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"Equitable Access to Technology"

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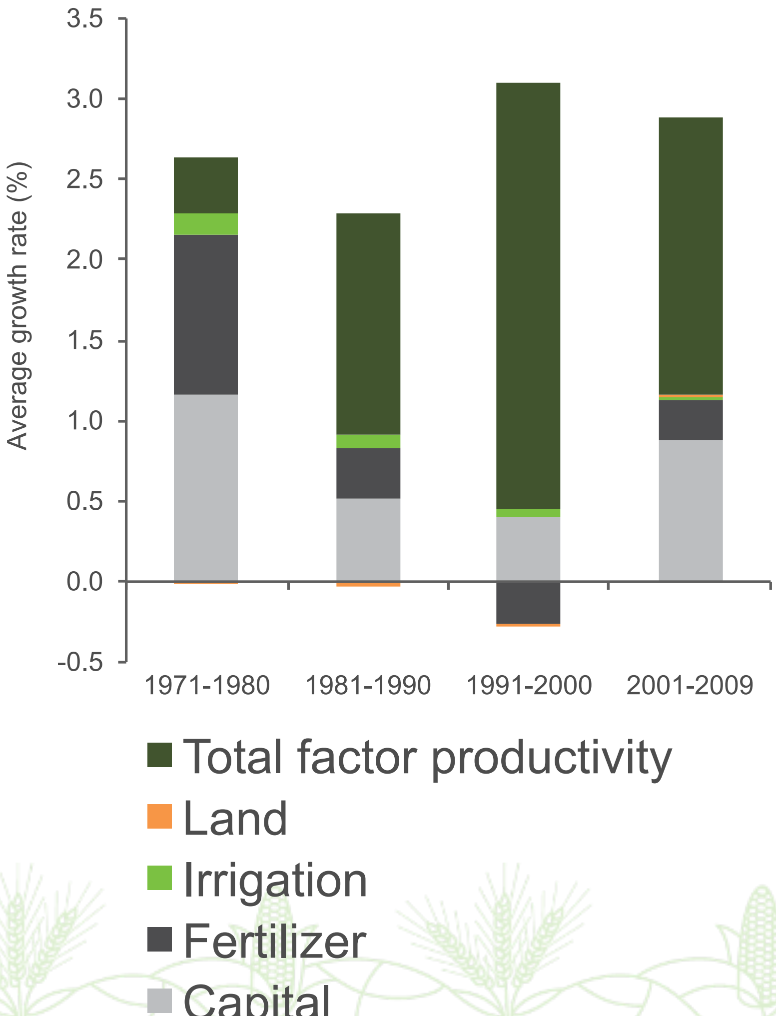
CGIAR RESEARCH PROGRAM ON Policies, Institutions, and Markets
Led by IFPRI

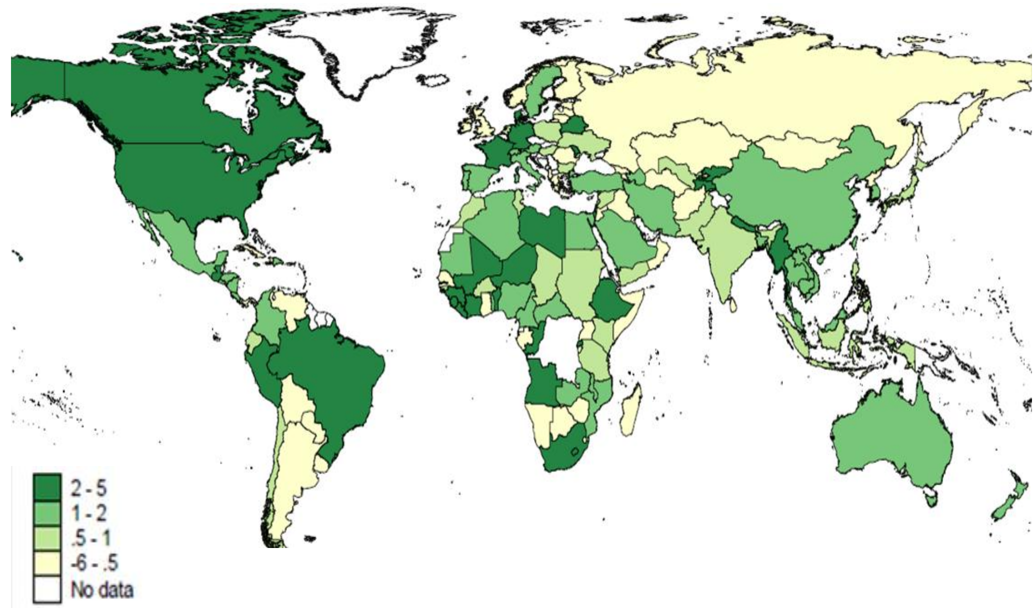
Global agricultural growth has been broadly driven by increased productivity – but has been heterogeneous

