



# Second Decade of Crop Biotechnology

Opportunities and Challenges for the Food System

Wrap-up Presentation  
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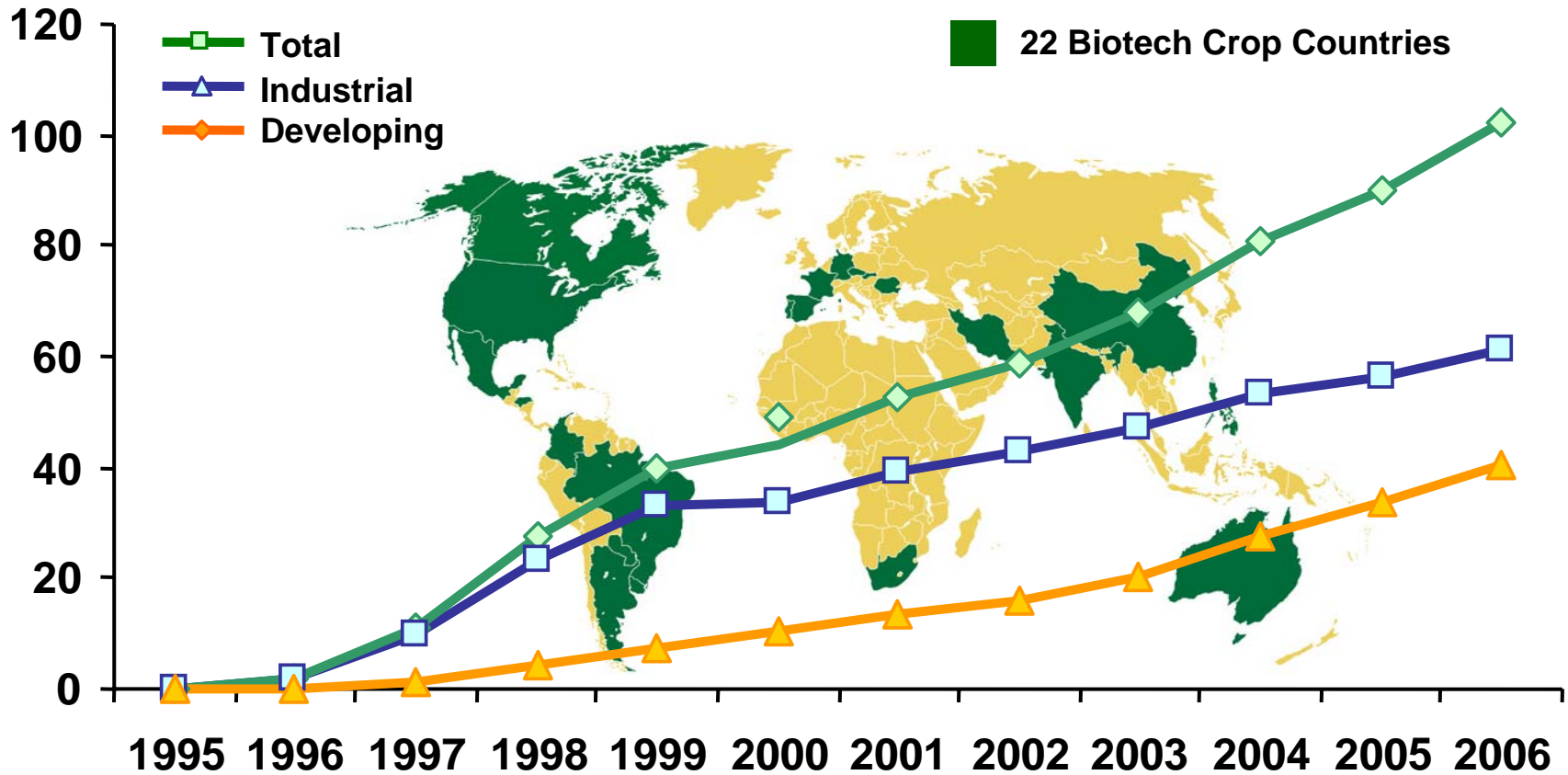
# The Challenge: Global Food, Feed, Fiber & Fuel Security Alleviation of Poverty and Hunger

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- 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

# 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.

## What We Have Learned: Adoption of Biotech Crops

- Farmer adoption faster than anticipated
  - In 12 years, herbicide tolerant soybeans constitute 90% of US soybean acreage
  - Over 250 million acres worldwide
- Farmer benefits: increased yields, increased net returns, management time saved (allowing more opportunity for off-farm income), other benefits
- There are unintended consequences - “Biology happens”



