ASTI Agricultural Science & Technology Indicators

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Setting meaningful investment targets in agricultural R&D: Challenges, opportunities, and fiscal realities

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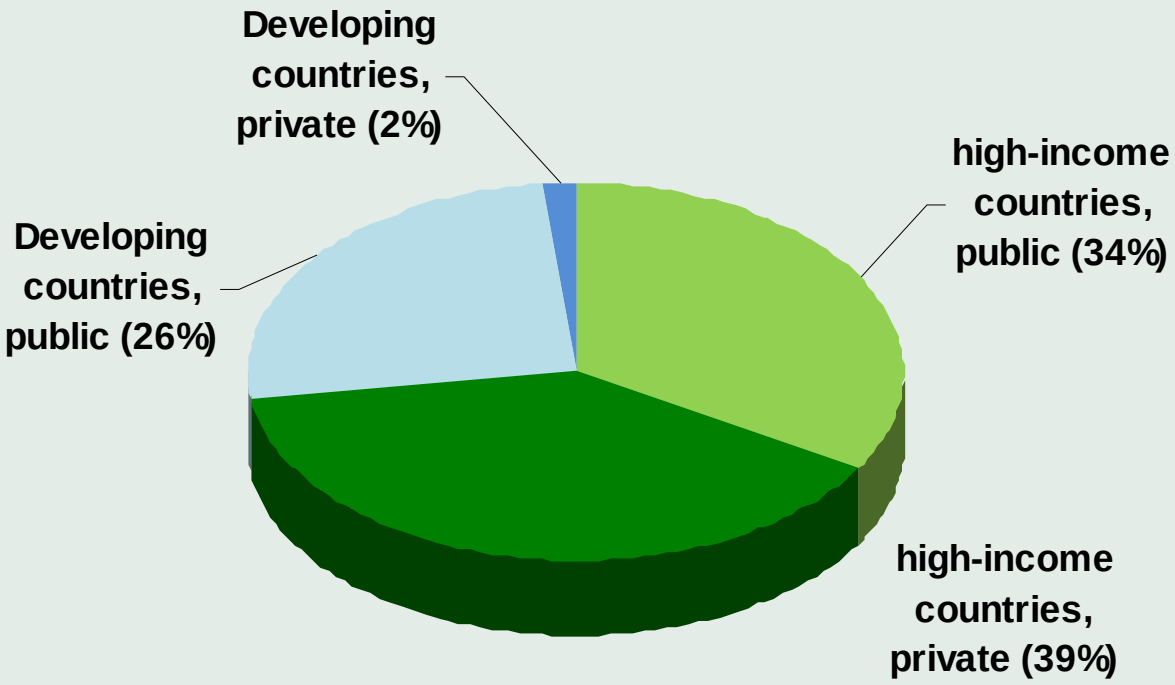
Outline of presentation

- Trends in agricultural R&D investments
- Perspectives of underinvestment
- Capacity constraints (fiscal and institutional)
- Future investment options

