ASTI Agricultural Science & Technology Indicators

IFPRI® INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
Supported by the CGIAR

Agricultural R&D in Africa: Investment, Human Capacity, and Policy Constraints

Gert-Jan Stads

Program Coordinator, ASTI

Paris, 15 June 2011

OECD Conference on Agricultural Knowledge Systems:

Responding to Global Food Security and Climate Change Challenges

Outline of Presentation

- **Introduction to ASTI**
- Agricultural R&D investment and capacity trends in Africa and globally
- Private-sector investment in agricultural R&D
- Future directions to address current challenges in African agricultural R&D

Rationale for Monitoring the Allocation of Agricultural R&D Resources

- Extensive empirical evidence that agricultural R&D investments have greatly contributed to agricultural development, economic growth, and poverty reduction
- Policymakers are increasingly recognizing the value of greater investment in agricultural R&D as an essential element in increasing agricultural productivity
- R&D indicators are essential to measure, monitor, and benchmark the inputs, outputs, and performance of agricultural R&D systems.

Background – ASTI initiative

- ASTI compiles, processes, and publicizes data on institutional developments, investments, and human capacity trends in agricultural R&D in developing countries worldwide
- Led by IFPRI; funded by BMGF
- Collaborative network with a large number of national, regional, and international partners
- First-hand data collection on institutional basis
- Covering government, higher education, nonprofit (and private for-profit) R&D agencies
- Focus on input indicators (for now)

ASTI Methodology

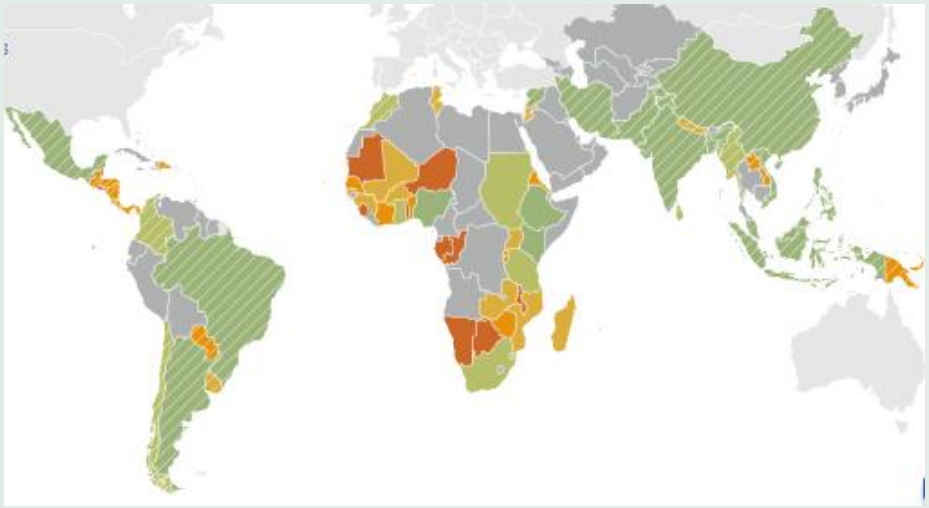
- ASTI data collected based on internationally accepted definitions and statistical procedures for compiling S&T statistics (OECD's Frascati Manual)
- This facilitates comparisons of ASTI datasets with other relevant S&T datasets
- FAO definition of agriculture: crops, livestock, forestry, fisheries, natural resources, etc.
- Aim is to provide:
  - Trends over time
  - Comparable information across countries and regions

Portfolio of ASTI Data at Country Level

- Institutional setup of agricultural R&D
- R&D spending time series data by cost category
- Time series data by funding source
- Time series data of researchers and support staff by degree and gender
- Age distribution of scientists (for some countries)
- Research focus data by commodity and thematic area

ASTI's Country Coverage

- Sub-Saharan Africa: 2008
- South Asia: 2009 (ongoing)
- China: 2007
- Other Asia-Pacific: 2002/03
- Latin America: 2006
- Middle East/North Africa: 2002



- OECD: external data

Current ASTI Outputs

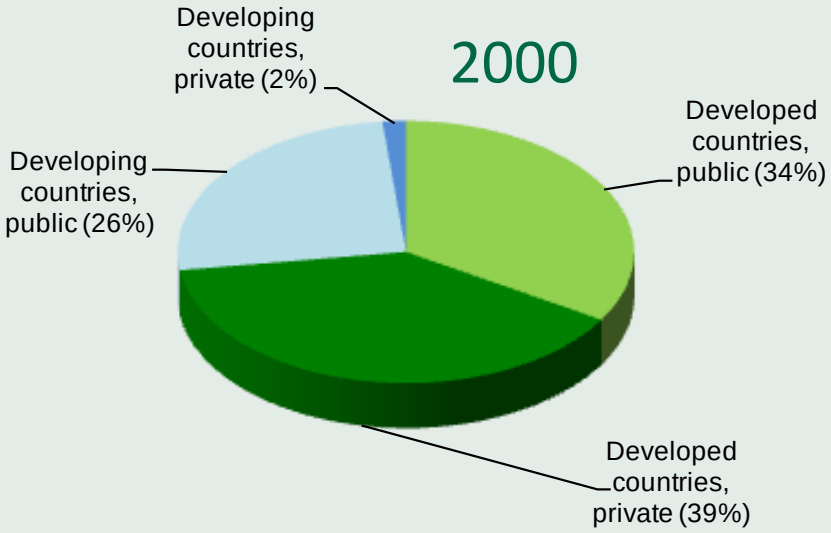
- Country notes
- Regional and subregional reports
- Data in-focus sheets
- Downloadable datasets
- ASTI website (www.asti.cgiar.org)
- ASTI blog (astinews.ifpri.info)
- Analytical assessments
- Country/regional/other seminars and presentations
- Press releases/media outreach events

