

Broad Global Overview and Latest Information on Biotech/GM Crops

by

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

<http://www.isaaa.org>

US registered, Not-for-Profit Charity, co-sponsored by public and private sector organizations

Mission of ISAAA :

- **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.
- For more information, visit <http://www.isaaa.org>

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

Acceptance Issues related to Biotech Crops



- **Food safety** - labeling and traceability
- **Environmental Impact**
 - **Gene Flow** -conservation of biodiversity- coexistence
 - **Effect on non-target organisms** - Monarch Butterfly
 - **Management of Bt resistance** – durability - a challenge
- **Restricted Access and Control of GM technology**
 - **Role of the Private sector, IPR**
- **Ethical considerations**
- **Above issues impact on INTERNATIONAL TRADE**

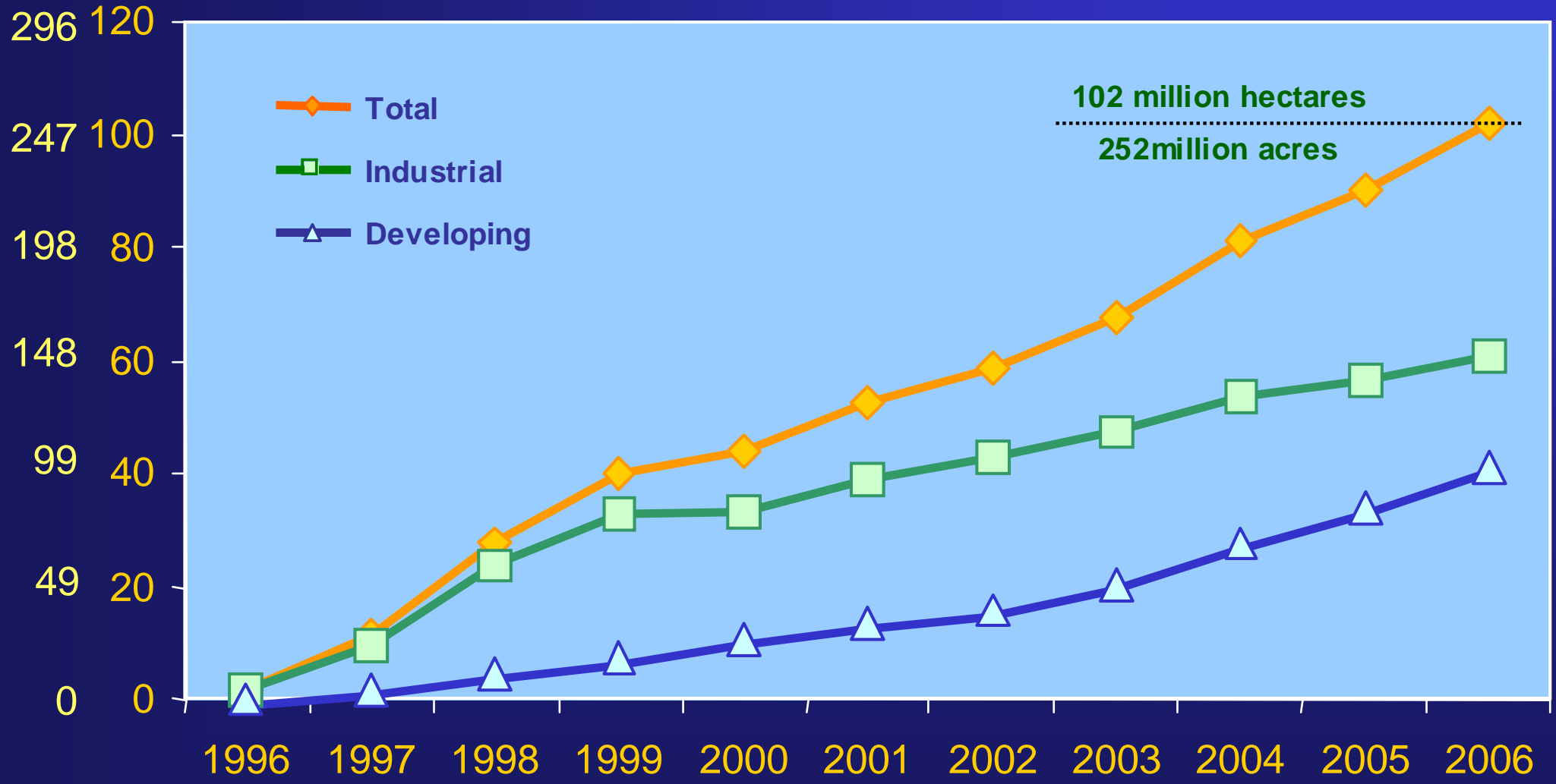
2006 Highlights --- A Milestone Year

- **100 million hectare barrier breached**
12 million ha 13% - second highest in last 5 years
- **102 m. has in 22 countries**, up from 90 m has in 21 countries in 2005
- **> 500 million hectares 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**