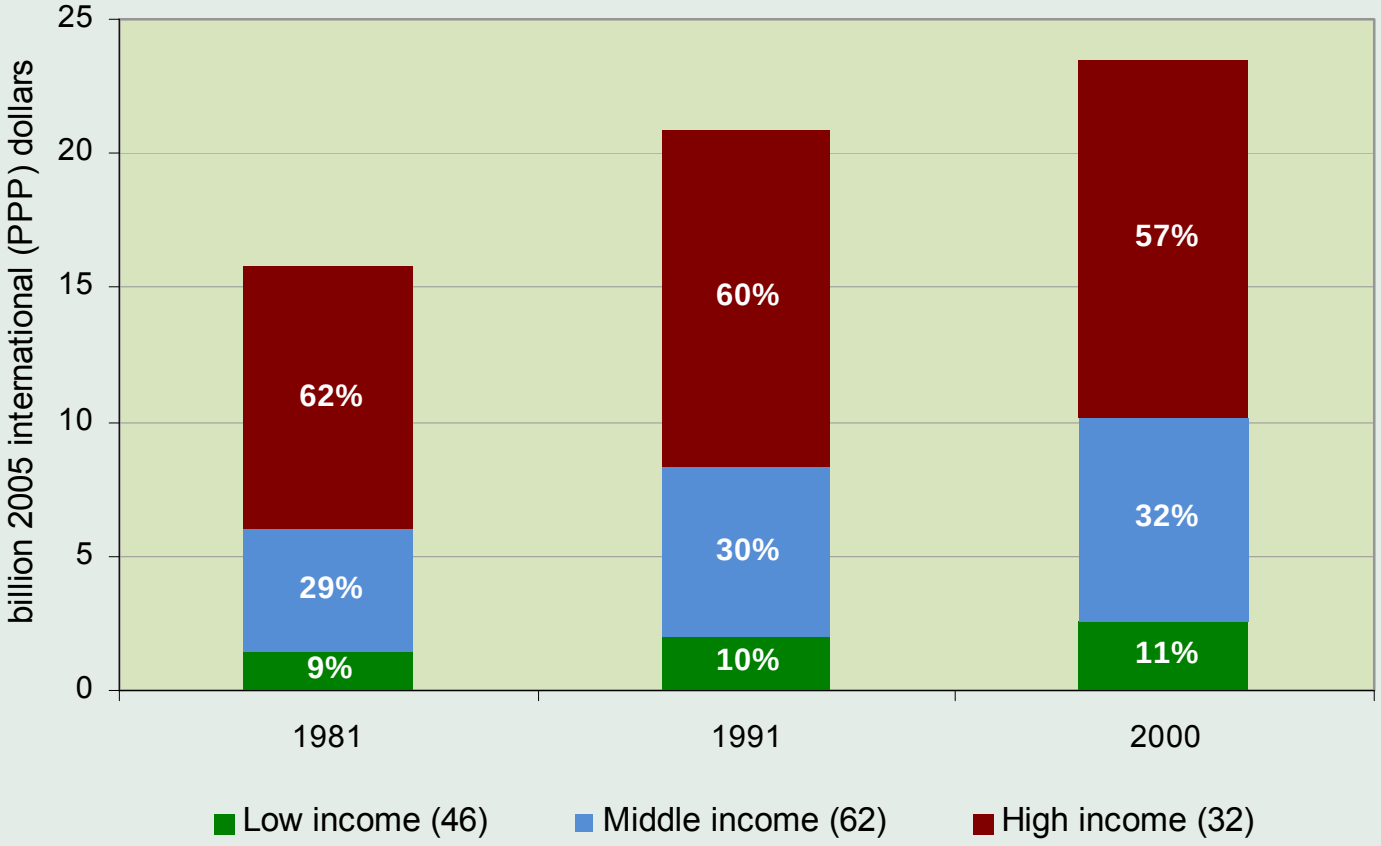
Public and private sector investment in agricultural R&D

