

Feeding the World by 2050: Role of technology and policy

Shenggen Fan

Director General | International Food Policy Research Institute

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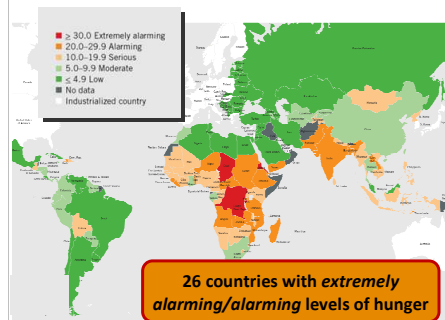
Food Insecurity and Undernutrition Remain Persistent



2011 Global Hunger Index

GHI components:

- Proportion of undernourished
- Prevalence of underweight in children
- Under-five mortality rate

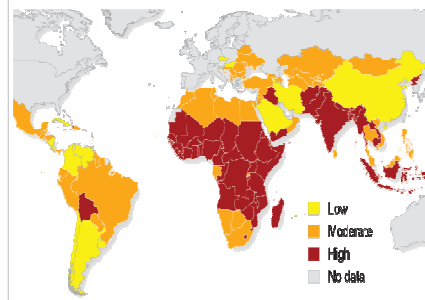


Source: von Grebmer et al. 2011

Prevalence of Micronutrient Deficiencies

Deficiencies in:

- Iron
- Vitamin A
- Zinc



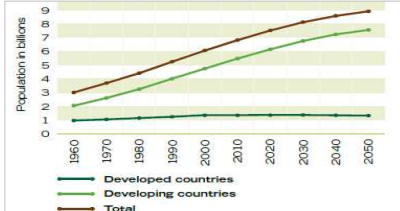
Source: HarvestPlus 2011

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Emerging Challenges to Food Security

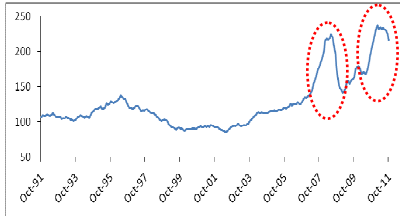


Population growth, 1960–2050



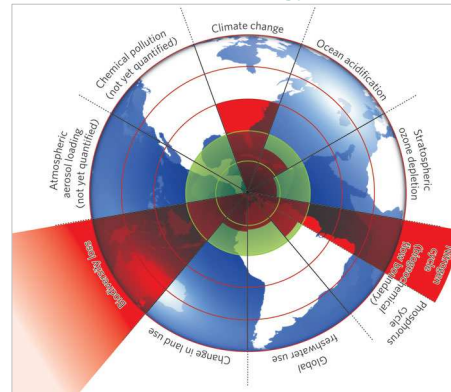
Source: CropLife International 2010

FAO Food Price Index, 1991–2011



Source: Data from FAO 2011
Note: 2002-2004 = 100

Limits to the anthropocene (land, water, energy)



Source: Rockström 2011

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Food Security is Driven by Technological Innovation in Agriculture



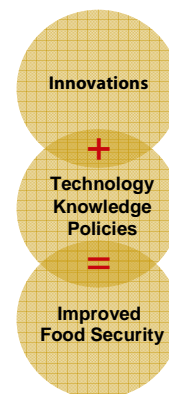
Asian Green Revolution: High-yielding rice varieties and irrigation development

East and Southern Africa: Breeding improved maize varieties (1965 to 1990)

Nigeria, Ghana, and Uganda: Pest- and disease-resistant cassava (1971-89)

Philippines: Breeding improved tilapia (1988 to 1997)

India: Dryland millet and sorghum varieties (mid-1960s-now)



Source: Spielman and Pandya-Lorch 2009

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Investment in Agricultural R&D Has Higher Returns



	Ghana	Uganda	Tanzania	Ethiopia	China	India	Thailand
Returns to agriculture or rural income (local currency/local currency spending)							
Agric. R&D	16.8	12.4	12.5	0.14	6.8	13.5	12.6
Education	-0.2	7.2	9.0	0.56	2.2	1.4	2.1
Health	1.3	0.9	n.e.	-0.03	n.e.	0.8	n.e.
Roads	8.8	2.7	9.1	4.22	1.7	5.3	0.9
Ranking in returns to poverty reduction							
Agric. R&D	n.e.	1	2	n.e.	2	2	1
Education	n.e.	3	1	n.e.	1	3	3
Health	n.e.	4	n.e.	n.e.	n.e.	4	n.e.
Roads	n.e.	2	3	n.e.	3	1	2

Source: Fan, Mogues, and Benin 2009
Note: "n.e." indicates not estimated

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Past Links Between Policies and Food Security



Green Revolution

- Promoted enabling and sustained policies and investments
 - Built up infrastructure alongside market, finance, extension, & input systems

China's "firing from the bottom" development approach

- Initiated gradual reform process based on trial-and-error experimentation
- Supported system of think-tanks to provide evidence during reform process

Vietnam's rice sector

- Implemented series of land tenure and agricultural market reforms (domestic & int'l.) transforming Vietnam from rice importer to 2nd largest exporter in span of 10 yrs.

