



# **Adoption, Impact and Future Prospects of GM/Biotech Crops**

**by**

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**International Service for the Acquisition  
of Agri-biotech Applications (ISAAA)**

**<http://www.isaaa.org>**

# The Challenge – Global Food, Feed, Fiber & Fuel Security

## Alleviation of Poverty and Hunger



- **Population** 1999 - 6 billion 2050 - 9 billion  
90% of population in the South by 2050
- **Crops** – Principal source of food, feed and fiber- 6.5 billion  
Metric Tons per year, valued at \$1.7 trillion
- **Cultivable Crop Land per capita**  
1.1 acres in 1966  
0.6 acres. in 1998  
0.4 acres in 2050
- **Lower growth in grain yields** - World grain yields grew at 2.1 % in  
1980s, but at approx 1.0 % per annum in the 1990s
- **Malnutrition/Poverty**  
852 million people suffer from hunger/malnutrition  
1.3 billion afflicted by poverty
- **CHALLENGE --- Double food production sustainably on same  
crop land area of approx 3.75 billion acres by 2050**
- **Food is the first medicine**

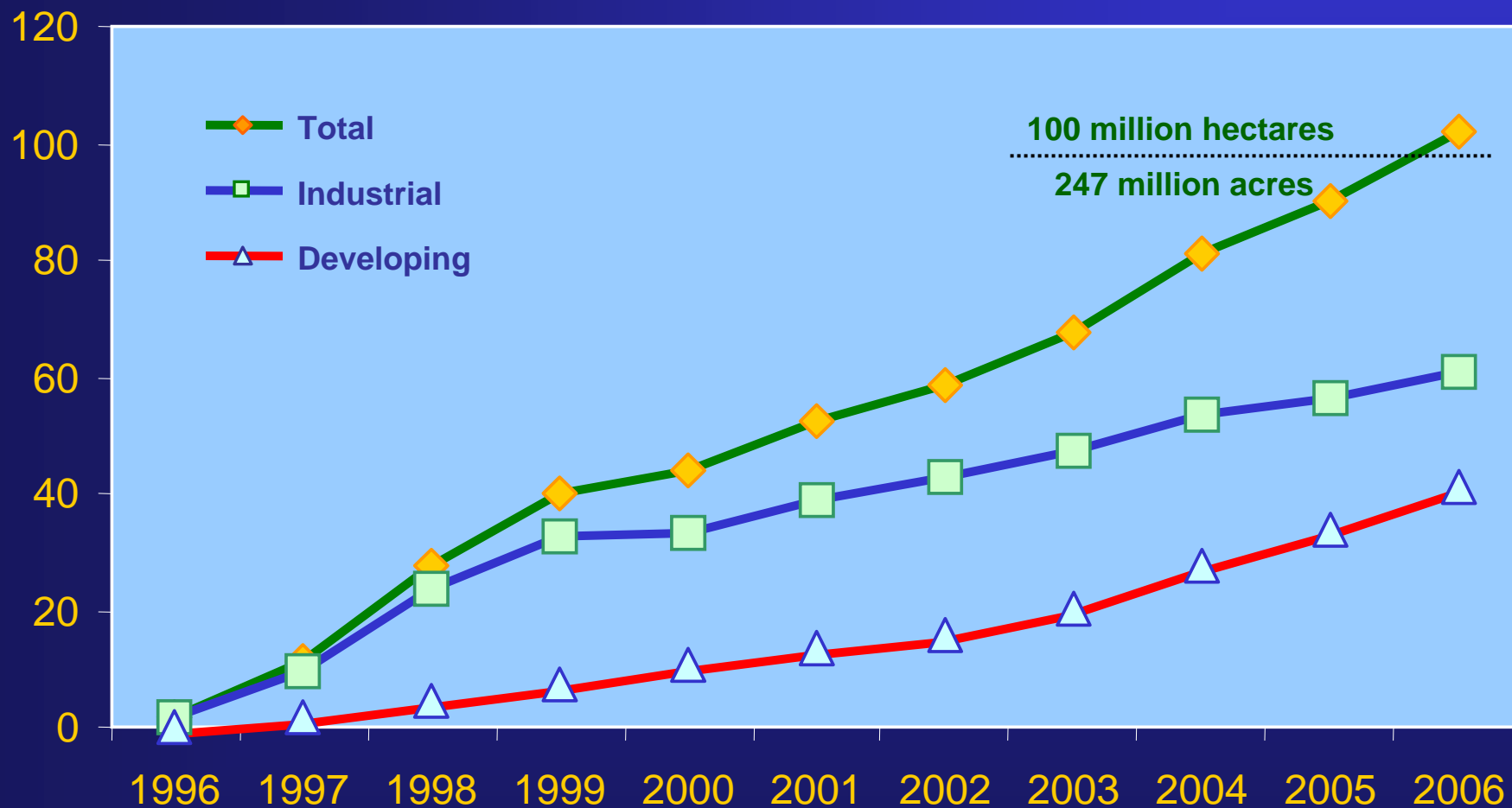
Source: Clive James 2007

# A Global, Food, Feed, Fiber and Fuel Strategy



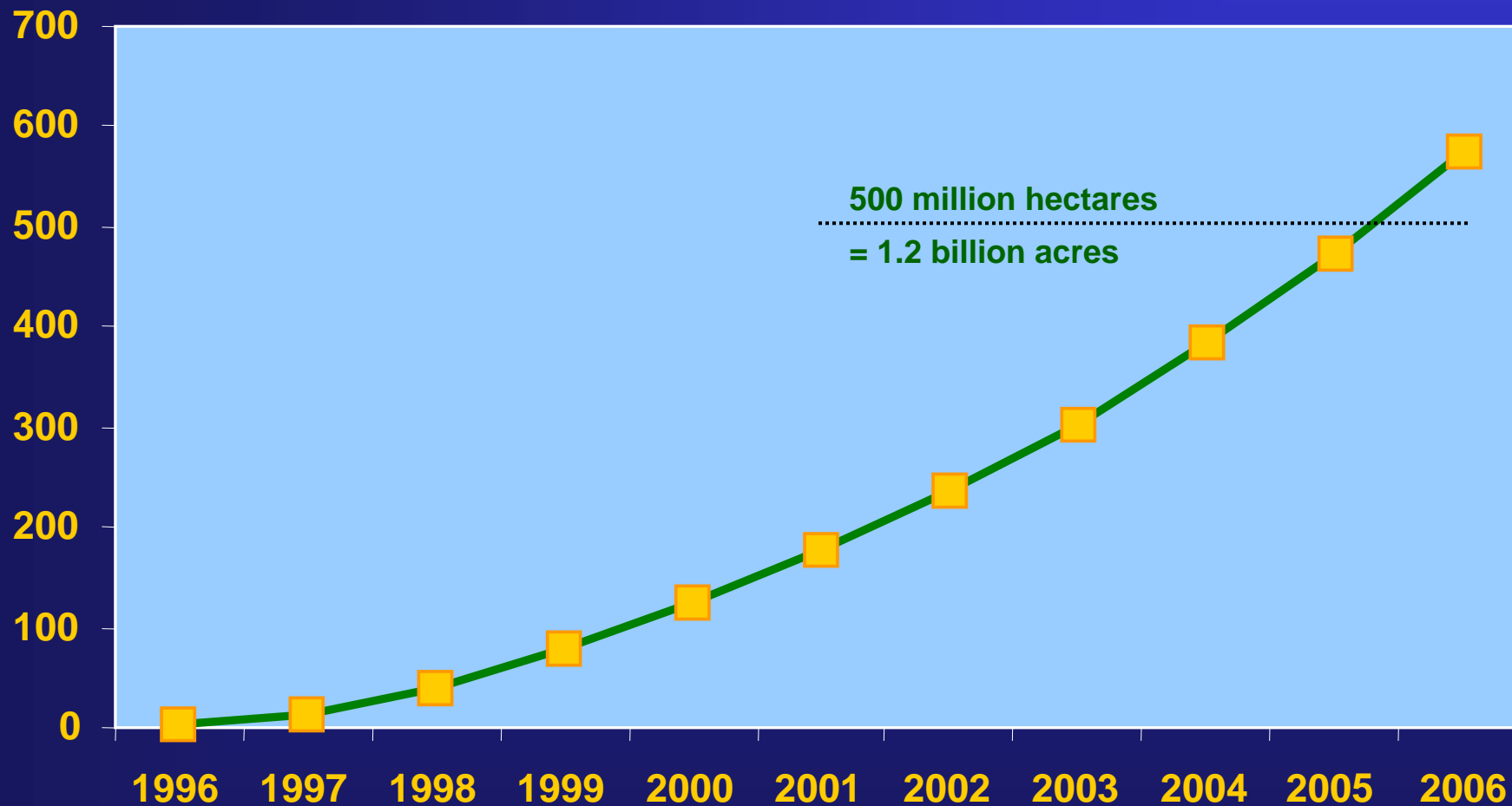
- **NO SINGLE APPROACH** will provide solution to food, feed, fiber and fuel security
- Conventional crop improvement **ALONE** will not double food production by 2050 – **GM/BIOTECH CROPS NOT A PANACEA** but important
- Successful strategy must have **MULTIPLE APPROACHES** that address all the principal issues that include:
  - Population Stabilization
  - Improved food distribution systems
  - The technology Component - A crop improvement **STRATEGY THAT INTEGRATES CONVENTIONAL AND BIOTECH/GM CROP APPROACHES** to optimize productivity and that can **CONTRIBUTE** to food feed, fiber & fuel security

