Improving Confidence in Biotech Cotton

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INTRODUCTION

- Cotton is an important cash crop
- In 1996 the first GM crop to be approved for general release in South Africa was Bt cotton.
- After its release it was rapidly adopted by both commercial and small-scale cotton farmers.
- Today, more than 90% of all cotton grown in South Africa is GM – insect resistance and/or herbicide tolerant

GM COTTON GROWN IN SA

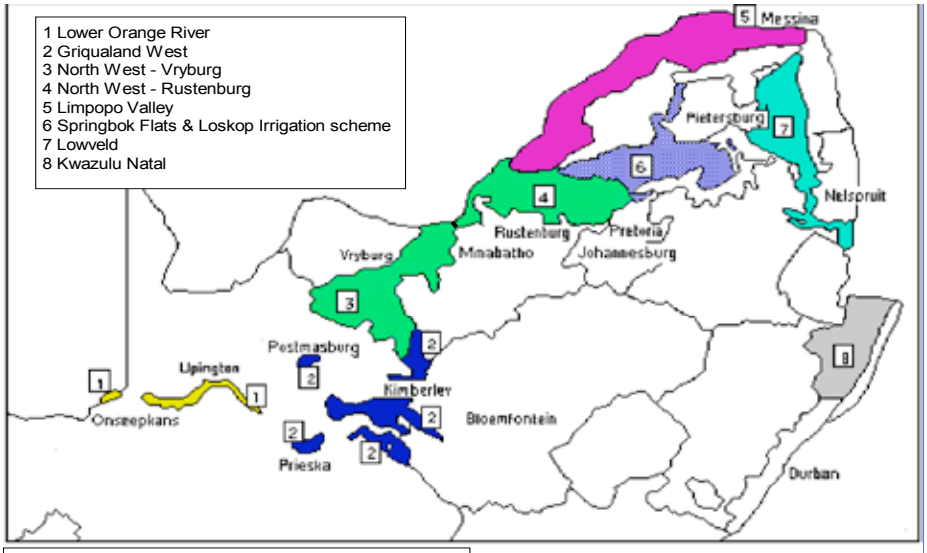
Today the following GM cotton crops are grown in South Africa:

COTTON	Bt cotton
	Herbicide tolerant cotton
	Bt/herbicide tolerant cotton

BIOTECH COTTON

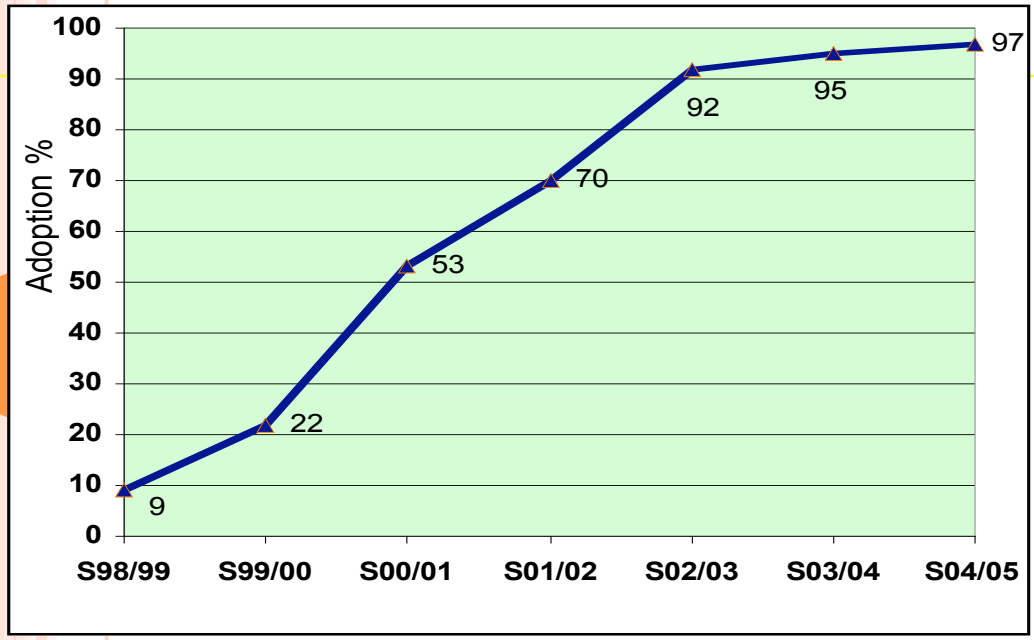
- Biotech cotton is a short- cut to improving the cotton industry
- It reduces the cost of production by cutting on the use of pesticides thereby restoring confidence and profitability in the cotton as a crop
- Efforts to increase crop production by conventional breeding have reached a plateau and to meet growing demand, production efforts have to go up.
- The quick possible way is to reduce the loss due to insect pests.
- Agricultural biotechnology as one of many tools to help boost our agricultural production. This, in turn allows us to attain a better standard of living