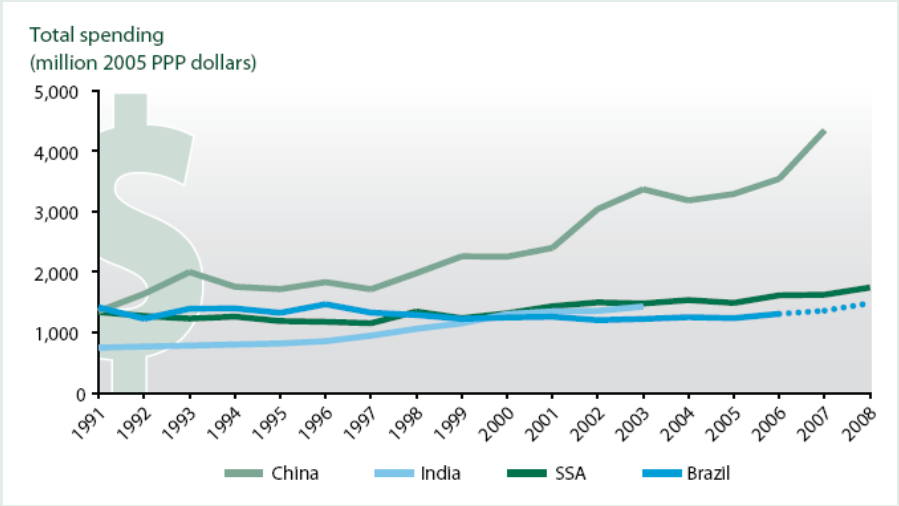
Outline of Presentation

- Introduction to ASTI
- **Agricultural R&D investment and capacity trends in Africa and globally**
- Private-sector investment in agricultural R&D
- Future directions to address current challenges in African agricultural R&D

Global investment in agricultural R&D

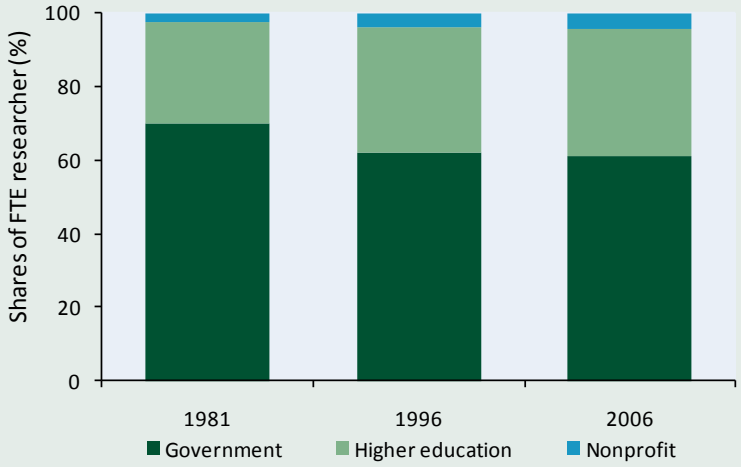
- 2000: $39.6 billion (in 2005 PPP prices)
- Private sector plays dominant role in developed countries; not so in developing countries
- R&D investments in China, India, and Africa have increased steadily since 2000
- After a period of stagnation, R&D investments in Brazil increased rapidly during 2006–2009