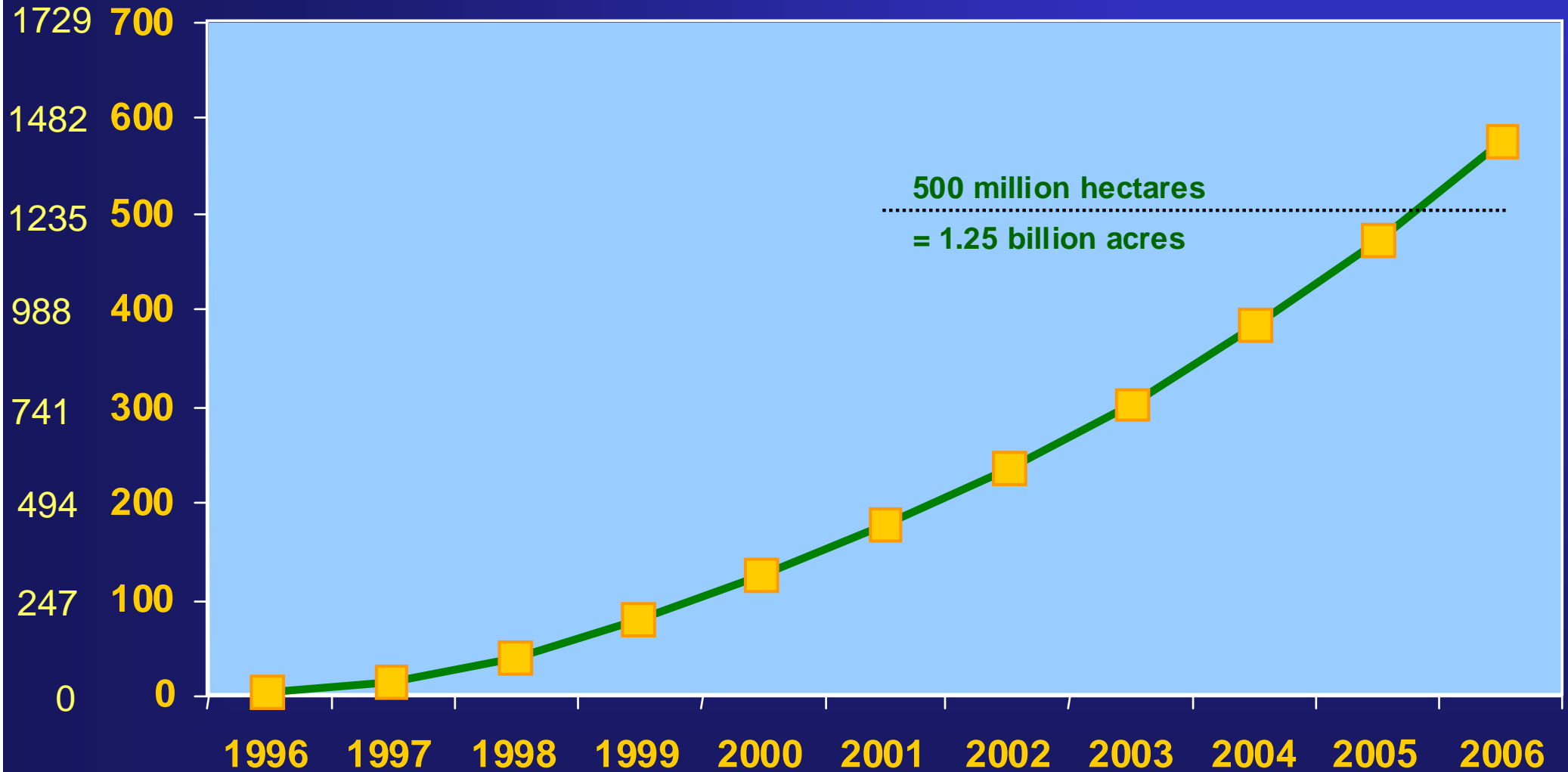
Global Area of Biotech Crops, 1996 to 2006: Industrial and Developing Countries (Million Hectares)