COTTON GROWN IN SOUTH AFRICA

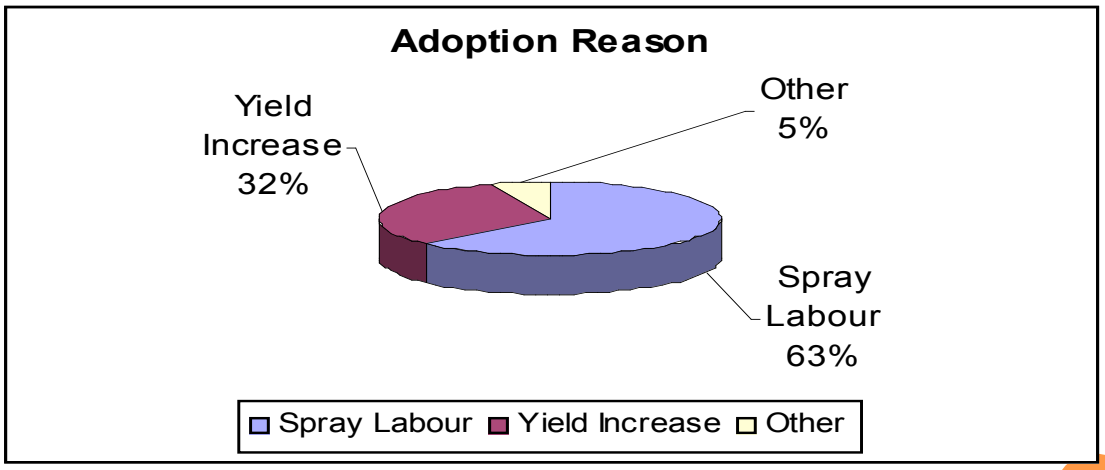


Cotton Production Regions of South Africa

ADOPTION OF Bt COTTON in MAKHATHINI



Adoption Reasons



IMPLICATIONS FOR SMALLHOLDER GROWERS.

POSITIVES

Improved Yields and income

- The technology provides improved yields, income and better quality cotton and better prices.

Savings

- Costs of pesticides, time, labour.

Safety

- Reduced handling of harmful chemicals.

IMPLICATIONS FOR SMALLHOLDER GROWERS

NEGATIVES

- High cost of seeds (however it is still cheaper than conventional farming, due to lower spraying costs)
- Emergence of other pests which were previously controlled by bollworm sprays:
  - Jassids, green stinkbug
  - These are easily controlled with 1-2 sprays
  - Are not as damaging as bollworms

COTTON BOLLWORMS

BT-COTTON VS. NON BT-COTTON (BOTH PLANTED AT THE SAME TIME)

Bt-cotton
- Small compact plant
- Many mature bolls ready for harvest
- -3 sprays for non bollworm pests

Non Bt-cotton
- Large plant, excessive vegetative growth
- Difficult to spray
- Few bolls to harvest
- 10 sprays for all insect pests

