



Myanmar

The Status of Bt Cotton - the Silver Sixth - in Myanmar, 2010

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SUMMARY


In 2010, Myanmar became the fifth country in South and South East Asia, and the 29th country in the world to commercialize biotech crops. A long staple insect resistant Bt cotton variety named “Silver Sixth” or “Ngwe chi 6” was estimated to have been planted by 375,000 farmers on about 270,000 hectares (0.7 hectare per farm), equivalent to 75% of all the cotton grown in Myanmar (James, 2010).



Myanmar: A Brief Agricultural Profile

Myanmar formerly known as Burma is the largest country in mainland South East Asia and has borders with five nations, India, Bangladesh, China, Thailand and Laos and a coast line on the Andaman Sea. With a population of 50 million, Myanmar is mainly an agricultural based economy which contributes more than half (50.3%) of the national Gross Domestic Product (GDP) of US\$26.5 billion equivalent to US\$635 per capita; an estimated 25% are below the poverty line. Agriculture employs 70% of total population of the country which has two distinct agro-eco climates - the temperate North and tropical South. This allows the country to cultivate different crops throughout the year. The different agro-climatic zones embrace the extensive deltatic region, the long coastal strips, the central zone and the hilly regions with a broad range of crops including rice, oil seed crops, pulses, and industrial crops including cotton, vegetables, fruits and flowers under their respective cropping systems (MCSE, 2001; UNEP GEF, 2006).

Approximately 4.5 million farm families cultivate various crops on an estimated arable land of 10.6 million hectares, with an average 2.35 hectare per farm family. It is estimated that around 3 million farms (two-thirds of all farms) cultivate less than an average 2 hectares. There are four principal crops - rice, pulses, cotton and sugarcane that ensure food self sufficiency and earn significant foreign exchange. Rice occupies 47% or 5.5 million hectares of the cultivated area and cotton occupies about 350,000 hectares. Most of the crops are rainfed with a noticeable increase in area under irrigation in recent years. Intensive multiple cropping system allows farmers to reap significant returns throughout the year. India relies heavily on the supply of beans and pulses from Myanmar and imports more than one billion dollars worth of agricultural produce annually.

	
Population	50.5 million
GDP	26.5 billion
GDP per capita	US\$635
Agriculture as % GDP	50.3%
% employed in agriculture	70%
Arable land	10.6 mha
Ratio of AL/Population*	0.7
Major crops: Rice, pulses, beans, cotton, groundnut, sugarcane & sesame	
Commercialized biotech crops	Bt cotton
Biotech crops area in 2010	270,000 hectares
*Ratio: % global arable land/% global population	

In 2009-10, Myanmar-India bilateral trade reached US\$1.2 billion with India being Myanmar's fourth largest trading partner after Thailand, China and Singapore. Myanmar's export to India amounted to US\$1 billion whereas import from India is US\$194 million (CSO, 2010).

Cotton in Myanmar

Cotton is a traditional crop grown in Myanmar and is the principal fiber crop of the country. It occupies about 350,000 hectares, primarily in the central zone of the country which receives 600 mm to 1000 mm rainfall. Approximately half a million farmers (an estimated 503,566 farming 368,000 hectares in 2007) cultivate an average 0.7 hectares of cotton per farm in the regions of Western Bago, Mandalay, Magwe and Sagaing (ICAC, 2008). Traditionally, cotton farmers grew indigenously developed varieties of *Gossypium arboreum* until the large scale commercial adoption of upland cotton varieties of *Gossypium hirsutum* in the 1960s. The Ministry of Agriculture and Irrigation (MOAI) conducts all activities related to research, development and seed multiplication on their own research farms, located in the central part of the country. In addition, there is a cotton fiber and miniature spinning laboratory, established in the 1980s designed to ensure compliance with quality parameters (Tun Win, 2008). Most of the cotton produced in the country is used by the textile industry with 0.3 million spindles and a large number of spinning units to meet the growing demand for quality yarn and fabric in the country. The Cotton and Sericulture Department (CSD) of the Ministry of Agriculture and Irrigation conducts all the R&D and extension activities on cotton in seed farms, in all the major cotton producing zones that are also responsible for seed multiplication of improved varieties (Figure 1). Yezin Agricultural University (YAU) and the Department of Agricultural Research (DAR) also conduct research on cotton.