Biotech crops: “A contribution, not a solution”

# Bottlenecks to Biotech Crops – Developed World

- Cost and complexity of obtaining simultaneous regulatory approvals
  - Regulatory requirements moving with scientific knowledge
  - Scientific-based regulations crashing against consumer demands and politics
  - Impacts on trade
- Market opportunities for which consumers see benefits
- Technology development
  - Understanding the genetic basis of traits
  - Costs of R&D
- Obtaining and enforcing intellectual property rights

## Bottlenecks to Biotech Crops – Developing World

- Ability for farmers to see the technology and gain access to the technology
- Internal science and technology capacity
- Internal product development capacity
- Development of regulatory system
- Development of intellectual property rights protection systems: “Protect what you have; not what you don’t have”
- Trade consequences

# What is Changing?

- Globalization of biocrops
  - Predicted significant growth in acreage in Asia and Brazil
  - Slow to moderate growth in Africa and EU
- At the same time, market-specific product development, especially outside of US, rather than leveraging of US products (e.g., Bt eggplant)
- Opportunities in biofuels
- Greater concern for environmental consequences and sustainability

# What is changing?

- Better understanding of the benefits and risks of the technology
- “Academic Capitalism”
  - Driven by budget cuts and economic development goals
  - Supporting industry in the area/state
- Innovations in IPR may provide greater access




## Looking Forward: New Biotech Crop “Products”

- Further stacking of traits
- Quality traits of interest to processors and consumers
- Environmental stress tolerance
- Disease resistance
- Nutrient utilization efficiency
- Biofuel applications
- Pharmaceutical and industrial proteins


# What do we still need to know?

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- How do we balance different needs for agricultural production?
  - How can we have productive input and dialog with stakeholders in order to balance complex stakeholder interests?
  - What will happen with regulatory procedures?
    - Conditional/unconditional approvals
    - Tiered approaches
    - Moving away from event-by-event approvals in certain cases
    - Managing adventitious presence
    - Harmonization of regulation
    - Keeping costs in line with risks
- 
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# What do we still need to know?

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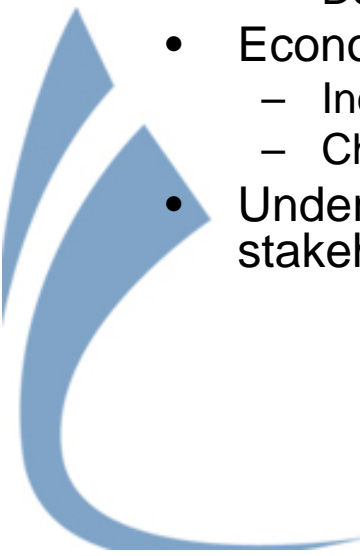
- How do we provide access to farmers to appropriate technologies and to markets?
  - How do we provide greater income and better quality of life to farmers while protecting consumers?
  - How do we develop scientists and agricultural production expertise, especially in the developing world?
  - How do we protect intellectual property rights (an important driver for innovation) while still providing access to knowledge and resources that can move science forward?"
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# What do we still need to know?

- How do we measure and communicate non-obvious impacts?
  - Impacts on trade
  - Pest resistance management
  - Liability
  - Public confidence “Knowing where your children are after 10pm”
  - Realistic assessments of costs and risks
    - Better measurement tools
    - Better communication methods

# Opportunities and Challenges

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- Increase agricultural production
    - Deliver twice as much food by 2050
    - Meet demands for feed and fiber
    - Balance demands for biofuels
    - Coexistence of agricultural systems
  - Environmental
    - Think greater productivity per unit of input
    - Protect soils and fragile ecosystems
  - Adapt to climate change
    - Enhance yield stability
    - Don't exchange one problem for another
  - Economic success
    - Incentives and access for farmers
    - Choice of affordable, nutritious food for consumers
  - Understand and communicate realistic benefits and costs for stakeholders
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## After the Conference

- Most presentations will be available on the Farm Foundation website:  
[www.farmfoundation.org](http://www.farmfoundation.org)
- An Executive Summary will be available on the website in about a month
- If you have further questions, please contact me at [annbublitz@earthlink.net](mailto:annbublitz@earthlink.net)

## Thank You to

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- Participants
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- Laurie Marsh and Vicki Liszewski, Farm Foundation staff
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**Thank you!**

