



PUBLIC SECTOR AGRICULTURAL RESEARCH: WHY IT MATTERS FOR SUSTAINABLE DEVELOPMENT

USAID: Agriculture Sector Council Seminar

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OVERVIEW

- ① The Context of Agricultural Research and Development
- ① Public Sector Agricultural Research: Challenges & Opportunities
- ① A Successful Case in Public Sector Research
- ① Public Agricultural Research in Support of Feed The Future
- ① International Agricultural Research and Global Partnerships





SPECIAL CHARACTERISTICS OF AGRICULTURE & AGRICULTURAL RESEARCH

- ◎ The biological nature of agricultural production
 - ◎ Greater unpredictability
 - ◎ Influence of weather
- ◎ The structure and size of the agricultural sector
 - ◎ Characterized by numerous, decentralized producers
- ◎ Spatial diffusion of agriculture
 - ◎ Different crops and production practices are best suited to specific locations because of differences in weather, soils, pest and disease pressure, and day length
 - ◎ Agricultural research is fragmentary in its practical application

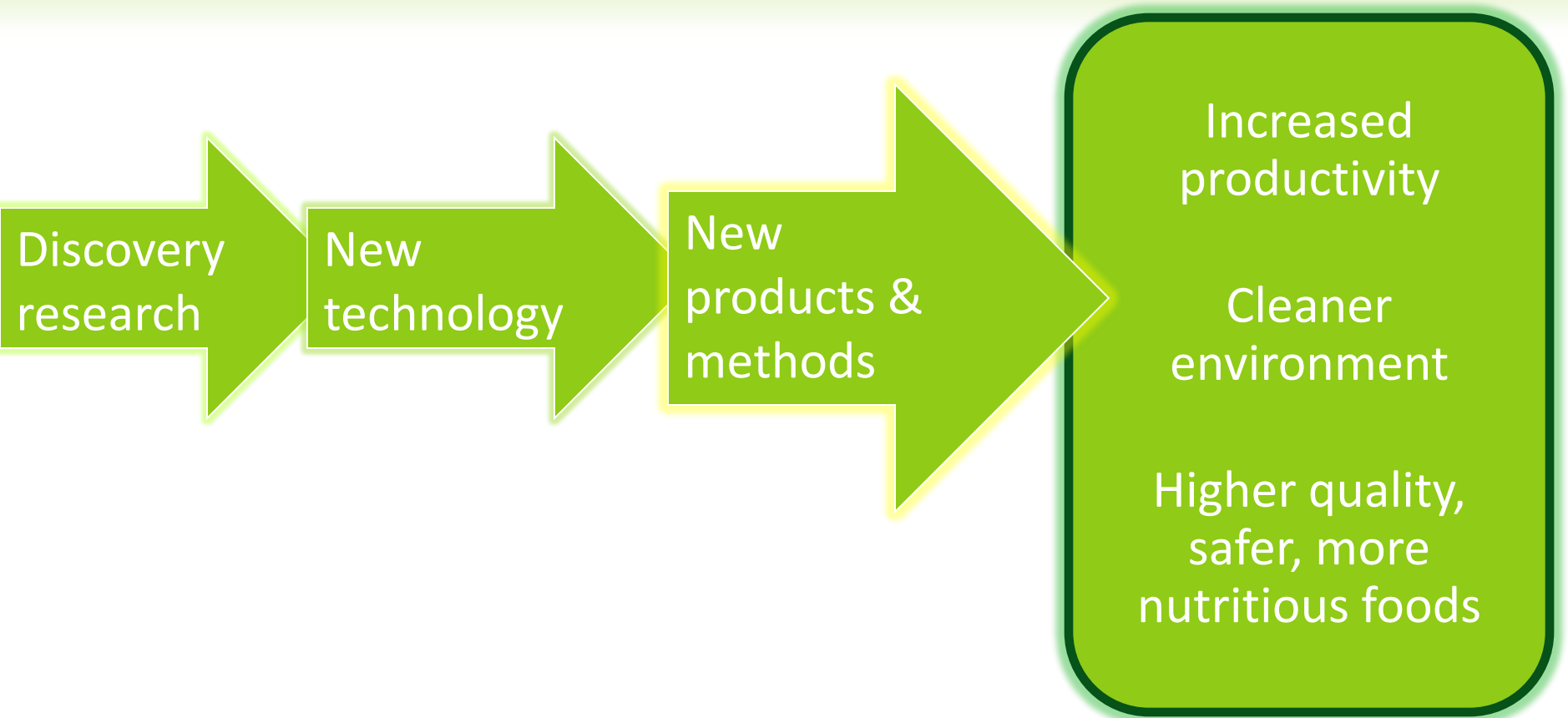


BENEFITS OF PUBLIC AGRICULTURAL RESEARCH

- ◎ Market Factors: no incentive for private investment for research aimed at the public good
 - ◎ Results of agricultural research can be used by many people
 - ◎ Provides Public Goods, such as clean air and water
- ◎ Serves national interests:
 - ◎ Supports regulatory enforcement (health & safety)
 - ◎ Improves nutrition and food safety
- ◎ Government conducts basic R&D
 - ◎ Spurs economic growth and development; research & technology transfer



