



# **Global Overview of Biotech/GM Crops and Future Prospects**

**by**

**Dr. Clive James, Founder and Chair, ISAAA**

**IICA, Costa Rica, September, 2009**

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

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

# Overview of Presentation

---



- **ADOPTION, 1996 - 2008**
- **IMPACT of Biotech crops**
- **FUTURE – 2nd Decade, 2006 - 2015**

# The Two European Philanthropic Co-sponsors of the ISAAA 2008 Report

---



- **Fondazione Bussolera-Branca, Italy** – supports the sharing of knowledge to aid global society to make knowledge-based decisions about biotech crops
- **Ibercaja, Spain** – the fourth largest bank in Spain based in the maize growing area of the country where Bt maize is successfully grown – largest area of Bt maize in the EU

Source: Clive James , 2009

# ISAAA – [www.isaaa.org](http://www.isaaa.org)



Not-for-Profit Charity, co-sponsored by public and private sector organizations – [a pro-choice org.](#)

## **Mission**: ALLEVIATION OF POVERTY

- **Share knowledge on crop biotechnology** so that the global community is more well informed about the attributes and potential of the new technologies
- **Contribute to poverty alleviation by increasing crop productivity and income generation**, particularly for resource-poor farmers, and to bring about a safer environment and more **sustainable** agricultural development, through crop biotechnology.

Source: Clive James, 2009

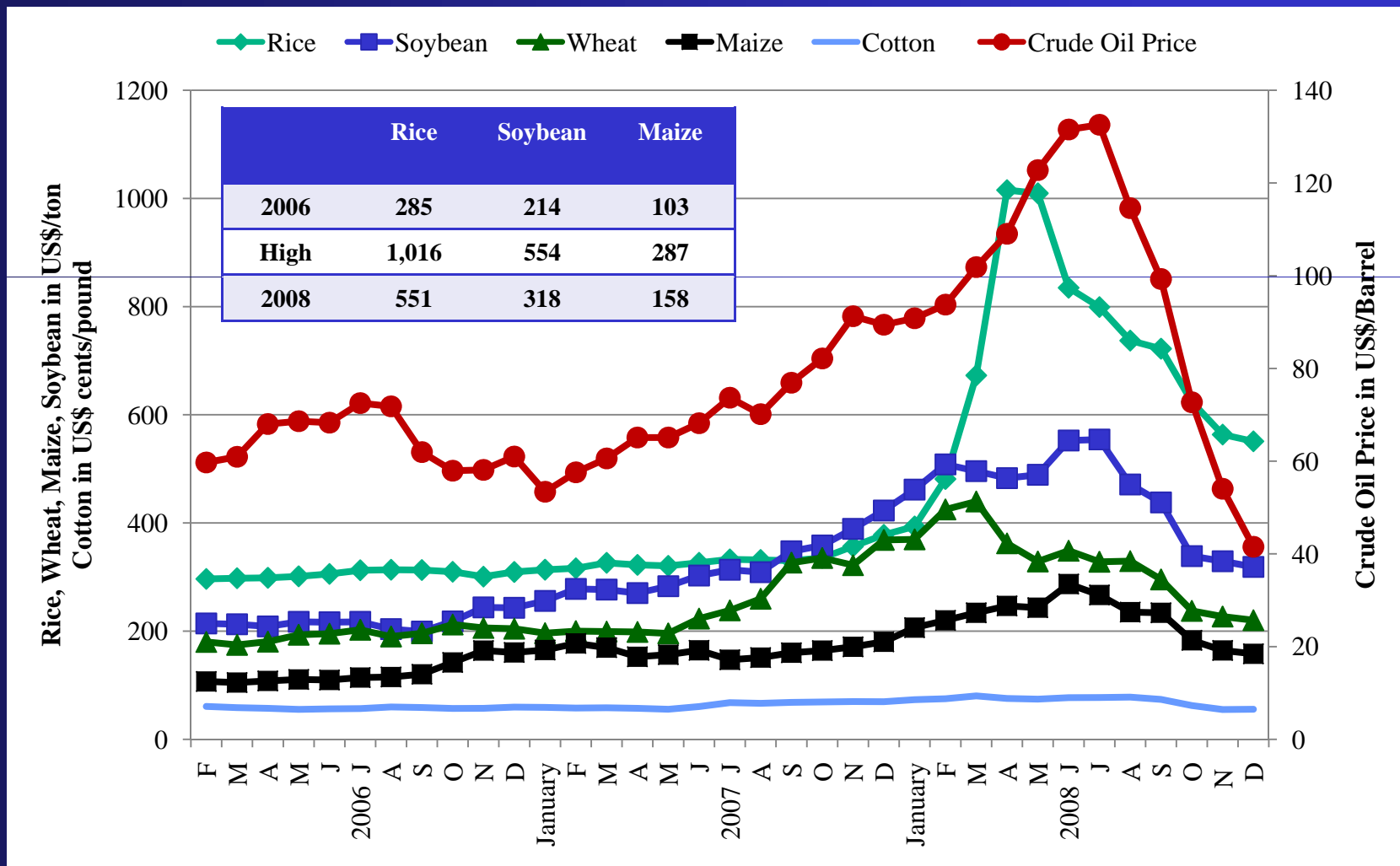
# Acceptance Issues related to Biotech Crops