SELECTED FARMER EXPERIENCES WITH BT COTTON

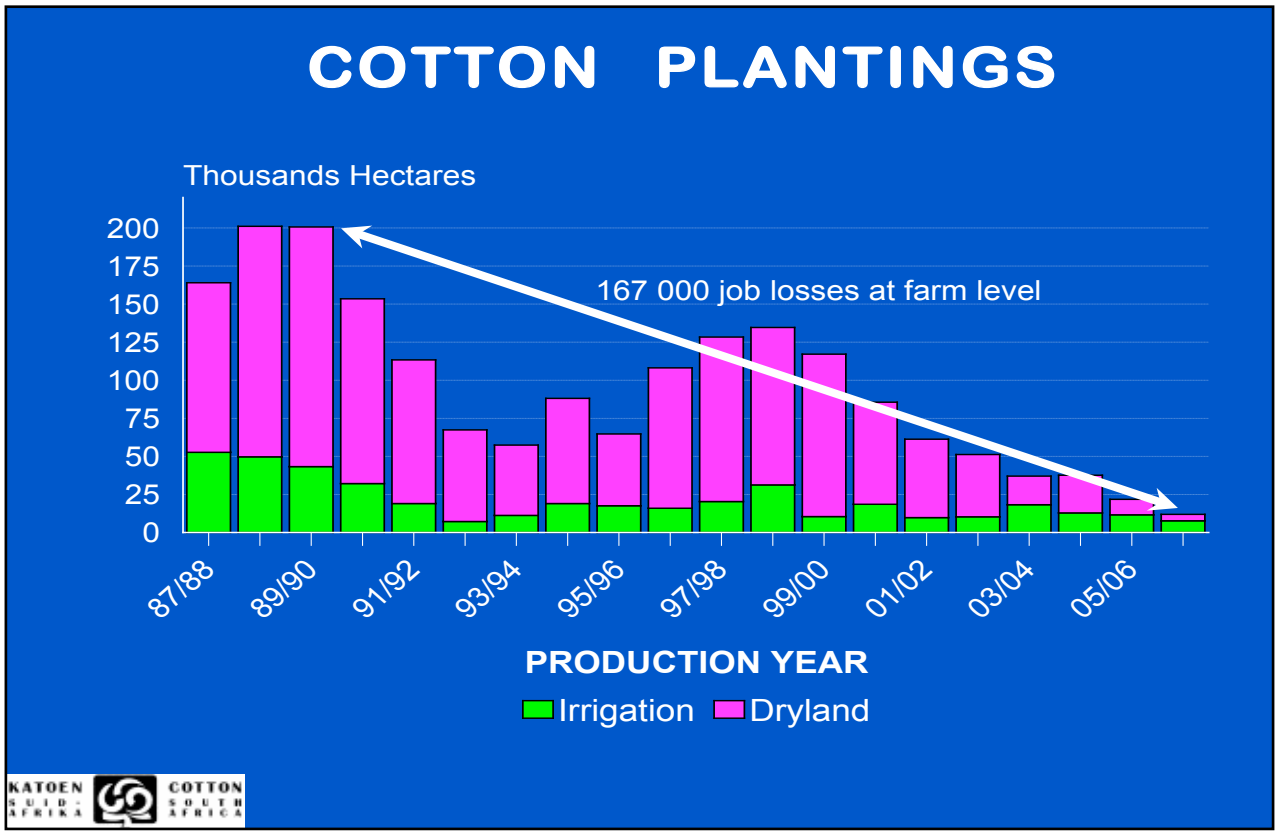
- Philiswe Mdletshe, Makhathini increased her yield from 3 to 8 bales cotton per ha and increased her net income by US$5730. She reduced insecticide sprays from 10 to 2 with Bt cotton and saved 1000 l water (Mdletshe, 2004)
- University of Reading & University of Pretoria concluded that Bt cotton yields were 40% greater than non-Bt cotton and farmers paid 42% less in spraying costs (Morse et al., 2004)
- ARC over 5 year period noted average yield increases of 349 kg/ha with Bt cotton. At US$0.45/kg this meant an extra profit of US$156/ha (Sunday Independent Business Report, 2006)

