers some concluding remarks.

## 2. An institutional history of cotton production in Burkina Faso

A key component missing from many transgenic crop assessments is a critical analysis of the institutional structures, which steward producers' adoption of the technology. Particular institutional features aid, while others impede, the successful adoption and performance of Bt cotton. Some features may also increase or attenuate the differential impacts of the technology. How Burkina Faso's cotton sector institutions affect Bt cotton adoption and performance depend to an extent on their historical configuration and commitments. This section traces that history from the emergence of the Burkinabè cotton sector in the colonial era, through World Bank restructuring, to the 2004–2007 cotton crisis. This critical institutional history provides a framework for the social and agro-ecological analysis in Section 3.

### 2.1. Burkina Faso's vertically integrated cotton sector

Two main interventions have shaped Burkina Faso's cotton sector, (1) French colonial efforts to set up a vertically integrated export-oriented cotton sector beginning in the 1950s and (2) World Bank-led efforts to reduce the degree of state control and power in the sector beginning in the 1990s. After World War II the French colonial government sought ways to boost cotton exports from its colonies. But efforts were slow given the diversity and poor performance of cotton varieties, the existence of a regional (domestic) cotton market and a lack of modern growing practices. To address these concerns the French formed a research centre charged with the production of modern cotton cultivars and founded the French government-owned *Compagnie Française pour le Développement des Fibres et Textiles* (CFDT), or the French company for the development of textiles and fibers (Isaacman and Roberts, 1995).

The CFDT colluded with gins to destroy locally grown traditional varieties of cottonseed. After successfully eradicating these traditional varieties, and gaining a legal monopoly over cotton manufacturing, marketing and credit supply from the newly inde-

<sup>4</sup> All interviews were semi-structured and were conducted by the author in French. Interviewees included: representatives from the three Burkinabè cotton societies, SOFITEX, FASO COTON, and SOCOMA; the French cotton company and majority owner of SOCOMA, Geocoton; the Burkinabè cotton growers union UNPCB; the two main firms involved in the introduction of genetically engineered crops in Burkina Faso, Monsanto and Syngenta; the Burkinabè state-level office that manages the cotton sector – *Le Secrétariat Permanent de Suivi de la Filière Coton Libéralisée* (SP/SFCL); the regional anti-GE organization – *La Coalition des Organisations pour la Protection du Patrimoine Génétique Africain* (COPAGEN); the Burkinabè Ministry of Agriculture; the Burkinabè National Research Institute, INERA; the French Development Agency, AFD; the World Bank; the French academic research institute, CIRAD; the Dutch development organization, SNV, and a host of non-governmental organizations that work in the Burkinabè cotton sector.

<sup>5</sup> This survey is part of a broader collaborative project analyzing the dynamics of agrarian change in southwestern Burkina Faso. The surveys referenced in this research were conducted in February and August of 2009, and we conducted with a team of local research assistants in four different languages, French, More, Dioula and Bwaba. Households were chosen based on their prior inclusion in previous surveys conducted in 1996 and 2004.

Download English Version:

<https://daneshyari.com/en/article/5074108>

Download Persian Version:

<https://daneshyari.com/article/5074108>

[Daneshyari.com](https://daneshyari.com)