M Acres



Accumulated Global Area of Biotech Crops, 1996 to 2006 (Million Hectares)

M Acres



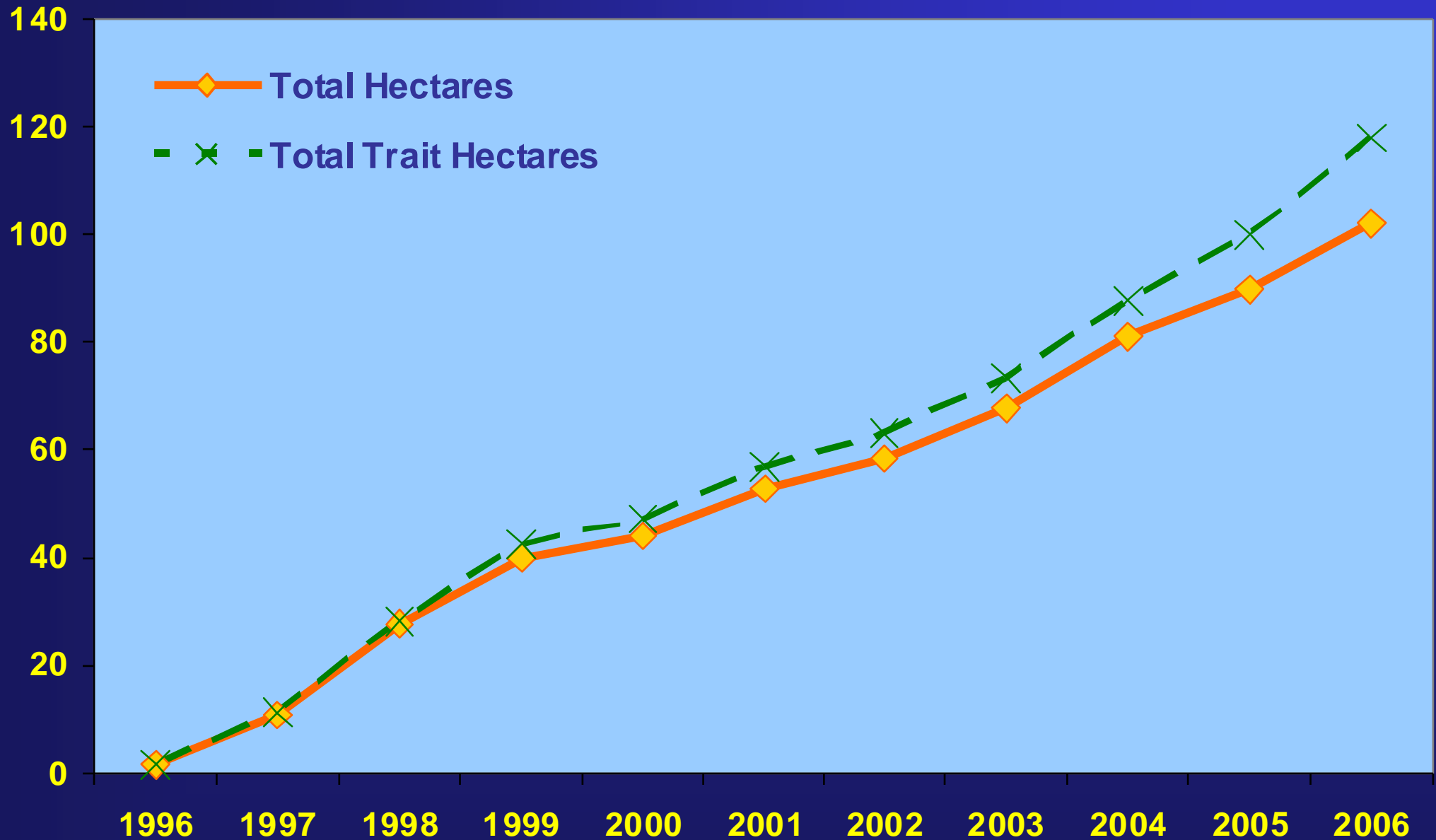
2006 – Major Growth on all Continents

- In North America, US growth soars by 4.8 million ha – largest absolute growth for any country in 2006
- In South America, Brazil - biotech soybean & cotton (new in 2006) grows by 22% to 11.5 million hectares
- In Asia, India emerges as leader, tripling area to 3.8 million ha overtaking China at 3.5 million ha
- South Africa triples biotech crop area to 1.4 million ha, with major increase in maize for food and feed
- Slovakia in the EU becomes 6th country to plant Bt maize

