

Financial and Human Capacities in Agricultural R&D in Developing Countries: Recent Evidence

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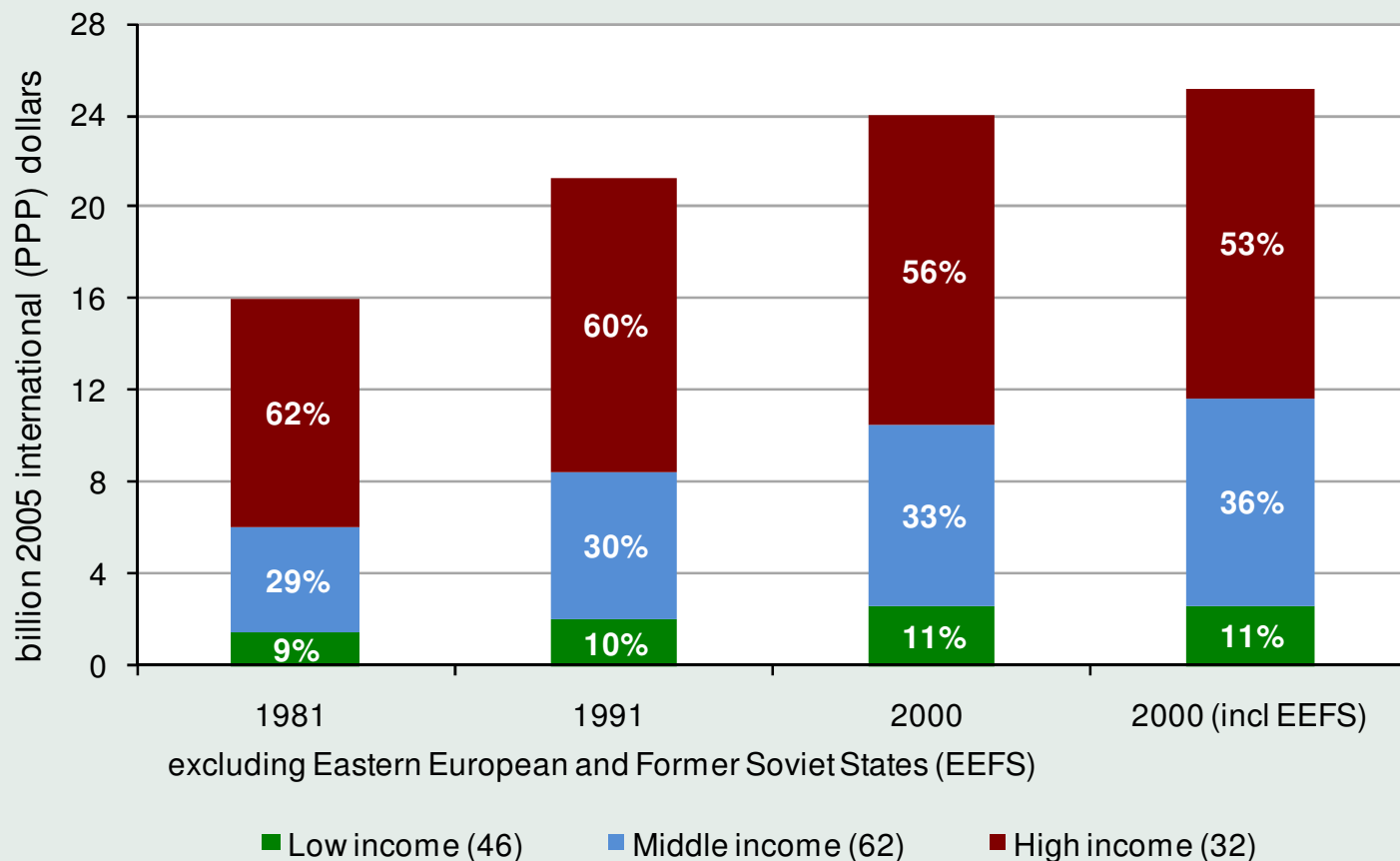
Background – ASTI initiative

