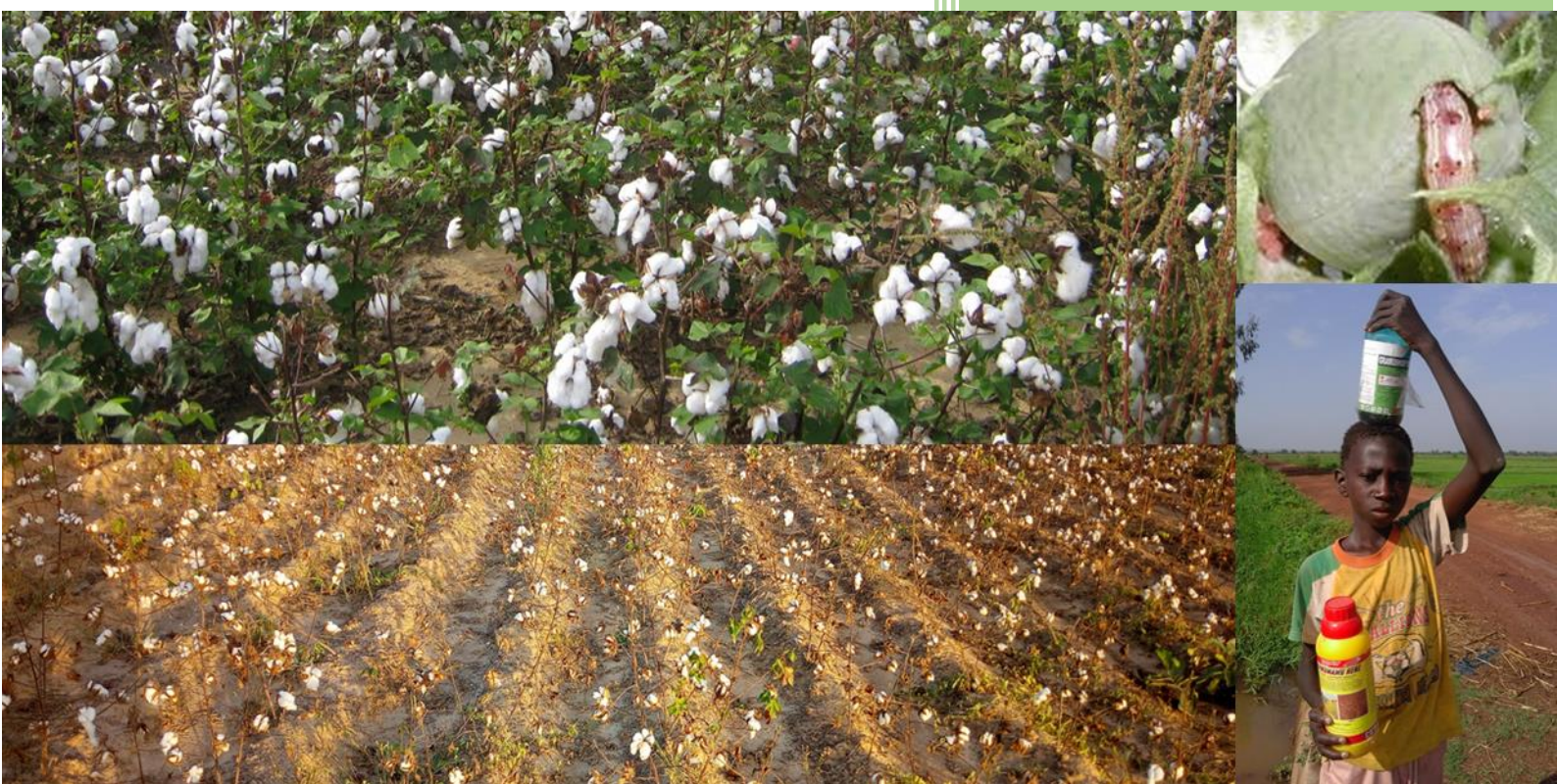


Farmers' perception on the first year experience with full conventional cotton in Burkina Faso



Africa Biotech

in partnership with

OFAB Burkina

Farmers' perception on the return to full conventional cotton in Burkina Faso

December 2016

A survey conducted by **Africa biotech**
in partnership with **OFAB Burkina Faso**



The African Network on the biotechnologies called (Africa Biotech) was thrown officially, on June 30th, 2016, in Ouagadougou.

This network consists of several organizations of the civil society, among others, of the Foundation Agnès Marie (FAM), the Association for the nature conservation (APN), Together let us reassure the future (ESF). These organizations work essentially in the field of the human health, in the field of the environment, in the field of the food safety, and in the field of the climate change. The main objective of the network is to contribute in a significant way to the promotion of the biotechnologies in Burkina Faso and in Africa. For the president of Africa Biotech, Mahama Ilboudo, the creation of this network was essential in view of the experience of Burkina Faso, regarding biotech crops.