---



- **Food safety** – food as safe, or safer, than conventional
- **Environmental Impact**
  - **Gene Flow** -conservation of biodiversity - coexistence
  - **Effect on non-target organisms** – Target specific tech
  - **Management of Bt resistance** – durability - a challenge
- **Ownership of the technology**
  - **Role of the Private sector, IPR** –public/private balance
- **Ethical considerations** – the right to food
- Above issues impact on **INTERNATIONAL TRADE**

# Prices of Commodities (\$/ton) and Oil (\$/barrel), January 2006 to December 2008



Source: Compiled by Clive James, 2009

# Public Interest in Biotech Crops



- 
- Given high price of commodities can biotech crops produce **more affordable food, feed and fiber?**
  - Can they mitigate some of the challenges associated with **climate change** & contribute to **sustainability?**
  - Can biotech crops contribute to **global food security** and to the **alleviation of poverty and hunger?**

Source: Clive James, 2009

# A Food, Feed, & Fiber Strategy to Double Global Production by 2050



- **NO SINGLE APPROACH** will allow food, feed, and fiber production to be doubled **SUSTAINABLY** by 2050 for over 9 billion people
- Conventional crop improvement **ALONE** will not double crop 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
  - A Technology Component is **ESSENTIAL** – A crop improvement **STRATEGY THAT INTEGRATES** the **BEST** of **CONVENTIONAL** and the **BEST** of **BIOTECH** to optimize productivity and **CONTRIBUTE** to food, feed and fiber security