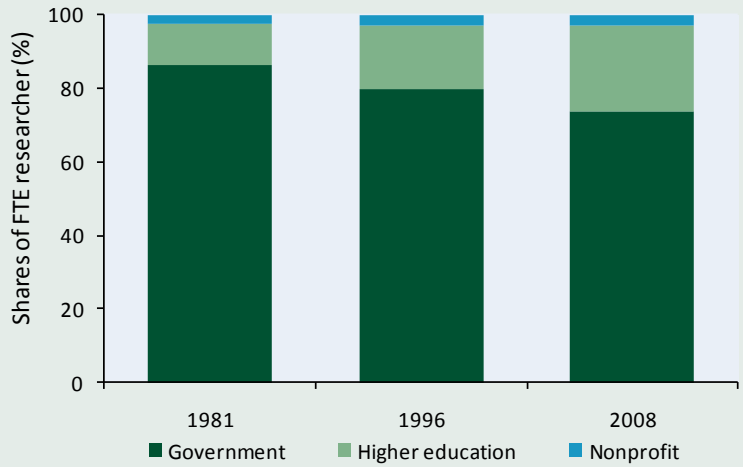


Gradual Shift in Institutional Composition of Public Agricultural R&D

Latin America and Caribbean



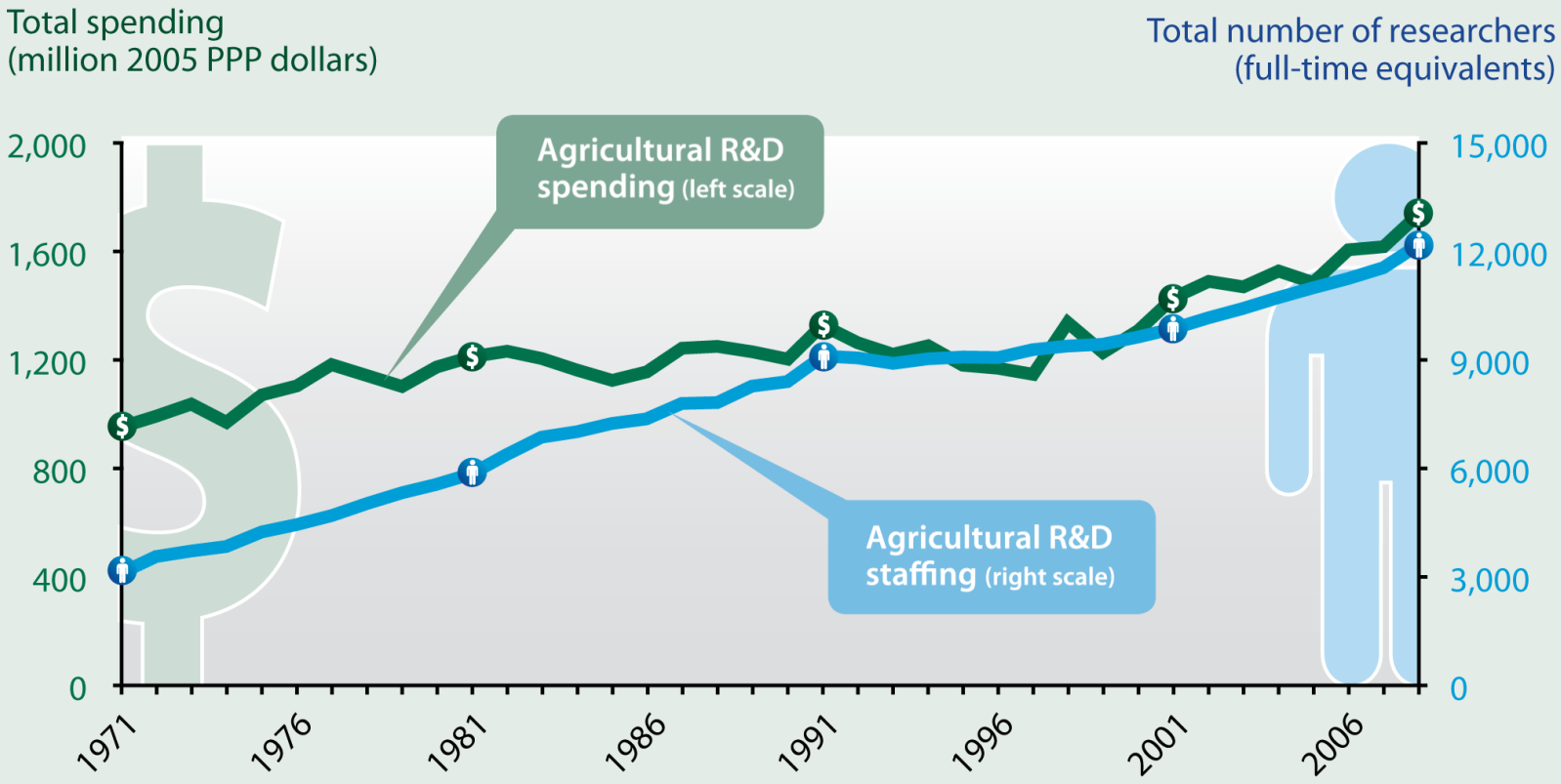
Sub-Saharan Africa



- Share of government sector in public agricultural R&D has gradually declined
- Many new (small) higher education units involved in agricultural R&D
- Regional averages hide significant cross-country variation
- Role of private sector very difficult to assess

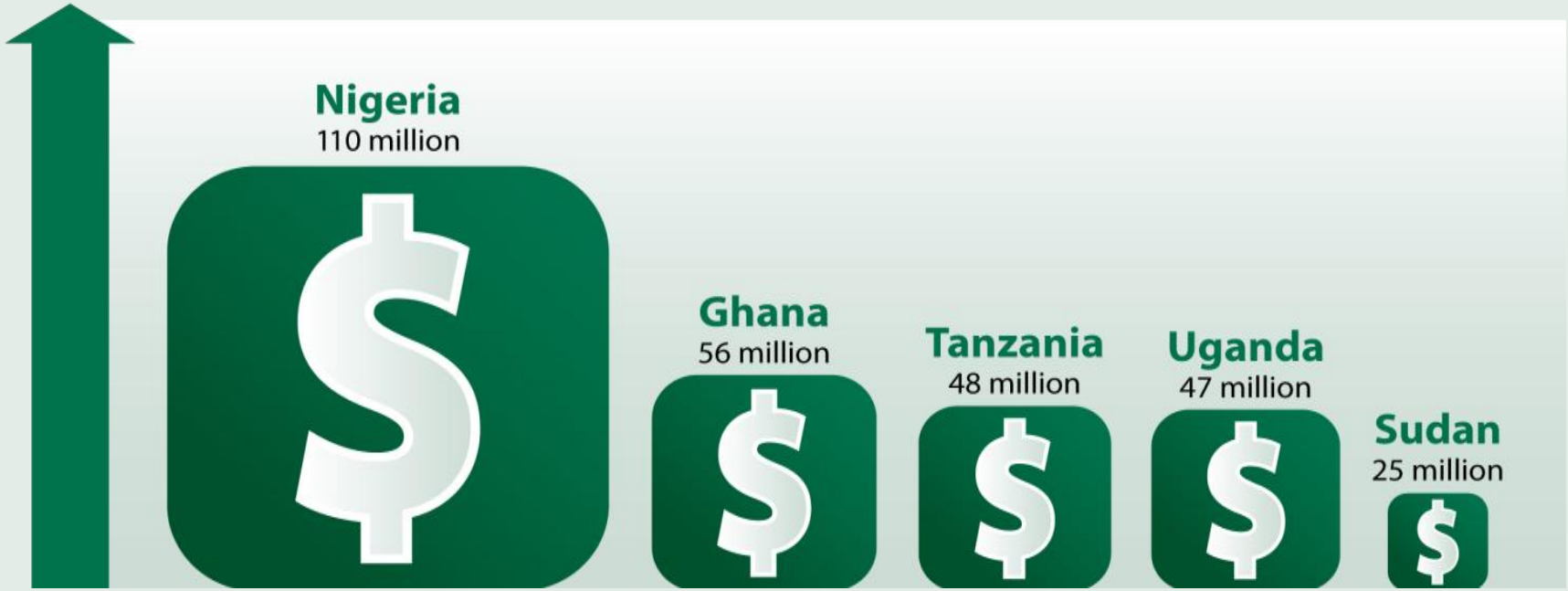
Long-term Investment and Capacity Trends in Agricultural R&D in Sub-Saharan Africa