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FORUM OUVERT SUR LA BIOTECHNOLOGIE
AGRICOLE SECTION DU BURKINA FASO

OFAB-Burkina our mission

To enhance knowledge-sharing and awareness on agricultural biotechnology that will raise understanding and appreciation of the technology and contribute to building an enabling environment for informed and timely decision-making.

OFAB-Burkina our vision

A food secured Africa where agricultural biotechnology is making significant contributions.

OFAB-Burkina: our objectives

- Establish and manage a range of platforms that will raise the profile of biotechnology use in agriculture for enhanced productivity;
- Contribute to informing policy decision making processes on matters of agricultural biotechnology through provision of factual, well researched and scientific information;
- Forge strategic alliance for optimization of resources through convening and encouraging inter-institutional networking and knowledge sharing in the agricultural biotechnology space;
- Enhance targeted capacity strengthening that will improve communication across all sectors in biotechnology for African agricultural development.

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- OFAB Africa

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Introduction

Cotton is the most important cash crop in Burkina Faso where it got the nickname of “white gold” long before gold mining came to the forefront in recent years. Moreover, more than three millions of people, especially in rural areas are living out of cotton and its products thereof. The cotton sector of Burkina Faso is well organized. It is composed of three main entities acting under one umbrella known as AICB, the Interprofessional Cotton Association of Burkina: (i) the three cotton companies (Sofitex, Faso Coton and Socoma), (ii) the National Union of Cotton Growers (UNPCB) and (iii) government representatives from the ministry of trade. The three cotton companies control the cotton production entirely and each of them has its own production zone (Figure 1). Seeds and other inputs (fertilisers and pesticides) are given as loans to farmers at the beginning of the cropping season. All the cottonseed produced by farmers is sold to cotton companies after harvest and the loans are deduced from the money earned by farmers.