circa 2000: 39.6 billion in 2005 international (PPP) dollars

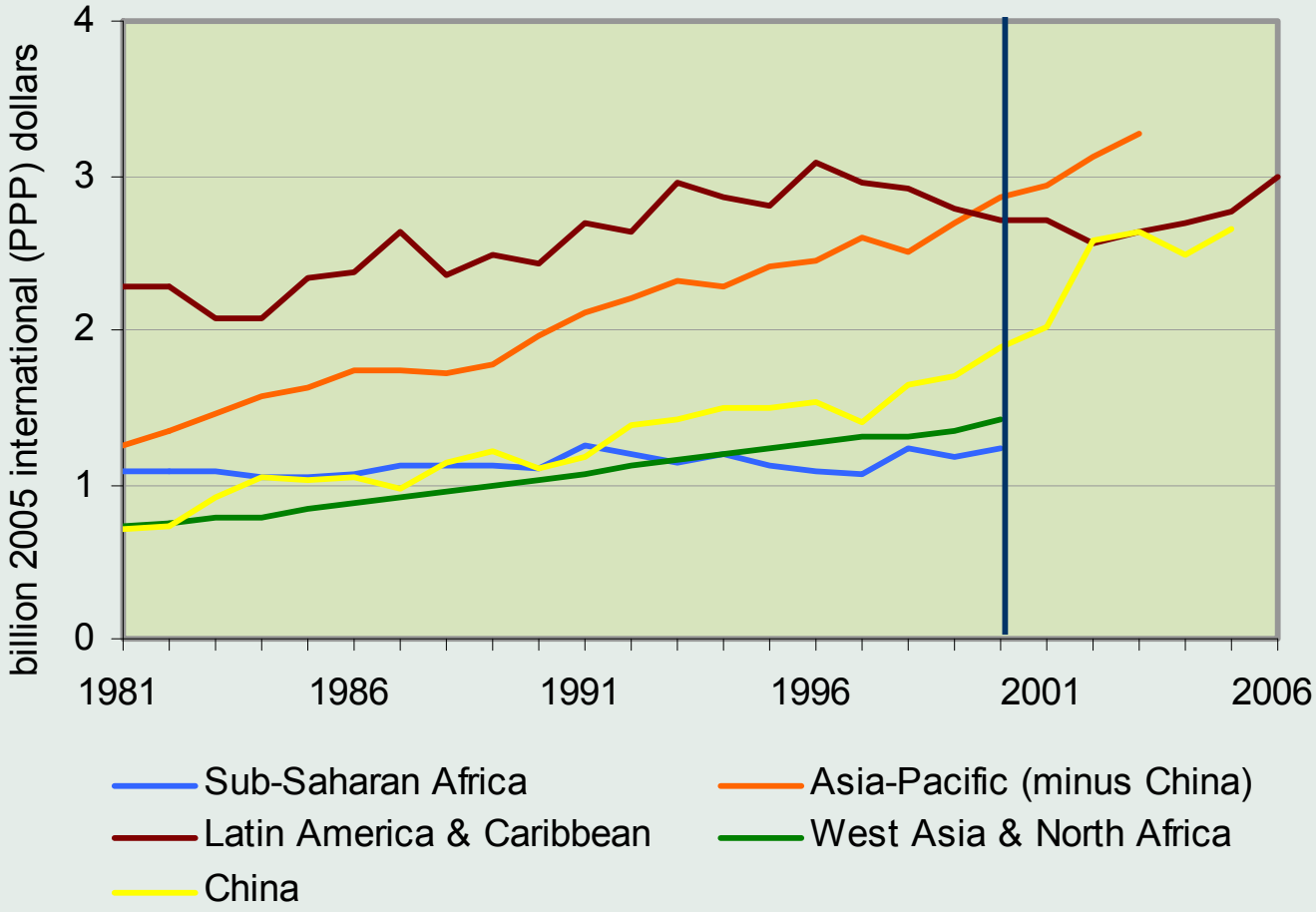


developing = low- and middle income countries

Public agricultural R&D investment