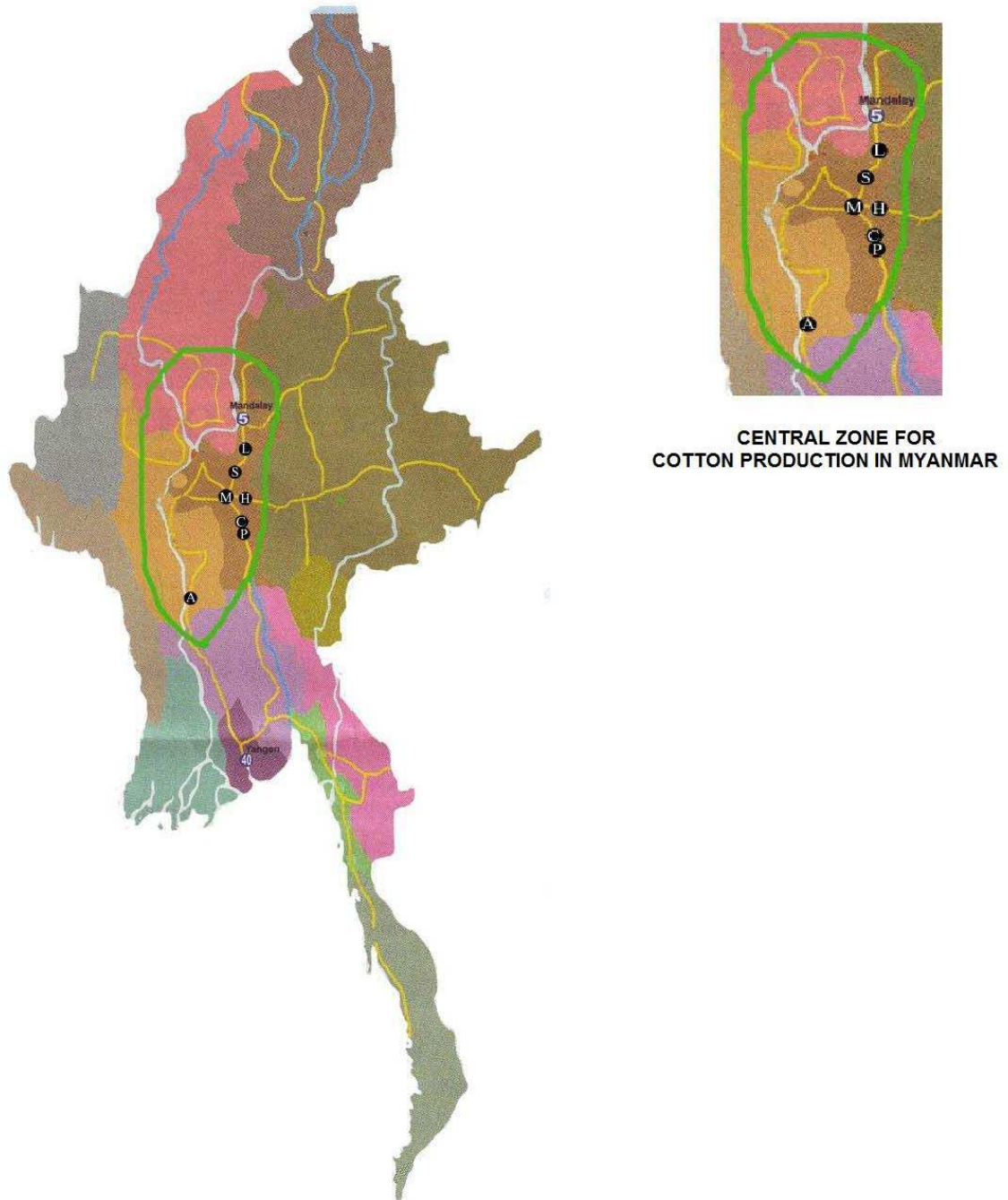
Bt Cotton in Myanmar

In 2010, for the first time, it was reported that Bt cotton was being widely grown in Myanmar (Gain Report BM0025 USDA/FAS 3 Nov 2010; Myanmar Times, 2010). The reports confirmed that a long staple variety named 'Silver Sixth' popularly known as "Ngwe chi 6" Bt cotton variety was developed in Myanmar in 2001. Following field trials at Mandalay's research facilities the first release was in 2006-07. In the interim, cotton farmers have quickly switched to Ngwe chi 6 Bt cotton variety with adoption increasing significantly from 8,300 hectares in 2007-08 to 140,000 ha in 2008-09. In 2009-10, the adoption of Ngwe chi 6 Bt cotton variety doubled with an estimated 270,000 hectares farmed by 375,000 farmers or 75% of the cotton area planted in all



