



# Two Years of Bt Cotton Cultivation in Sudan

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## The Country

The Republic of Sudan is situated in North-eastern Africa. The country borders Egypt, Eritrea, Ethiopia, South Sudan, the Central African Republic, Chad and Libya. Once the largest country in Africa, in July 2011, South Sudan was granted independence and Sudan became the third largest country in Africa after Algeria and the Democratic Republic of Congo. The country has a land mass of 188 million hectares and a population of 37.9 million—at a population growth rate of 2.5 %. The Blue and the White Niles run from the South to the North and to the east Sudan borders the Red Sea. Almost half (46 %) of the population in Sudan are poor and the goal is to reduce this to 23 % by the MDG goal year of 2015. According to the

World Bank (2013) the country's GDP is USD 66.55 billion.

## Agriculture

Agriculture employs about 80 % of the population and contributes a third of the GDP. Cotton and gum Arabic are the major agricultural exports while sorghum is the main food crop. Other important crops include wheat, millet, cassava, peanuts, sugarcane and sesame—grown for domestic consumption.

Sudan has a long cotton cultivation history that dates back to 1867 with the official launch of the Gezira irrigation scheme in 1956 where the bulk of the crop has been grown. Cotton is a major cash crop in the country, and an important source of income for a large number (about 200,000) of growers and their families. The irrigated areas around the Nile are fertile and today, cotton is

cultivated on about 70,000 hectares in the districts/states shown in Table 1 with the largest area being the famous Gezira region. The bulk of the production, nearly 90 %, is exported as raw fibre, while the other 10 % is locally consumed. Major importers of Sudan's cotton are Egypt in Africa, Germany and Italy in Europe and Thailand and Bangladesh in Asia. However, the contribution of cotton to foreign exchange earnings has declined over the years. Compared with average export earnings of USD 270 million in the 1970s, proceeds from cotton exports declined to only USD 42 million in 2001. In addition, domestic lint consumption consistently declined from an average of 86,000 bales during the 1980s to only 16,000 bales in 2001 due to problems in the local textile industry.

The cotton industry employs a considerable amount of hired seasonal labor during picking and ginning operations. Cotton crop residues are also an important source of animal feed for the livestock industry. Sudan has for a long time grown extra-long staple cottons, but the variety spectrum has broadened to include long, medium and short staple varieties. Prior to South Sudan being granted independence, of the 203,000 hectares of cotton grown in the 2003/2004 season for example, 118,000 ha (58 %) were under the long-staple variety "Barakat", 77,000 ha (38 %) under the medium-staple "Acala", and 8,000 ha (4 %) under the short staple varieties "Nuba and Acarain".

Despite this long cultivation history, production and the share of cotton in Sudan's foreign export earnings has been declining over the last five years attributed mainly to bollworms infestation.



## Bt Cotton Production

Ernest efforts are now being made by the Sudanese government to revive both cotton production and the domestic textile industry. The initiation of Bt cotton research in the country in 2009 was one such effort that is boosting productivity and restoring cotton as a main cash crop and a major contributor to the country's economy: 2013 was the second year of commercial planting of Bt cotton in Sudan. A total of 61,530 ha of Bt cotton, up more than three-fold from 20,000 ha in 2012, were planted in both rain-fed and irrigated areas. This hectarage was grown by 27,000 compared to 10,000 farmers in 2012 that on average grew cotton on about 1 to 2.5 ha of land. Of the total national cotton hectarage of 69,132 ha in 2013, 61,530 hectares, equivalent to 89 %, was biotech. The Bt cotton was grown in six of the major irrigated areas: Gezira, Rahad, New Halfa, Suki, Sennar and White Nile; and in the rain-fed areas of Blue Nile State, North Kurdufan and by two private companies, Arab Company Sudan and Egyptian Company under large scale mechanized production system (Table 1).

The current commercially grown Bt cotton variety named "Seeni 1" was released by the National Variety Release Committee in March 2012 and approved by the Biosafety Authority for commercial production in June 2012.





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Table 1. Actual production areas of cotton in Sudan, 2013/2014

District / State	Type	Area (1,000 Ha)		% of Bt Cotton
		Bt cotton	Non Bt cotton	
Gezira	Irrigated	14.5	5.9	71
Rahad	Irrigated	12.1	0.9	93
New Halfa	Irrigated	14.5	0.8	95
Suki	Irrigated	9.9	0	100
Blue Nile	Rainfed	4.6	0	100
North Kurdufan	Rainfed	1.8	0	100
Arab Company	Rainfed	2.7	0	100
Sudan-Egyptian Company	Rainfed	0.8	0	100
<b>Total</b>		<b>60.9</b>	<b>7.6</b>	<b>89%</b>



## Benefits of Bt Cotton

One of the notable benefits for Bt cotton farmers was reduction in the cost of production. In the first year of commercialization, 2012, Bt cotton saved 37 % of the direct cost of cotton production: The cost of producing non Bt cotton was much higher at USD 885 per ha compared to USD 585 per ha for Bt cotton. The net profit for a farmer planting Bt cotton, was USD 400 per hectare.

The first season of planting of Bt cotton in Sudan demonstrated the efficacy of Bt in its endogenous control of bollworms which encouraged continued adoption.

The advantages of Bt cotton were reflected in reduced production cost, increase in cotton productivity and maintenance of the environmental balance. The average yield of Bt cotton was higher at 5.2 tonnes/ha compared to the 3.1 tonnes/ha realized from conventional cotton. With proper agronomy, the crop could record a yield ranging from 12.6 tonnes/ha to 15 tonnes /ha depending on the field. This increase in yield is attributable to the harvest of the lower third of the plant's bolls, which in conventional varieties would be



lost to cotton bollworms. In addition, the cotton yield was of much higher quality. The threefold increase in hectareage of Bt cotton between 2012 and 2013 is clear evidence that the experience of farmers was positive in the first year of planting in 2012 and has provided the incentive for a large increase in adoption in 2013.

An important lesson learnt from the first season crop is that increase in cotton productivity and production depends on adhering to the recommended crop husbandry practices. Expanding the area under Bt cotton will thus require an agronomic package supported by an efficient extension service.

### The Biotech Regulatory Framework

The government of Sudan has put in place the requisite biosafety regulation structures that have enabled commercialization of Bt cotton. The country ratified the Cartagena Protocol on Biosafety in 2005 and consequently developed a National Biosafety Policy that aims at promoting the application of biotechnology as a tool in the sustainable development of the country to benefit the people of Sudan; ensuring the judicious and wise use of modern biotechnology in order not to jeopardize the environment and human health; protecting Sudan's biological diversity by preventing possible genetic contamination.

The Higher Council for Environment and Natural Resources of Ministry of Environment and Physical Development is the national Focal Point for Cartagena Protocol. There is steadily increasing recognition of the critical role of biotechnology in the country's development as indicated by the increasing investment by the government and development partners in infrastructural and human capacity.



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