RESEARCH FOR THE PUBLIC GOOD





THE ESSENTIAL ROLE OF PUBLIC AGRICULTURAL RESEARCH

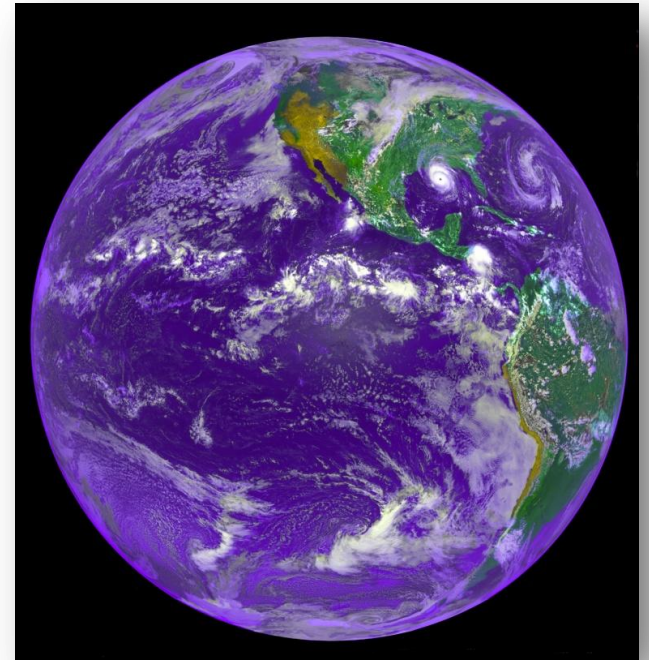
- ◎ Food Security
- ◎ Conservation & Environment
- ◎ Nutrition & Public Health
- ◎ National Security
- ◎ Non-research Public Goods





21ST CENTURY CHALLENGES

- ⊙ Food Security
- ⊙ Food Safety
- ⊙ Nutrition and Health
- ⊙ Bioenergy
- ⊙ Climate Change