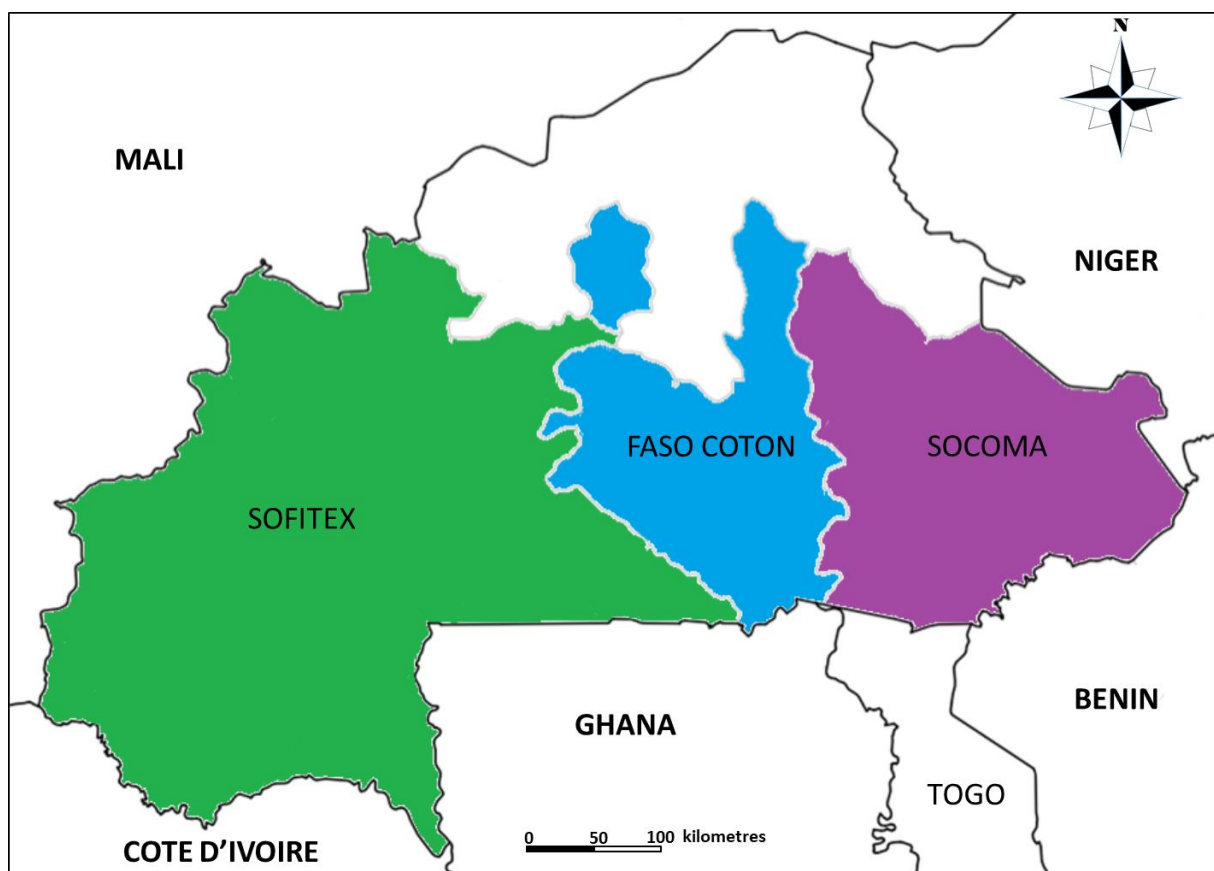


Figure 1. Map of Burkina Faso showing the cotton production zones (Sofitex, Faso Coton and Socoma). No cotton is grown in the northern part (area in white)

Cotton cultivation in Burkina Faso goes back to 1924 when it was identified as a key agricultural opportunity in several countries of the Sudano-Sahel zone. Growing cotton has always been associated with the use of insecticides to control insect pests, particularly the bollworm *Helicoverpa armigera* and related species. Pest control in cotton has been somewhat successful until the mid-1990s when insect resistance to insecticides became a serious issue for farmers. This was temporarily circumvented by increasing the number of sprays above six, which was the recommended number. Very quickly, even the use of more pesticides (up to 18 sprays) became unsuccessful in pest control while economically unbearable. In some instances, farmers made use of the banned and highly hazardous insecticide endosulfan.

Scientists at the Institute of Environment and Agricultural research (INERA) were urged to find an adequate solution because of the socio-economic importance of cotton for the country. At that time, research was already ongoing on the possible use of insect-infecting viruses to control *H. armigera* and related lepidopteran pests. Unfortunately, no satisfactory results were obtained. It is in this context that the introduction of genetically modified (GM) cotton was decided after discussion with Monsanto which provided the technology as BollgardII™ cotton. BollgardII™ cotton was engineered to express two insecticidal proteins genes (Cry1Ac and Cry2Ab) originating from *Bacillus thuringiensis* (Bt). Therefore, the term “Bt cotton” became popular wherever people referred to the GM cotton.

The tests on Bt cotton started in 2003 with the assessment of the efficacy of the Bt genes to control local populations of insect pests. Then, an agreement was reached between Monsanto and its AICB partners to transfer Bt genes into local cotton varieties through conventional breeding. In 2008, seeds were produced for commercial release in 2009 along with of cotton conventional and organic cotton production. Thereafter, Bt cotton gained a lot of popularity among farmers to the detriment of conventional cotton and the country became the first cotton producer in Africa since 2008.

The epic of Bt cotton came to an end in 2016, when AICB with cotton companies at the forefront decided to revert to full conventional cotton production. The decision was taken because cotton companies claimed that they were losing profit due to the fact that Bt cotton

displayed 1.6 mm shorter fibre length compared to conventional cotton. This decision was highly controversial, especially among farmers despite a statement from AICB indicating the rolling back to Bt cotton as soon as the fibre length issue is solved (AICB, 2016).

This report summarises the perception of farmers a year of reverting to conventional cotton production after eight years of massive cultivation of Bt cotton. It describes the findings of a survey conducted by Africa Biotech in partnership with the Open Forum for Agricultural Biotechnology, Burkina Chapter (OFAB-Burkina). A total of 420 cotton farmers were interviewed in the main cotton production areas of the three cotton zones. Farmers were chosen at random and interviews were done after their consents.

Impact of the return to full conventional cotton on areas under cotton cultivation

Total areas devoted to cotton cultivation was assessed from farmers' declarations on the field sizes in the three cotton production zones before (2014 and 2015) and after (2016) reverting to conventional cotton. No reduction in areas devoted to cotton was observed, whatever the cotton growing zone. In Sofitex and Faso coton zones, there was even a slight increase in areas. Therefore reverting to full conventional cotton did not discourage farmers in growing cotton. On the one hand, this likely reflected the effect of the vast campaign undertaken by the cotton companies while preparing the suspension of Bt cotton. Measures taken in favour of farmers by cotton companies included the following: (i) 5% increase in the buying price of cottonseed; (ii) the commitment to rapidly pay farmers as soon as cotton is harvested; (iii) an increased technical assistance; and (iv) the endowment of farmers with automatic spraying devices.

