Toward World Food Security

PRESENTED BY

Greg Traxler
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BILL & MELINDA GATES *foundation*

Food Security

when all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

FAO, 2002

Dimensions of Food Security

Global Food Security

- We produce enough food, but 870 million are hungry
- 6.8 billion world population growing by 78 million per year, reaching 9.1 billion by 2050
- Monitored by commodity prices, but this is a lagging indicator
- We need to produce more food by investing in technology

National Food Security

- Does not mean food self-sufficiency
- Depends on domestic agriculture and trade policies
- Agriculture ignored recently
- Free trade in agriculture immensely important

Local Food Security

- Infrastructure and social policies as well as agriculture

Individual Food Security

- Every country has hungry people, safety nets are needed

Low income, food deficit countries, particularly those in Africa have been facing a chronic food crisis, long before the food price spike, but…

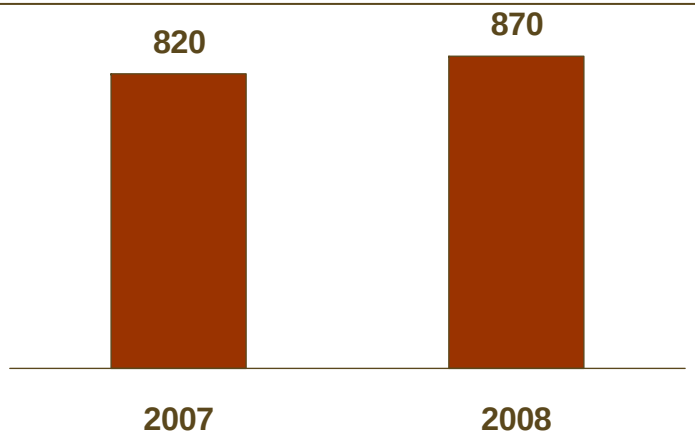
As a result of high food prices, the number of chronically hungry people worldwide has increased by 50 million in 2007 to reach 870 million.

Total world poverty increased by 73 to 105 million people due to recent food price increases, with 30 million additional persons in Africa alone.

When food supply lags or is disrupted, people suffer

Seems obvious, but often forgotten by groups opposed to better agricultural technology

Estimates of chronic hunger (millions of people)



Most of those who have recently fallen into hunger are located in Sub-Saharan Africa and South Asia.

Multiple Causes of Current Food Crisis

Long term changes in the food markets

Rising energy prices and the diversion of land to bio-fuels

Increased biofuel demand in 2000-07 contributed to 30% of increase of grain prices by one estimate

- **Rising incomes and increase in demand for food & animal feed**
- **Rapid urbanization and the increased reliance on imports for feeding the cities**
- **Declining food aid supplies and the growing reliance on market purchases for safety net programs;**
- **Rising fertilizer & freight prices**
- **Neglect of agriculture**

Contributors to the *recent spike*

- **Weather events**
- **Declining cereal stocks**
- **Policy interventions**

The Food Price Crisis in Perspective

Figure 2—Global food prices in the long and short run

Sources: The historical data are compiled and interpolated by the author from data from BLS 2008, Godo 2001, NBER 2008, OECD 2005, U.S. Census Bureau 2008, and United Nations 1999; the recent food price data are from FAO 2008a.

Source: **J. von Braun**. ***Food and Financial Crises: Implications for Agriculture and the Poor***, **IFPRI, 2008**

Factors influencing future price trends: new analysis needed

Demand side determinants

- Population growth & Urbanization
- Income elasticity of food demand
- Feed & bio-fuel demand

Supply response

- Area expansion possibilities
- Increased Intensification
- Reducing the yield gap
- Input price trends

Investment Decisions

- Infrastructure development
- Agricultural R&D

Climate Change Risks

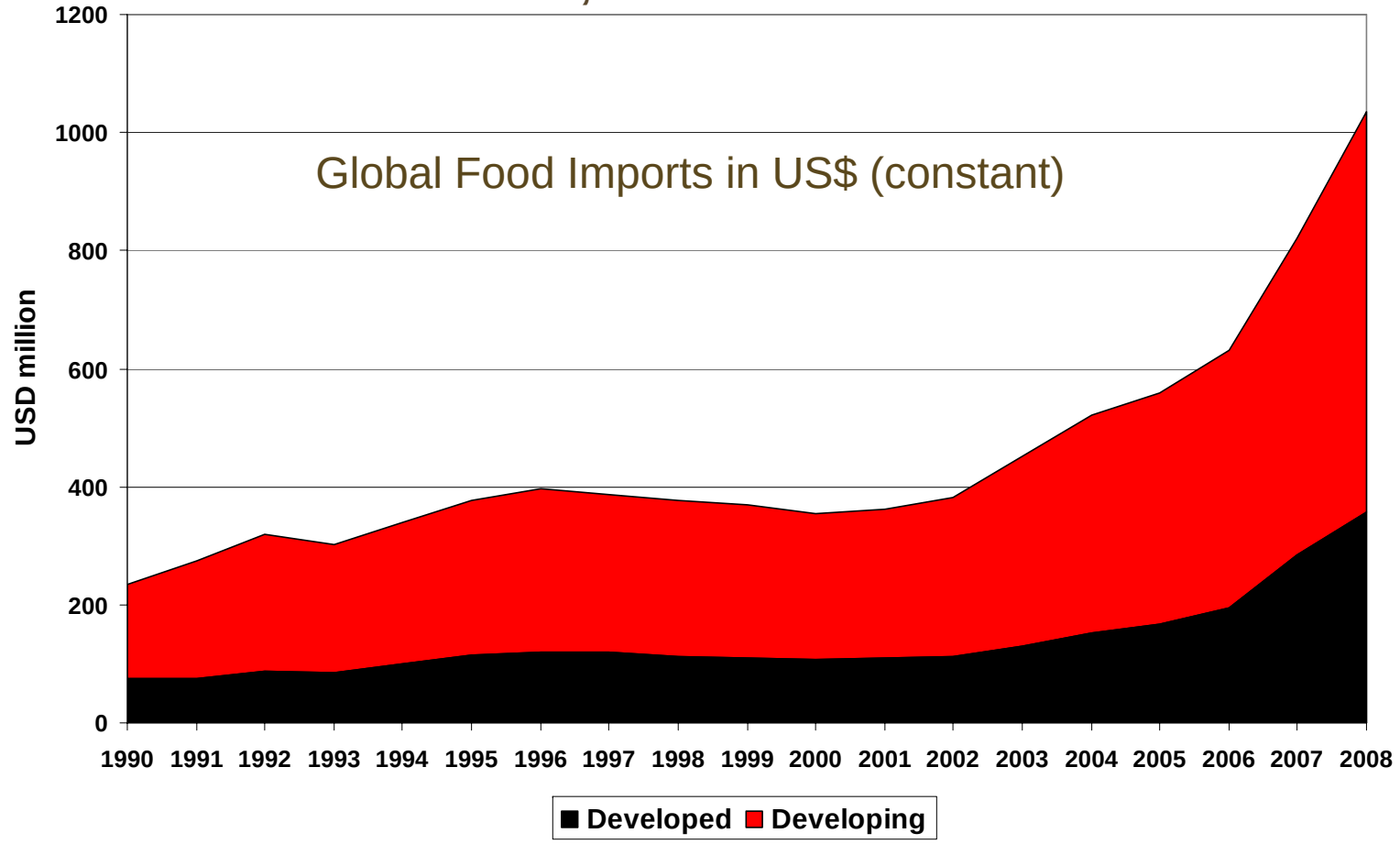
- Long term productivity impacts
- Volatility in supplies