- Collects and analyzes primary data on institutional developments, investments, and capacities on agricultural R&D in developing countries and links this to a few secondary data sources for the global updates
- Institutional survey rounds covering government, higher-education, nonprofit (and private for-profit) R&D agencies
- Collaborative network with large number of national, regional and international partners; facilitated by IFPRI
- Data collection is on a region by region basis

Background – GCARD presentation

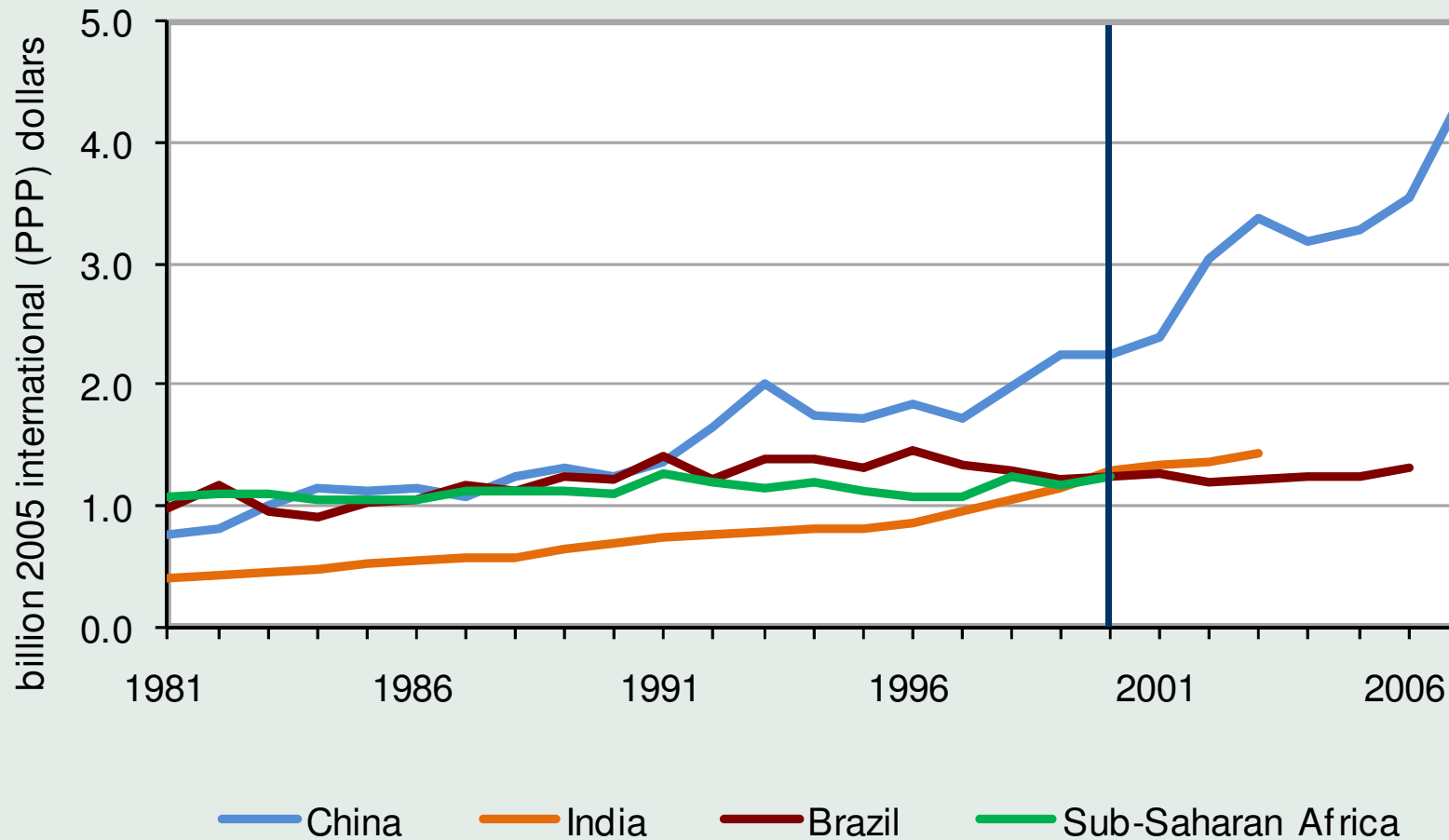
- Latest global update available: 2000 (second revision with major differences due to WB indicators + improvements in ASTI and secondary data sources)
- Post 2000 data for Asia-Pacific (2002/3), China (2007), Latin America (2006); first results Sub-Saharan Africa (2008)
- Global and regional trends mask a high level of diversity, which need more emphasis in the global/regional debates
- Is an intensity ratio of 1-1.5 percent a meaningful target?
- Data results focus on R&D inputs, not on performance