trends globally, 1981, 1991, and 2000

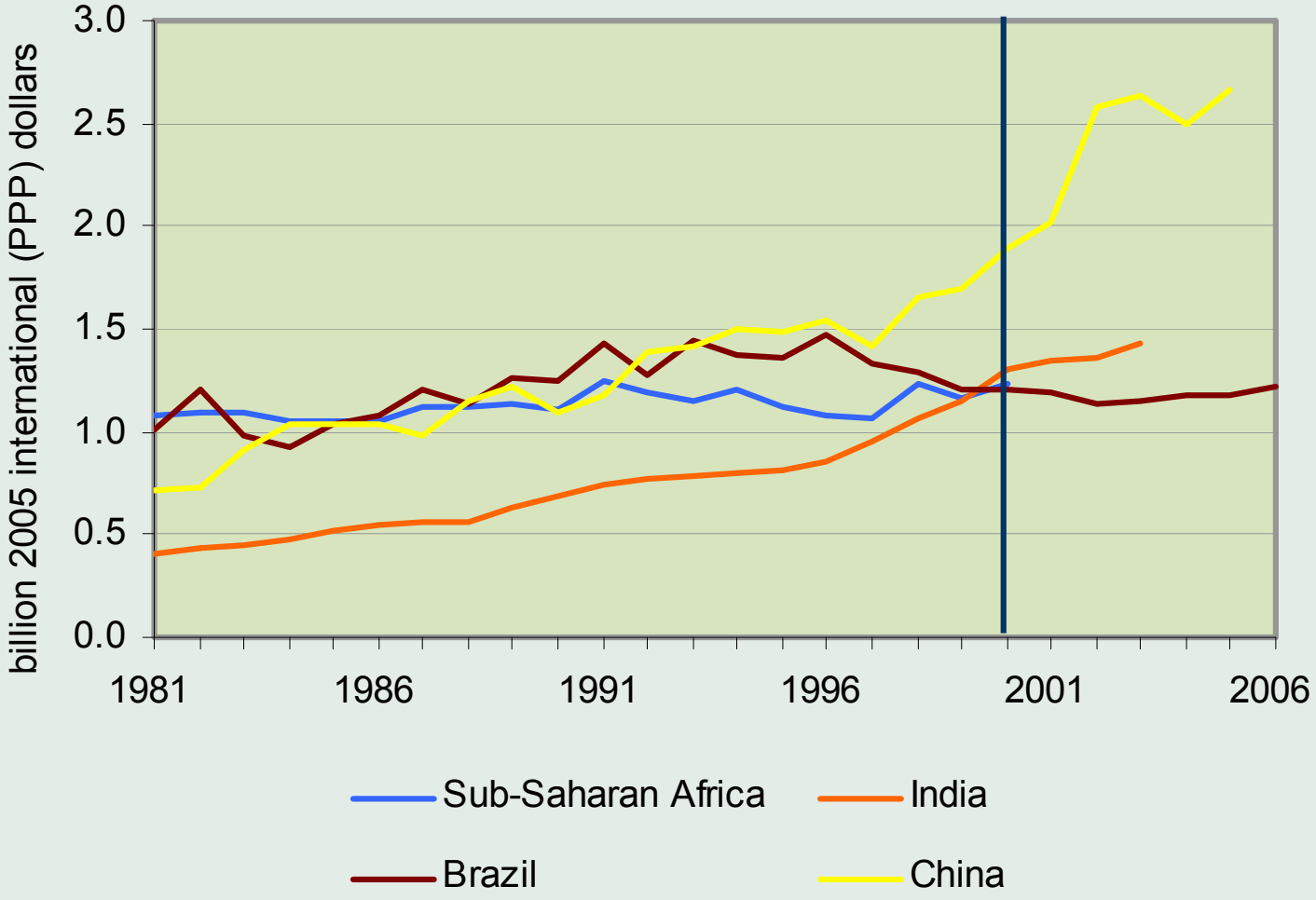


Public agricultural R&D investment trends in developing countries, 1981-2006