On the other hand, farmers kept growing cotton because the market is well planned and guaranteed by cotton companies before cotton is grown. Therefore, farmers are ensured to get cash which amount depends on their production since the buying price is known in advance. Another possible reason is that cotton is the important cash crop bringing revenues far better compared to other crops, particularly cereals and sesame.

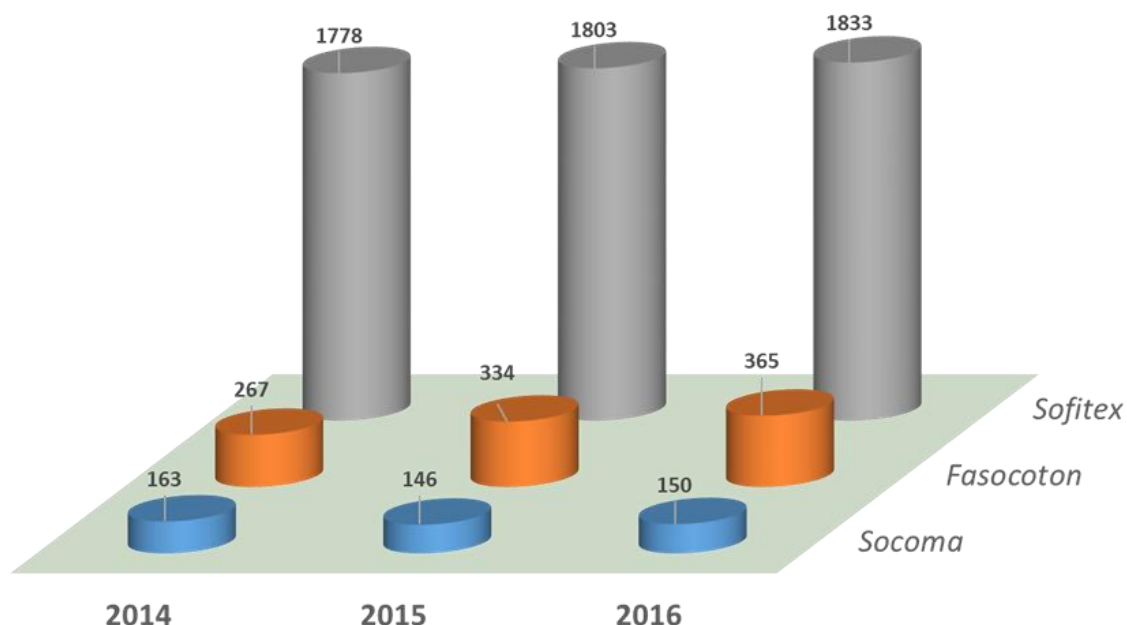


Figure 2. Area under cotton cultivation in the three cotton growing zones before (2014-2015) and after (2016) the return to full conventional cotton

Assessment of levels of field infestation by insect pests

Farmers' perception on the level of insect pest pressure is presented in figure 3. The majority of farmers in Sofitex zone (82.9%) indicated that the levels of insect populations were significantly higher following the return to full conventional cotton in 2016. By contrast, farmers in Faso Coton and Socoma zones estimated that less field infestation by insect pests occurred. This trend was consistent across the two zones despite the low number of respondents. However, the proportion of farmers reporting lower insect pest pressure was greater in Socoma zone (91.7%) than in Faso Coton zone (58.3%).

