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
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?

• 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
What do we still need to know?

• 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?"
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

• 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
After the Conference

• Most presentations will be available on the Farm Foundation website: 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
Thank You to

• Speakers and Moderators
• Participants
• Walt Armbruster, President, and Mary Thompson, Farm Foundation Communications Director and Program Manager
• Laurie Marsh and Vicki Liszewski, Farm Foundation staff
• Dina Biscotti, University of California
Sponsors

- Farm Foundation
- Jeanne M. Sullivan
- USDA APHIS Biotechnology Regulatory Services
- USDA Agricultural Research Service
- USDA Economic Research Service
- Athenix Corporation
- Bayer CropScience
- BASF Plant Science
- BioTech Decisions, Inc.
- Monsanto Company
- J.R. Simplot Company AgriBusiness Group
Planning Committee

• Walt Armbruster, Farm Foundation
• Roger Beachy, Danforth Center
• Ann Bublitz, Farm Foundation Fellow
• Peggy Caswell, USDA ERS
• Bill Niebur, Pioneer Hi-Bred
• J.B. Penn, Deere & Company
• Mike Phillips, BIO
• Caird Rexroad, USDA ARS
• Eric Sachs, Monsanto
• Mark Scholl, Entira
• Rod Stacey and Phil Ashcraft, Verdant Partners
• David Zilberman, University of California, Berkeley
Thank you!