2006 – New Crops & Stacked traits

- **The first perennial biotech crop, herbicide tolerant alfalfa** - a very important forage crop- was planted on 80,000 hectares in the US
- Of the 102 million has. of biotech crops planted in 2006 **15% were stacked with 2 or 3 traits** in one biotech variety- eq. to **118 million “trait hectares”**
- Stacked traits are a very important feature of biotech crops because they **deliver multiple benefits in one biotech variety**
- **Stacked traits grown in six countries** - US, Canada, Australia, Mexico, South Africa and Philippines

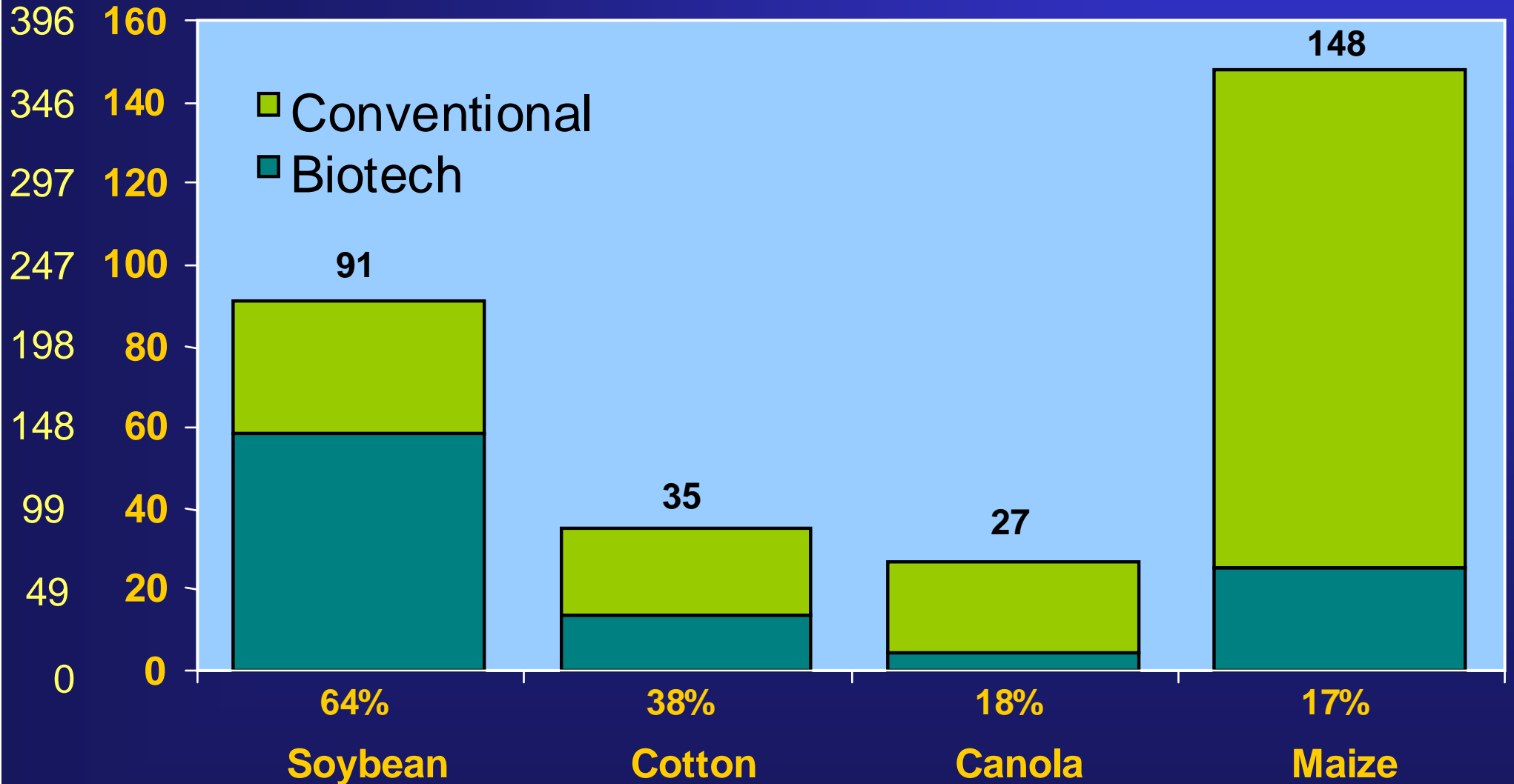
Comparison of Adoption of Biotech Crops by Hectares and "Trait Hectares"