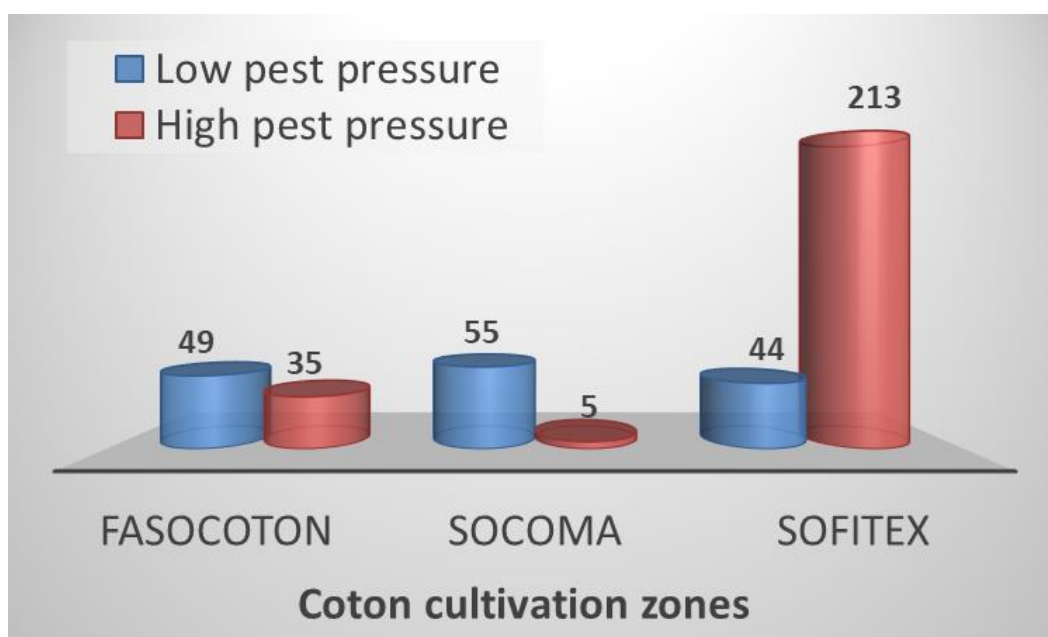


Figure 3. Distribution of farmers in relation to pest pressure assessment in cotton fields in the three cotton growing zones

The observations on higher pest pressure in Sofitex zone is in line with what was expected and feared. Farmers in this zone were urged by the cotton company to monitor the occurrence of insect pests permanently for quick reaction by spraying. Figures obtained in Faso Cotton and Socoma zones are surprising. One would rather expect higher insect pressure or at least similar levels of infestation when comparing years with and without Bt cotton. Indeed, very active campaigns by cotton companies were conducted in the two zones to influence farmers in supporting the suspension of Bt cotton.

Farmers' perception on labour hardness

Figure 4 depicts the opinions of farmers about how difficult is growing conventional cotton versus Bt cotton. Almost all farmers in Sofitex zone (98.2%) were of the opinion that growing conventional cotton required much more labour. In addition, growing Bt cotton was more attractive because less time-consuming. The majority of farmers in Socoma and Faso Cotton zones also indicated that conventional cotton was more labour intensive. In spite of lower numbers of respondents compared to Sofitex zone, proportions of farmers

who found conventional cotton more difficult to grow were 90.0% and 65.1% in Socoma zone and Faso Coton zone, respectively.

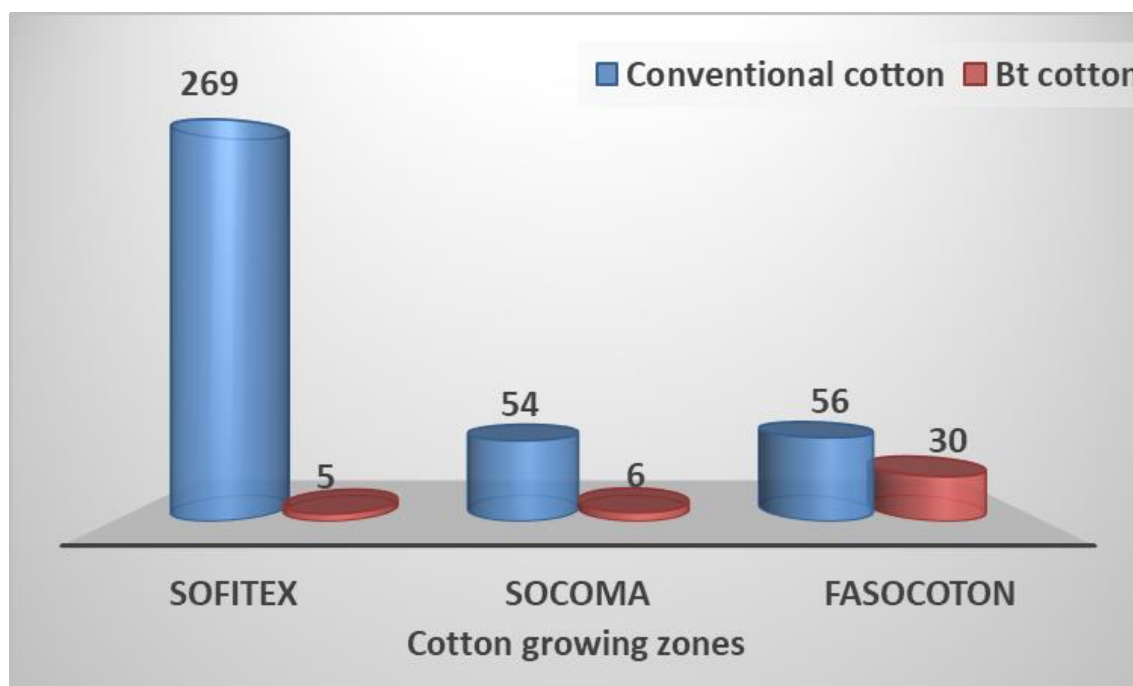


Figure 4. Labour hardness in relation with the cultivation of conventional and Bt cotton