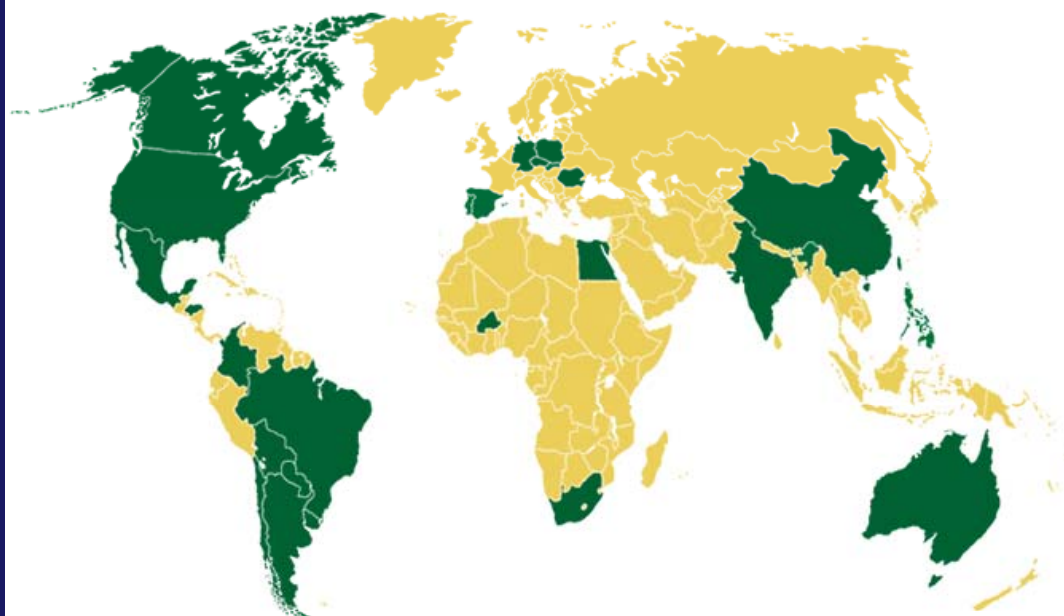
Source: Clive James, 2009

**ADOPTION  
OF  
BIOTECH CROPS  
1996 - 2008**

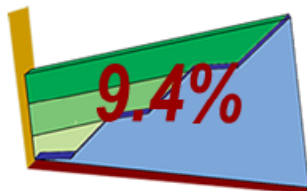
# Global Area (Million Hectares) of Biotech Crops, 2008: by Country



## Global Status of GM Crops in 2008



Increase over 2007



■ 25 countries which have adopted biotech crops

In 2008, global area of biotech crops was 125.0 million hectares, representing an increase of 9.4% over 2007, equivalent to 10.7 million hectares.

Source: Clive James, 2009.

### Biotech Mega-Countries

50,000 hectares, or more

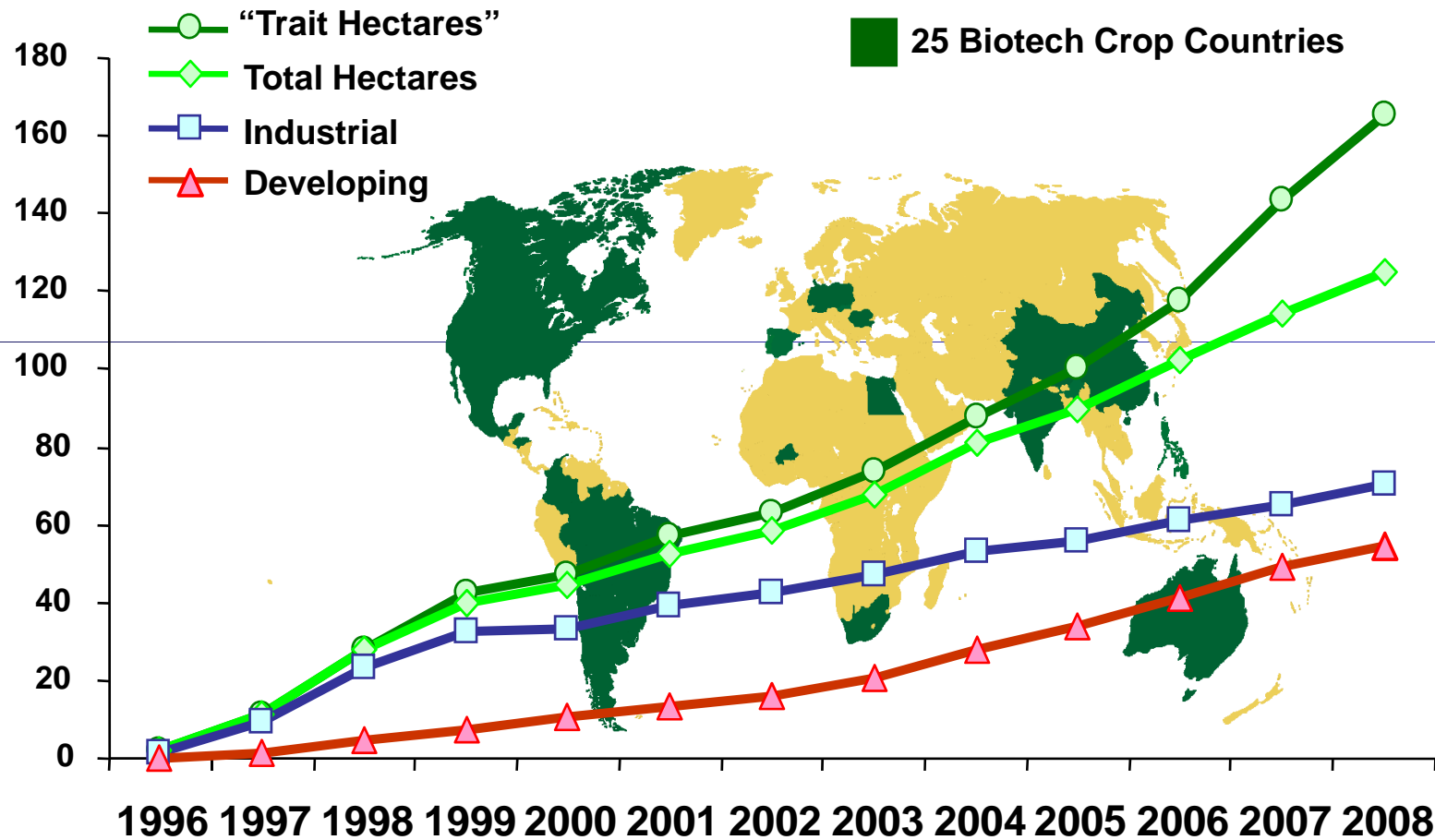
USA	62.5 million
<i>Argentina*</i>	21.0 million
<i>Brazil*</i>	15.8 million
<i>India*</i>	7.6 million
Canada	7.6 million
<i>China*</i>	3.8 million
<i>Paraguay*</i>	2.7 million
<i>South Africa*</i>	1.8 million
<i>Uruguay*</i>	0.7 million
<i>Bolivia*</i>	0.6 million
<i>Philippines*</i>	0.4 million
Australia	0.2 million
<i>Mexico*</i>	0.1 million
Spain	0.1 million