Source: Clive James, 2007

Global Adoption Rates (%) for Principal Biotech Crops (Million Hectares) 2006

M Acres



Developing countries record bigger gains in biotech area than industrial countries in 2006



- From 1996 to 2006, % of global area of biotech crops in **developing countries increased every year-**
- **40% in 2006**
- Biotech area in developing countries **grew by 7.0 million hectares, or 21% in 2006, compared with 5.0 million hectares or 9 % in industrial countries**
- The **five** lead biotech crop developing countries - **China, India, Argentina, Brazil and South Africa, with a combined population of 2.6 billion (40% of global) grew 38.2 million hectares of biotech crops in 2006, equivalent to 37% of global total**

Source; Clive James , 2007

The five lead developing countries deploying biotech crops in 2006

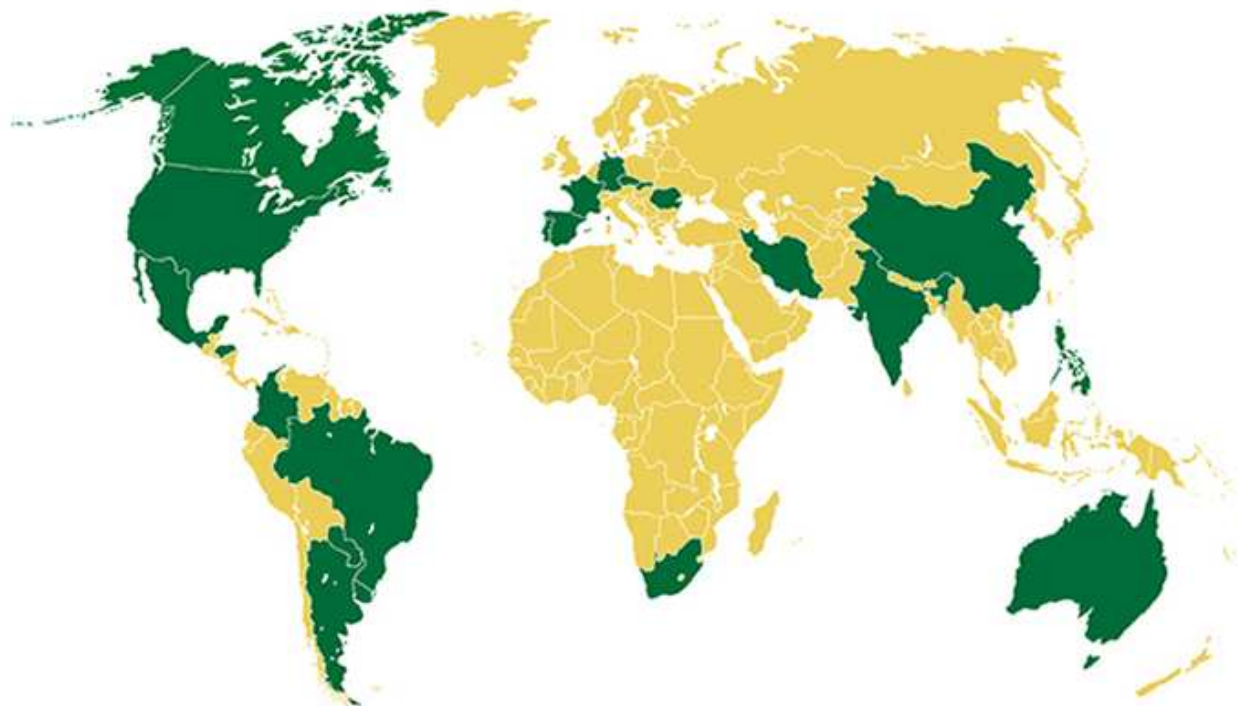


- **China** 6.8m small farmers grew 3.5 m has of Bt cotton in 2006 with potential benefit of \$1 billion in 2010.