Altogether, the majority of farmers (90.2% over the three cotton zones) indicated that Bt cotton was their choice when considering labour hardness. However, about 10% (41/420) farmers considered that conventional cotton required less labour. A few reasons for this unexpected view included: (i) Bt cotton yield too much which made the harvest difficult; (ii) because Bt cotton drove farmers into larger field sizes, field operations particularly tillering and weeding became of concern. Obviously, these reasons are hardly pertinent to be considered as real drawbacks of Bt cotton. They could be applied to conventional cotton as well if larger field sizes were cultivated for one reason or another. Therefore, considering the Faso Coton zone, the relatively high proportion of farmers (34.9%) who found Bt cotton more labour intensive is likely due to views influenced by campaigners rather than actual observations.

Assessment of the amounts of insecticides and spraying practices

Table 1 summarises the amounts of insecticides used for spraying cotton fields during three consecutive years in the three cotton growing zones. Data for two years preceding the suspension of Bt cotton (2014 and 2015) and one year after the suspension (2016) are presented. In any instance, the quantities of insecticides increased dramatically. On average, insecticide use increased by 50.6% in Faso Coton zone, 160.7% in Socoma zone and 163.1% in Sofitex zone, respectively. The amounts of insecticides used during the first year of full cultivation of conventional cotton alone were higher than the aggregates from two years when both conventional and Bt cotton were grown.

Table 1. Amounts of insecticides in litres used before (2014-2015) and after (2016) the return to full conventional cotton

Cotton cultivation zone	Year			
	2014	2015	2014 +2015	2016
Fasocoton	908	1,343	2,251	1,695
Socoma	274	240	514	670
Sofitex	2,207	2,538	4,745	6,243
Total	3,389	4,121	7,510	8,608

According to recommendations for cotton cultivation, conventional cotton should be sprayed six times whereas only two sprays are required for Bt cotton. In practice, farmers used to spray as soon as they judge that infestations are taking place. Therefore, farmers' declarations on the amounts of insecticides used in Sofitex zone were consistent with their opinions on the levels of field infestation by insect pests. By contrast, the increase in the use of insecticides in the two other cotton zones were contradictory with opinions expressed about the levels of insect pest populations in the field. Given that the farmers do not have recourse to insecticide unless they think it necessary because of the cost, data on amounts of insecticides used reflected the situation on the ground. Consequently, it can be concluded that pressure from insect pests was higher when only conventional cotton was grown.

Farmers were also questioned about the quantity of insecticides used in their respective fields. Based on field sizes, the dose of insecticide per hectare was calculated for both Bt and conventional cotton between 2014 and 2016 (Figure 5).