Less than 50,000 hectares

<i>Chile*</i>	Romania
<i>Colombia*</i>	Portugal
<i>Honduras*</i>	Germany
<i>Burkina Faso*</i>	Poland
Czech Republic	Slovakia
	<i>Egypt*</i>

\* Developing countries

# GLOBAL AREA OF BIOTECH CROPS Million Hectares (1996 to 2008)



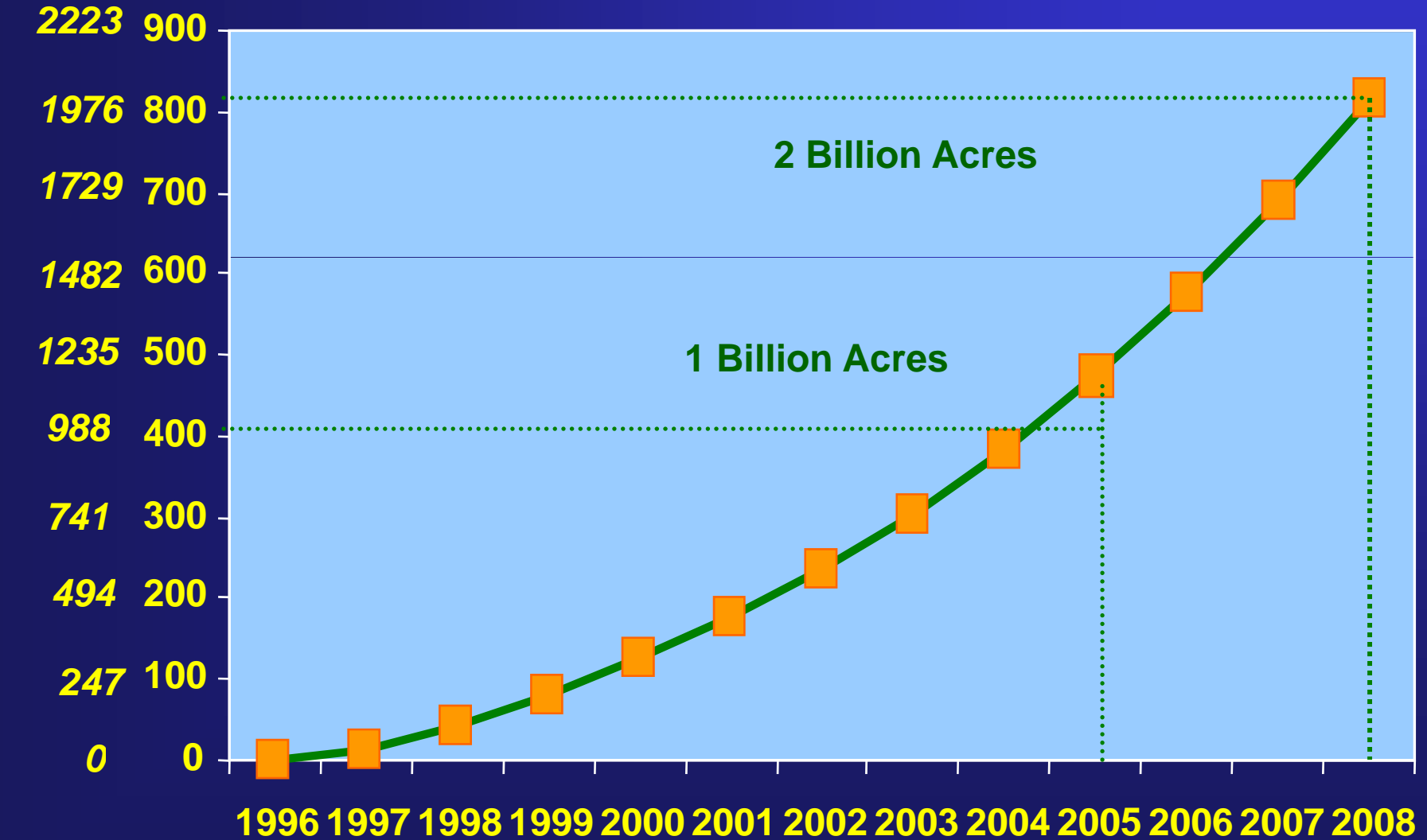
*An "apparent" increase of 9.4% or 10.7 million hectares between 2007 and 2008, equivalent to a "real" increase of 15% or 22 million "trait hectares"*