Growth in global agricultural output per worker



BUT total factor productivity growth varies across countries

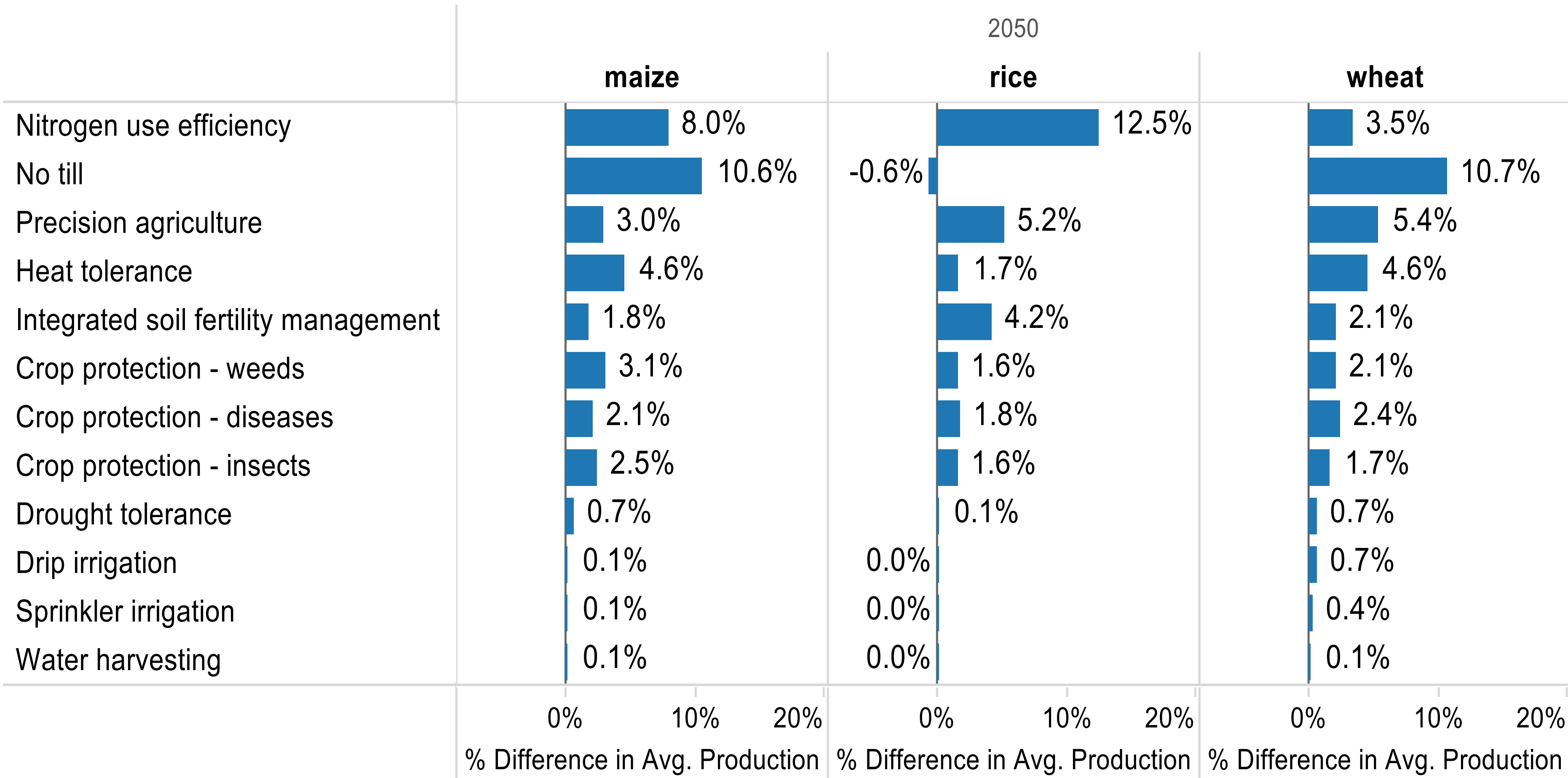
Average annual agricultural total factor productivity growth, 1995-2009 (%)