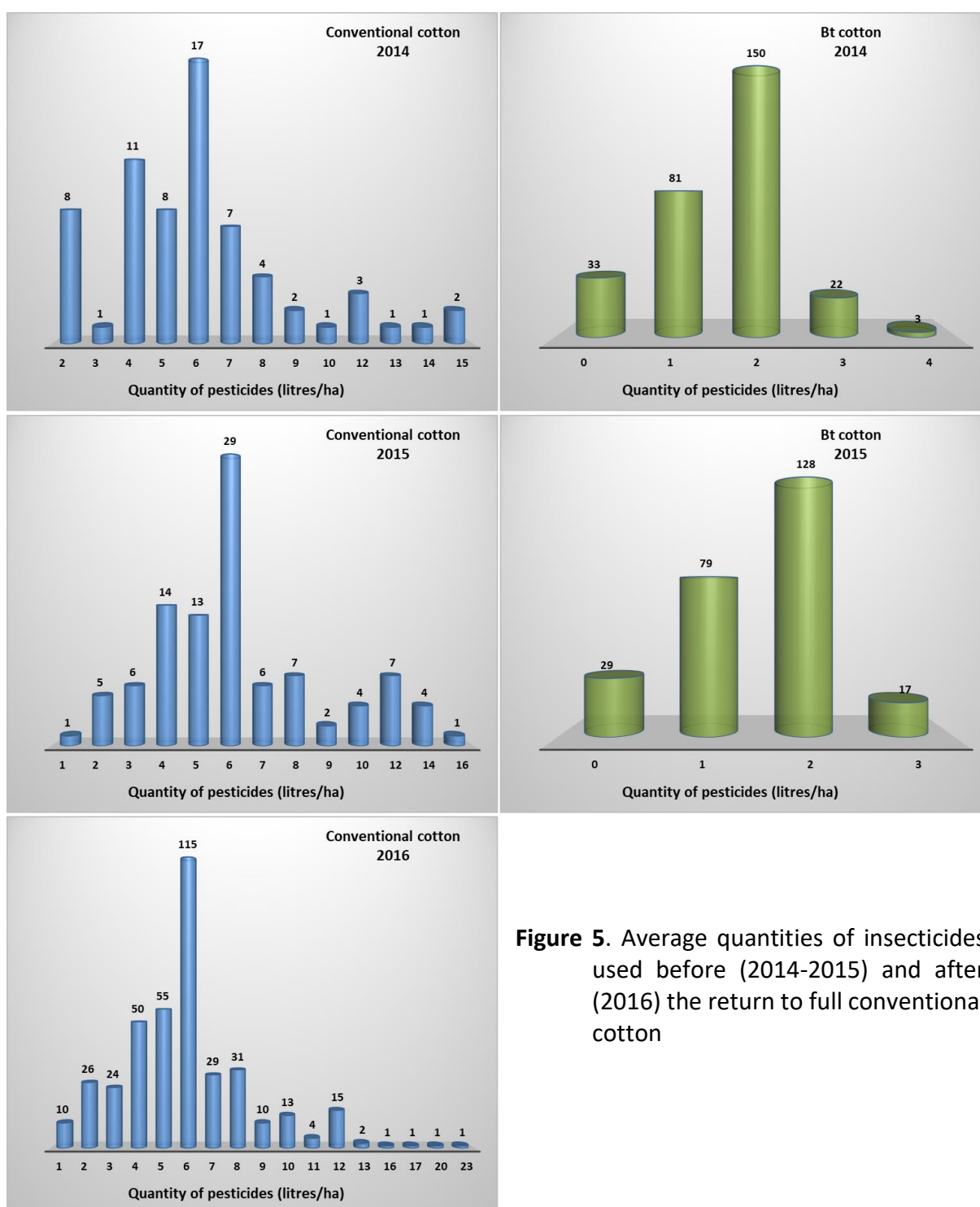


Figure 5. Average quantities of insecticides used before (2014-2015) and after (2016) the return to full conventional cotton

For conventional cotton, the quantities of insecticides used per hectare varied from 2 to 15 litres in 2014. The highest relative frequency (25.8%) was found with the dose of 6 litres/ha, which is the recommended dose for insect control in conventional cotton. A significant

number of farmers (42.4%) used less insecticide and did not follow the recommendations. Conversely, 31.8% of farmers had recourse to additional amounts of insecticide.

Wider ranges of insecticide doses used in 2015 (1 to 16 litres/ha) and 2016 (1 to 23 litres/ha). As in 2014, relative frequencies were highest (29.3% and 29.6% for 2015 and 2016, respectively) for the recommended dose of 6 litres/ha. Likewise, 39.4% of farmers in 2015 and 42.5% of farmers in 2016 used lower insecticide doses than recommended. Furthermore, additional quantities of insecticides were used by 31.3% and 27.8% of farmers in 2015 and 2016, respectively.

Altogether, conventional cotton farmers used the recommended insecticide dose more often. However, significant numbers of farmers still used lower doses which is detrimental for proper insect control. This may lead to the development of resistance to insecticides used, therefore exacerbating the pest control issue. Required quantities of insecticides are part of the inputs given as loans to farmers by cotton companies at the beginning of the cropping season and under-dosing cannot be explained by the non-availability of insecticides. Actually, part of the insecticides are diverted to other crops, mainly vegetables.

Using extra-dosage of insecticides remains a burden for farmers which must find cash for it. Moreover, the quality of the additional amount of insecticide is most often questionable due to parallel market maintained by insecticide smuggling.

In Bt cotton farming, the range of insecticide doses was considerably narrow (0 to 4 litres/ha in 2014 and 0 to 3 litres/ha in 2015, respectively). The recommended dosage in Bt cotton farming is 2 litres/ha, which was followed by high proportions of farmers. Relative frequencies of farmers having used the recommended dosage were 51.9% and 50.6% in 2014 and 2015, respectively. Similarly to conventional cotton, 39.4% of Bt cotton farmers in 2014 and 42.7% in 2015 used under-dosages. In addition to diverting part of the insecticides for other crops, many farmers still believe that Bt cotton is already protected against pests and does not need much spray, if any. A few Bt cotton farmers (8.7% in 2014 and 6.7% in 2015) used additional amounts of insecticide for pest control. Farmers explained that they always do extra spraying whenever it rained just after an insecticide treatment.