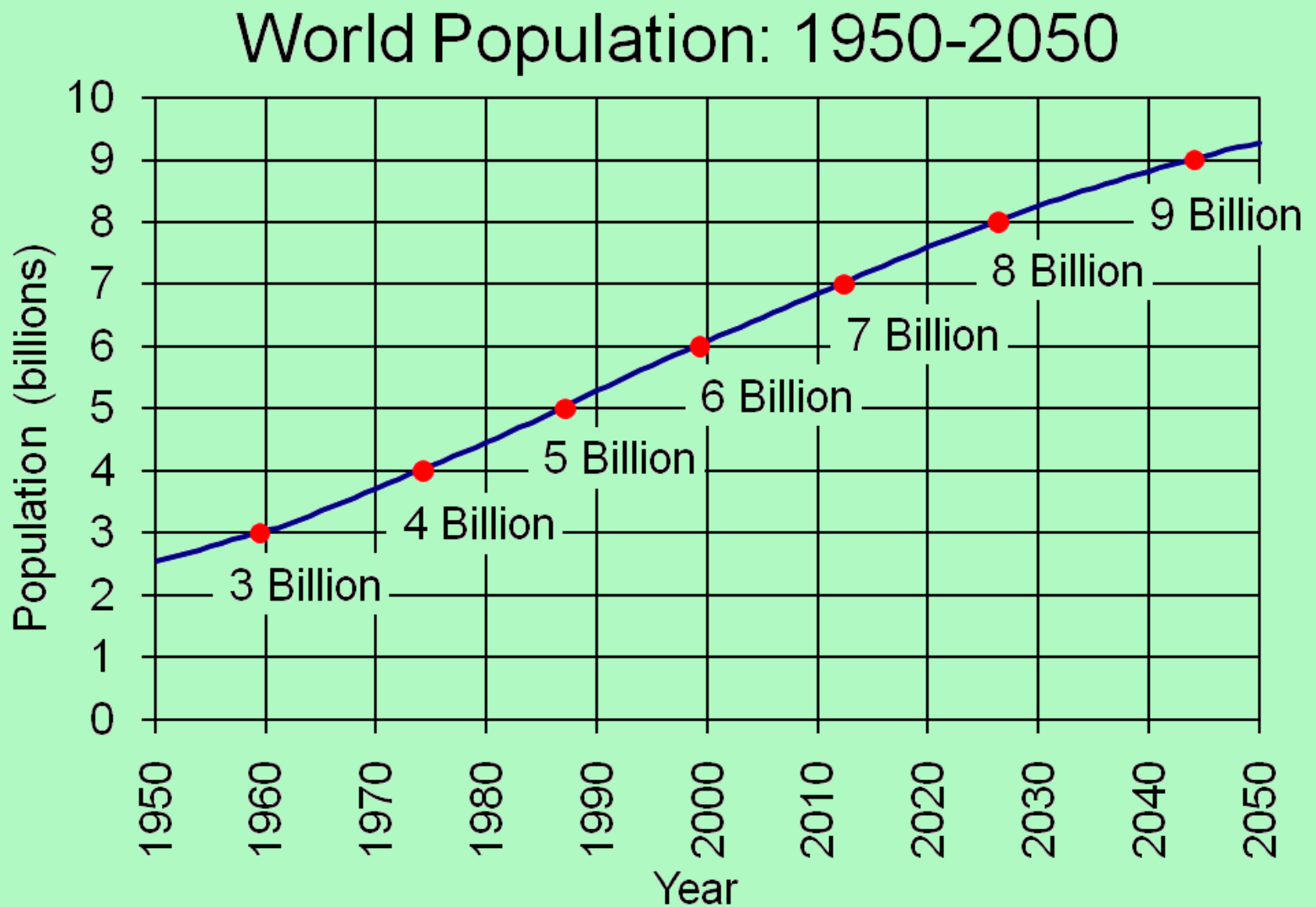
AGRICULTURAL SCIENCE'S ROLE



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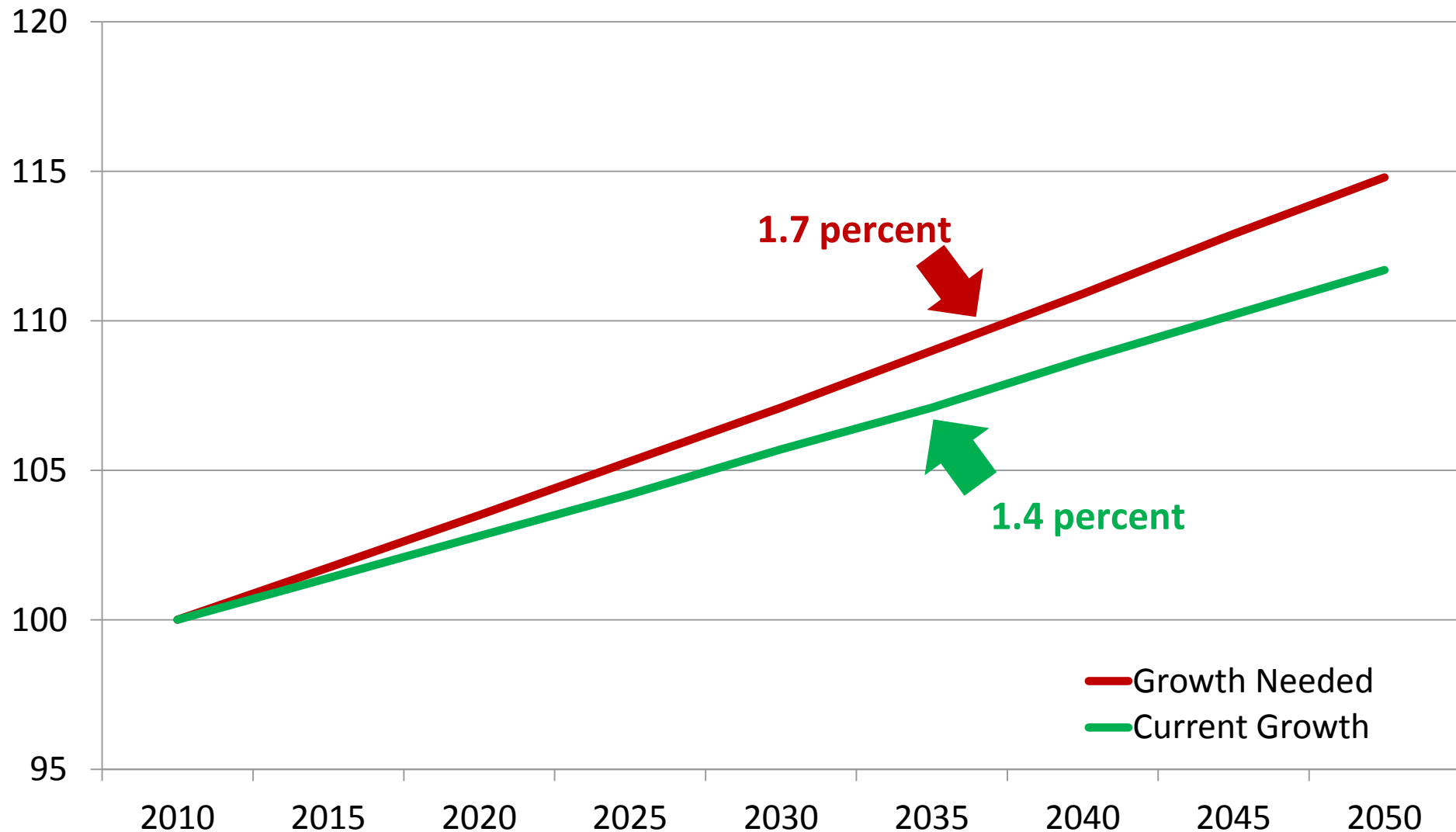
- ⊙ Developing new and improved foods
- ⊙ Increase nutrition
- ⊙ Increase productivity
- ⊙ Increase sustainability
- ⊙ Developing bioenergy crops
- ⊙ Climate change
 - ⊙ Adaptation
 - ⊙ Mitigation