Source: Nin Pratt and Yu 2012

Percent change in total cereal production, developing countries

2050 with technology vs. 2050 baseline (IMPACT)



Source: Rosegrant et al. 2014

The global food system is still vulnerable to long-term pressures, short-term shocks

Population growth, rising incomes, urbanization

Climate change, extreme weather events

Agriculture-related risks, food safety risks

Growing land, water constraints

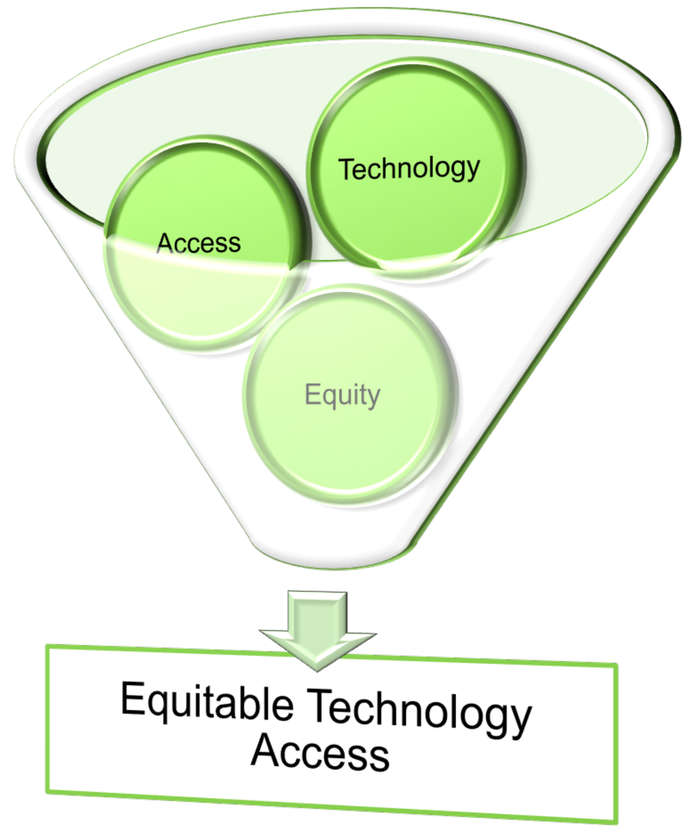
Persistent conflicts

The global food system is needed to play bigger role in economic and social development

Photos: Ngo Trung; USDA; Goyette; UNDP; Niehaus

Technological change involves multiple equity dimensions and types

- Definition
  - Access to, control of resources and opportunities
  - Including assets, inputs and services such as land, labor, education, extension, financing and technology
- Dimensions
  - Equality expenditure per capita
  - Distribution according to “need”
  - Equality of access
- Types
  - Gender
  - Sociodemographic “classes”
  - Economic sector
  - Cultural



The Gatzweiler – von Braun 2016 conceptual framework

- Two distinct dimensions
  - Human capabilities - realized freedoms for people to do and be what they value including trade-offs among choices
  - Agro-ecological potential - potential provided by the land and all value derived
- Types of well-being improving innovations
  - Technological: increasing efficiency in the production process and reducing labor costs.
  - Institutional: Improved access to land, better land use rights, or alternate non-agricultural income opportunities