Public agricultural R&D investment by income group, 1981, 1991, and 2000



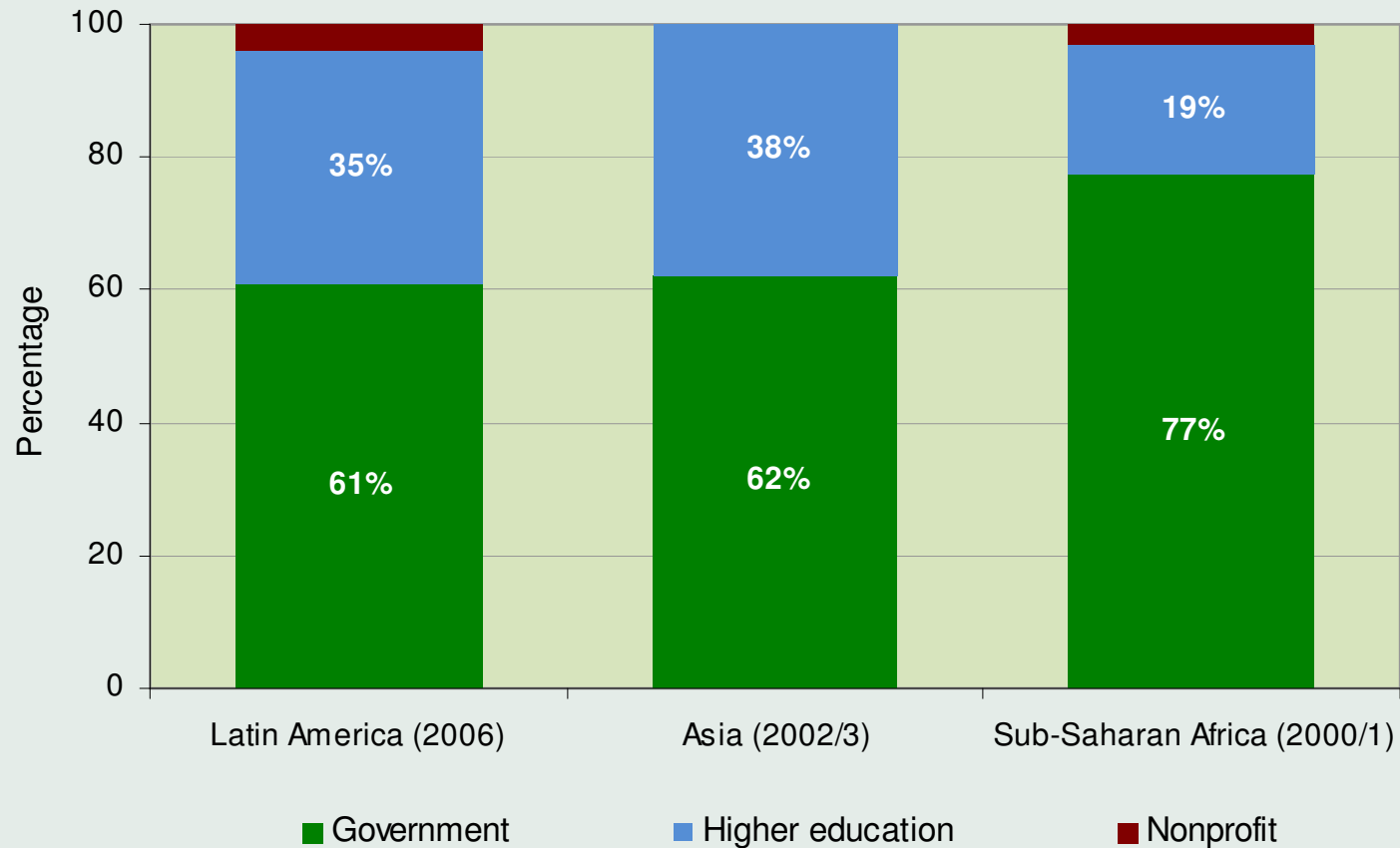
2000 share Brazil, China, and India in developing total = 41%