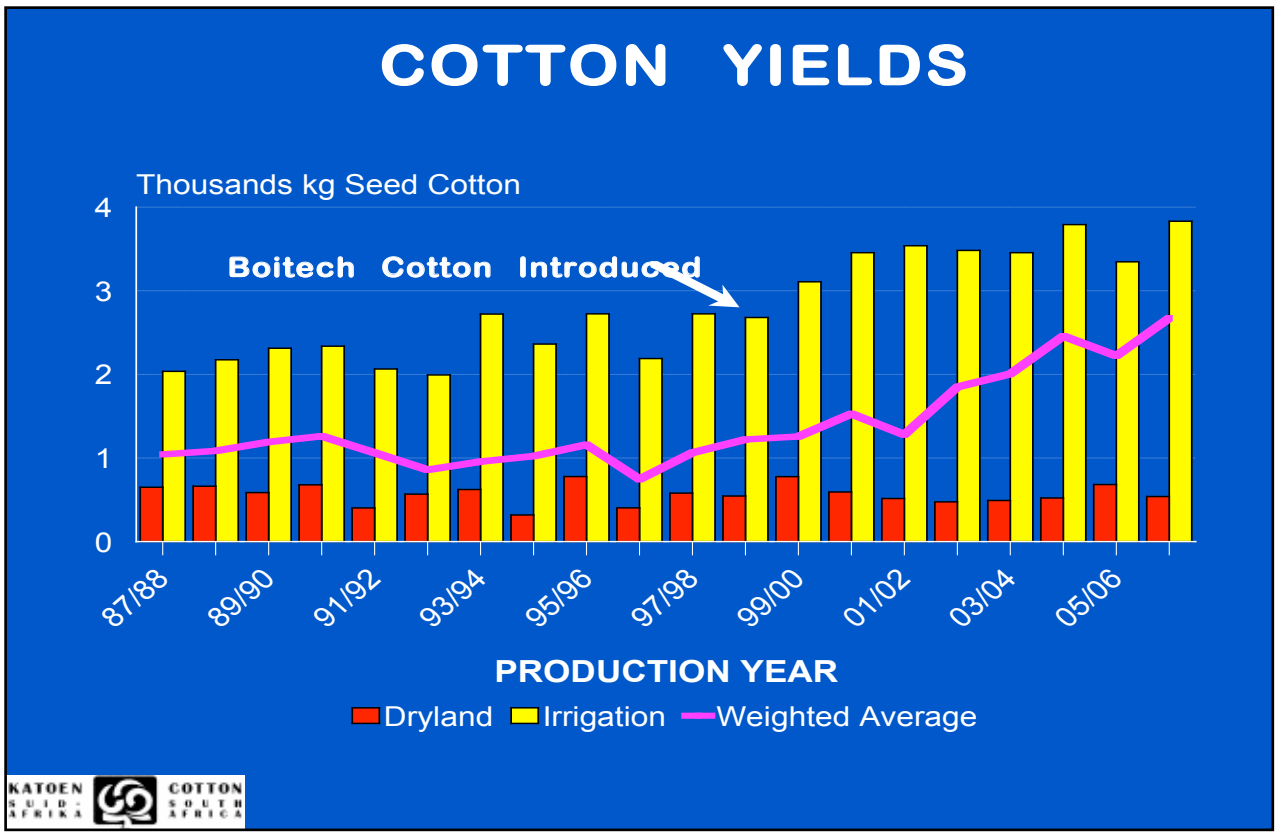
SELECTED FARMER EXPERIENCES WITH BT COTTON