# Global Area of Biotech Crops, 1996 - 2006: Industrial and Developing Countries (Million Hectares)



Source: C.James, ISAAA. 2006

# Accumulated Global Area of Biotech Crops, 1996 to 2005 (Million Hectares)



Source: C.James, ISAAA. 2006

# 2006 Highlights -- A Milestone Year



- **250 million acres barrier breached**  
**30 million acres - 13% - second highest in last 5 years**
- **255 million acres in 22 countries**, up from 225 million acres in 21 countries in 2005
- **> 1 billion acres planted globally since 1996**
- **More than 10 mill. biotech farmers** – 10.3 million - up from 8.5 million in 2005 - 90% or 9.3 mill. are resource-poor farmers in developing countries
- Of 6.5 billion global population **more than 50%, 3.6 billion, live in the 22 biotech countries in 2006**

# 2006 – Major Growth on all Continents

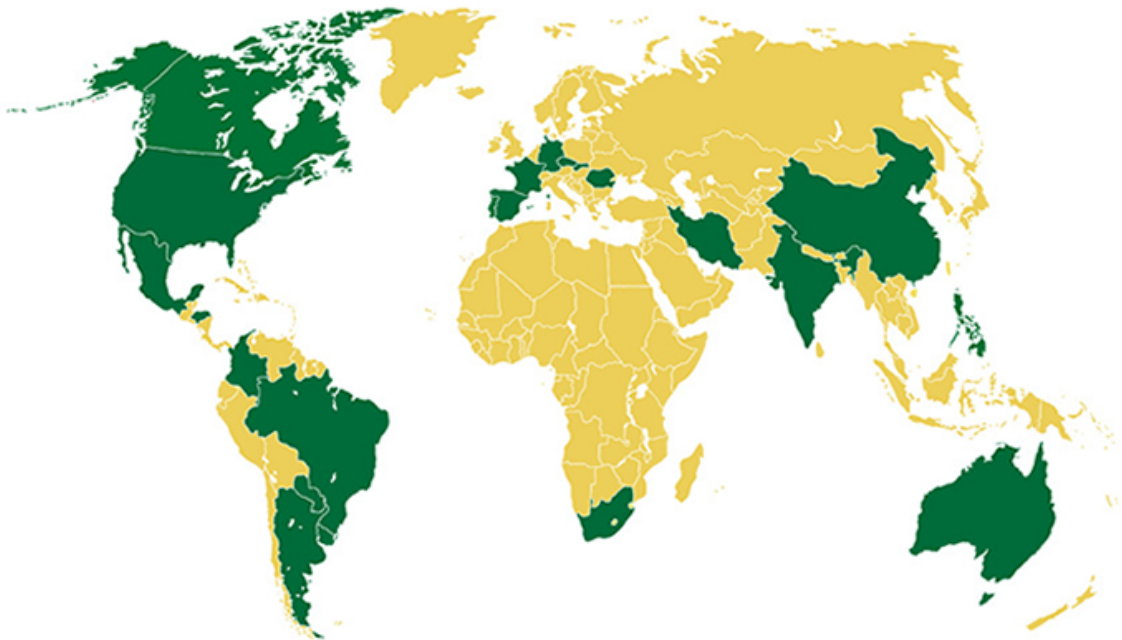


- In North America, US growth soars by 12 million acres – largest absolute growth for any country in 2006
- In South America, Brazil - biotech soybean & cotton (new in 2006) grows by 22% to almost 30 million acres
- In Asia, India triples area of Bt cotton to 9.5 million acres compared with China at 8.8 million acres
- South Africa triples biotech crop area to 3.5 million acres, with major increase in maize for food and feed
- Slovakia in the EU becomes 6th EU country to plant Bt maize

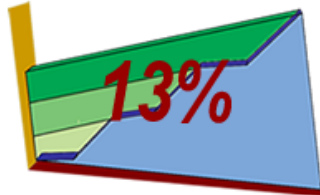
# Global Area of Biotech Crops, 2006: By Country (Million Hectares)



## Global Status of GM Crops in 2006



Increase over 2005



■ 22 countries which have adopted biotech crops

In 2006, global area of biotech crops was 102 million hectares, representing an increase of 13% over 2005, equivalent to 12 million hectares.

Source: Clive James, 2006

### Biotech Mega-Countries

50,000 hectares, or more

USA	54.6 million
Argentina	18.0 million
Brazil	11.5 million
Canada	6.1 million
India	3.8 million
China	3.5 million
Paraguay	2.0 million
South Africa	1.4 million
Uruguay	0.4 million
Philippines	0.2 million