- Agricultural R&D investments and capacity increased by more than 20 percent during 2001–2008



Main Drivers of Growth in Public African Agricultural R&D Spending, 2001–2008

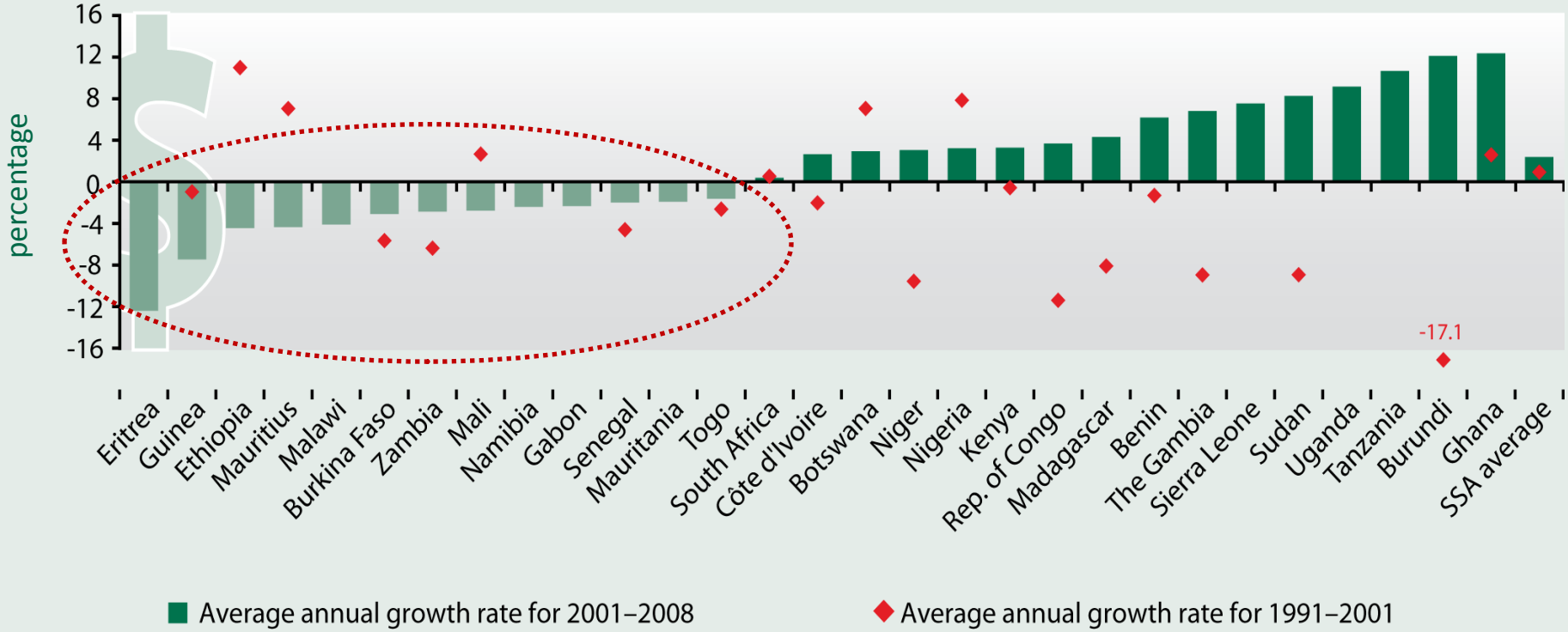
- Most of this growth occurred in only a handful of countries and was largely the result of increased government commitments to boost low salary levels and to rehabilitate neglected infrastructure.