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



developing = low- and middle income countries

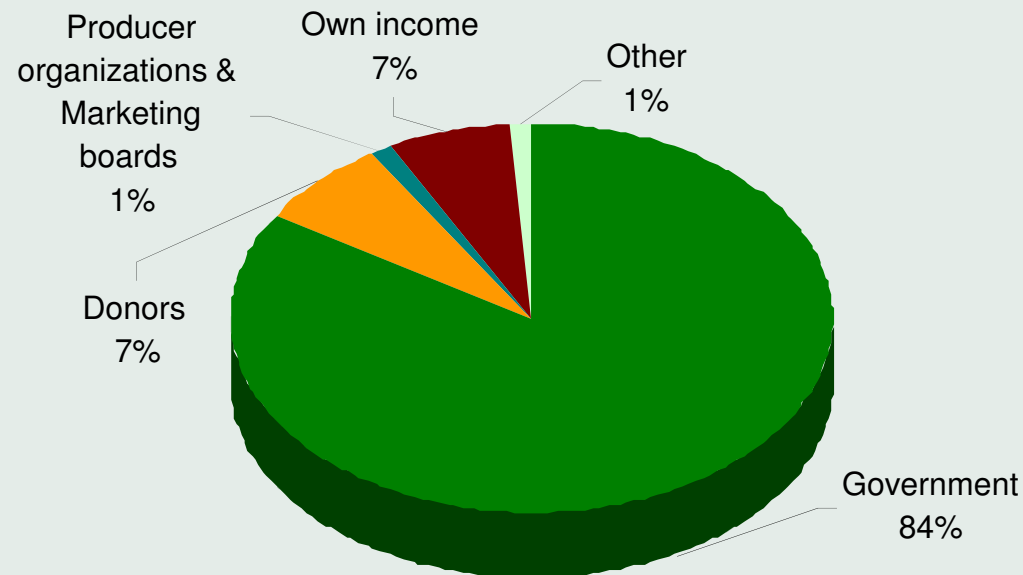
Governments remain main agricultural research performers.....