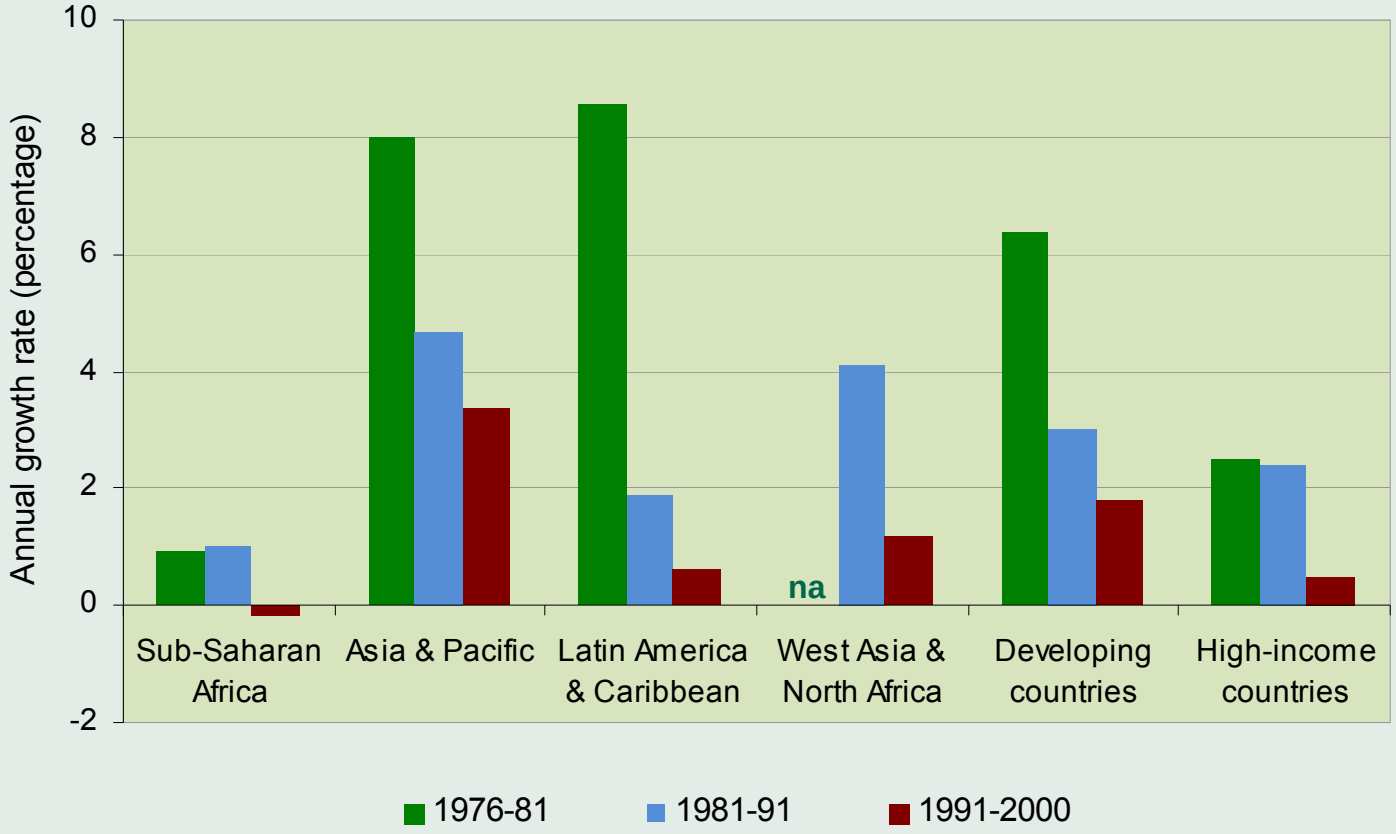


developing = low- and middle income countries

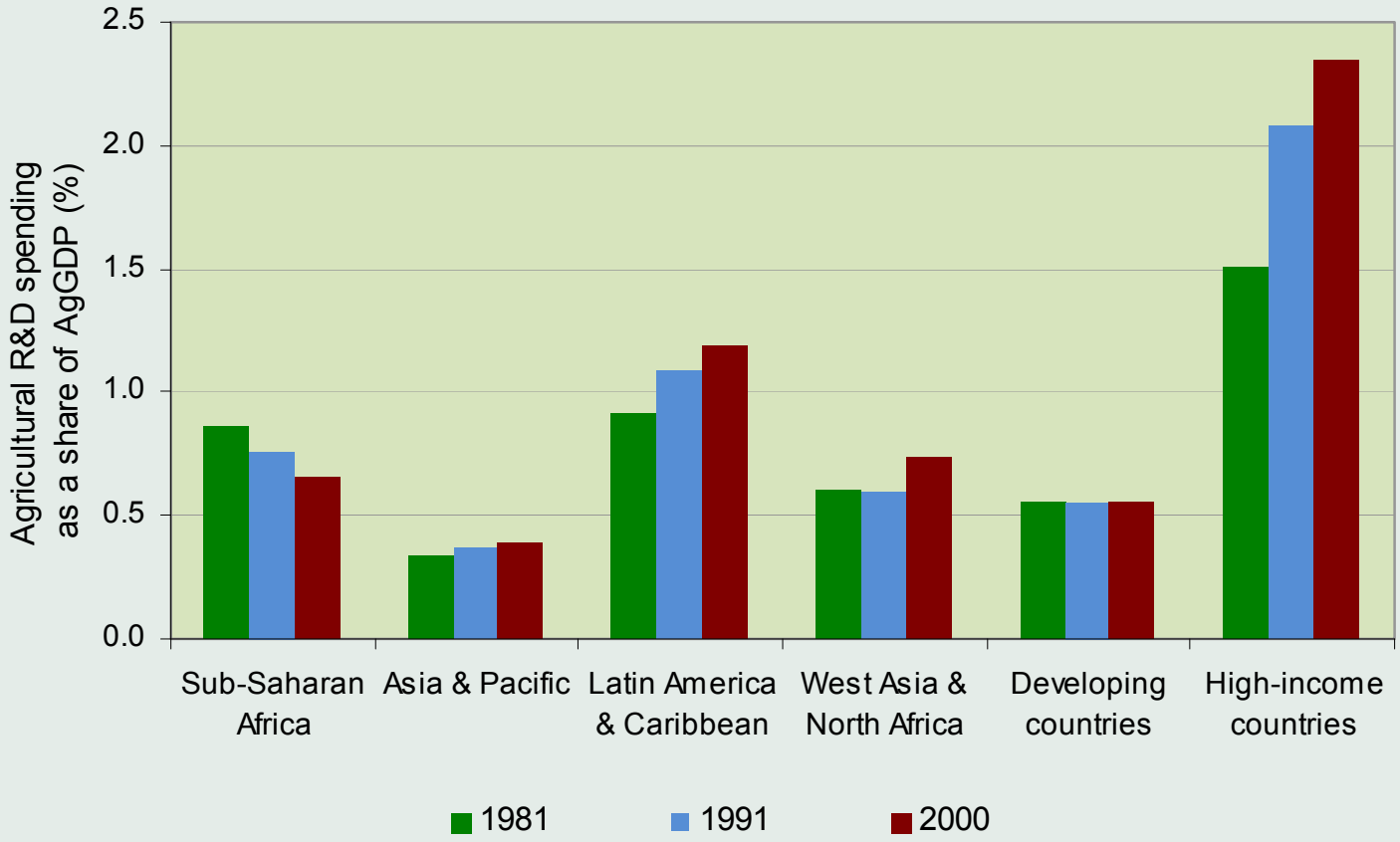
Sub-Saharan Africa compared to Brazil, China, and India, 1981-2006