All data in 2005 PPP dollars

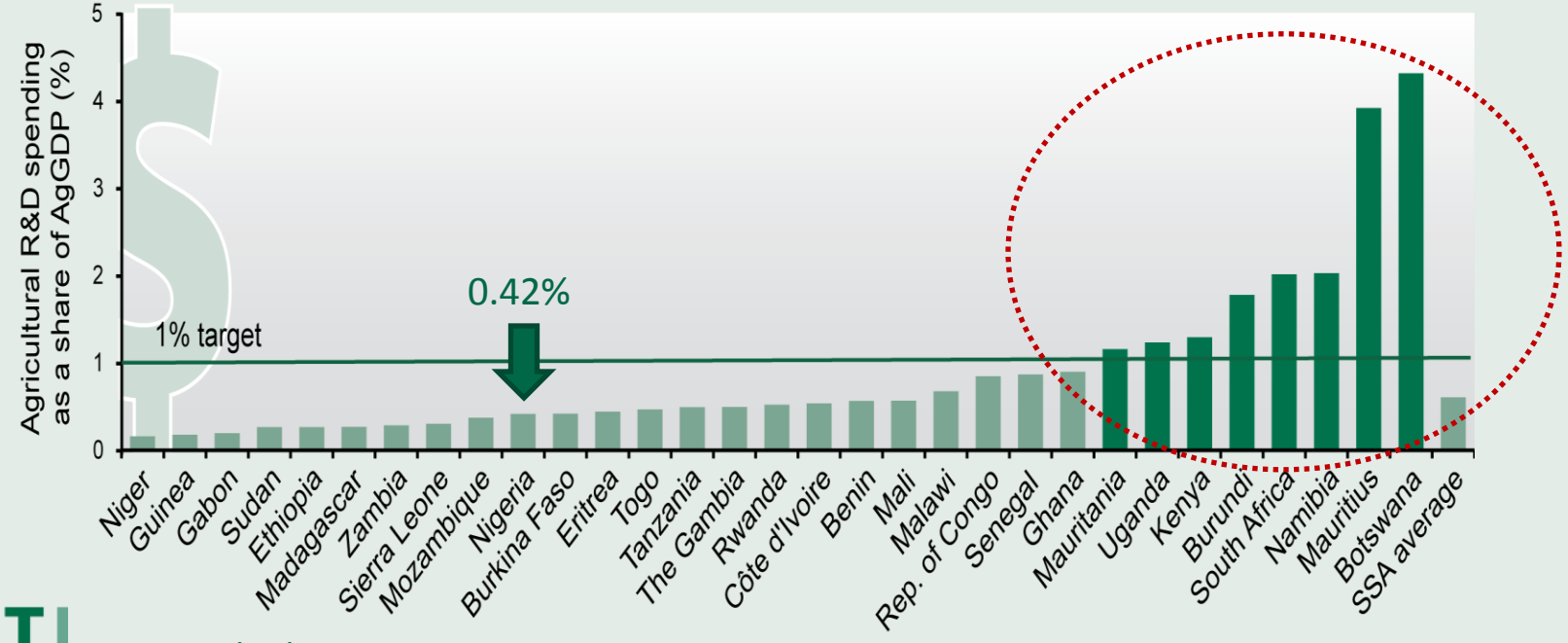
Important Cross-Country Differences and Challenges

- Total agricultural R&D spending fell in 13 sample countries during 2001–2008 (including many in francophone West Africa); Decline started in 1990s for some.



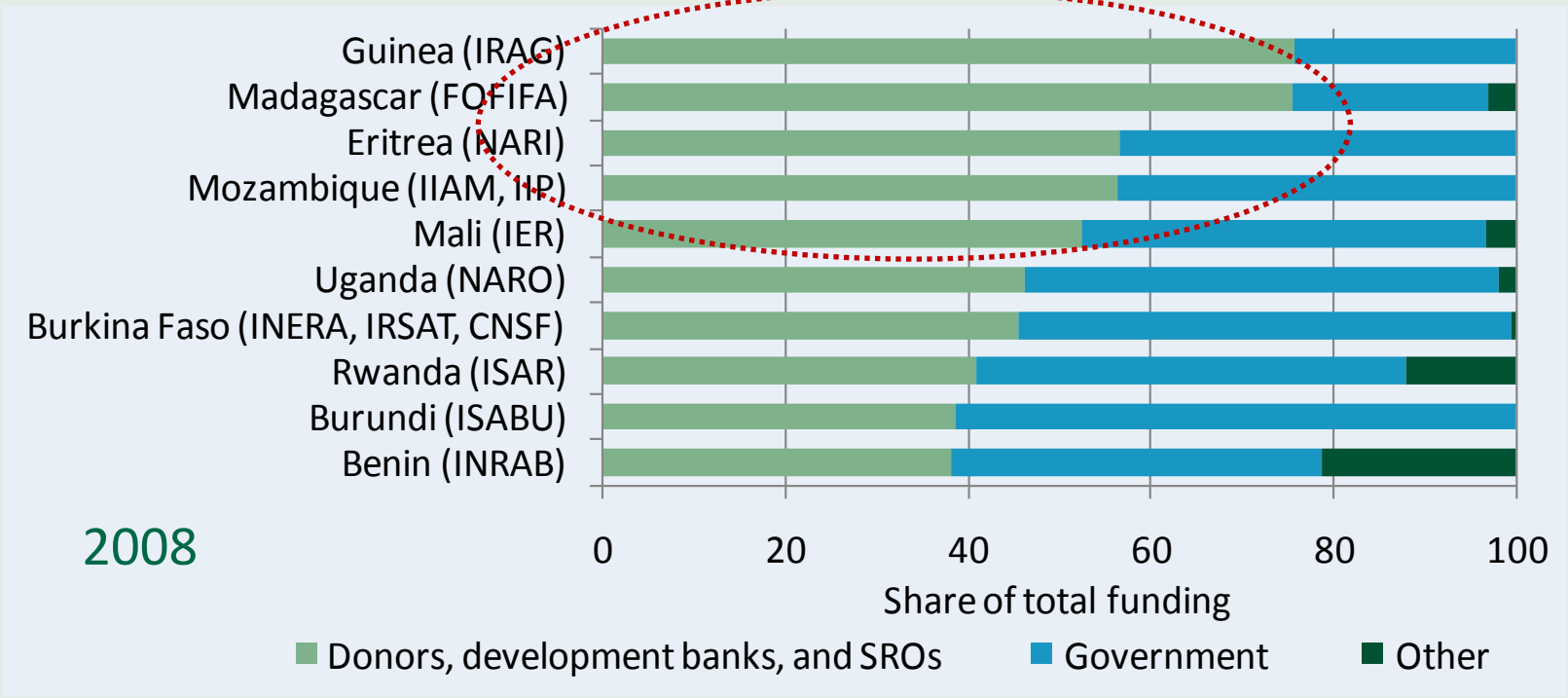
Severe underinvestment in African agricultural R&D