Australia	0.2 million
Romania	0.1 million
Mexico	0.1 million
Spain	0.1 million

Less than 50,000 hectares

Colombia	Iran	Honduras
Portugal	Germany	France
Czechia	Slovakia	

\* *Developing countries*



# Impact of Biotech Crops



Source; Compiled by Clive James , 2007

- **IMPROVED PRODUCTIVITY AND INCOME** – Increased yields of 5 to 50%. Farm income gains of **\$5.6 billion in 2005** & **\$27 billion 1996-2005**; **biotech crop production value of \$50+ billion in 2006**
- **PROTECT BIODIVERSITY** - Double crop production on same area of land - **save the forests/biodiversity - 33m ac. loss/year in DCs**
- **ENVIRONMENTAL IMPACT** - Reduce need for external inputs
  - **Saving of 224,300 MT a.i. pesticides** from 1996 to 2005
  - **Saved 9 billion kg CO<sub>2</sub> in 2005**(4m cars)-helps climate change
  - **Conservation of soil & WATER = SUSTAINABILITY**
- **SOCIAL BENEFITS**
  - **Contribution to alleviation of poverty of 9.3 million small farmers in 2005. compared with 7.7 million in 2005**
  - **Improved environment & health & a time saving technology**
  - **More affordable food, feed, fiber and fuel**

# The Future – The Next Decade, 2006 - 2015



- **Continued growth in US, Canada and Australia** through stacking and expanded range of crops featuring agronomic, quality & other traits plus the very important trait of drought tolerance in about 5 years
- 1st decade 1996-2005, was the the decade of the Americas, **2nd decade will likely feature strong growth in Asia** led by **India, China & new countries like Pakistan and Vietnam**
- **Brazil** has enormous potential to be the **lead country in Lat America**
- **Africa** - # of biotech countries to increase modestly , led by **Egypt** in N. Africa, **Kenya** in E. Africa and **Burkina Faso** in W Africa
- **Slow to modest growth in the EU**, and potential in **Eastern Europe**
- Use of **biotech crops for biofuel- ethanol & biodiesel-** led by **US and Brazil** plus many other countries will be a **major new development.**