A GROWING CONCERN

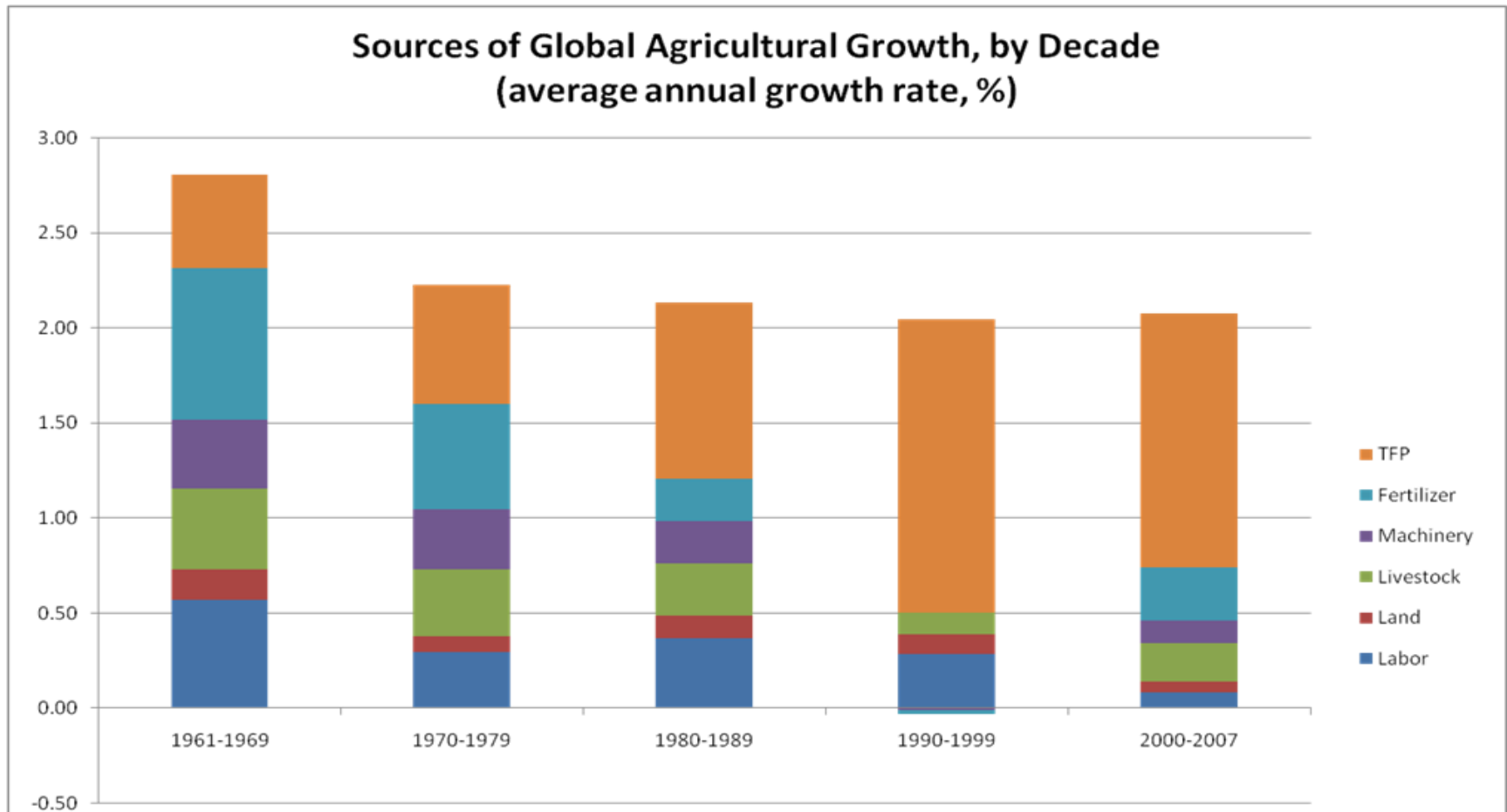


Source: U.S. Census Bureau, International Data Base, June 2010 Update.

AGRICULTURAL PRODUCTIVITY GAP



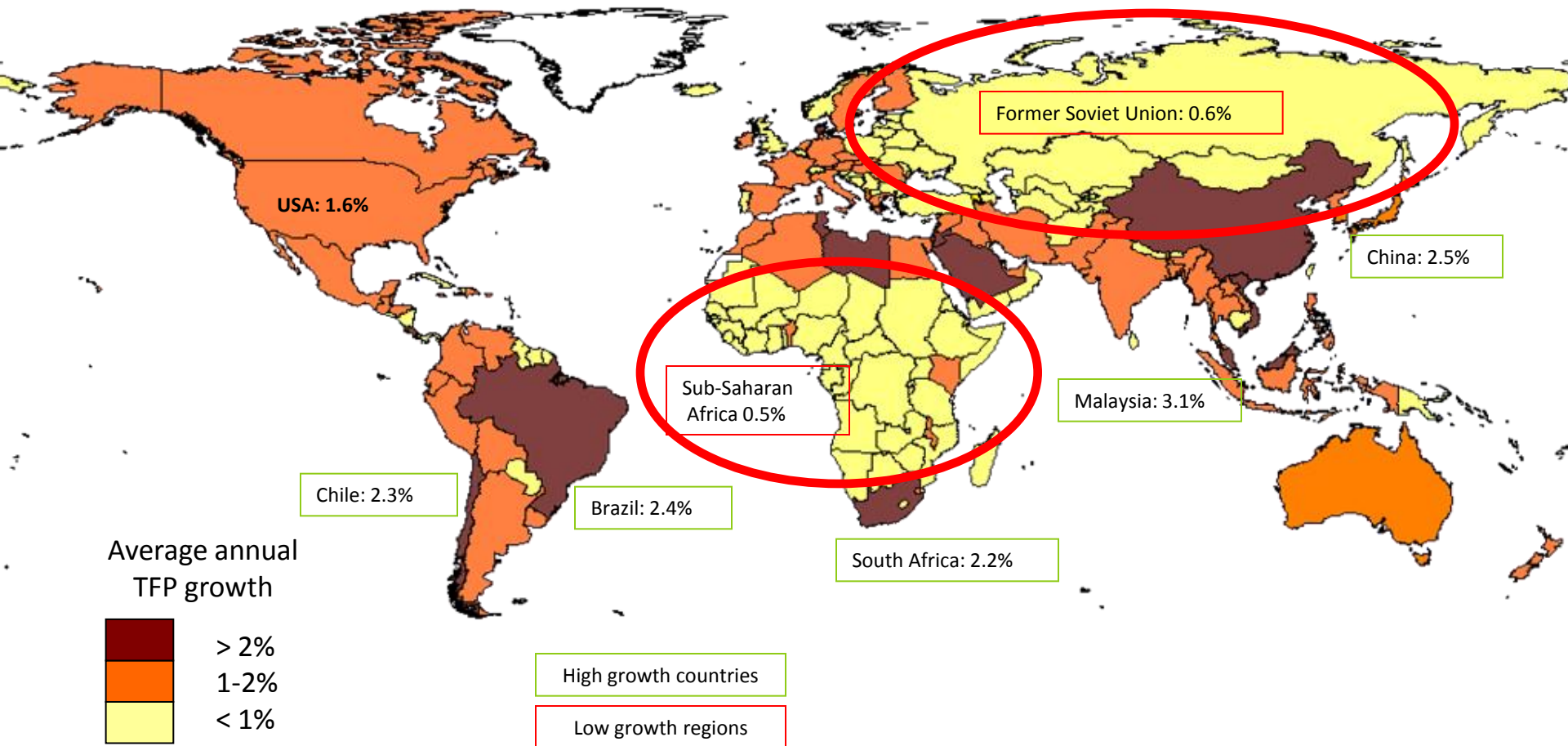
PRODUCTIVITY GROWTH IN GLOBAL AGRICULTURAL ECONOMY ACCELERATING...