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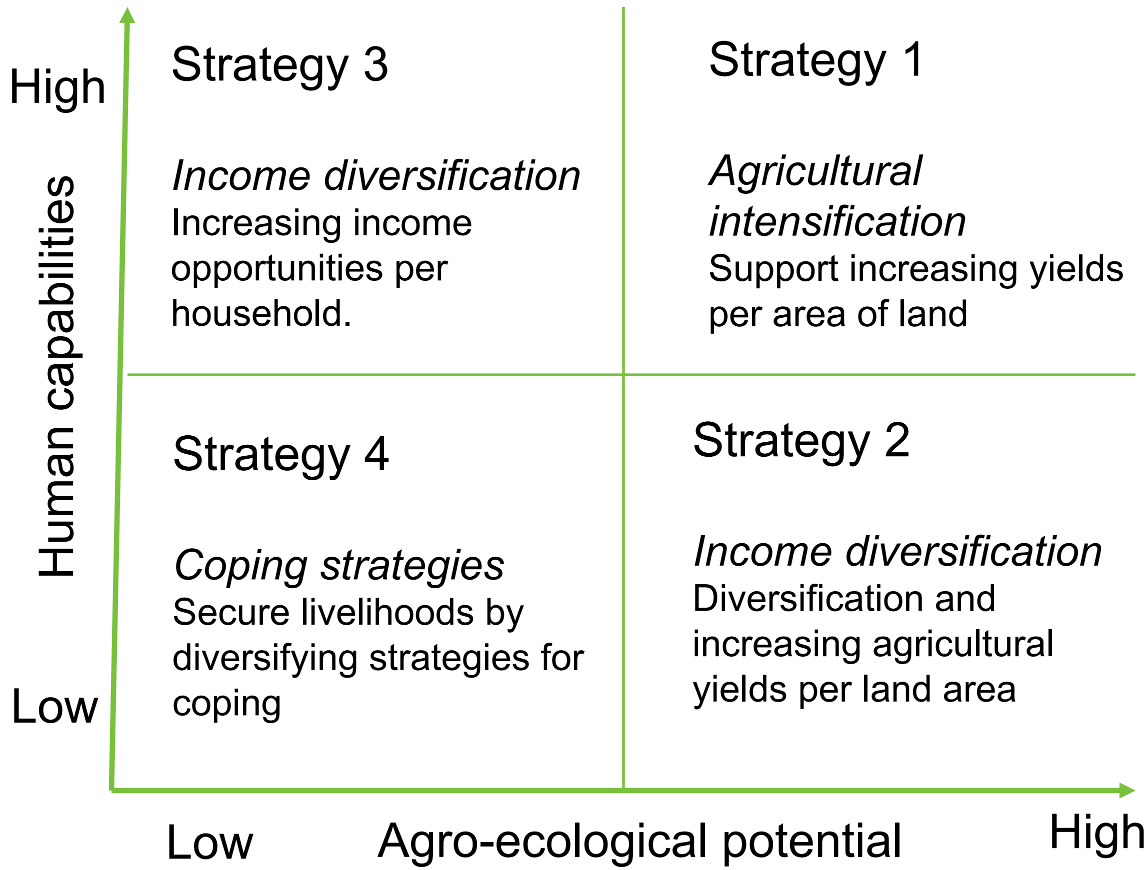
Potential strategies, technological and institutional innovations



Source: Gatzweiler and von Braun 2016

Heterogeneity

- **Significant heterogeneity:** Within each of the four segments due to gender, income, age, health and other sociodemographic classes
- **Targeted and purposeful strategies:** to address existing variability and complexity
- **Agents for equity and change:** approaches, roles, and funding
- **Competitive advantage:** agents for change and potential dilution of capabilities

Building on FAO's food security pillars to build technology pillars

- ***Availability*** - ensuring adequacy of technology supplies in terms of quantity, quality and variety of food
- ***Access*** - optimizing stability in the affordability and allocation of technology, as well as the preferences of individuals and households
- ***Utilization*** –ensuring technology used is safe and efficacious and is sufficient to meet needs of individual or household needs. Elements include food safety, nutritional values, access to healthcare, sanitation and education
- ***Stability*** - the ability to consistently produce technology over time. Technology insecurity can be transitory (temporary decline in access), or chronic (constant failure to access technology).