major cotton growing regions including Western Bago, Mandalay, Magwe and Sagaing in Myanmar

Figure 1. Cotton Research & Development Farms in Myanmar



Caption: L= Lungyaw farm; S= Shwedaung farm; A= Aunglan farm; H= Hlaing det farm; C= Chaung Magyi farm; M= Padawzet farm; M= Fibre quality lab; P= Pyaw bwe farm.

Source: Adopted from Tun win, 2008



In 2010, it is estimated that the Ngwe chi 6 Bt cotton variety was grown by 375,000 farmers (based on an estimated 503,566 farmers growing all cotton in Myanmar in 2007) (ICAC, 2010 Personal Communication), on approximately the same area of 270,000 hectares (an average of 0.7 hectares of Bt cotton per farm). Bt cotton now occupies the entire long staple hectareage in the country (Table 1).

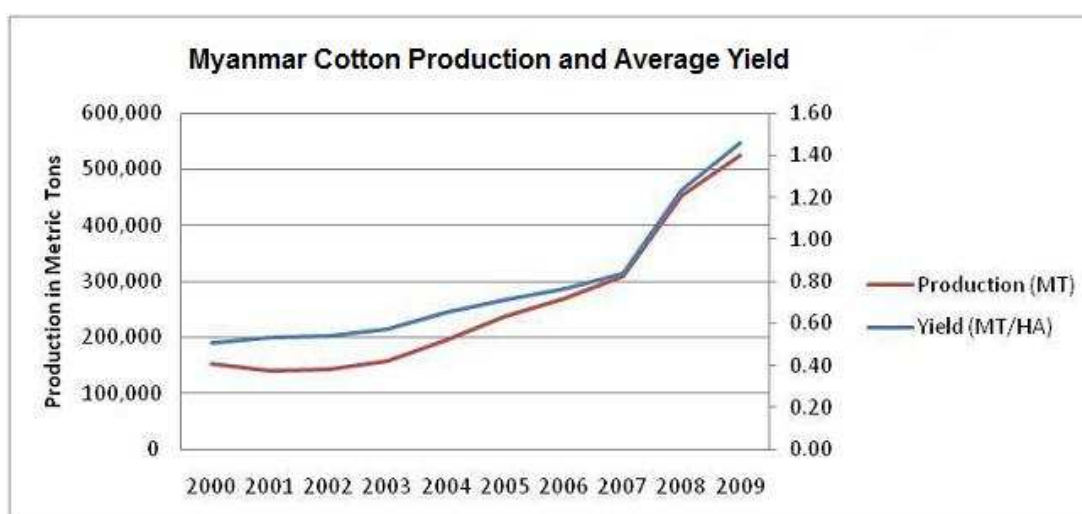
Table 1. Adoption of Bt Cotton in Myanmar, 2006 to 2010