Sample of about 55 low- and middle income countries, excluding China

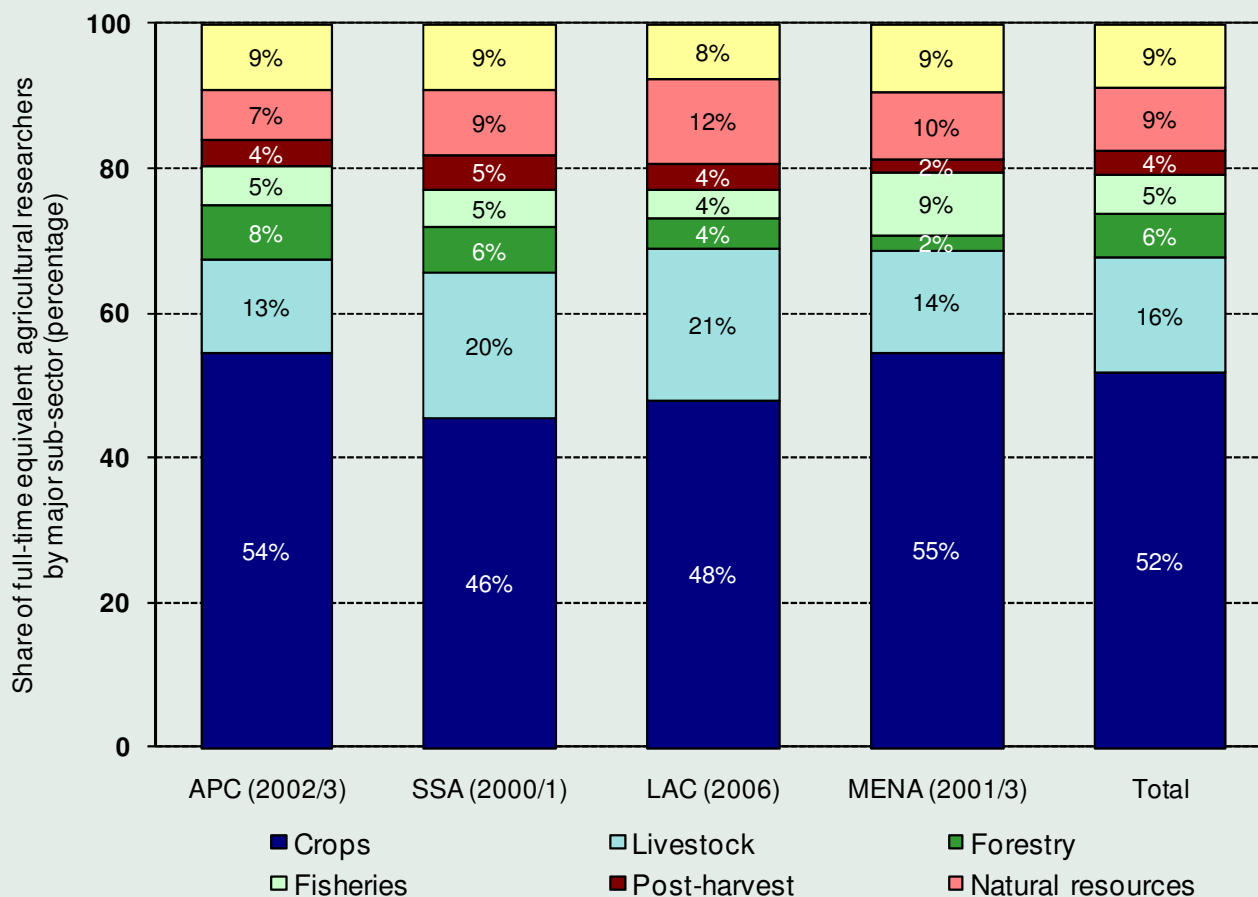
.....and funders of public agricultural research

Government agencies (371)
Total funding (2000s) = \$3,782 million (2005 PPP dollars)



Sample of about 55 low- and middle income countries, excluding China

Public agricultural researchers by major sub-sector, 2000s



Sample of about 55 low- and middle income countries, excluding China

Diversity across countries: Public R&D spending

- Asia-Pacific (evidence up to 2002):
 - Regionally growth was high since the mid-1990s due to substantial increase in India and China
 - Growth for China continues: adjusted for inflation 2007 level (\$4.3 billion) was close to twice the 2000 total (\$2.3 billion)
 - But spending growth in Pakistan, Indonesia, and Laos were sluggish or negative
- Latin America & Caribbean(evidence up to 2006):
 - Argentina, Brazil, and Mexico accounted for more than two-thirds of total regional spending in 2006
 - Spending at Embrapa increased with about 15 percent during 2006-08
 - In general, spending in middle-income countries increased while spending in low-income countries declined during 1996-2006

Diversity across countries: Public R&D spending (cont'd)

- Sub-Saharan Africa (evidence up to 2000 / 2008 in July):
 - Data up to 2008 for more than 30 countries are being synthesized and analyzed, some countries are finished
 - Ghana and Nigeria have seen substantial increased in spending in government sector since 2000
 - Developments in many francophone West African countries were not as favorable with declining or stagnating spending levels during 2000-08

Diversity across countries: funding agricultural R&D

- Government funding through block grants or competitive funding schemes
- Non-governmental sources of funding are increasing importance in many countries:
 - Donor funding: high dependency for many African, but also a number of Asian and Latin American countries
 - Generating internal revenues: China, Indonesia, Chile, Cote d'Ivoire
 - Production or export levies: Colombia (most advanced) but also in many other countries in Latin America, Asia, and Africa