The height of the bar shows the average annual growth rate in global agricultural output by decade. The colored components of the bar show how growth in resources (fertilizer, machinery, livestock capital, land and labor) and total factor productivity (TFP) each contributed to output growth. Increases in fertilizer use were the dominate source of agricultural growth during the "Green Revolution" decades of the 1960s and 1970s. Increases in TFP, which, through adoption of new technology and farming practices, raise the efficiency of resource

...But Growth Remains Uneven Regionally

Agricultural productivity growth by country, 1970-2007



Source: Based on Fuglie (2010).



How Do We CLOSE THE PRODUCTIVITY GAP?





MORE AG RESEARCH IS NEEDED TO CLOSE THE GAP

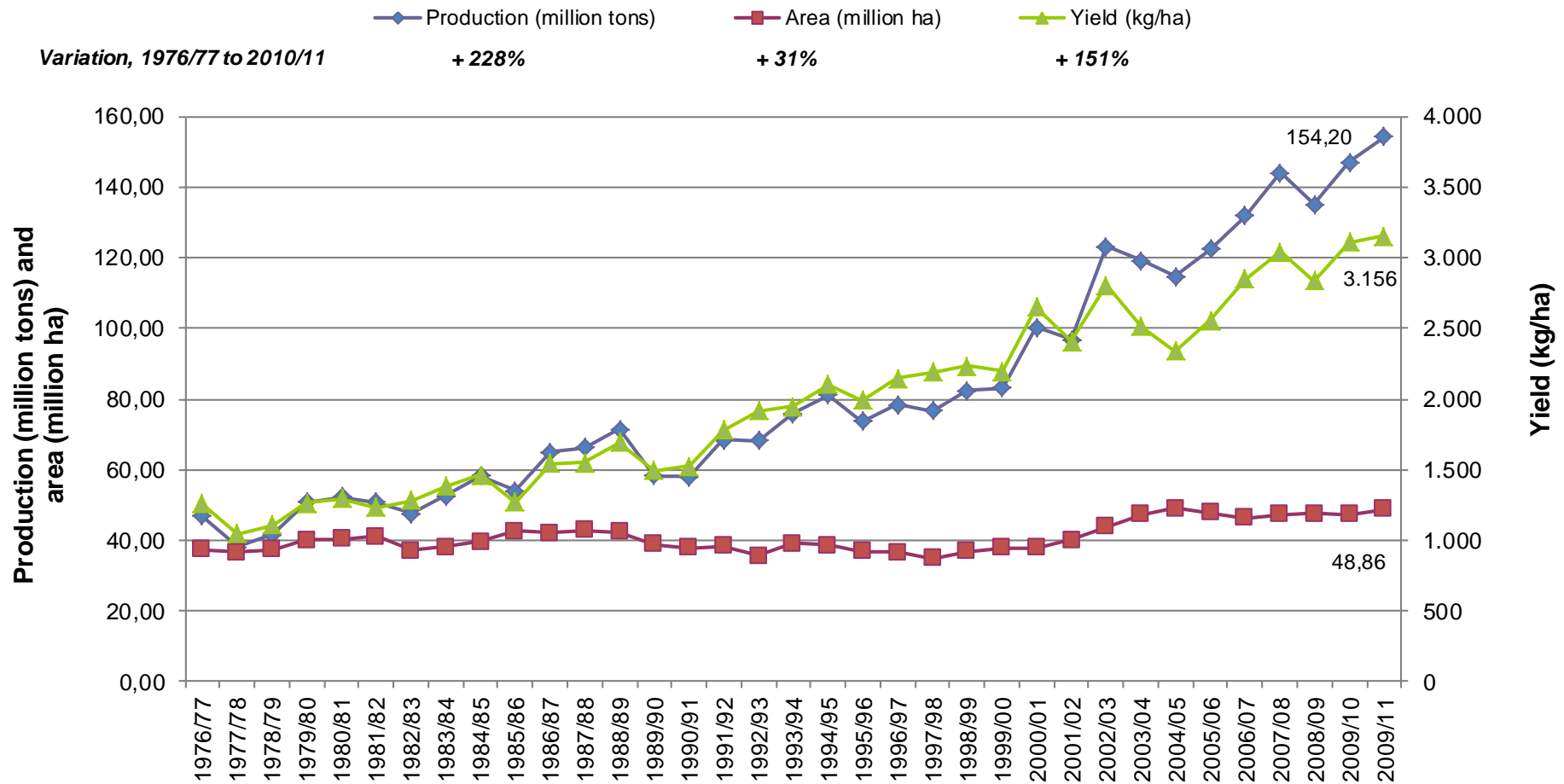
- © Society is under-investing
- © Demand growth in poor countries where opportunities for raising productivity growth are greatest