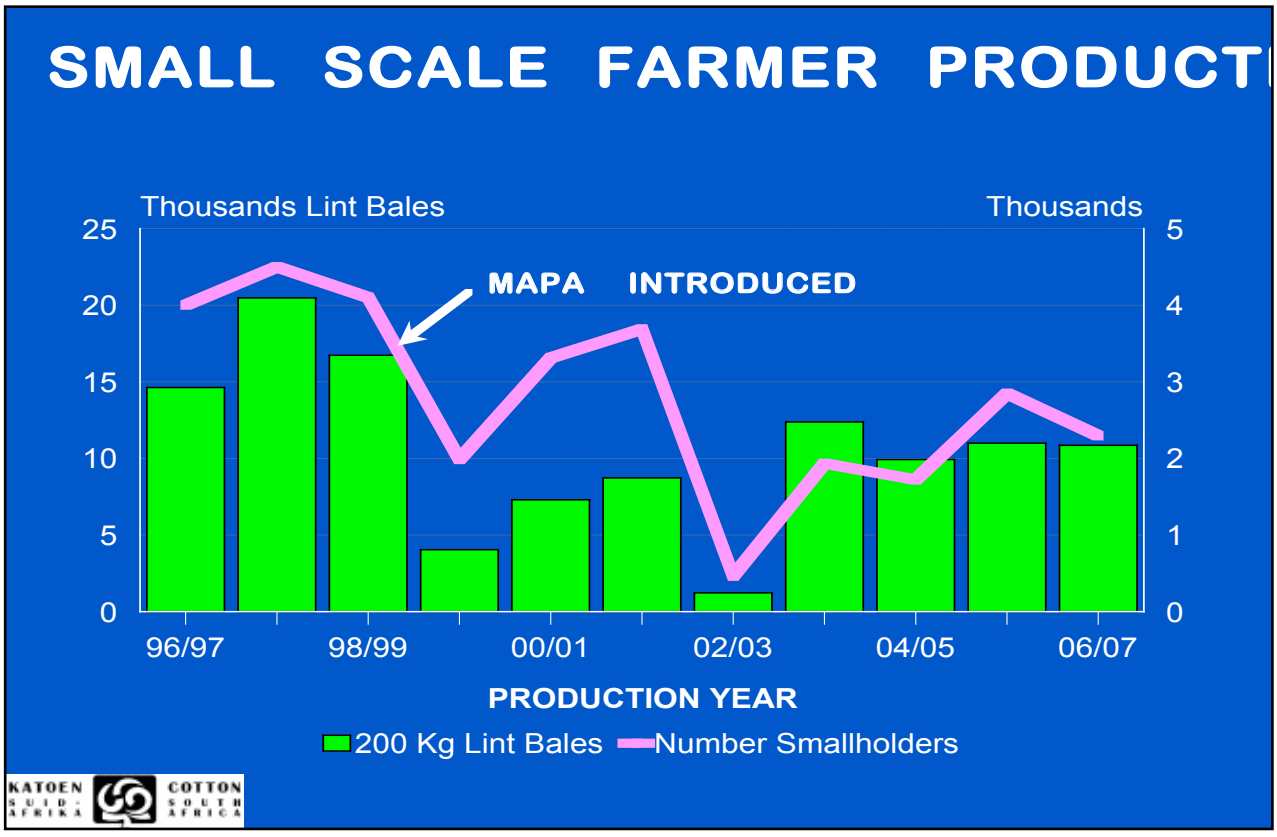
- Velapi Mlambo, Makhathini has planted Bt cotton for more than 3 years of his 5 ha farm. During one of the worst drought in many years his yield was 800 kg/ha compared to 600 kg/ha from non-Bt cotton – a 25% increase. He sprayed his Bt cotton 3 times for insects compared with 15 times with non-Bt cotton. (Mlambo, 2007)
- Strategies for cotton in West and Central Africa – enhancing competitiveness in the “Cotton 4” (Ilhem Baghdadli, Hela Cheikhrouhou & Gael Raballand. World Bank, 2007)