Global annual growth rates in public agricultural R&D investment, 1976-2000



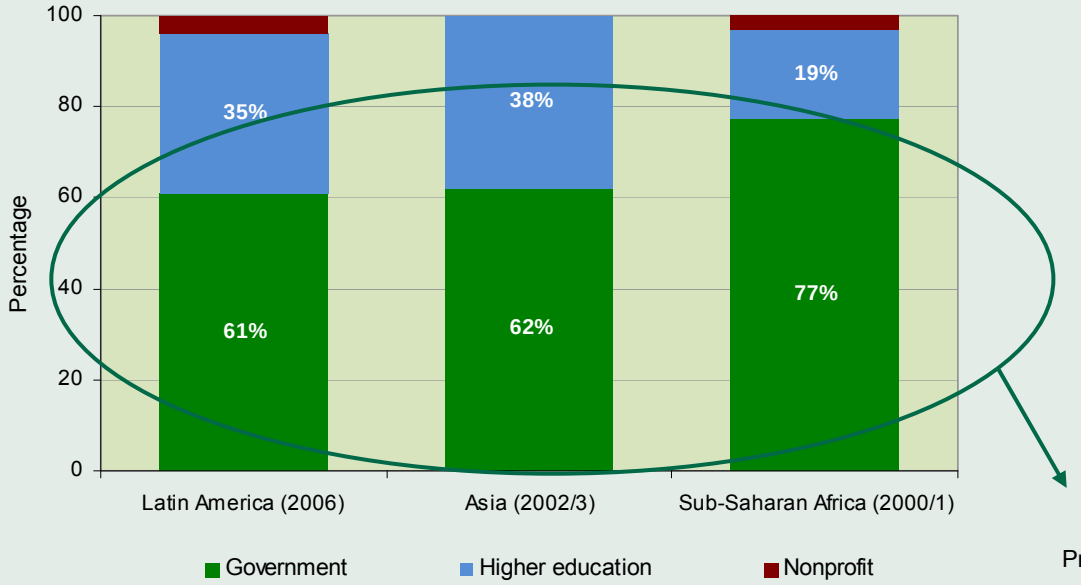
Intensity of public agricultural R&D investments, 1981-2000



Spatial concentration of public agricultural R&D spending, 2000

	Agr. R&D Spending	Population	Agr. Land	Agr. GDP
		(*percentage*)		
Top 5	48	52	23	47
Top 10	62	56	33	52
Bottom 80	6	11	14	6