Diversity across countries: R&D capacity trends

- No global trends available, only for some regions
- Most regions have made considerably process in building research staff capacity
- Capacity trends in most countries are less erratic than investment trends
- But high variation in the magnitude, growth and distribution in qualifications (PhD, MSc, and BSc) and gender
- Many African, but also other developing countries struggle to maintain viable agricultural capacities. This often a combination of aging research staff, brain drain, and bans on public-sector recruitment

Setting meaningful targets: Intensity ratios

- GCARD 2010 calls for countries to spend 1.0 to 1.5 percent of their agricultural output on (public?) agricultural R&D
- The evidence:
 - Average developing countries (2000): 0.6%
 - Average Sub-Saharan Africa (2000): 0.7%
 - Brazil (2006): 1.8% / China (2006): 0.5% / India (2003): 0.4%
- This means that, to reach this target, growth in public spending levels (assuming no growth in agricultural output) needs to be higher in China and India than, on average, in Sub-Saharan Africa

Setting meaningful targets: Intensity ratios (cont'd)

- Agricultural R&D investments can grow at a high pace, but with a similar growth pattern in agricultural output the intensity ratio will remain stagnant
- Or, an increase in the intensity ratio could be the result of a decline in agricultural output
- Need to assess the policy and institutional environment of agricultural R&D
- And the structure and size of the agricultural sector and overall economy
- Examples: research related to the agribusiness sector, spillovers, private sector involvement

Main recommendations to the proposed GCARD roadmap

- In addition to global/regional trends, emphasize the diversity across countries and in time in terms of financial and human capacities in public agricultural R&D
- In addition to increased investments in R&D, additional investments are urgently needed for human capacity building at universities and R&D agencies redress the declining researcher capacity (aging and brain-drain)
- Intensity ratios give a good indication of research investment levels, but they should be assessed within the overall context of (public) agricultural R&D and agricultural role sector within a country

Main recommendations to the proposed GCARD roadmap (cont'd)

- Not only look at the amount or intensity ratio but also at the efficiency of agricultural R&D investments
- Importance of up-to-date investment and capacity data for public and private sectors and improved dissemination to inform global, regional, and national dialogues
- Build capacity at the national level (where lacking) and collecting, synthesizing, and analyzing

Please visit www.asti.cgiar.org

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About ASTI
The Agricultural Science and Technology Indicators (ASTI) initiative compiles, analyzes, and publicizes data on institutional developments, investments, and capacity in agricultural R&D at national, regional, and global levels... [read more](#)

ASTI data tool
The ASTI timeseries database provides access to agricultural R&D indicators for developing countries in tabular format. For OECD countries, please refer to the S&T indicators provided by the OECD.

Latest Countries
• Argentina
• Chile

Key Publications
Latin America and the Caribbean: Trends in Agricultural R&D Capacity (2007-2010) (PDF 1.8 MB)
Measuring Agricultural Research: Global Indicators Underlying Data for FTEs (PDF 1.1 MB)
Agricultural R&D Capacity: Asia Pacific Region - 2007-2010 Synthesis (PDF 1.1 MB)

In 2000, the world spent \$23 billion on agricultural R&D (in 2005 PPP prices)

This represented an increase of nearly 50% over the level recorded two decades earlier

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MFA SUBJECT
VIEW SNAPSHOT DATA

MAIN COUNTRY:

COMPARE DATA WITH:

Total agricultural research expenditures (in million 2005 PPPs) public	150	168
Total agricultural research staff (in FTEs) public	1351.0	1351.9
Research staff by institutional category (in FTEs) government / higher education	1351.0	630.2
Public research staff by degree level (in FTEs) PhD / MS / BS	1351.0	642.7
Public female research staff (in FTEs) PhD / MS / BS	290.0	152.3
Public male research staff (in FTEs) PhD / MS / BS	1061.0	500.4

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Total agricultural R&D spending - Public Sector (million 2005 PPPs)

World map showing R&D spending by country. Legend: 0, 50, 100, 500 million 2005 PPPs. Year: 2000. Display date of latest available year:

Ranking
Total agricultural R&D spending - Public Sector (million 2005 PPPs)
Total agricultural R&D expenditures (including salaries, operating costs, and capital costs) by the government, higher education, and non-profit sectors combined in million purchasing power parity (PPP) dollars of the year 2005

COUNTRY CHARTS

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