Higher food import bills

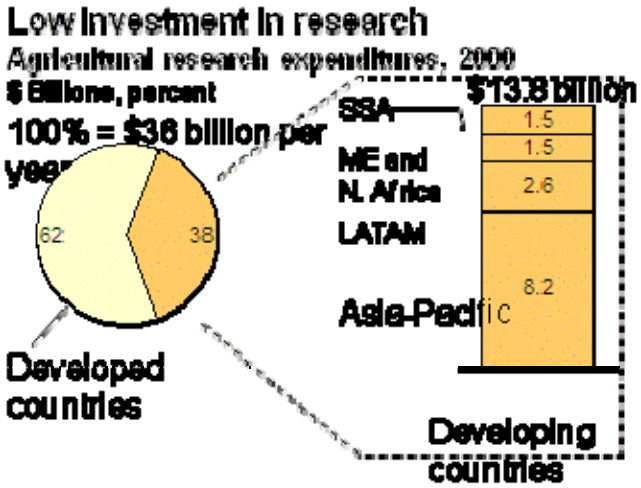
The global cost of imported food in 2008 reached nearly $1 trillion, a 26% increase over 2007 peak.

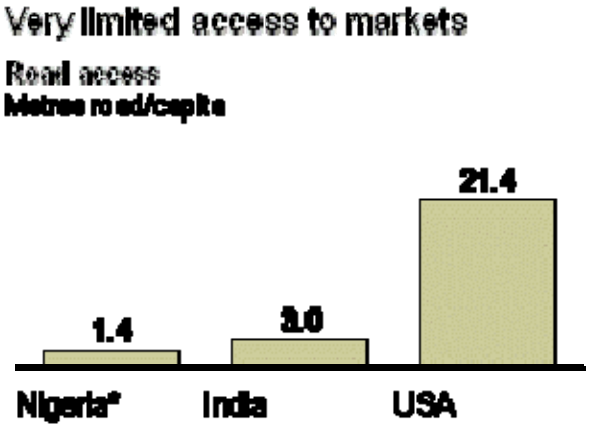
Low income food deficit countries face the highest impact:

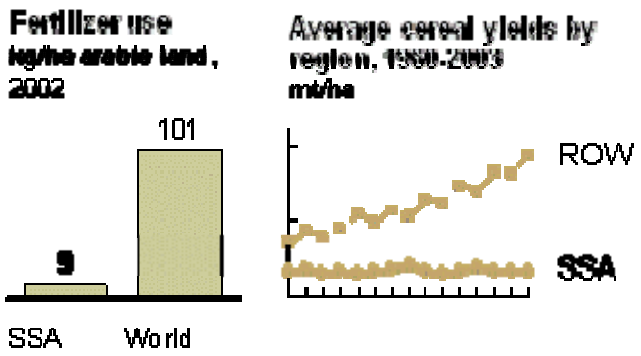
By the end of 2008, the food import bills of high-risk countries could cost four times as much as 2000, a tremendous burden on these countries.

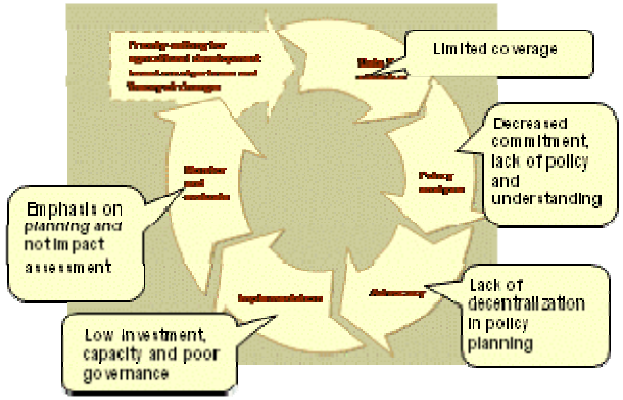


Poor supply response is a multi-faceted problem







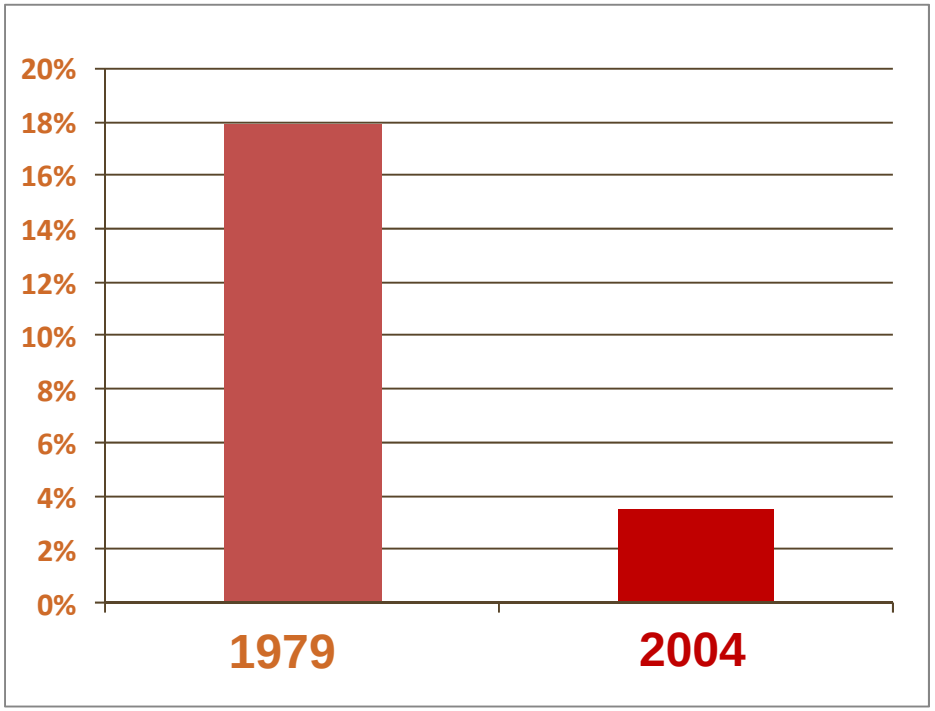


Source: FAOStat; IFDC; World Bank

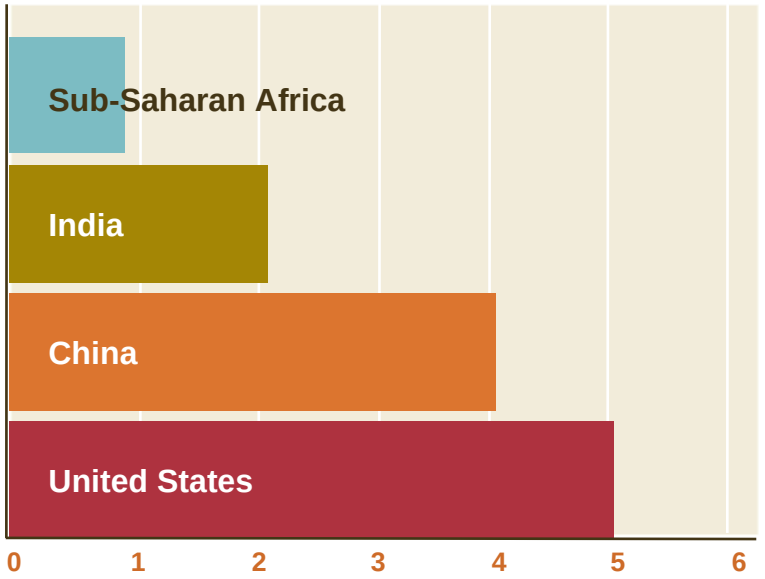
Agriculture's Impact Ignored

Despite its importance, agriculture has been neglected over the last several decades by both developing and donor countries—especially in Sub-Saharan Africa