Reports on cases intoxications from insecticides

Farmers witnessed a number of intoxications cases from the use of insecticides in the three cotton growing zones (Figure 6). In total 229 cases all related to conventional cotton farming were reported. Most cases involved discomforts not causing serious health damage. Unfortunately, serious health issues were also reported although in low numbers. Such cases included severe intoxications requiring hospitalization as well as deadly intoxications. Severe cases (n=24) were reported particularly in Sofitex zone. Deadly intoxications were reported in Socoma zone (n=4) and Sofitex zone (n=3). These figures apply to human beings only. Deadly poisoning were also reported in cattle but no figure was provided.

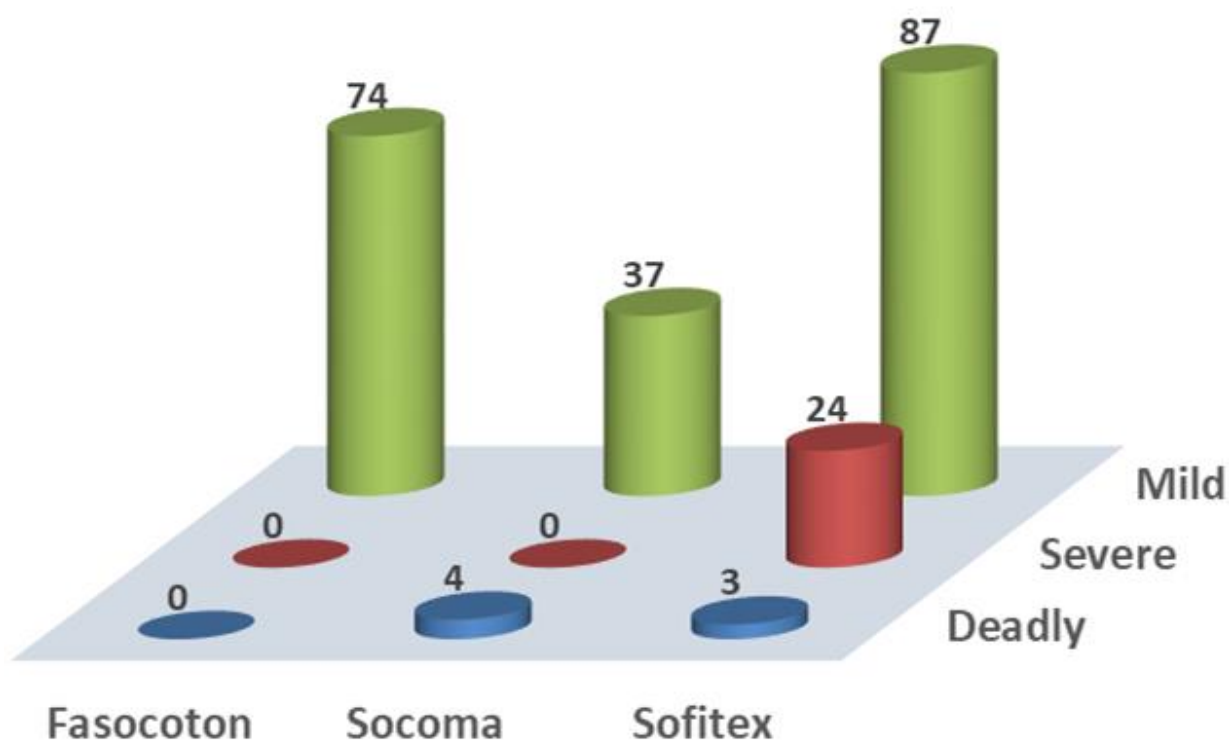


Figure 6. Type and severity of intoxications from pesticides in the three cotton cultivation zones

Conclusion

Most reports on cotton cultivation in Burkina Faso are issued by cotton companies. In this report, farmers were directly questioned on different aspects of the return to full conventional cotton farming following the suspension of Bt cotton in 2015. Although massive campaigns were undertaken to convince farmers on the need to revert to conventional cotton, most farmers felt betrayed by the decision. Actually farmers did not have much choice due to the structure of the cotton sector which is highly controlled by cotton companies.

The area devoted to cotton was not reduced following the return to full conventional cotton but many concerns were noticed. The most important one was the return to hard labour with extended field operations particularly due to more insecticide sprayings. Other concerns included the massive use of insecticides leading to intoxications cases in humans and cattle, some of them being deadly.

Altogether, the return to full conventional cotton remains an unstable situation with several complaints from farmers. Many groups of farmers are urging cotton companies to bring back the Bt cotton in a very short term. Data from 2017, the second year without Bt cotton exacerbated the tensions between farmers and cotton companies. For sure, all actors now agreed that it is urgent to return to Bt technology as soon as possible. The main difficulty for that is finding the appropriate way to achieve this goal after the breach of contract with Monsanto.