- **India** – adopted Bt cotton in 2002; x 3 fold increase to 3.8 mill has in 2006 benefiting 2.3 million small farmers
- **Argentina** - #2 biotech country - 18% global area in 2006 Benefits~\$2 billion/yr from biotech soy, & cotton
- **Brazil** – 11.4m has RR Soy and 0.1 m Bt cotton in 2006 – Potentially #1 in Lat Am- maize, sugarcane, rice, other
- **South Africa** – Lead country in Africa – in 2006 3 fold increase - maize, white (food), yellow (feed), soy, cotton.

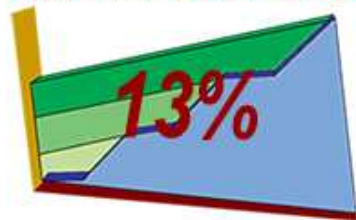
Global Area of Biotech Crops, 1996 to 2006: By Country (Million Hectares)



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.

Biotech Mega-Countries

50,000 hectares, or more

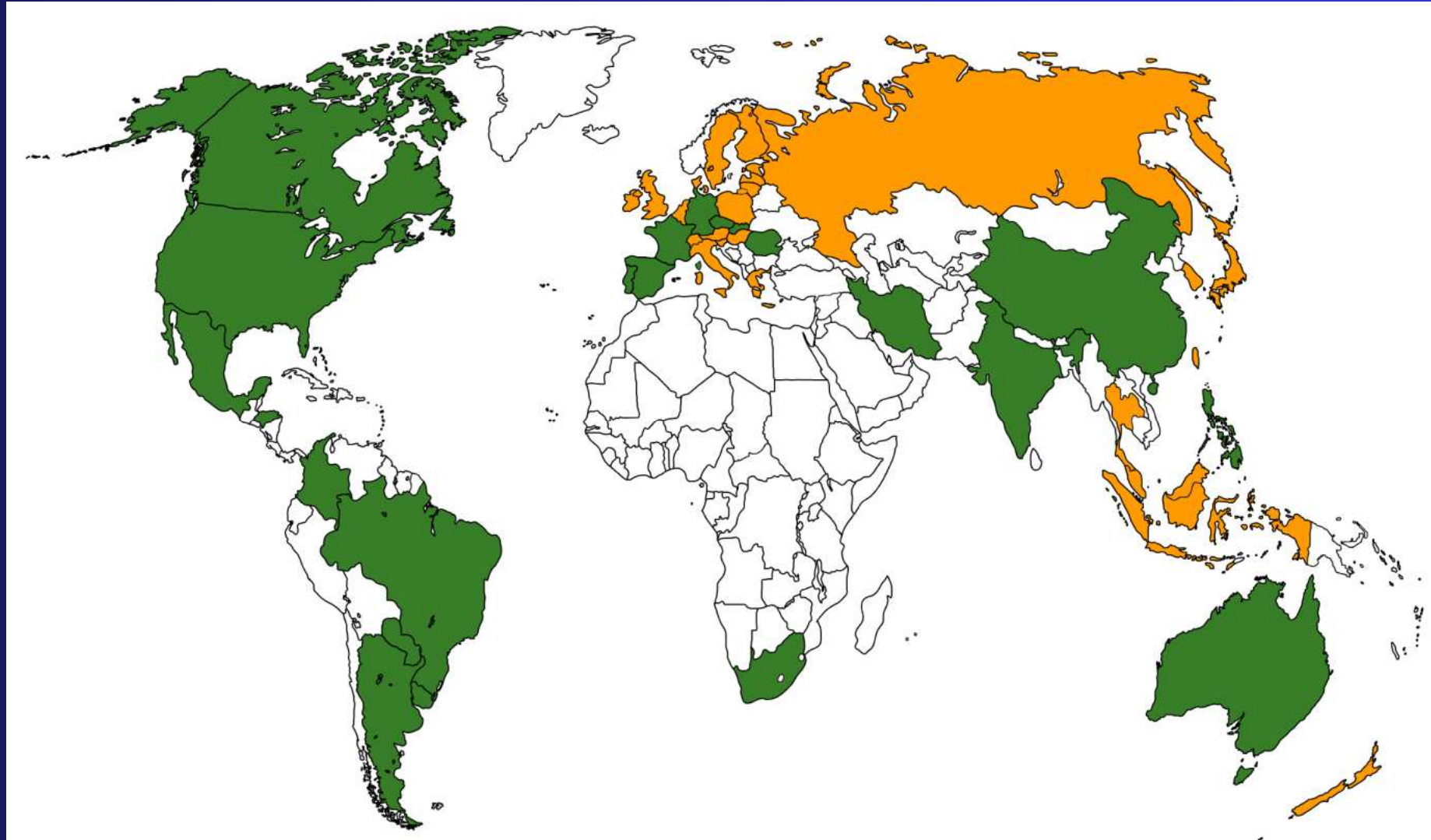
USA	54.6 million
Argentina	18.0 million
Brazil	11.5 million
Canada	6.1 million
India	3.8 million
China	3.5 million
Paraguay	2.0 million
South Africa	1.4 million
Uruguay	0.4 million
Philippines	0.2 million
Australia	0.2 million
Romania	0.1 million
Mexico	0.1 million
Spain	0.1 million