Share of Official Development Assistance for Agriculture



Average yield for a farmer in:



Tons of cereal per acre

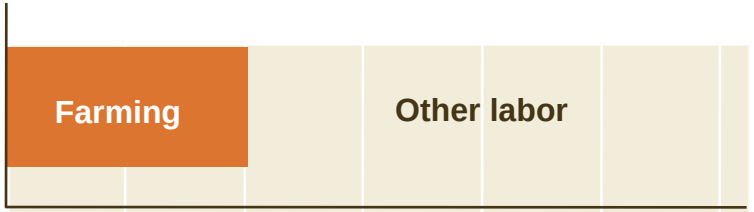
Agricultural Development

Agriculture is key to reducing hunger and poverty

- Most people living on $1 a day rely on agriculture for food and income
- In Sub-Saharan Africa, farming accounts for 2/3 of employment and 1/3 of GDP
- In South Asia, the rural poverty rate is still approximately 40%

Employment in Sub-Saharan Africa

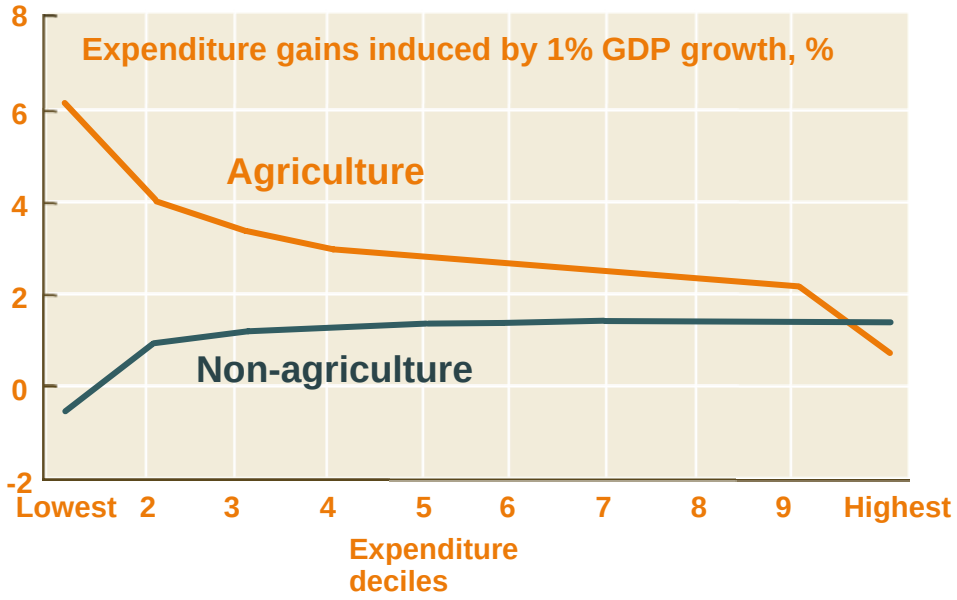
GDP in Sub-Saharan Africa



Agricultural Growth Reduces Poverty more Effectively than Growth in other Sectors

- Agriculture growth is 2–4 times more effective for the poor than non-agricultural growth.
- Almost no country has managed a rapid rise out of hunger and poverty without increasing its agricultural productivity.
- Reducing hunger and poverty on a large scale starts with improving agricultural development.

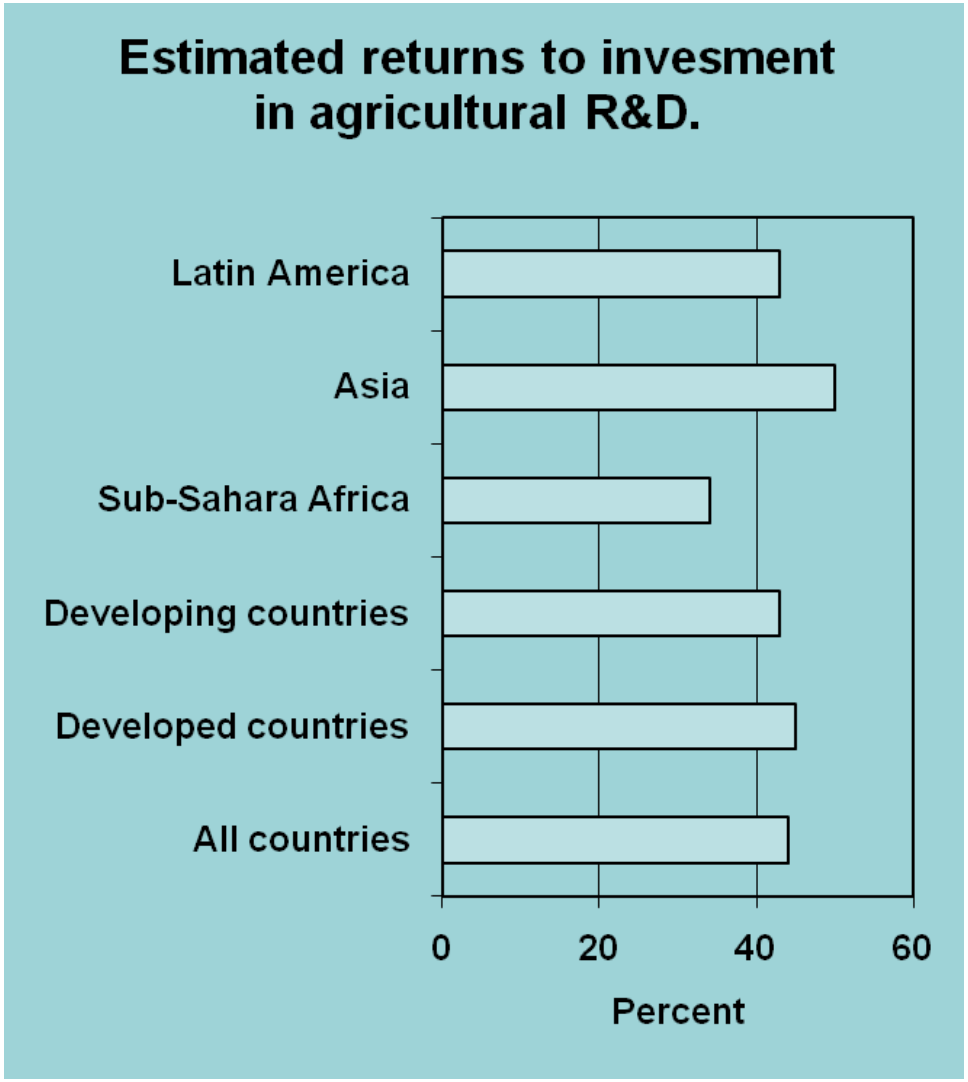
For the poor, agriculture has special poverty-reducing benefits.



Investments in agricultural research and development yield high returns.

Agricultural research and development (R&D) yield returns of 40-50 percent.

Returns are high in all regions, including Sub-Saharan Africa.