**Source: Clive James, 2009**

# Accumulated Global Area of Biotech Crops, 1996 to 2008 (Million Hectares, Million Acres)



M Acres



Source: Clive James, 2009

# SUMMARY – 2008 HIGHLIGHTS



- **25 countries**; 3 new: Burkina Faso, Egypt and Bolivia
- **Progress in Africa**: increased from 1 to 3 countries
- **13.3 mill. biotech farmers**, up 1.3 mill, – 90% or 12.3 million were small and resource-poor farmers
- **2<sup>nd</sup> billionth acre planted** 1<sup>st</sup> bill 10 years – 2<sup>nd</sup> 3 years
- **Stacked traits** – 10 countries, 27 million hectares (22%)
- **Five countries** grew new biotech crops
- **A new biotech crop** RR sugar beet in US and Canada

Source: Clive James, 2009



---

# IMPACT OF BIOTECH CROPS

# GLOBAL IMPACT of BIOTECH CROPS



Source: Compiled by Clive James , 2009

- **IMPROVED PRODUCTIVITY AND INCOME** – Farm income gains of **\$44 billion from 1996 to 2007**, of which **56%** was due to cost reduction and **44%** due to a production gain of **141 m tons**.
- **PROTECT BIODIVERSITY** – Double crop production on same area of 1.5 million hectares of crop land – **save forests/biodiversity** – **13m ha loss/year in dev countries** – **141 mill tons would have required an additional 43 mill hectares** – a land saving technology
- **ENVIRONMENTAL IMPACT** – Reduce need for external inputs
  - **Saving of 359,000 MT pesticides from 1996/ 2007** – **9% saved**
  - **Saved 14 bill kg CO<sub>2</sub> in 2007** – contribution to climate change
  - **Conservation of soil & WATER thru biotech + no/low till**
- **SOCIAL BENEFITS**
  - Contribution to **poverty alleviation** of **12.3 million small resource-poor farmers in 2008** & **welfare benefits** emerging