Brazil: Model for Success

Brazil's Growth of Agricultural Productivity

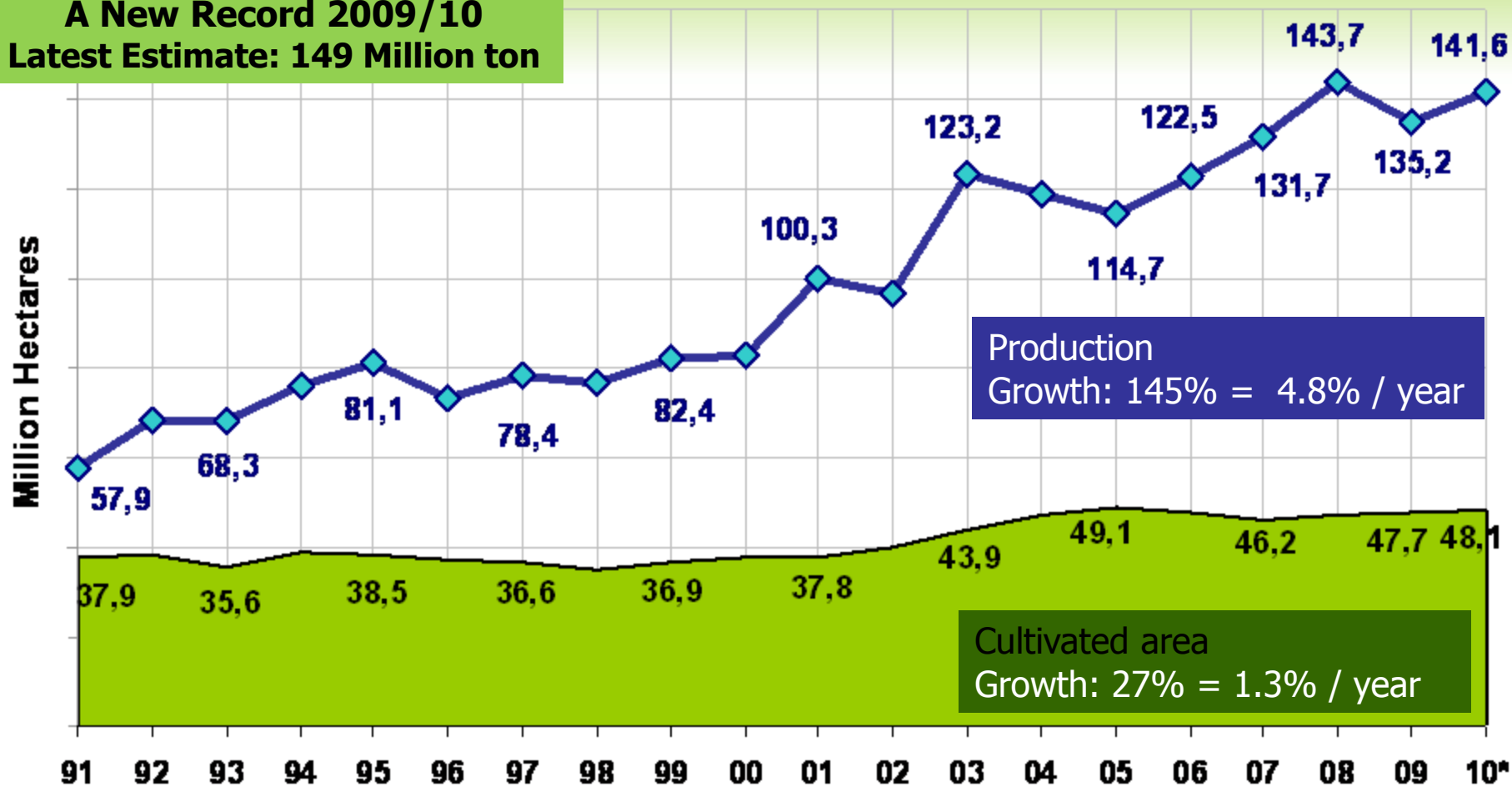


Source:after CONAB.