Agricultural R&D is a Powerful Engine for Economic Growth and Povery Reduction

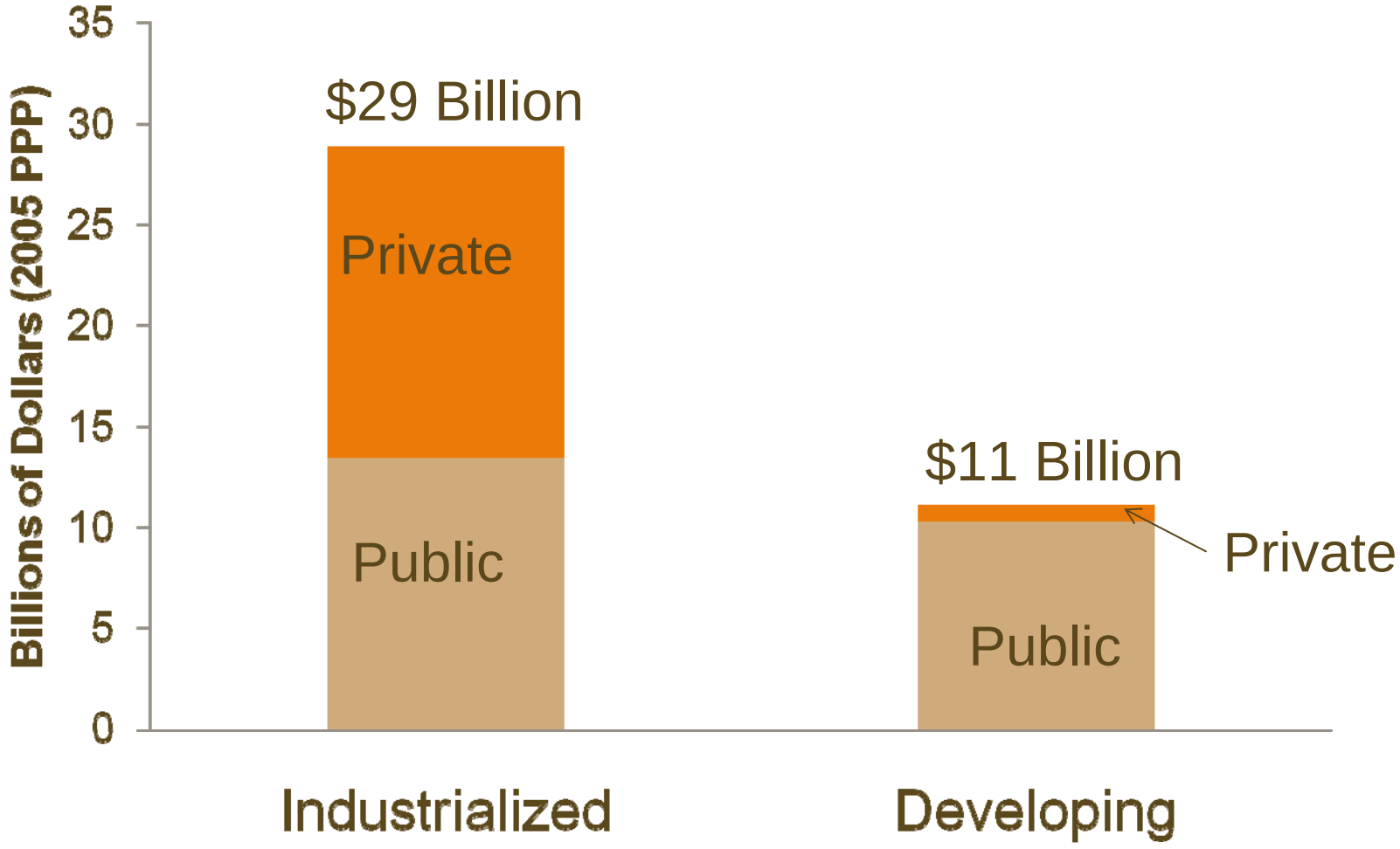
Table 4—Impact of doubling R&D investment on poverty and output growth under poverty minimization

Region	R&D allocation (millions of 2005 US$) 2008	2013	Change in number of poor (millions) 2008-2020	Agricultural output growth (percentage points) 2008-2020
Sub-Saharan Africa	608	2,913	–143.8	2.75
South Asia	908	3,111	–124.6	2.40
Southeast/East Asia	1,956	2,323	–13.4	0.69
West Asia and North Africa	546	614	-0.2	0.23
Latin America	957	990	-0.2	0.07
Total	**4,975**	**9,951**	**–282.1**	**1.11**

Source: von Braun, Fan, et al. 2008.

Source: **J. von Braun.** ***Food and Financial Crises: Implications for Agriculture and the Poor*****, IFPRI, 2008**

Combined Public & Private Agricultural Research Expenditures, 2000 Developed & Developing Countries



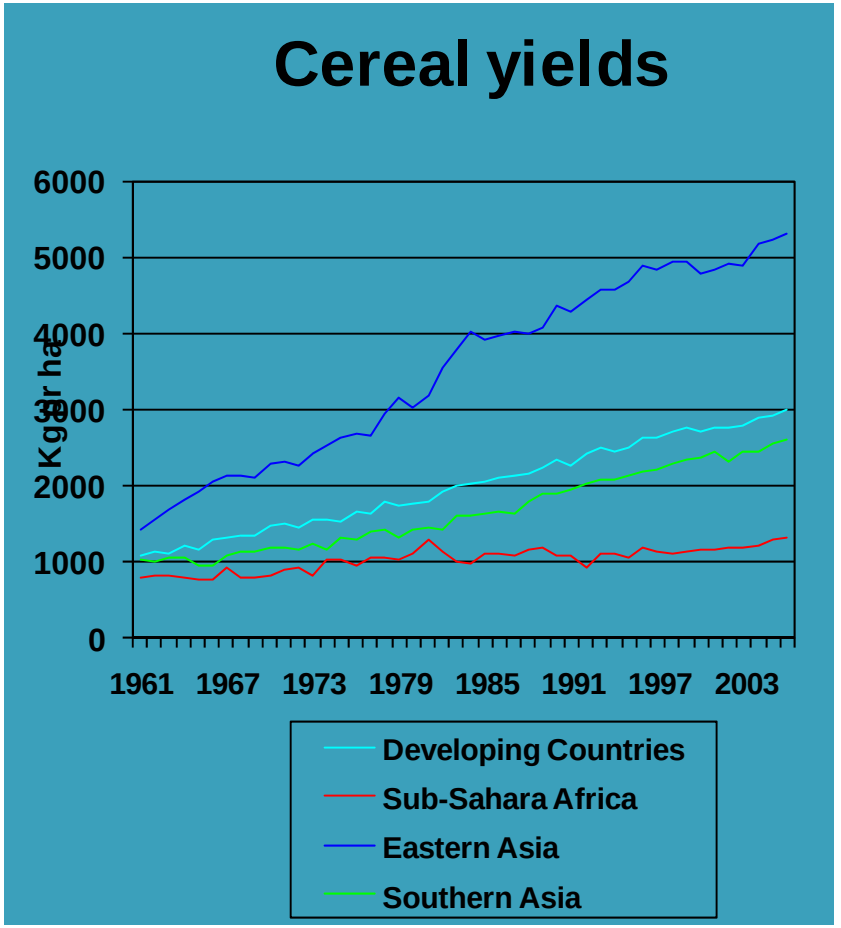
Green revolution impacts on crop improvement