Less than 50,000 hectares

Colombia	Iran	Honduras
Portugal	Germany	France
Czechia	Slovakia	

* *Developing countries*

Global Status of 51 Countries with Regulatory Approvals*, 2006



Countries with approvals* for **planting** biotech crops – **22 countries**



Countries with approvals* for **food/feed import/use** & environmental release only – **29 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 - 13m ha 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 CO₂ 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 2006, compared with 7.7 million in 2005**
 - **Improved environment & health & a time saving technology**
 - **More affordable food, feed, fiber and fuel**

Biotech Crops – Global Economic Benefits: 1996 to 2005, and 2005



	1996-2005	2005
ALL COUNTRIES	\$ 27.0 billion	\$ 5.6 billion
USA	\$ 12.9 billion	
Argentina	\$ 5.4 billion	
China	\$ 5.2 billion	
Brazil	\$ 1.4 billion	
Canada	\$ 1.0 billion	
India	\$ 0.5 billion	
Others	\$ 0.6 billion	

Source: Brookes 2007

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



2006

2015

of Biotech Countries

22

~ 40

of Farmers Planting
Biotech Crops

10.3 million

~ 20 million

Global Biotech Area

102 million
hectares

~ 200 million
hectares

Source: Clive James, 2007

Challenges for the Future



- Responsible and efficient stewardship
- Improved Communication with Society. Knowledge-based decisions re Biotech crops

ISAAA's Global Knowledge Center (KC) on Crop Biotechnology & Network of Biotechnology Information Centers (BICs)



• 19 Near-term nodes

• 4 Future nodes

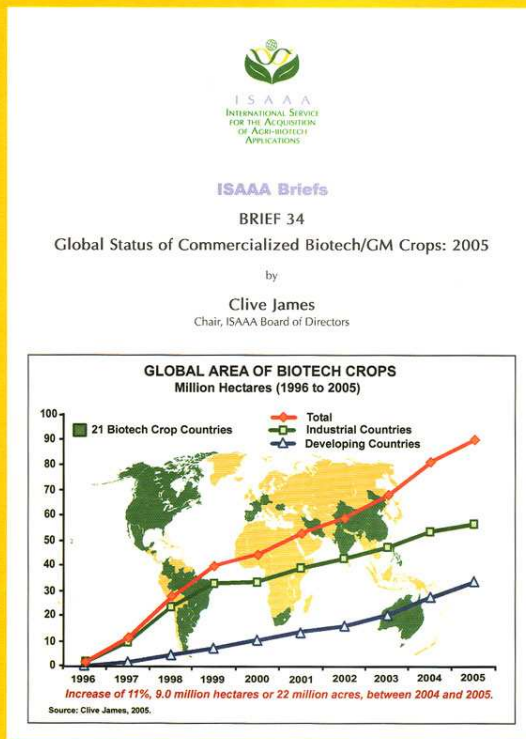
★ Global Knowledge Center (KC), based at ISAAA, S.E.Asia Center in the Philippines

ISAAA CropBiotech Update Recipients



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

Impact of ISAAA Annual Global Status Review



No. 34 - 2005

No. of media articles

~ 1,000

No. of countries reached

= 47

No. of people reached

= ~450-500 million

No. of languages

= 17

>95% of articles are positive or neutral

ISAAA Briefs No. 34-2005 – “Global Status of Commercialized Biotech/GM Crops: 2005”