- In 2008, only 8 countries spent more than 1% of their agricultural GDP on agricultural R&D
- Some countries have such low (and declining) investment levels that the effectiveness of agricultural R&D on rural development and poverty reduction could be questioned



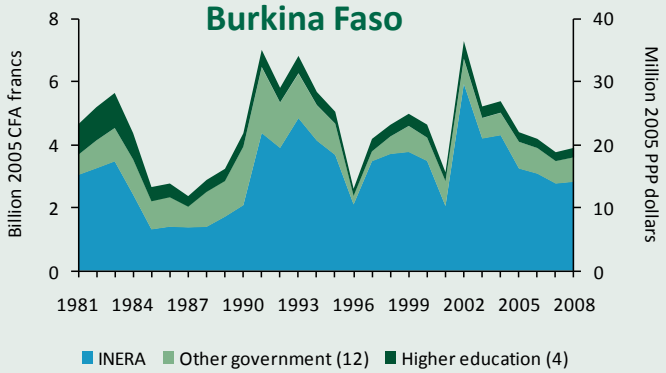
Dependence on Outside Funding

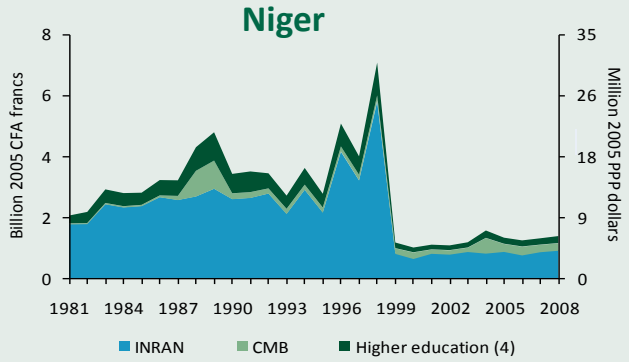
- Although the government is the principal funder of agricultural R&D in Africa as a whole, many R&D agencies are extremely dependent on donor funding and development bank loans

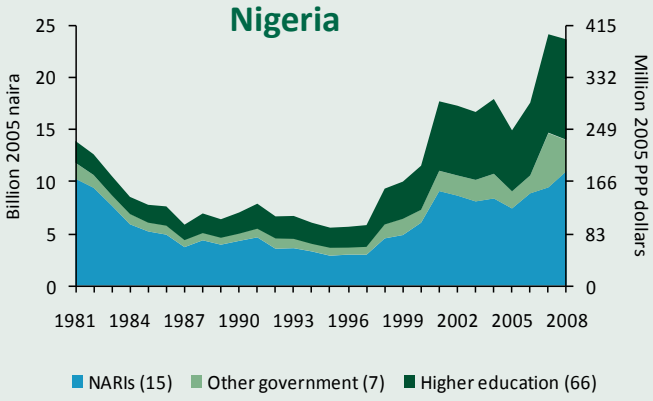


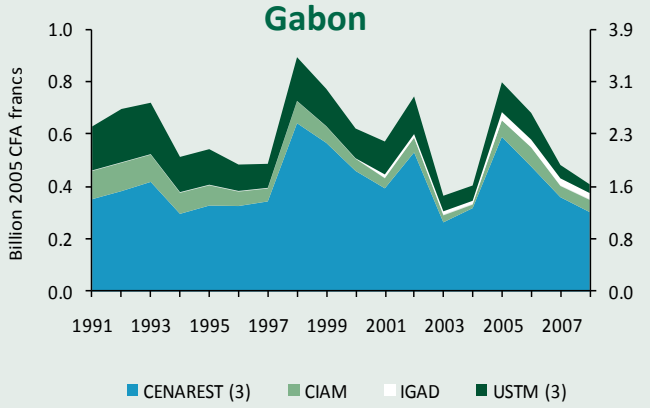
Wide Fluctuations in Year-to-Year Funding for Public Agricultural R&D

- Donor and government funding has been highly volatile, making viable long-term research programs difficult