Production

- Cereal output in developing countries has grown 2.8 percent annually for three decades

Productivity

- Yields, not area, were responsible for growth
- TFP grew along with yields

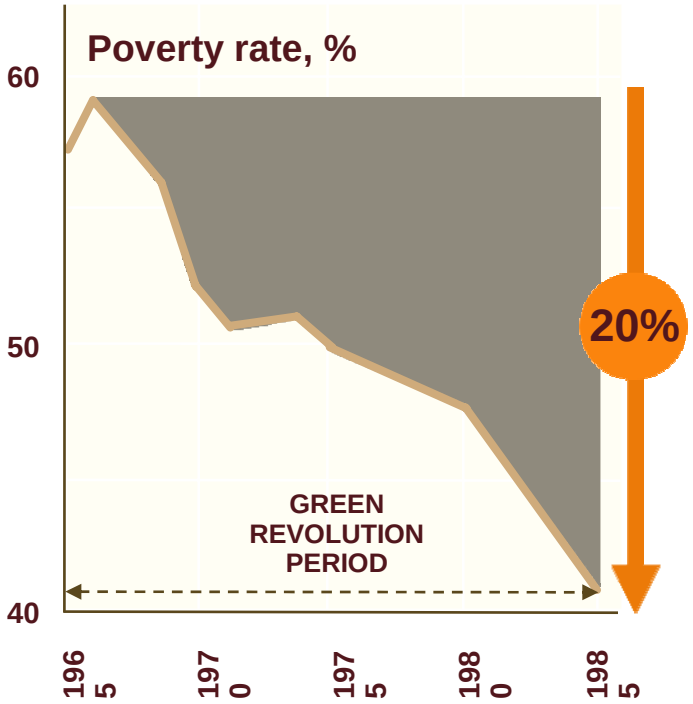


The Green Revolution Showed What Agriculture Can Do

From the 1960s to the 1980s, crop improvements in Asia and Latin America helped:

- **Doubled food production.**
- **Save hundreds of millions of lives.**
- **Lay a foundation for growth in countries like India and China.**

Rural poverty in India



Nearly 20% reduction in poverty in just two decades.

17

Without the Green Revolution:

Food production would have been 20% lower in the year 2000;

Food imports to developing countries would be almost 30% higher;

Calorie consumption per capita would be 13-14% lower;

Child malnutrition would be up by 6-8%.

Evenson & Rosegrant (2003)

Lagging Productivity Growth in Africa and South Asia

Table 2—Total factor productivity growth in developing-country regions, 1992–2003

Region	Average annual % growth				
	1992-94	1995-97	1998-2000	2001-2003	1992-2003
East Asia	5.0	4.5	–1.1	2.5	**2.7**
South Asia	1.7	–0.2	1.2	1.4	**1.0**
East Africa	–1.7	2.0	0.2	1.3	**0.4**
West Africa	1.8	2.5	2.4	–0.1	**1.6**
Southern Africa	0.4	3.3	3.6	–0.6	**1.3**
Latin America	1.8	2.0	2.9	4.3	**2.7**
North Africa and West Asia	–0.1	1.9	1.5	2.8	**1.4**
All regions	2.8	2.7	0.6	2.5	**2.1**

Source: von Braun, Fan, et al. 2008 and Nin Pratt, IFPRI.

Source: **J. von Braun.** ***Food and Financial Crises: Implications for Agriculture and the Poor*****, IFPRI, 2008**

Agricultural Productivity Growth Challenges for Africa

- Heterogeneous farming systems and staple crops – Not just rice and wheat
- Low levels of public agricultural R&D and the need to attract private sector R&D investment
- Under investment in enabling environment – Roads, irrigation, ports, education
- Poor policy incentives for enhancing productivity
- Meeting immediate food security while focusing on long term productivity growth – Subsidies vs. Investment
- Climate change threats to overall productivity growth & to increased incidence of extreme events

Developing countries and donors have underinvested in agriculture

Sub-Saharan African Gov't

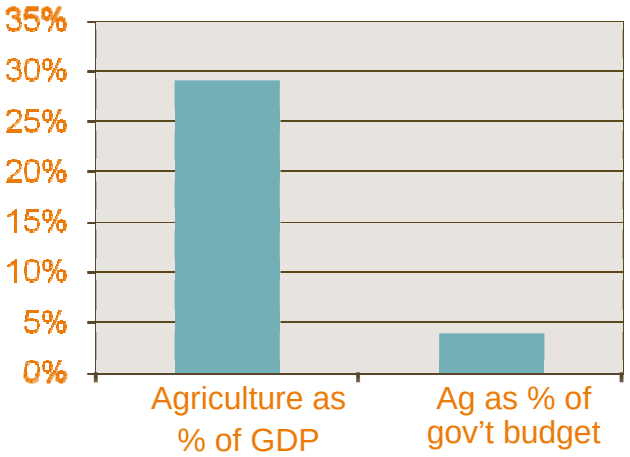
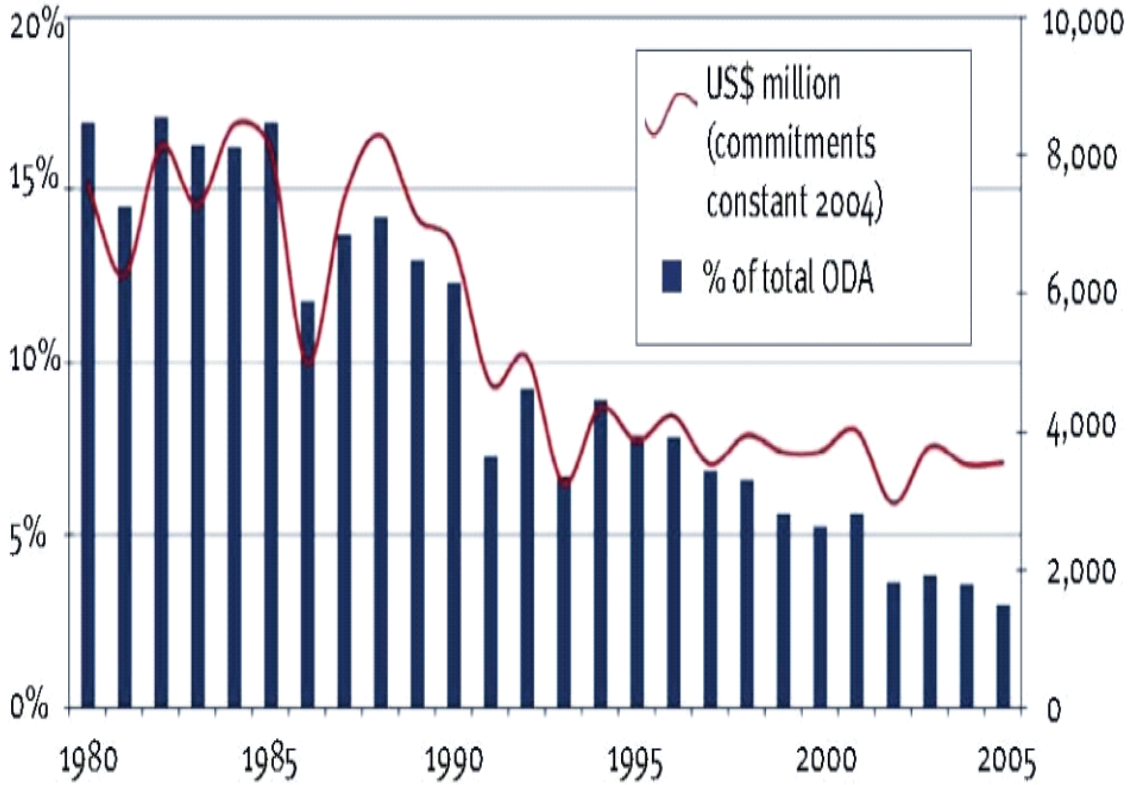