Government remain crucial in developing countries' agricultural R&D

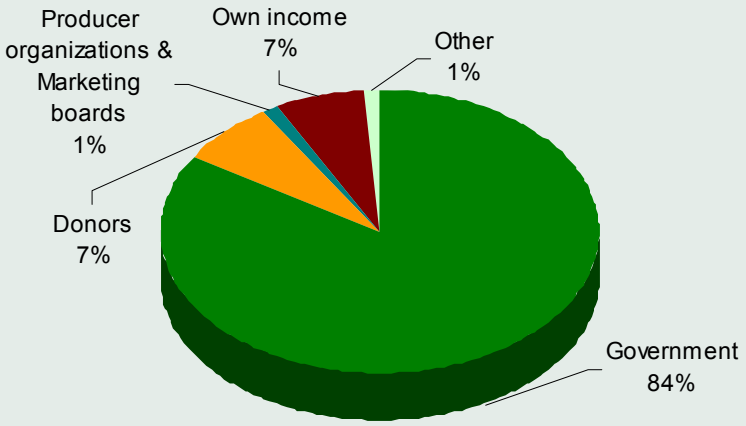


Executing agricultural research

Sample of circa 55 countries, excluding China

Funding agricultural research

Government agencies (371)
Total funding = $3,782 million (2005 PPP dollars)



Concept of underinvestment: Three dimensions

- Rate of return to public investment in agricultural R&D is higher than social rate of return on capital or other opportunities for public investment - more investments will result in more social gains than social costs
- Failure to maintain on-farm productivity growth at its historical trends – lost potential is sign of underinvestment
- Insufficient financial capacity to meet various pre-set targets that in themselves demand increasing investments in agricultural R&D

Common descriptive targets: Some examples

- MDG1: Halving hunger and poverty – Annual growth in GDP of 6%
  - ASARECA: GDP growth of 6% produces 3% growth per capita
- Maputo Declaration of commitment to agriculture: Annual growth in public agricultural expenditure of 10%
- IAC report/NEPAD: doubling investments for agricultural research / research intensity
- Fiscal effort: Each low income country could raise government share in total economy to 20%, but may not always advisable (e.g. post-conflict)

Capacity constraints

- How fast the system can adapt to challenges or exploit opportunities
  - Priority
  - Fiscal capacity
  - Absorptive capacity

Agricultural Research Intensity Ratio (ARI)

$$ARI \equiv \frac{AgRE}{AgE} \times \frac{AgE}{BUD} \times \frac{BUD}{GDP} \times \frac{GDP}{AgGDP}$$

$\frac{AgRE}{AgE}$ ↓ Priority to Research in Agriculture

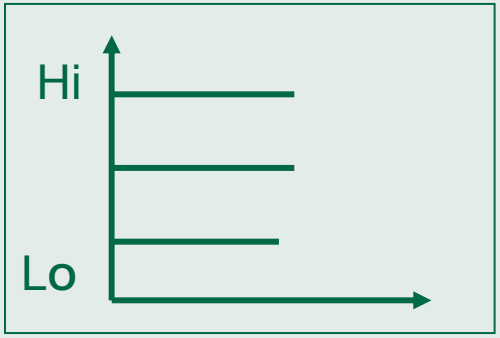
$\frac{AgE}{BUD}$ ↓ Priority to Agriculture

$\frac{BUD}{GDP}$ ↓ Fiscal Capacity

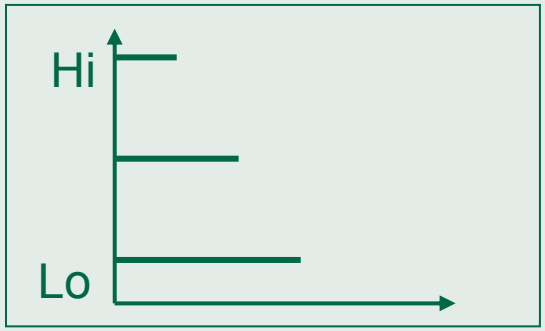
$\frac{GDP}{AgGDP}$ ↓ Structure of the Economy