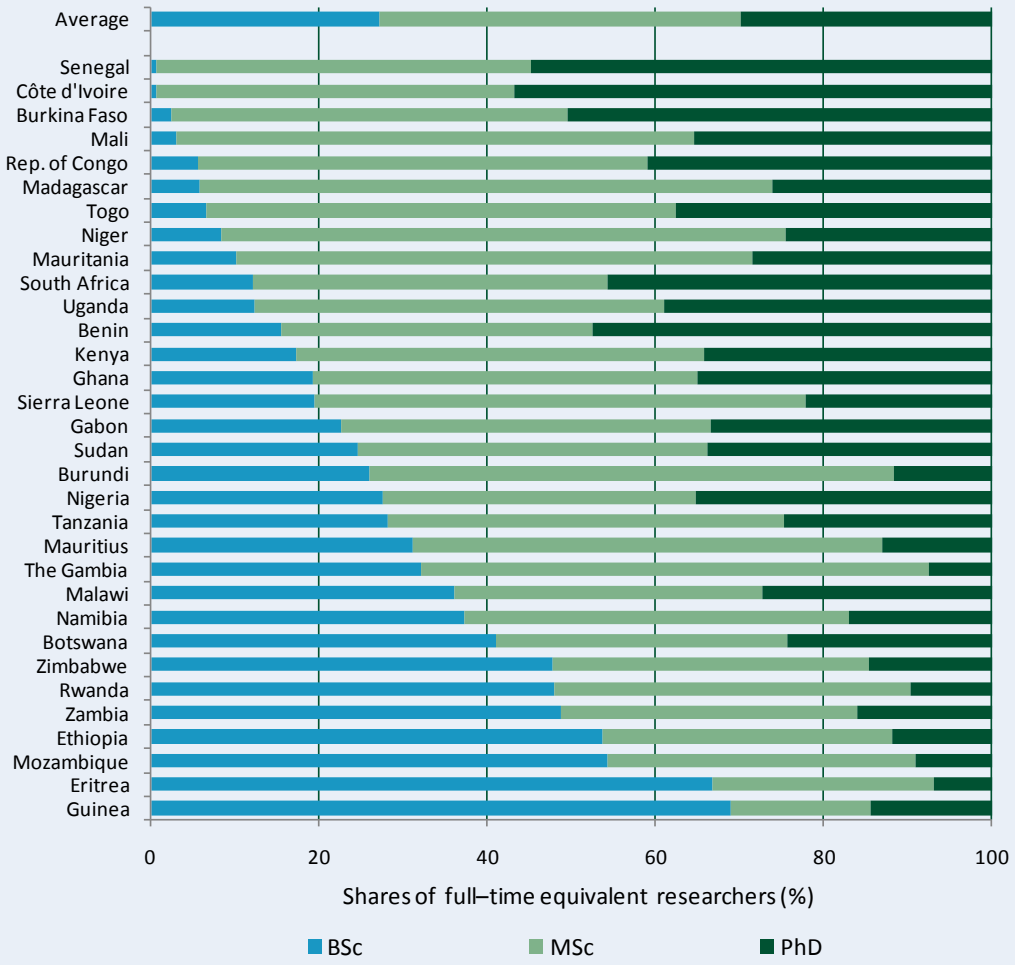








Human Capacity Development in African Agricultural R&D



- Researchers in francophone Africa more highly qualified
- Women are more represented in junior roles
- During 1970s and 1980s, many countries received considerable donor support for staff training abroad. By the late 1990s, many donors had cut/eliminated funding for training.
- Some smaller countries lack critical mass of PhDs

Pressing Human Capacity Challenges in African Agricultural R&D

- Many countries face rapidly aging pools of scientists due to public sector recruitment restrictions
- Large influx of young BSc-qualified scientists after years of recruitment restrictions in many (anglophone) countries
- High staff turnover / brain drain: Many researchers have left agencies due to low salaries / conditions of service
- Limited in-country postgraduate training opportunities

Outline of Presentation

- Introduction to ASTI
- Agricultural R&D investment and capacity trends in Africa and globally
- **Private-sector investment in agricultural R&D**
- Future directions to address current challenges in African agricultural R&D

Private-Sector Investment in Agricultural R&D

- Overall, private agricultural R&D investment is limited in the developing world.
- Private-sector involvement is higher in Asia and Latin America than in Africa.
- Private-sector investment is higher in export commodities than in food crops (complementary role in some countries).
- Difficult to obtain good private-sector investment data
- ASTI involved in in-depth studies on role of private sector in agricultural R&D and innovation
  (Bangladesh, India, Kenya, Pakistan, Philippines, Senegal, South Africa, Tanzania, Zambia)

Case Study: Private-Sector Agricultural R&D in Senegal

- In 2008, private sector accounted for 14% of total agricultural R&D spending.
- Widespread believe among companies that new technologies will come from the public sector or from abroad without having to invest in them.
- Companies involved in producing seeds, fertilizer, and pesticides, or horticultural companies spent roughly 1% of their total sales on R&D.
- R&D investments by cotton, groundnut, and fisheries companies were minimal (around 0.1% of total sales).

Case Study: Private-Sector Agricultural R&D in Senegal

Various recent policy reforms have directly or indirectly stimulated private sector opportunities, e.g.

- Regional seed, fertilizer, pesticide, and livestock regulations have been harmonized to reduce trade barriers in the subregion.
- The establishment of FNRAA, a competitive R&D fund, has enhanced public-private partnerships in research.

However, implementation and enforcement of policies is often poor. Besides, many companies reported that government policies and regulations often discourage private R&D investment.

(e.g. lengthy administrative procedures to import agricultural inputs, stringency in registration and release of new varieties, a lack of enforcement of unfair competition laws disadvantaging local companies, widespread piracy, high cost of patenting, lack of tax incentives).