Figure 1: Official Development Assistance (ODA) to agriculture, 1980–2005

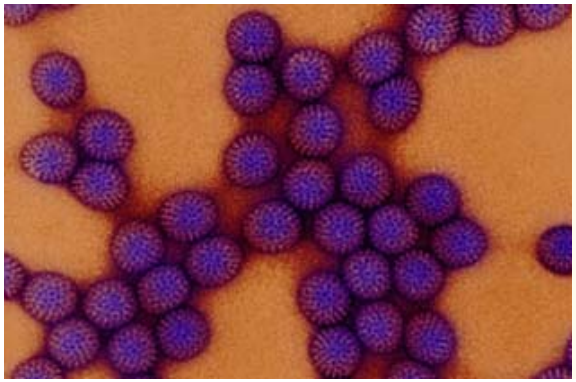


Source: OECD International Development Statistics – Creditor Reporting System.

Bill & Melinda Gates Foundation
Overview

How We Got Started

1997



Bill and Melinda read an article about rotavirus.

2000

BILL & MELINDA GATES foundation

They officially create the foundation.

2006

Warren Buffett decides to give Berkshire Hathaway stock.
New Division – Agricultural Development Launched

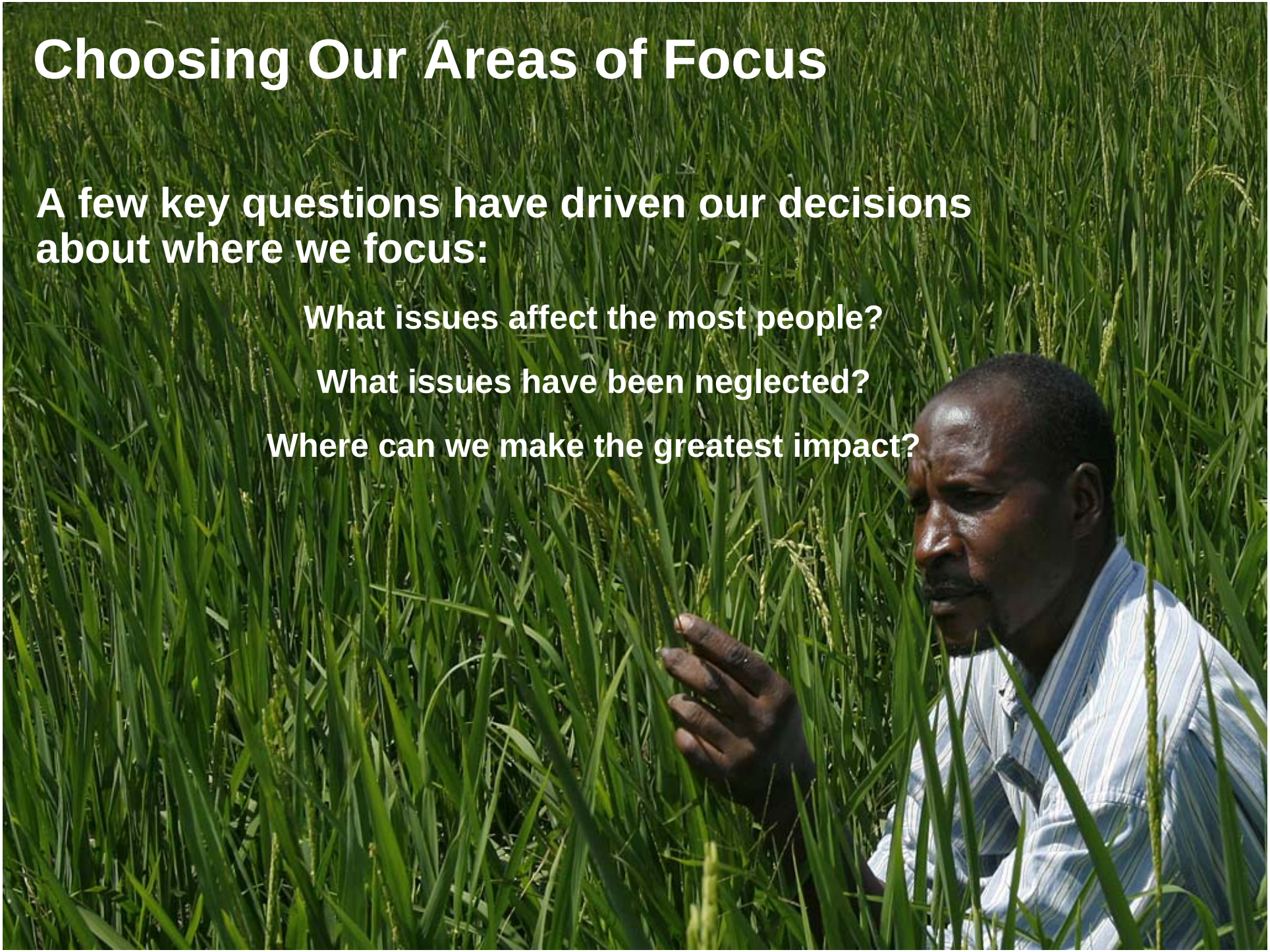
Core values of the foundation:

- *All lives—no matter where they are being led—have equal value.*
- *To whom much has been given, much is expected.*

Guiding Principles:

- This is a family foundation driven by the interests and passions of the Gates family.
- Science and technology have great potential to improve lives around the world.
- Our focus is clear — and limited — and prioritizes some of the most neglected issues.
- We leave room for growth and change – we're new at this and will have to learn

Choosing Our Areas of Focus



A few key questions have driven our decisions about where we focus:

What issues affect the most people?

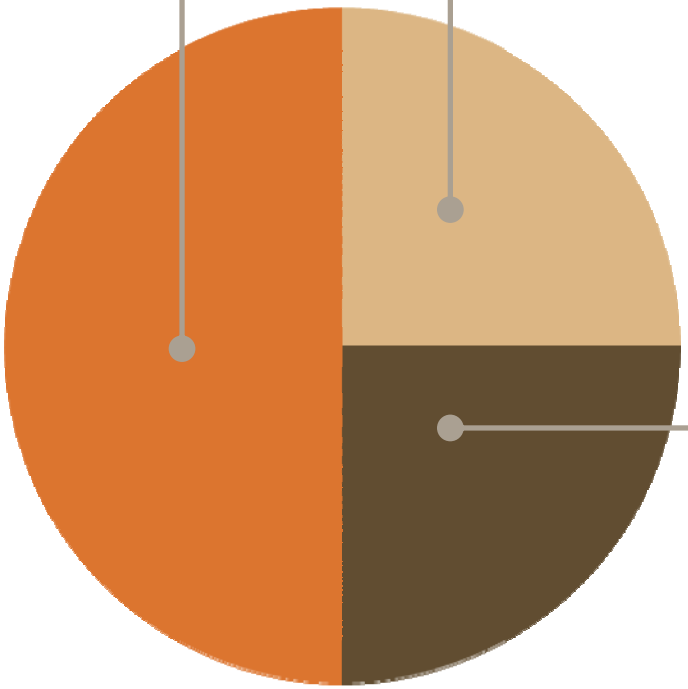
What issues have been neglected?