Based upon FAO. (2014). The State of Food Insecurity in the World 2014: Strengthening the Enabling Environment for Food Security and Nutrition. Rome: FAO.

The CGIAR as "Agencies for Equity Change"

- Ethical imperative but also a productivity change determinant
- Modes and mechanisms
  - Development of global public goods
  - Freedom to operate and public access of tools and technologies
  - Supporting public-private & public-public partnerships
- Continued public sector presence in areas where private sector is dominant
  - Many areas where public sector presence may be positive agent for efficiency and equity purposes

There is no shortage of novel ideas in the agricultural and life sciences

Super hybrid rice

"Prescription" agriculture

High-iron and high-zinc rice

Laser land leveling

Apomixis in field crops

Gene editing

C4 rice

Science in today's food system is built around narrow principles and objectives

Technology is the first-best solution to today's problems

Technology transfers alone will advance local science

Increased yields from crop improvement will end hunger

Agricultural science is scale-neutral and gender-neutral

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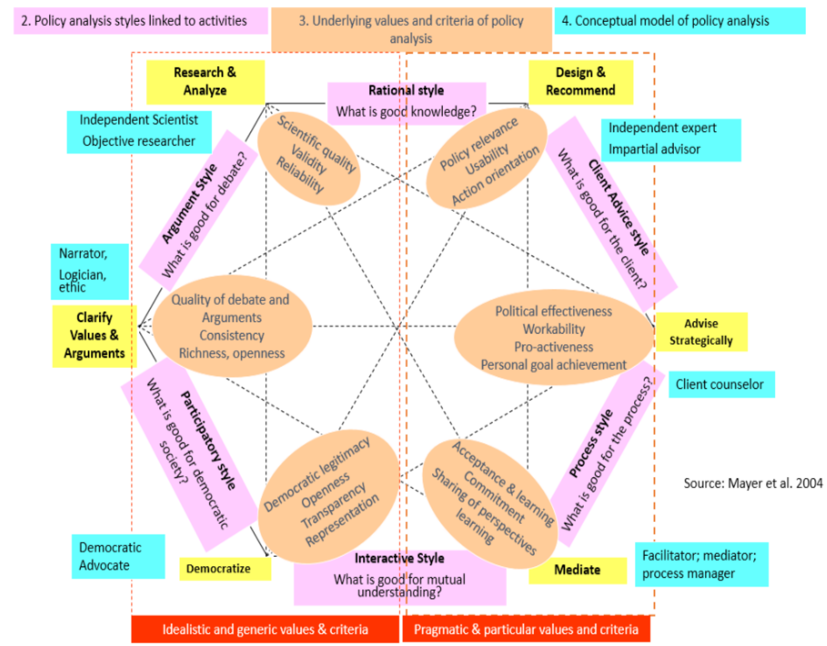
Improving Equity within Technological Change Processes (1)

- Novel investment and financing incentives (R&D prizes, PPPs, science parks, etc.)
  - Push mechanisms: incentives that reduce the costs of R&D and promote basic research to encourage spillovers
  - Pull mechanisms: incentives that increase the expected returns to R&D by improving or creating favorable market conditions

Improving Equity within Technological Change Processes (2)

- Engagement in complex and non-linear policy influence networks and change processes
  - Recognize that we have “wicked” problems in developing agriculture
  - “…wicked problems are those due to incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems…”



Improving Equity within Technological Change Processes (3)

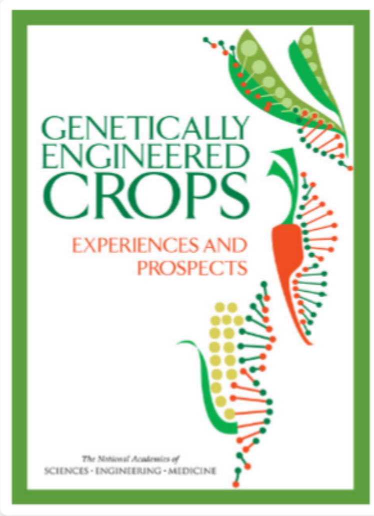
- Focus on gender and other equity issues as the starting point for technical change
  - Significant upfront expenditures
  - Lack of information
  - Access to complementary inputs locally
  - Limited capacities in implementing improved practices
- Use a two-tier approach to technology development
  - Make technology people-ready
  - Make people technology-ready