Determinants of ARI by country income group

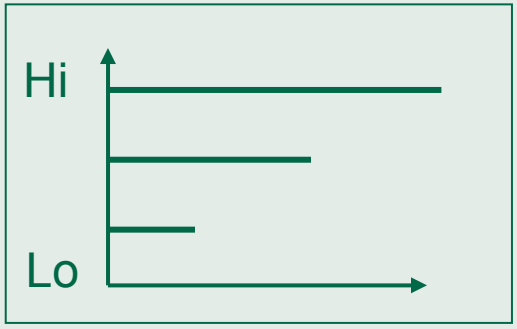
Priority to Research (AgRE/AgE)



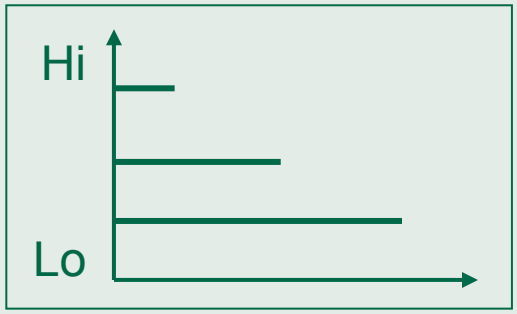
Priority to Agriculture (AgE/Bud)



Fiscal Capacity (Bud/GDP



Structure: Share of Agriculture (AgGDP/GDP)



Y Axis: level of country income per capita; X Axis: Ratios as defined

Priority to research

- In high income countries
  - Changing composition of AgRE away from productivity enhancement at farm level
  - Implications
    - Cumulative loss of productivity
    - Reduced spillovers in future for developing countries
    - Role of public sector research in structure, coordination and behavior of research and development

Priority to research (cont'd)

- IFPRI studies suggest research is most productive of investments in agriculture.
- Political economy of budget allocations need study (e.g. WDR 2008:
  - In India agriculture share in budget 11% but research losing to fertilizer, credit, electricity subsidies

Priority to agriculture

- Historical weakness of agriculture: low political voice, policy makers lack of knowledge of potential for pro-poor growth, prior negative experiences with agricultural projects.
- Structural adjustment protected certain areas (e.g. education) but not agriculture
- PRSP/HIPC stressed social goals and this influenced project selection

Fiscal effort or fiscal will?

- Taxable bases: what is reasonable effort?
- Fiscal centralization and decentralization
- Fiscal culture: circular problem of low revenue, low service, low compliance, corruption
- Fiscal strategy: future tax revenue as criterion in public investment? (Easterly)

Allocation of resources

- Efficiency of public management
  - Medium Term Expenditure Frameworks helped focus priorities in general; did less well in controlling actual expenditure
- Efficient financing
  - For example, competitive funds, payment for services, farmer check-offs, sales

Structure of economy

- Transforming countries offer chance to effect change for benefit of agriculture:
  - Growth of new sectors and tax bases
  - Markets and infrastructure offer opportunities for flow of inputs and new technology
- Need conscious effort to build support to R&D into transforming structures

Institutional and Human Capacity Development

- Balanced growth of domestic knowledge systems
  - NARS: demographic profiles and attrition
  - Agricultural universities: research mandate requires expansion MSc and PhD training
  - Both hard and soft skills required for collaboration
  - Creating regional postgraduate programs and research platforms
  - Identification of the gap does not say how fast it can be filled: need for balanced growth
- Reforms in sub-regional and international collaboration: CGIAR, SROs in Africa, Regional Productivity programs

Summary

- There is underinvestment relative to
  - Opportunity for net social gain
  - Need to meet stated goals
  - To maintain productivity and future spillovers
- There is fiscal potential that requires public management reform and exploitation of new funding mechanisms
- More countries are entering stage of transformation where structural change favors a better effort for agriculture: plan for it
- Reinvest in both research and higher education: balanced growth
- A multidisciplinary effort to develop methodologies to quantify the options for addressing emerging challenges.

Implementation

- Process to frame the agenda
- Information
- Methods for integration across disciplines
- Instruments for implementation
  - Legal frameworks
  - Institutions and markets for payment of ecosystem services
  - Intergovernmental, transboundary mechanisms

Setting meaningful targets

- Policies based on consensus on 2050 scenario
  - Every tool is needed
  - Productivity increases our choice among goals
- Measures of national capacity
  - A “sufficient” NARS
  - National commitment commensurate with capacity
  - Sustainable data and information
- Public expenditure framework linking priorities to disbursement

Thank you