Year	Adoption of Bt Cotton (ha)	Total Cotton (ha)	% Adoption
2006-07	<500	300,000	<1%
2007-08	8,300	368,000	2%
2008-09	140,000	360,000	39%
2009-10	270,000	360,000	75%
2010-11	270,000	360,000	75%

(Source: Compiled by ISAAA, 2010)

In 2010-11, the only cotton area that was planted with conventional non-Bt cotton variety was the area with short staple cotton variety, for which Bt cotton varieties are not available; “ Ngwe chi 6” is the only long staple Bt cotton variety released to date in Myanmar. According to the Ministry of Agriculture’s Extension Department approximately 75% of the cotton grown in Myanmar is long staple cotton whilst the balance of 25% is short staple. In 2009, Myanmar grew 360,000 hectares of cotton of which 270,000 hectares were long staple cotton producing 524,000 MT or 93 percent of total cotton production, whilst 68,000 hectares were short staple cotton producing only 38,000 MT or 7 percent of total cotton production. The yield of short staple cotton has grown at only 2.5% per year whilst the yield of long staple cotton has doubled since the introduction of Ngwe chi 6 in 2006-07 (Figure 2).

Figure 2. Cotton Area, Production and Yield in Myanmar, 2000 to 2009



(Source: Adopted from GAIN, USDA FAS, 2010)



R&D in Cotton Research in Myanmar

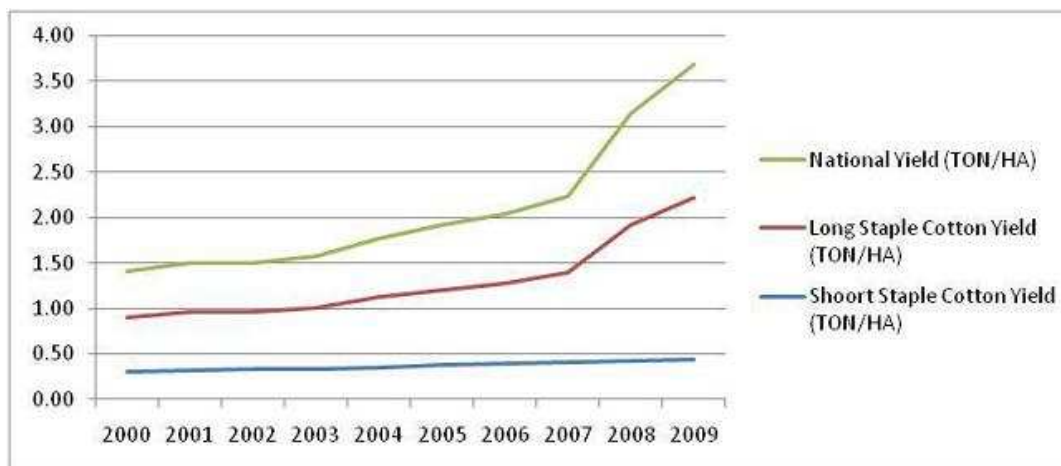
The cotton and sericulture department of the Ministry of Agriculture and Irrigation focuses exclusively on R&D programs to develop long staple cotton varieties and hybrids especially for better fibre quality and improved ginning percentage. In addition to the five commercially grown varieties (Ngwe chi 1, Ngwe chi 2, Ngwe chi 3, Ngwe chi 4 and Ngwe chi 5), four promising new cotton varieties namely SDG 1, SDG 4, SDG 6 and SDG 8, which possess greater ginning percentage, have been developed through conventional breeding. The introduction of Ngwe chi 6 – the long staple insect resistant Bt cotton variety developed using genetic modification technology was a landmark achievement of the Cotton and Sericulture department (CSD) of the Ministry of Agriculture and Irrigation in 2006 (USDA FAS, 2010; Myanmar Times, 2010). In 2010, Myanmar became the 13th cotton growing country in the world to commercially deploy biotech cotton and now joins the group of 29 biotech crop growing countries in the world in 2010.