Where can we make the greatest impact?

Grantmaking Areas

50%
Global Health Program

Discover, develop, and deliver life saving health solutions to people that need them most



25%
Global Development Program

Increasing opportunities for people in developing countries to lift themselves out of hunger and poverty

25%
United States Program

Greater opportunity for all Americans through the attainment of secondary and postsecondary education

$2.8 billion in grants in 2008; ~$20 billion since inception

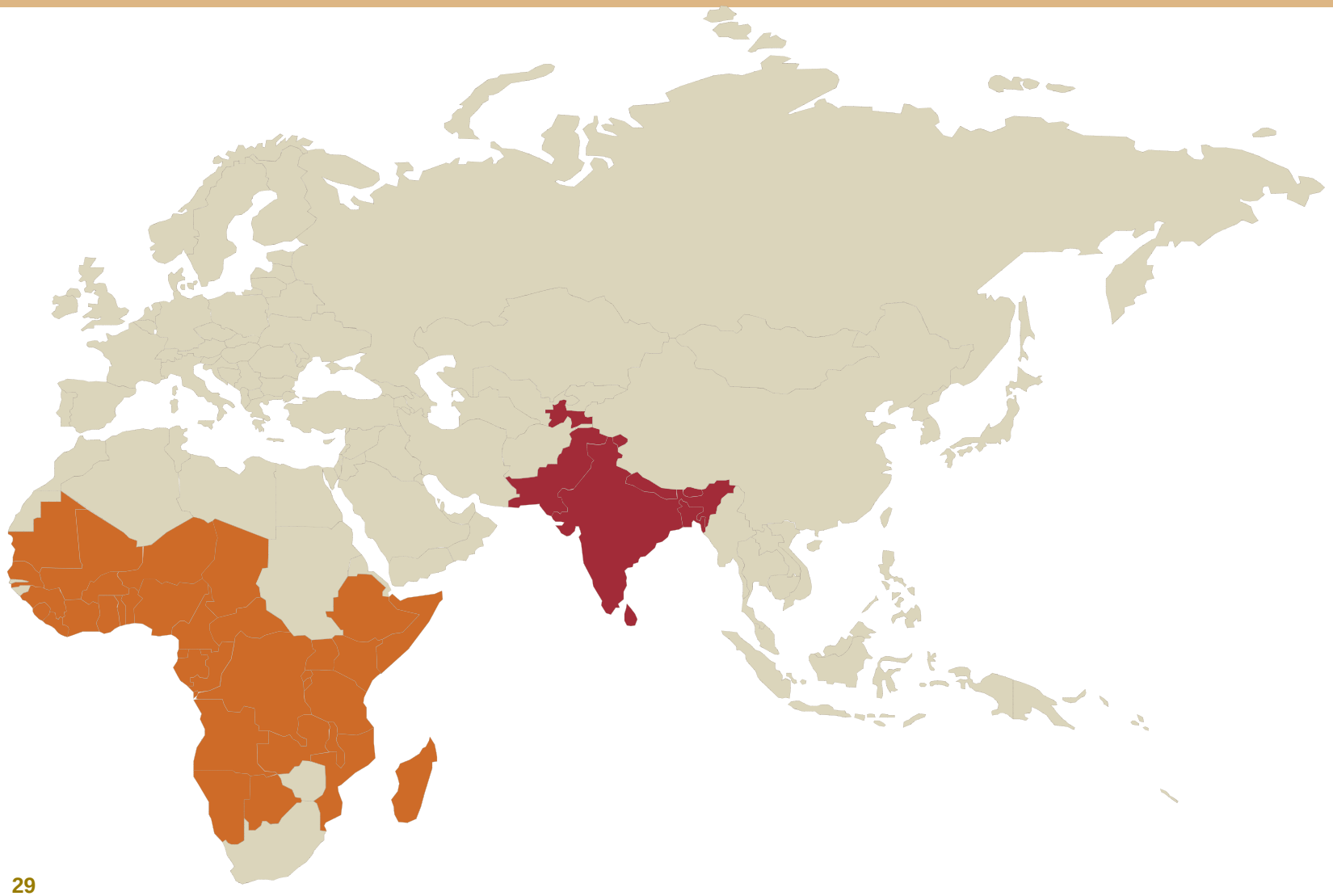
Agricultural Development

Our Approach

Core principles:

- Focus on small farmers; most are women
- Build strong partnerships
- Work across the full agricultural value chain

Focus on sub-Saharan Africa (90%), with some projects in South Asia



Support the Full Range of Farmers' Needs

We know there's no single, simple solution. We take a comprehensive approach, from seed to sale. We are very new and expect to learn from our mistakes.

1. Science & Technology

- Research and development on crop improvement issues

2. Farmer Productivity

- Quality seeds
- Irrigation
- Fertilizer
- Education and training

3. Market Access

- Access to information
- Access to new and existing markets
- Structured demand

4. Policy & Statistics

- Data and statistics
- Research and analysis
- Advocacy and policy change
- Learning and improvement

Science and Technology

Strategy:

- Increase productivity: Develop and distribute varieties that help farmers increase their yields and the efficiency of their use of inputs like water and fertilizer.

- Decrease farmer risk/volatility: Develop and distribute varieties that help farmers cope with droughts, floods, disease, and pests, as well as to help them with environmental adaptation

- Enabling improved nutrition: Support efforts to improve micronutrient availability in staple crops, and the diversity of crops farmers grow

Science and Technology

Grantmaking Priorities:

- Crop Improvement is the highest leverage area for R&D
- Crop management is essential to make best use of improved crops & inputs
- Seed systems seed delivery has been a key constraint, even when R&D succeeds

International Rice Research Institute / Ariel Javellana/CPS

Farmer Productivity

Strategy:

- Improved Inputs: Improvements in soil health and water management

- Improved knowledge: Expand small farmers' access to improved knowledge for decision making

- Focus on women: Ensure improved technologies are relevant and accessible to women who make up the majority of farmers in Africa

Farmer Productivity

Grantmaking Priorities:

- **Improved Inputs**
  - Soil health
  - Water management
- **Supporting Systems**
  - Human capital development
  - Extension systems
  - Gender investments (mentorships for women, mainstreaming)

Market Access

Strategy:

- New models to develop and market crop and livestock products

- New partnerships with public and private sector actors to expand small farmers' access to new and existing markets

- New tools and technologies to improve quality, reduce transaction costs, and increase efficiency