# THE FUTURE

**2006 – 2015, THE SECOND DECADE**

**2015, The Millennium Development Goal Year**

# The Future – 2nd Decade 2006-15

---



- CONTINUING FLOW OF NEW & IMPROVED BIOTECH CROPS
- POLITICAL WILL AND SUPPORT

Source: Clive James, 2009

# The Future – 2nd Decade 2006-2015

## FLOW OF IMPROVED TECHNOLOGY

---



- **More crops/traits** used by more farmers/countries
- **Biotech rice** – principal crop – 250m rice households
- **Drought tolerance** – principal trait – maize in 2012
- **Quality traits** – Golden rice, omega 3, high lysine etc.
- **More biotech crops** developed by countries from the South, **more South-South cooperation**
- Biotech applications for “**Speeding the breeding**” – MAS and biotech crops, to provide a faster response to more severe and rapid changes in **climate change**

Source: Clive James, 2009

# The Future – 2nd Decade 2006-15

## STRONG POLITICAL WILL AND SUPPORT

---



- Support from **G8** In Hokkaido, 2008
- In 2008, 2 new biotech countries in Africa. **Hon. W Ruto, Minister of Ag Kenya,** “*Biotechnology offers Africa an opportunity to increase food security*”
- Growing influence of the lead developing countries, **China, India, Brazil, Argentina & South Africa**
- Premier Wen Jiabo, China “*to solve the food problem we have to rely on big science and technology measures, rely on biotechnology, rely on GM*” (2008)

Source: Clive James, 2009

# Doubling in the 2<sup>nd</sup> Decade, 2006-2015



---

	2006	2015
# of Biotech Countries	22	~ 40
# of Farmers Planting Biotech Crops	10 million	~ 20 million or more
Global Biotech Area	100 million hectares	~ 200 million hectares