Challenges for the Future

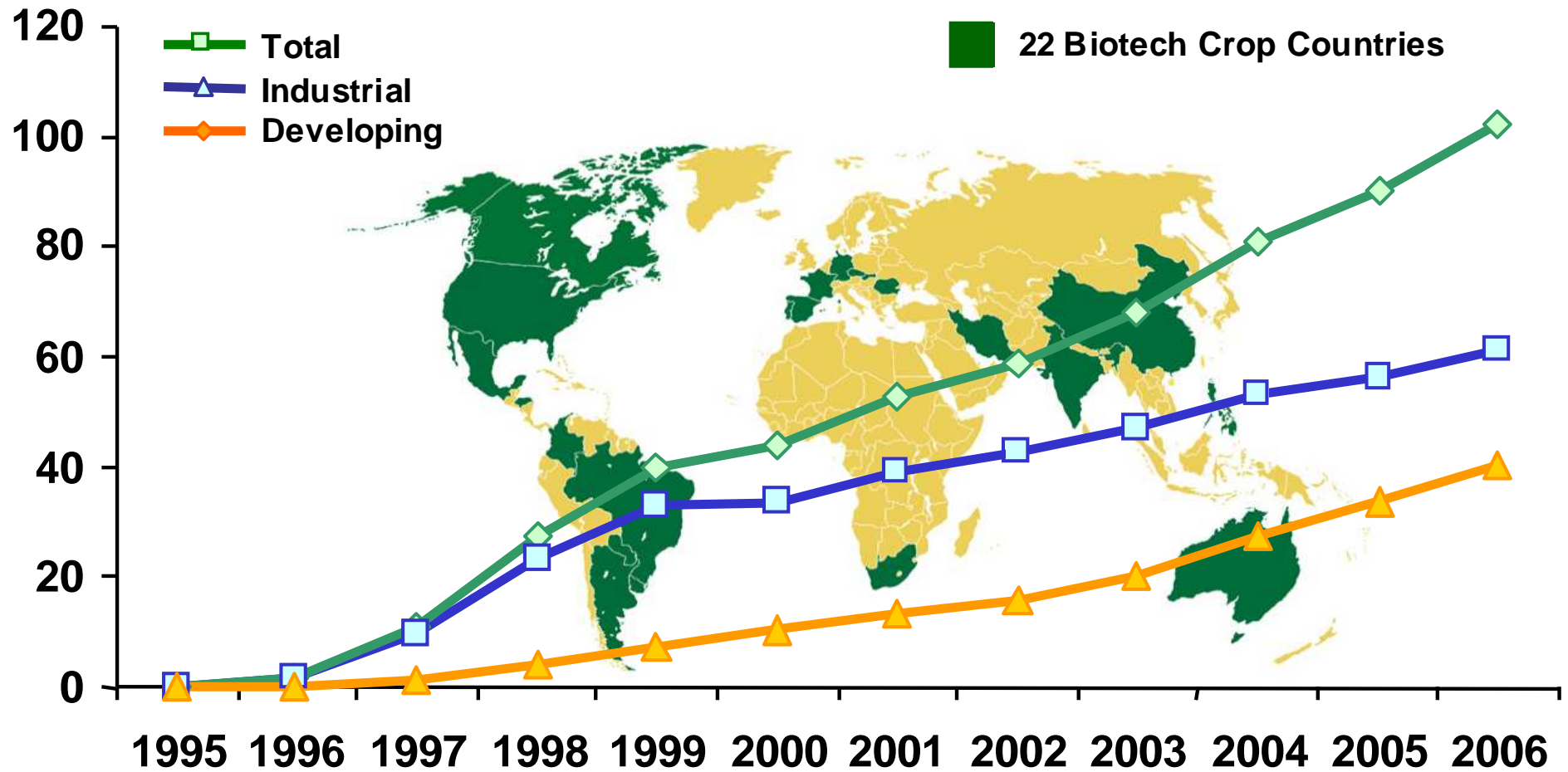


- **Ensure that those countries who wish to, have the option to use biotech crops in conjunction with conventional technologies to CONTRIBUTE to a more Sustainable Agriculture, Global Food, Feed & Fiber Security, Alleviation of Poverty and a Safer Environment**



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, 2007.