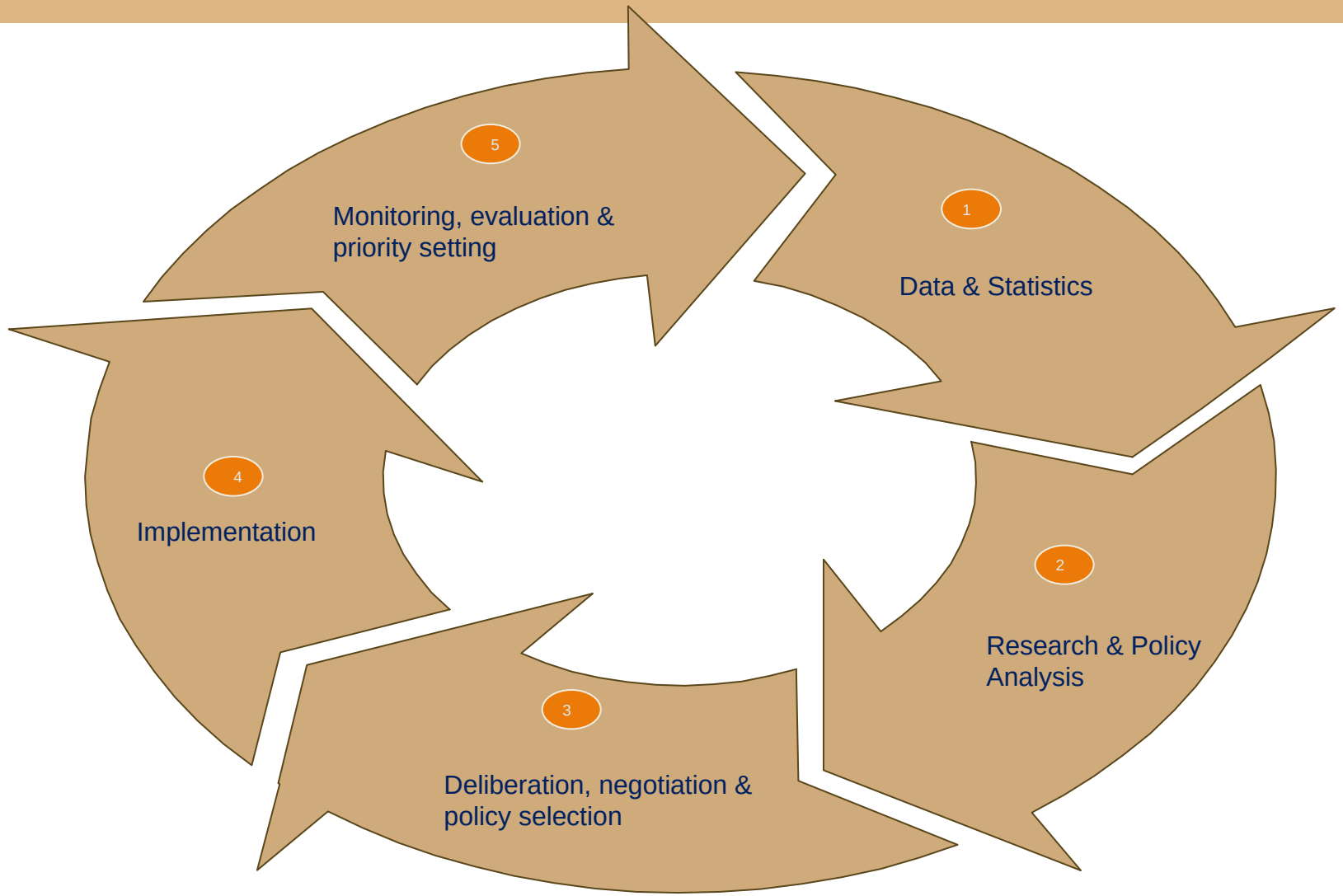
Policy and Statistics

Our Strategy:

- Improve the evidence base that is necessary for better agricultural investment and policy decisions
- .
- Support analysis, outreach and advocacy for evidence-based decision-making.

- Invest across the "policy wheel," including:
  - Data and statistics
  - Research and analysis
  - Advocacy and policy change
  - Policy implementation
  - Impact and learning

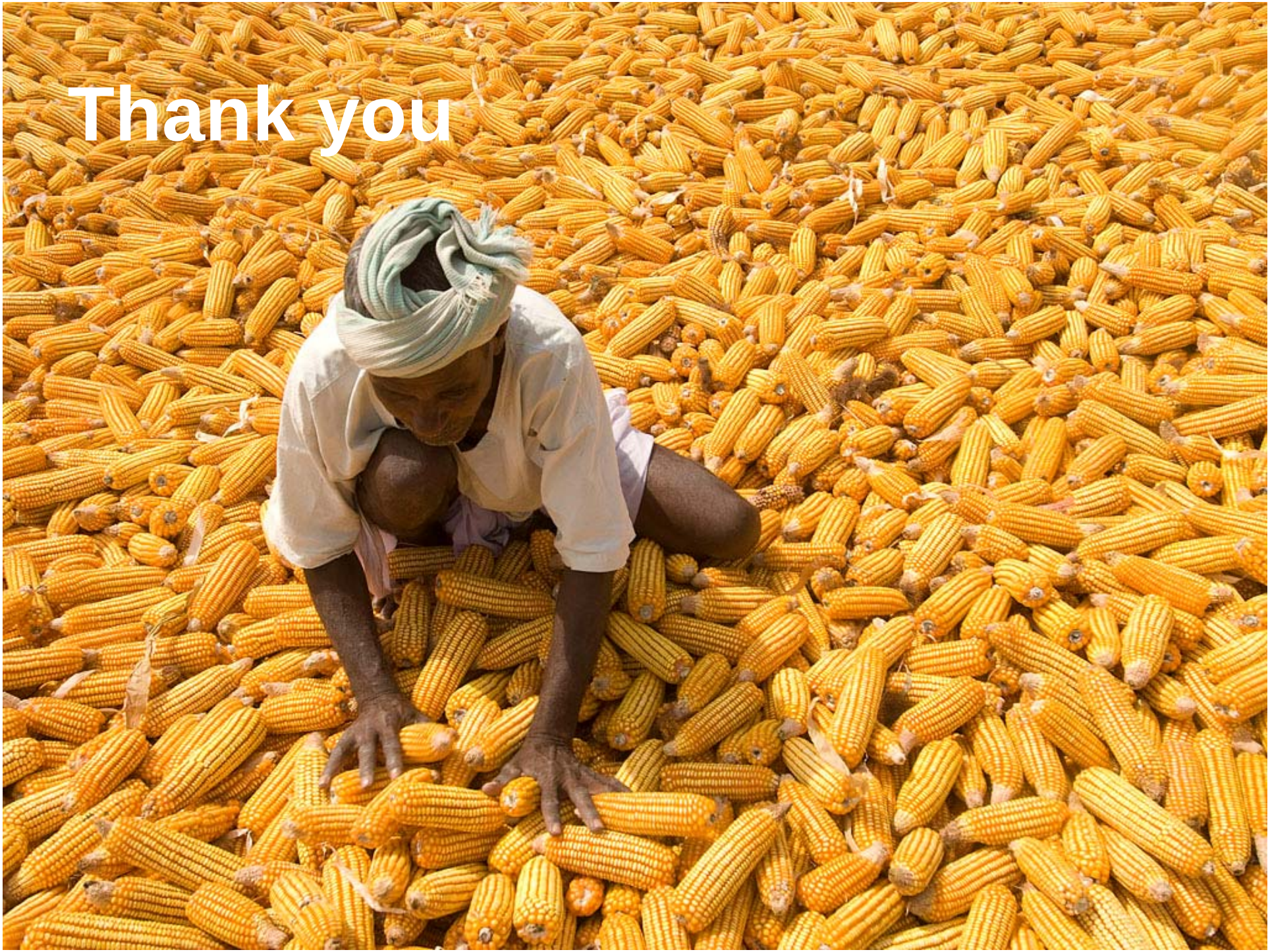
Our Policy Wheel



Policy and Statistics

Grantmaking Priorities:

- **Sub-Saharan Africa:**
  - Support improved enabling environment for agricultural productivity growth
  - Mobilize investment in agriculture
- **South Asia:**
  - Promote rural growth and improved nutrition in lagging regions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