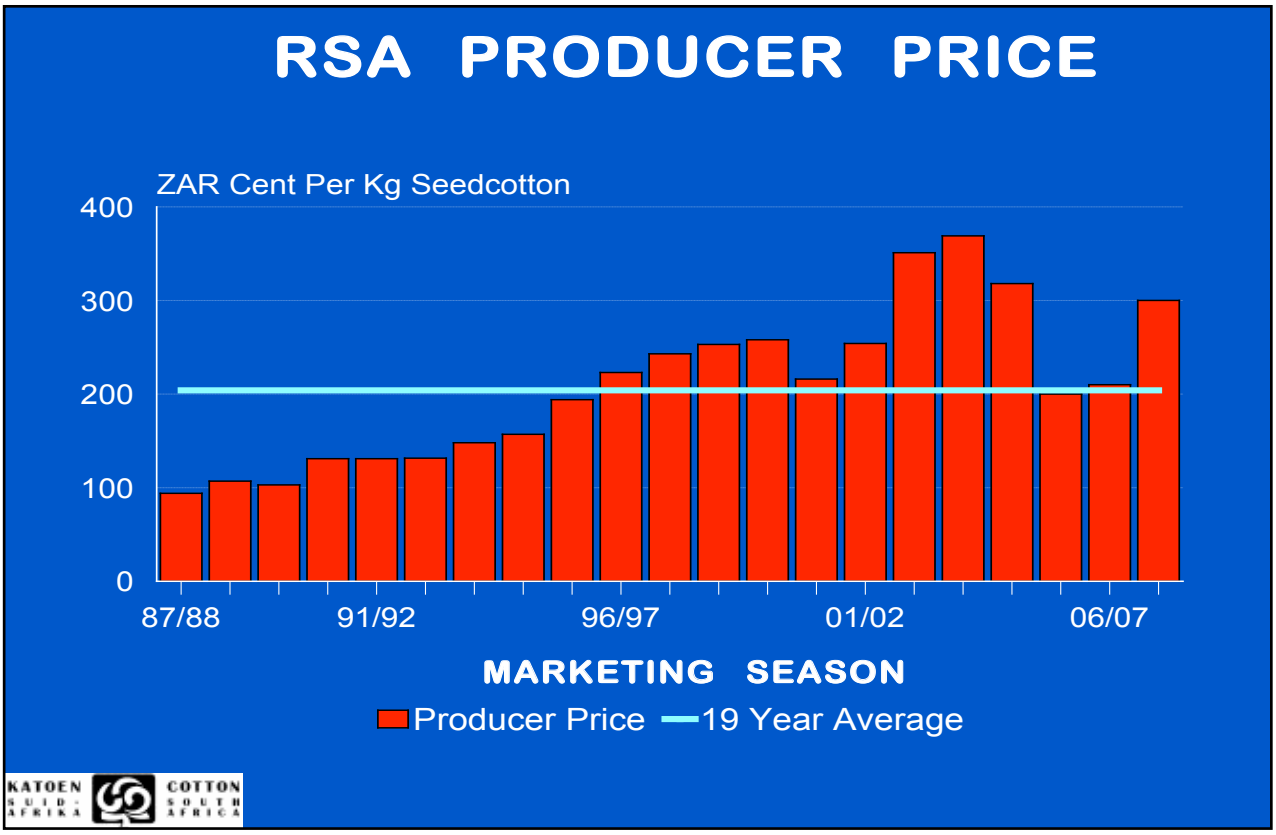
BENEFITS FROM GM CROPS

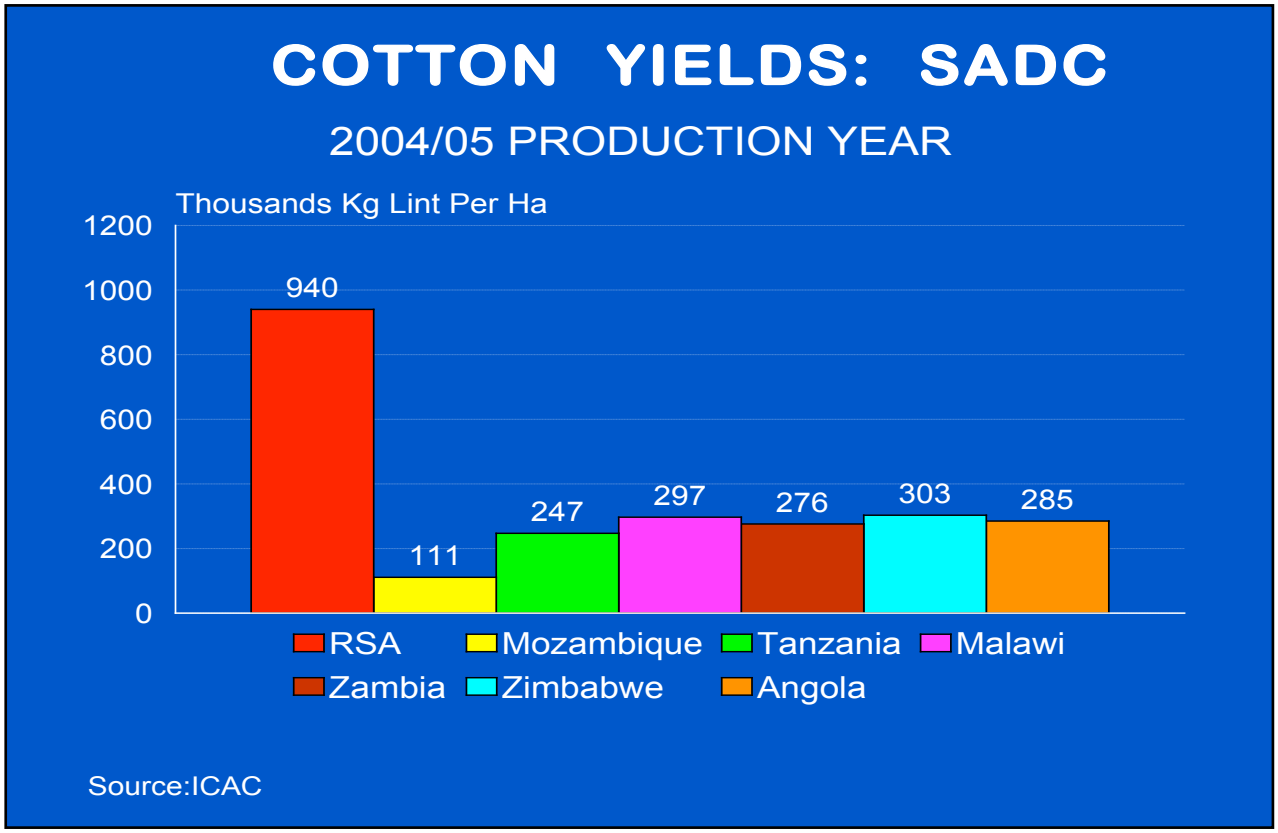
- (Gouse *et al*., 2005)
  Under irrigation Bt maize yields increased from 10.9 to 12.1 metric tones/ha (11%). Increased income = $117/ha.
  Under dry-land conditions yields rose from 3.1 to 3.4 metric tonnes/ha (11%). Increased income = $35/ha
- (Brookes & Barfoot, 2008)
  1998–2006 farm income increased by $156 million from GM maize, cotton and soybean.
- (James, C., 2008)
  Bt maize yields 31% more than corresponding hybrid and 134% more than conventional open pollinated varieties.