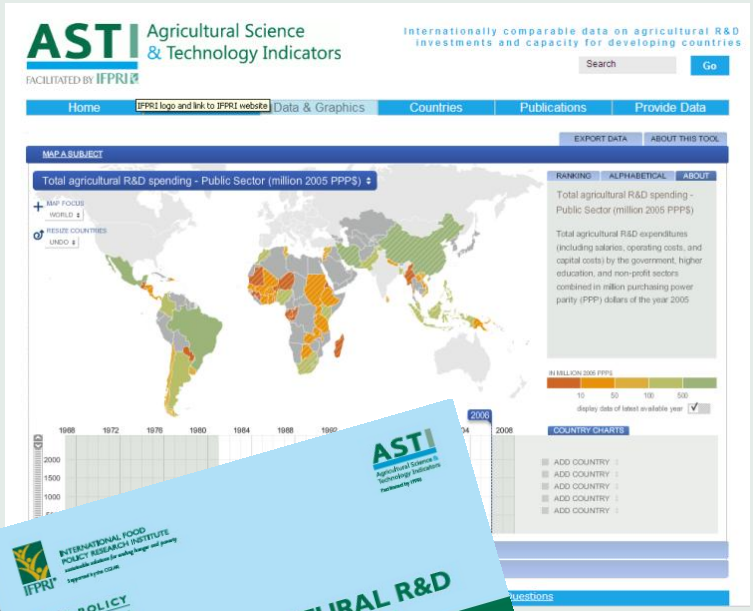
Outline of Presentation

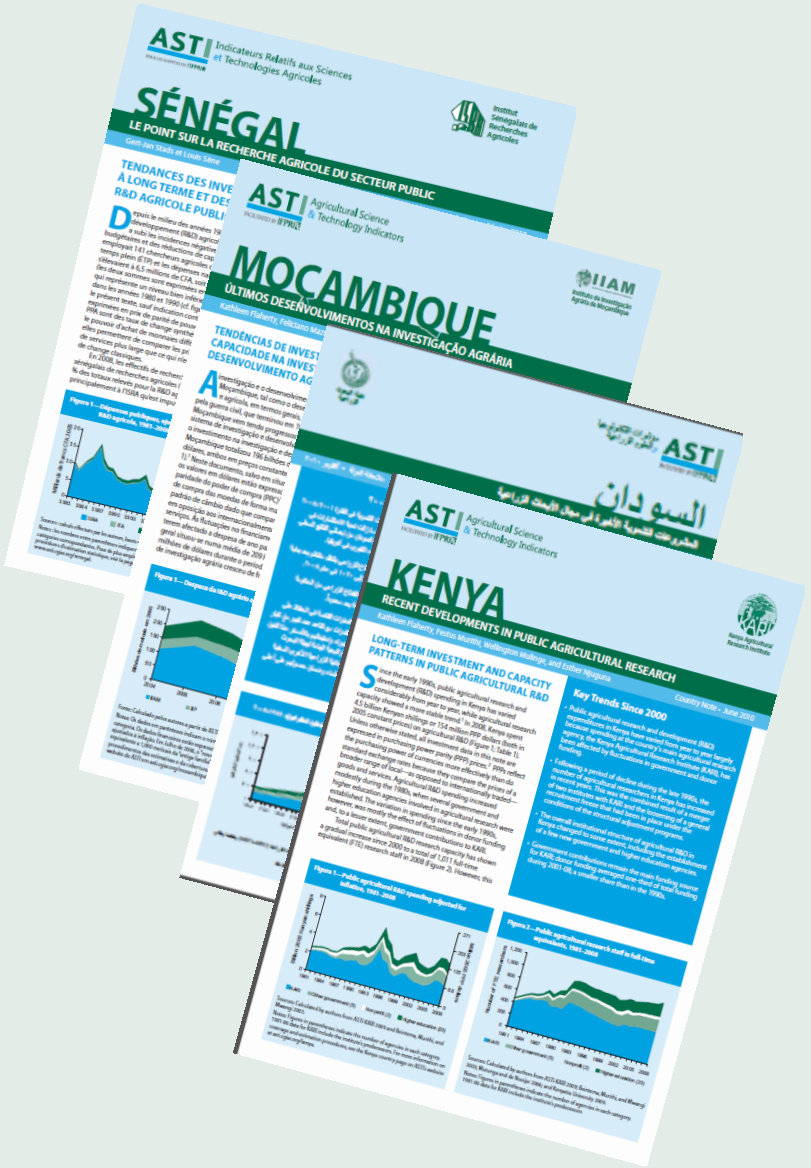
- Introduction to ASTI
- Agricultural R&D investment and capacity trends in Africa and globally
- Private-sector investment in agricultural R&D
- **Future directions to address current challenges in African agricultural R&D**

How to Address Current Investment and Capacity Challenges in African Agricultural R&D?

- National governments must provide higher and more stable levels of funding to public agricultural R&D. Governments will need to identify long-term national R&D priorities and design relevant programs while donor funding needs to be better aligned with these priorities.
- Governments must also create a more enabling environment to stimulate private-sector research.
- Governments (and donors) must address human capacity challenges in agricultural R&D (expansion of investment in agricultural higher education to allow increase in the number and size of PhD and MSc programs and to improve curricula of existing programs).
- Agricultural R&D must be maximized at the (sub)regional level. Many small countries often lack the required critical mass to produce high-quality research outputs.

Please visit www.asti.cgiar.org





Thank you