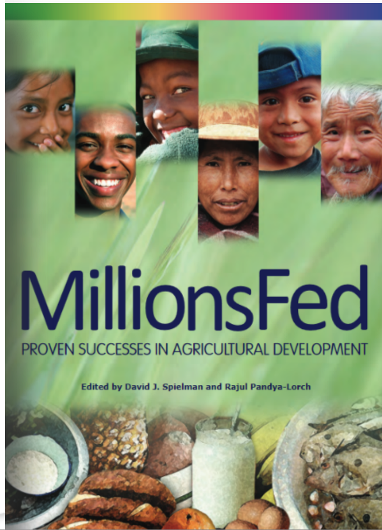
Improving Equity within Technological Change Processes (4)

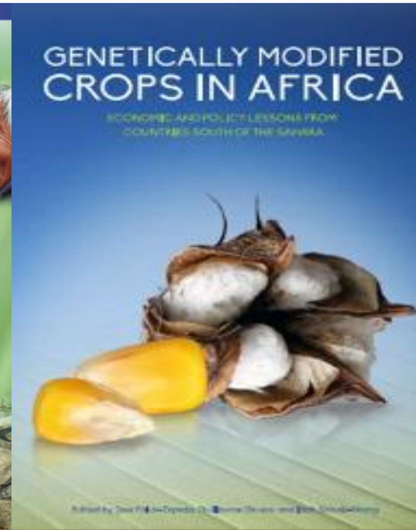
- Design policy, legal and regulatory frameworks that encourage innovation
  - Legal frameworks for resource rights
  - Regulations to encourage scientific inquiry and exchange (biosafety and genetic resources)
  - Markets and trade regimes that are more open, transparent, and fair
- Build innovative capabilities at the organizational level
  - Public agencies, private firms, civil society organizations
  - Increased use of information and communication technologies
  - IP regimes
  - Building sustainable private-sector-led input markets

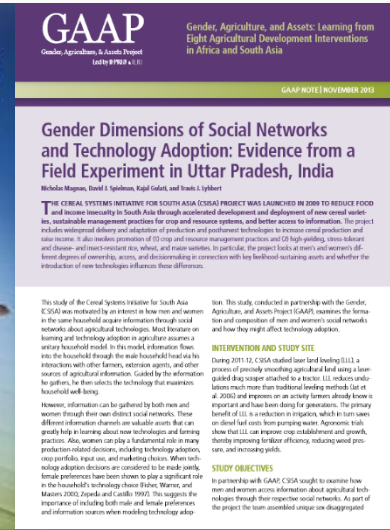
In conclusion:
A new, knowledge-based global food system focused on ensuring equity

- **Advancing scientific frontiers**—investing in R&D
- **Designing better policies**—evidence-based decision-making
- **Integrating gender and ensuring equity**—in both policy and technology design
- **Linking to health and nutrition**—yield gain is not enough
- **Ensuring sustainability**—synergies in agriculture and environment

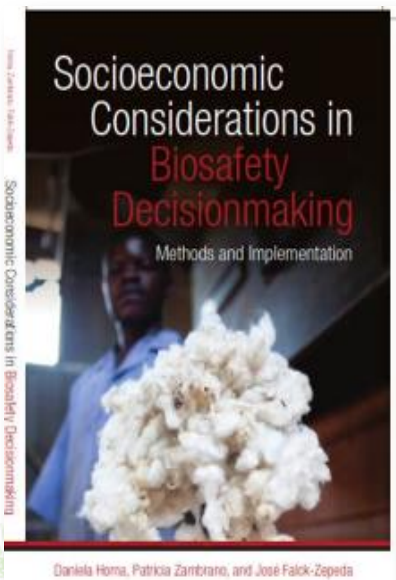








Thank you for your interest!!!



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