---

Source: Clive James, 2005

# Challenges for the Future

---

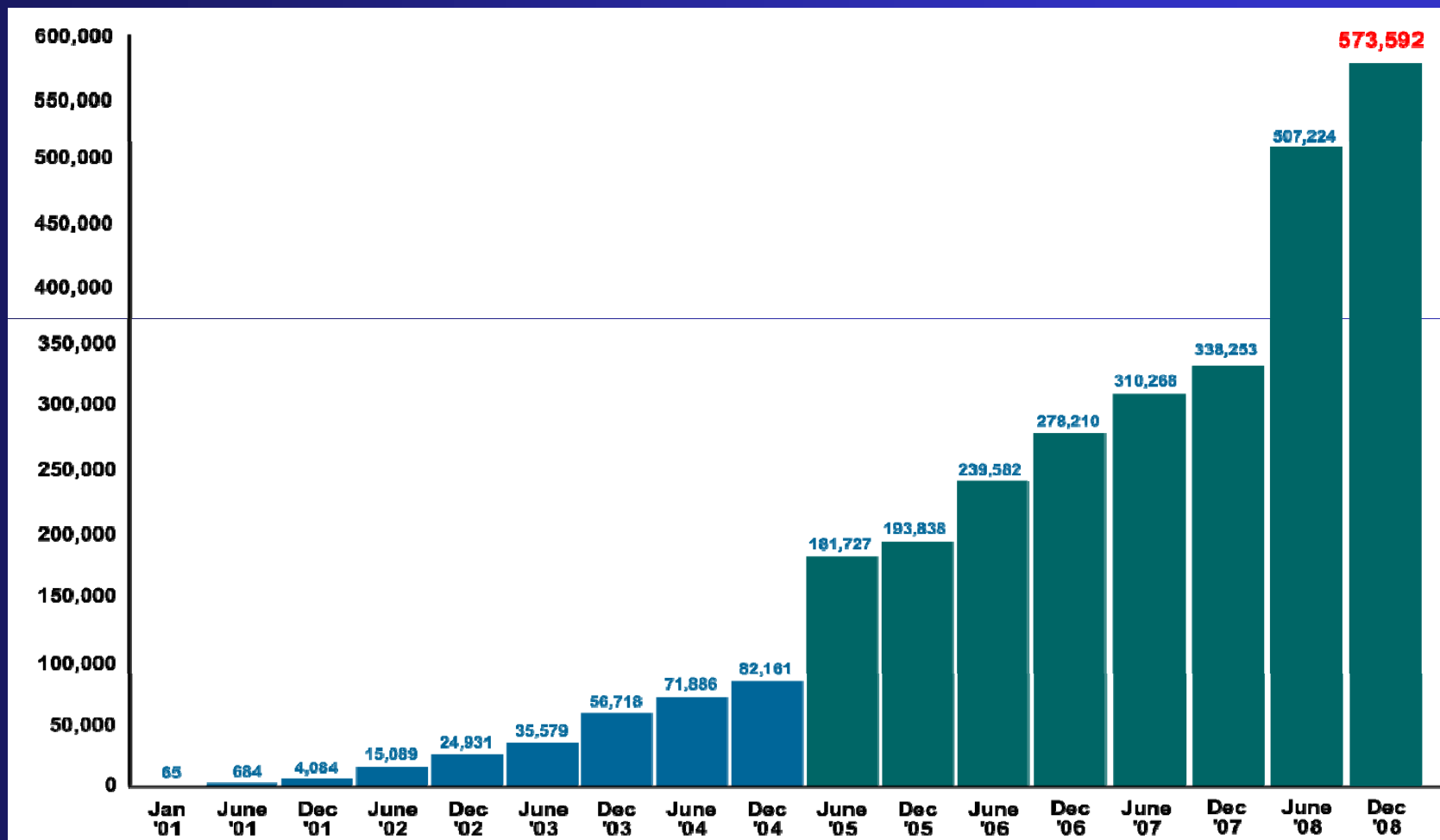


- **Establish responsible and efficient regulatory systems, that are appropriate for developing countries with limited resources**
- **Improved Communication with Society about the attributes and potential of biotech crops**

Source: Clive James, 2009



# ISAAA CropBiotech Update Recipients January 2001 – December 2008



- Includes recipients of CropBiotech Update translations in Arabic, Bahasa Indonesia, Bangla, Chinese, French, Italian, Portuguese, Spanish, Thai, Japanese and Vietnamese
- Does not include subscribers to other list serves that pick up articles from the CropBiotech Update; estimated at 30,000

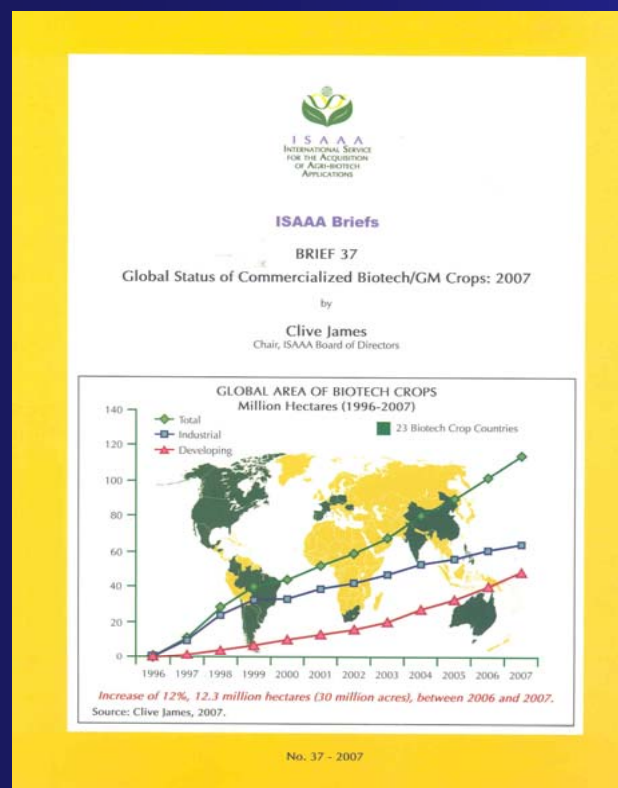
Source: Clive James, 2009

# Knowledge Sharing with Global Society



## Impact of ISAAA Annual Global Status Review

(As of January 15, 2009)