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Seeing Agriculture through New Lens



Nexus-focused thinking

- Water, land, energy, and food security
- Agriculture, nutrition, and health

Gender equality → Equal access to agricultural resources/ services improves agricultural output and productivity

Climate change → “Triple win” potential: adapt, mitigate, and increase productivity

Conflict prevention → Re-establish livelihoods and build resilience in conflict-prone countries

Employment and business opportunities → Focus on entire agribusiness value chain

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"Business as Unusual" to Improve Food Security – Technology

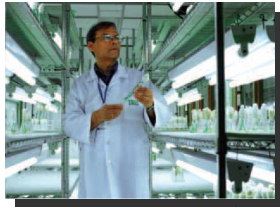


Technological Innovations

- Technologies are critical to
 - increase agricultural productivity
 - provide adaptive buffers against emerging challenges
 - enhance nutritional value of food crops
- Support technologies that are
 - smallholder-friendly
 - resource-efficient
 - climate-smart

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Promoting Technological Innovations



Source: Chris Stowers/PANOS



Bt Cotton



'Golden' Rice

Source: FBAE 2009

Technologies "from seed to fork"

- **Stress-resistant crop varieties**
 - Adapted to drought, salinity, and arsenic uptake
- **Enhanced natural resource and input use**
 - Water conservation and sustainable land management
- **Reduced post-harvest losses**
 - Low-cost technologies to clean, grade, store, and package products
- **Biofortification**
 - Improved-nutrient crops e.g. iron beans and vitamin A cassava in DRC, Rwanda, and Nigeria
- **Information & communication technologies (ICTs)**
 - Better access to financial, extension, market, and weather information

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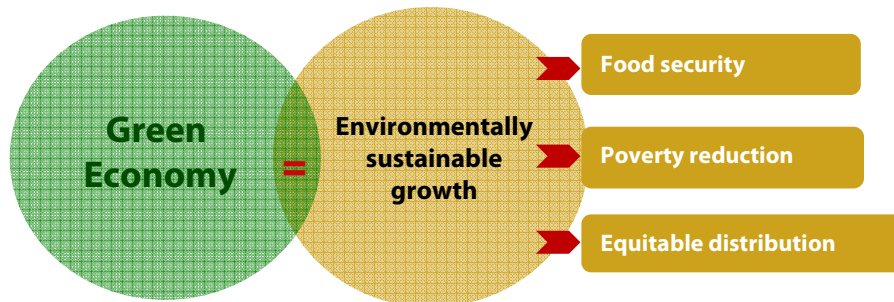


Policy Changes

- Increase investment in agriculture and set right priorities
 - Support agricultural R&D
 - Combine social protection with enhanced ag. productivity
- Reduce future volatility in food prices
 - Minimize food-fuel competition
 - Establish transparent market information systems
 - Production, trade, financial speculation on food, etc.
 - Create global and regional grain reserves
 - Support transparent and free global trade
- Promote country-led, evidence-based policies

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Rio +20: UN Conference on Sustainable Development 2012



Agriculture can play key role in green economy through natural resources, food production, and economic linkages

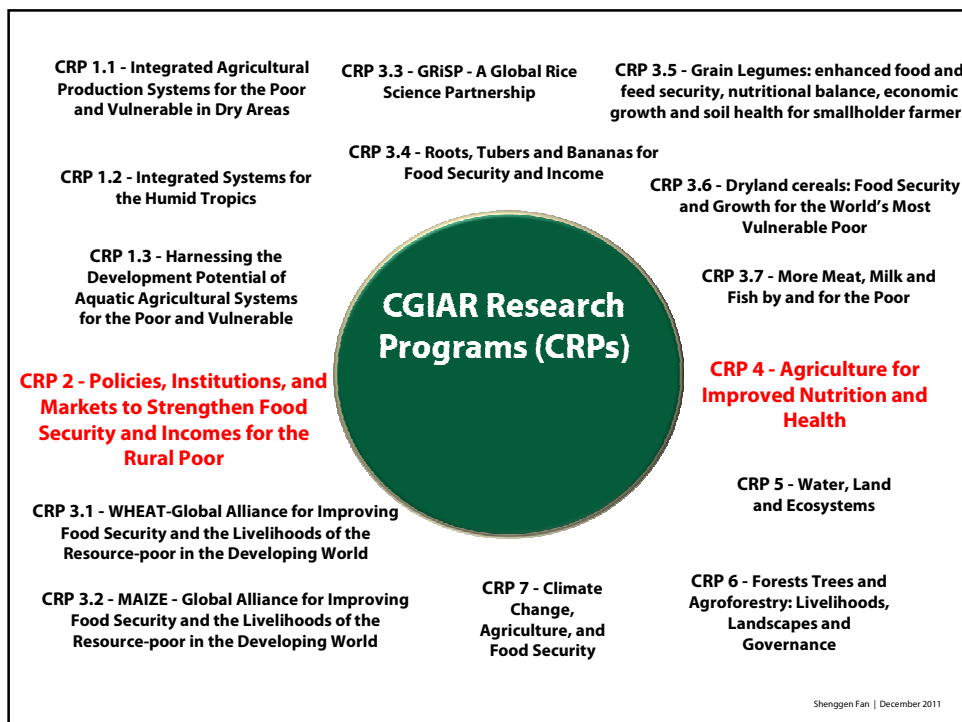
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CGIAR Is Changing the Way It Does Business



- New vision and strategic objectives
 - Food for People, Environment for People, and Policies for People
- Broadened research mandate to include nutrition and health
- Country-led approaches and inclusive partnerships
- Results-oriented strategy

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In Conclusion



- State of food security in the world remains precarious
- Changing global landscape presents challenges
- Development agenda needs to incorporate food security and changing role of agriculture
- Innovative approaches in terms of policies and technologies need to go beyond “business as usual”