COTTON YIELDS
Thousands kg Seed Cotton
4
3
2
1
0
Boitech Cotton Introduced
87/88
89/90
91/92
93/94
95/96
97/98
99/00
01/02
03/04
05/06
PRODUCTION YEAR
Dryland
Irrigation
Weighted Average
KATOEN SUID-AFRIKA
COTTON SOUTH AFRICA


SMALL SCALE FARMER PRODUCT
Thousands Lint Bales
Thousands
25
20
15
10
5
0
5
4
3
2
1
0
MAPA INTRODUCED
96/97
98/99
00/01
02/03
04/05
06/07
PRODUCTION YEAR
200 Kg Lint Bales
Number Smallholders
KATOEN SUID-AFRIKA
COTTON SOUTH AFRICA


RSA PRODUCER PRICE
ZAR Cent Per Kg Seedcotton
400
300
200
100
0
87/88
91/92
96/97
01/02
06/07
MARKETING SEASON
Producer Price
19 Year Average
KATOEN SUID-AFRIKA
COTTON SOUTH AFRICA


COTTON YIELDS: SADC
2004/05 PRODUCTION YEAR
Thousands Kg Lint Per Ha
1200
1000
800
600
400
200
0
940
111
247
297
276
303
285
RSA
Mozambique
Tanzania
Malawi
Zambia
Zimbabwe
Angola
Source:ICAC

FURTHER DEVELOPMENTS IN AFRICA

- Egypt – First commercial plantings of Bt maize in 2008/2009
- Burkina Faso – First commercial planting of GM cotton in 2008/2009
- Uganda – Confined field trials with GM banana
- Malawi – Confined field trials with GM cotton
- Kenya – Confined field trials with GM maize
- Research on cassava, sweet sorghum, sweet potato, drought resistance in maize and maize streak virus.

REASONS FOR SLOW PROGRESS IN ADOPTION

- Continued concerns about possible food and environmental safety
- Weak regulatory capacity
- Complexity of trade in transgenic crops
- High regulatory barriers leading to restriction or slow access to beneficial technologies
- High barriers may also restrict competition in seed market and reduce options for farmers

WAYS OF IMPROVING CONFIDENCE IN BIOTECH COTTON

- Ensure effective, stringent and transparent enforcement of biosafety regulation
- Showcase the benefits of biotech cotton
- Address arising concerns
- Highlight socio-economic benefits
- Regular consultation with farmers are critical for harnessing their support and addressing their needs

WAY FORWARD

GM crops can contribute to improved food security and poverty alleviation in Africa.

Developing farmers in Africa have shown that they are able to access the benefits of GM crops however they need:

- good governance
- financial support
- skills training
- market access
- the support of competent extension service
- an adequate rural infrastructure

CONCLUSION

- Although cotton production rarely meets local demand, it has a huge potential to accommodate smallholders
- Survey have indicated that South Africa has sufficient area to be dedicated to small-scale cotton planting in order to meet demand.
- Cotton has proved to be an ideal small grower crop, which is suited for marginal areas due to its transgenic characteristics
- It is also a non-perishable labour intensive crop with the potential to create much needed jobs in the rural areas.

- ***Agricultural GM technology is here to stay***
- ***It is currently underutilized, despite its specific appeal to a wide range of farming systems***
- ***Biotechnology and biosafety legislation and regulations need to be comprehensive but not too costly or restrict innovation***
- ***Sharing of science based information is key to success***