GROWTH OF AG PRODUCTIVITY IN BRAZIL

A New Record 2009/10
Latest Estimate: 149 Million ton



Embrapa - Today

Established in 1973

Employees: 8,916

Total Scientists: 2,024

Researchers with PhDs: 1,600

Budget: US\$ 1 billion

45 Research Centers

13 National Thematic Centers

16 National Commodity Centers

16 Eco-regional/Agroforestry Centers



WHAT ABOUT AFRICA?



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- ◎ Funding levels for science remain low
- ◎ Labs are ill-equipped
- ◎ Little practical training for researchers
- ◎ Poor governance hinders progress



FOOD SECURITY INITIATIVE



- ◎ Provide essential genetic resources
- ◎ Train more plant scientists
- ◎ Identify, develop, and release markers, genetic lines, breeds, or germplasm that better protect crops and livestock



USDA'S STRATEGY IN FEED THE FUTURE

- ③ Focus on nine countries where we have existing country investment plans
- ③ Focus on transformative areas of research to advance productivity
- ③ Partnering with USAID on select issues for agricultural research



FEED THE FUTURE

The U.S. Government's Global Hunger and Food Security Initiative



USAID/USDA GLOBAL AGRICULTURAL RESEARCH AGENDA

- ⊙ Advancing the Productivity Frontier: breeding and genetics
- ⊙ Transforming Production Systems: integration of research advances; examining elements of production systems of the poor.
- ⊙ Enhanced food safety and nutrition research



GENETIC RESOURCES



- ◎ 18 categories of collections
- ◎ 20 different genebanks
- ◎ The National Plant Germplasm System
 - ◎ More than 472,000 accessions
 - ◎ Over 11,300 plant species
 - ◎ Annually distributes approximately 120,000 of these to external researchers

CATTLE SNP COLLABORATION: *IBMC*

- ◎ Collaborative Development of DNA 60,000 Bead Illumina iSelect® assay
- ◎ USDA-ARS Beltsville Agricultural Research Center: Bovine Functional Genomics Laboratory and Animal Improvement Programs Laboratory
- ◎ University of Missouri
- ◎ USDA-ARS US Meat Animal Research Center
- ◎ Starting 60,800 beads – expected 53,000 SNPs to result
- ◎ Planned to genotype ~30,000 animals for multiple projects





BORLAUG COMMEMORATIVE RESEARCH INITIATIVE



- ③ Develop co-funded research collaborations
- ③ Expand research collaboration with the CGIAR
- ③ Align US government research programs with Feed the Future priorities
- ③ Co-fund and coordinate innovative public-private research partnerships



SPECIFIC RESEARCH TOPICS



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- ◎ Ug99 wheat stem rust
- ◎ Livestock production & health
- ◎ Pulse production
- ◎ Mycotoxins



OTHER PARTNERSHIP OPPORTUNITIES

- ◎ Technology Transfer
- ◎ Capacity Building
- ◎ Complement the research strategy by ensuring that linkages are made



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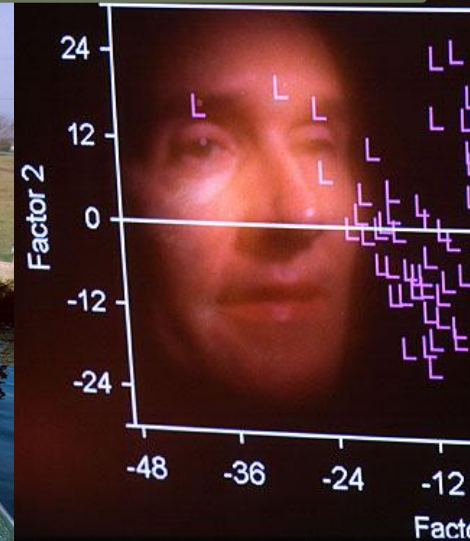


IMPORTANT COLLABORATIONS

- ◎ **Consultative Group on International Agricultural Research (CGIAR)**
- ◎ **Chinese Ministry of Science and Technology (MOST)**
- ◎ **Brazilian Agricultural Research Corporation (EMBRAPA)**
- ◎ **International Maize and Wheat Improvement Center (CIMMYT)**
- ◎ **International Center for Agricultural Research in the Dry Areas (ICARDA)**
- ◎ **International Livestock Research Institute (ILRI)**
- ◎ **International Institute for Tropical Agriculture (IITA)**
- ◎ **Centre de coopération internationale en recherche agronomique pour le développement (Cirad)**



A better future for all through agricultural research





THANK YOU!

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