Compiled by Clive James, 2007

# Projections for the Next Decade, 2006 - 2015



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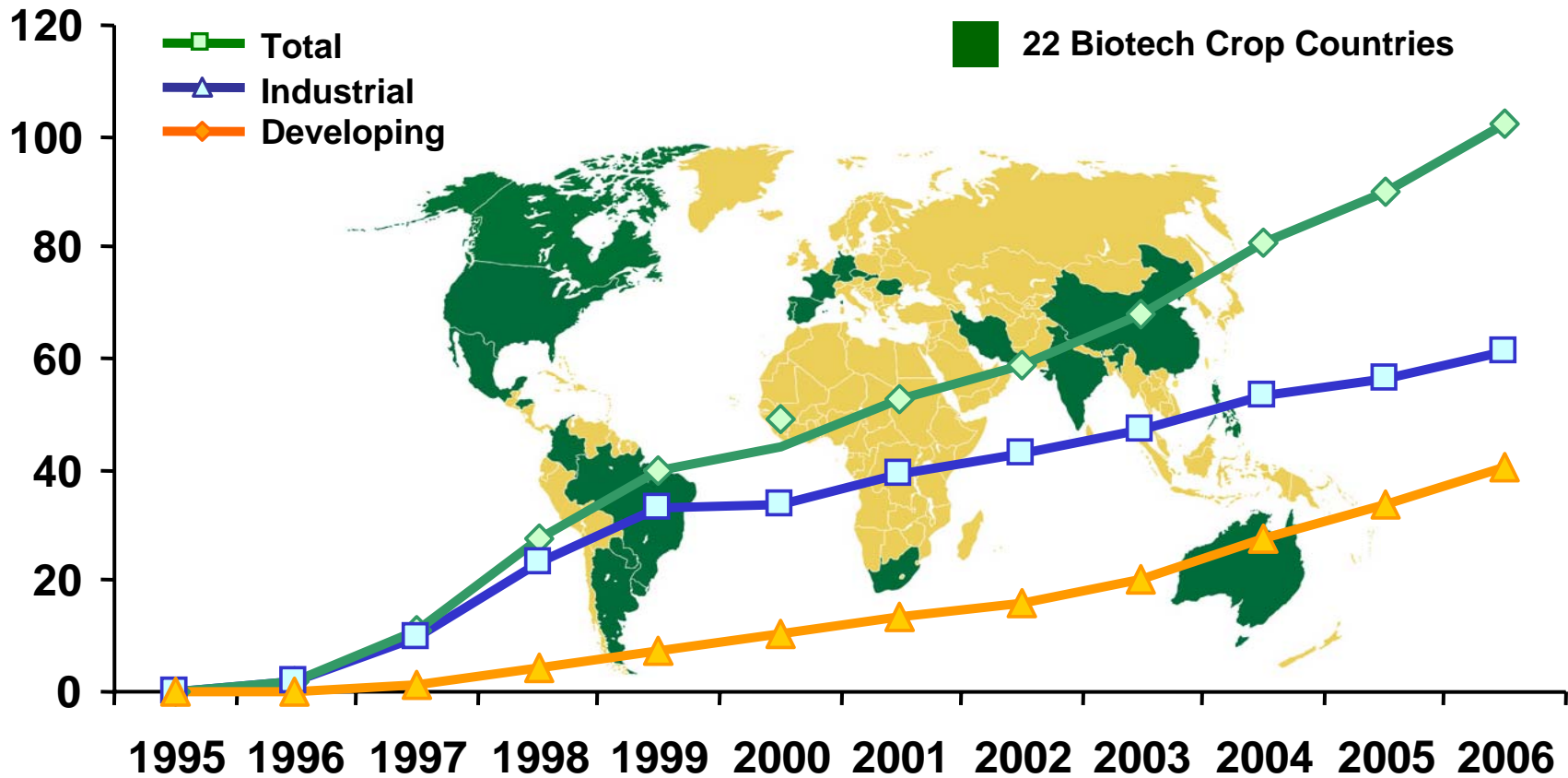
	2006	2015
# of Biotech Countries	22	~ 40
# of Farmers Planting Biotech Crops	10.3 million	20 to 100 million
Global Biotech Area	255 million acres	~ 500 million acres

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Source: Clive James, 2007

# GLOBAL AREA OF BIOTECH CROPS

## Million Hectares (1996 to 2006)



***Increase of 13%, 12 million hectares or 30 million acres, between 2005 and 2006.***

Source: Clive James, 2006.