No. of media articles = 1,588

No. of countries reached = 80

No. of people reached ~ 1.1 billion

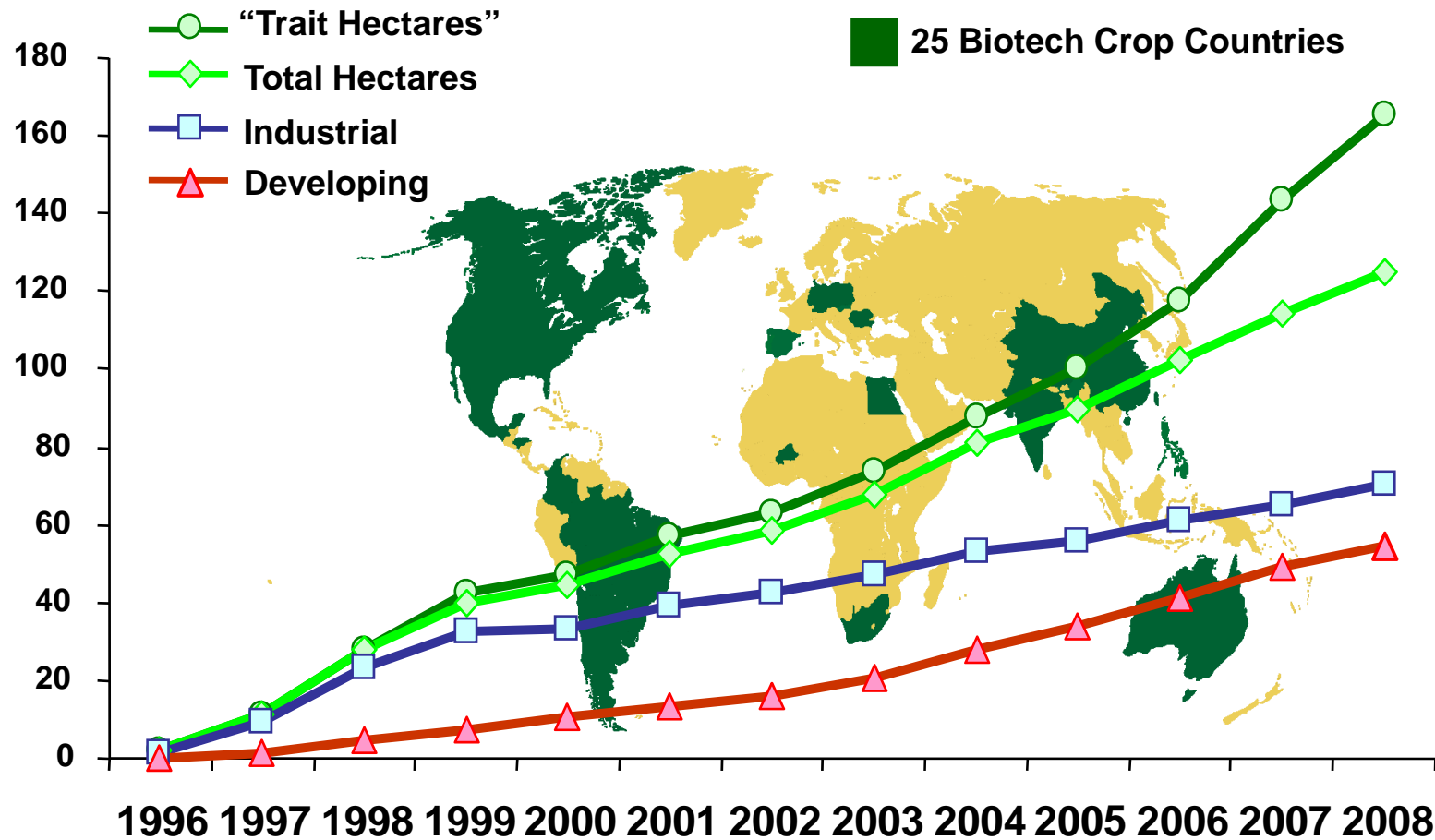
No. of languages = 41

>95% of articles are positive or neutral

**ISAAA Briefs No. 37-2007 – “Global Status of Commercialized Biotech/GM Crops: 2007”**

Source: Clive James, 2009

## GLOBAL AREA OF BIOTECH CROPS Million Hectares (1996 to 2008)



*An "apparent" increase of 9.4% or 10.7 million hectares between 2007 and 2008,  
equivalent to a "real" increase of 15% or 22 million "trait hectares"*

**Source: Clive James, 2009**