Myanmar was involved in a project in the mid 2000s to establish a National Development Policy with the assistance of the United Nations; the project was supported by the Global Environment Facility (GEF) in 2004 and terminated in 2005. Current laws that may facilitate the introduction of regulatory biotech and biosafety laws include the Essential Supplies and Services Act, the Pesticide Law, the Plant Pest Quarantine Law, the Seed Law, the National Food Law, and the Animal Health and Development Law. The National Biosafety Framework (NBF) was developed in accordance with the Cartagena Protocol on Biosafety (CPB) that was signed by Myanmar on 11 May 2001. Under the National Biosafety Framework (NBF), the Ministry of Agriculture and Irrigation drafted the Law of Biosafety with the help of UNEP GEF and this is pending approval by the legislature of the Union of Myanmar (UNEP GEF, 2006).

It is noteworthy that as long ago as in 2005, Myanmar had already completed four years (2001 to 2005) of field trials of Bt cotton in the Mandalay division of Myanmar (GAIN Report BM5018, 2005). These field trials were reported to have shown that the Bt cotton was well adapted to Myanmar's soil and climate. At the same time, efforts were made to strengthen the human resources and trained manpower in biotechnology areas including agriculture, pharmaceuticals, fermentation and industrial biotechnology in the country. In this regard, the Department of Biotechnology which was newly established in Yangon Technological University (YTU) under the Ministry of Science & Technology (MoST) has been conducting some programs in biotechnology since 1998. In 2001 a national Biotechnology Development Center was established at Patheingyi University, Irrawaddy Division in collaboration with the National Institute of Technology and Evaluation of Japan.



Figure 3. Comparing Yield of Long Staple Bt Cotton, Short Staple Cotton and National Average, 2000 to 2009



(Source: Adopted from GAIN, USDA FAS, 2010)

Benefits of Bt Cotton

It is estimated that more than 90% of long staple cotton producers in Myanmar have adopted Bt cotton. Compared to conventional long staple cotton, the best Bt cotton growers are estimated to have doubled or tripled yield using Ngwe chi 6 which requires one third less insecticides, resulting in a net significant increase in income (GAIN, USDA/FAS, 2010). The increase in income can be up to three times the income of competing crops such as beans, pulse and sesame, and can even be higher than the income from rice. Yield of long staple cotton has risen steeply from 2007 (coincides with introduction of Bt cotton Ngwe chi 6) to 2009 whilst the yield of the short staple cotton has remained stagnant (Figure 3).

Summing Up

ISAAA Brief 42 on the Global Status of Commercialized Biotech/GM Crops 2010 reports that Myanmar has officially become the fifth country in South and South East Asia, and the 29th country in the world to commercialize biotech crops in 2010 (James, 2010). A long staple insect resistant Bt cotton variety named “Silver Sixth” or “Ngwe chi 6” was estimated to have been planted by 375,000 farmers on about 270,000 hectares (0.7 hectare per farm), equivalent to 75% of all the cotton grown in Myanmar in 2010. The popularity of biotech Bt cotton variety has become evident from the fact that Bt cotton variety Ngwe chi-6 replaced other popular non-Bt long staple cotton varieties in the first year of its official introduction and the country reaped a bountiful yield and production of long staple Bt cotton as compared to short staple non-Bt cotton varieties. With the benefits begin to realize by cultivating Bt cotton in Myanmar, it is expected that the large scale adoption of Bt cotton and next generation biotech cotton traits including stacked insect resistant and herbicide tolerant traits will turn the “Silver Sixth” Bt cotton fields into the silver fields of gold in Myanmar.

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