

# Benefits and Costs of Stronger IP Protection for Asian Agriculture

Brian D. Wright

Agricultural and Resource Economics  
UC Berkeley

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What do *firms* and *countries* think about patents?

- Depends if they are **buying** or **selling**

# What do (some) **lawyers** think **economists** think about patents?

- Judge Rader, an intellectual leader of the Court of Appeals of the Federal Circuit will tell you (as he told the National academies in 2000):

***“All productive innovation in the history of the United States has been done by the private sector.”***

# What do economists think about patents?

1. Traditional tradeoff:

Incentive/monopoly restriction

2. Emerging concerns: uncertainty and transaction costs

3. On the horizon: importance of Venture capital/investment banking

4. Compared to what?

# Alternatives to Patents

- Creative urge
  - Farmer innovation: the original “*open source*”
  - Open source software
  - Scientists: *pay to play*
- Prizes
- Grants and contracts
- Patents
  - Wright, “The Economics of Invention Incentives: Patents, Prizes and Research Contracts” *American Economic Review* 1983

# What do economists think about TRIPS?

- Consensus (almost):

Less developed countries worse off  
USA better off

What can agriculture tell us about  
IPR and innovation?

# Agricultural Crop Research: Traditional “Open Source” Model

- Open access to University research
- Open access to landraces in centers of diversity
- Pooling of germplasm in *ex situ* genebanks
- Collaboration and free exchange of cultivars between International Agricultural Research Centers (IARCS) and National Agricultural Research Centers (NARS)

# Record since 1960s with “Open Source” Breeding:

- World population up 80%
- Cropped land area roughly constant
- Food prices have declined
- Income growth, not population is the big challenge (outside Africa)
- Average Less Developed Country (LDC) citizen gets:
  - **28% more calories**
    - » **59% more vegetable oil**
    - » **50% more animal calories**

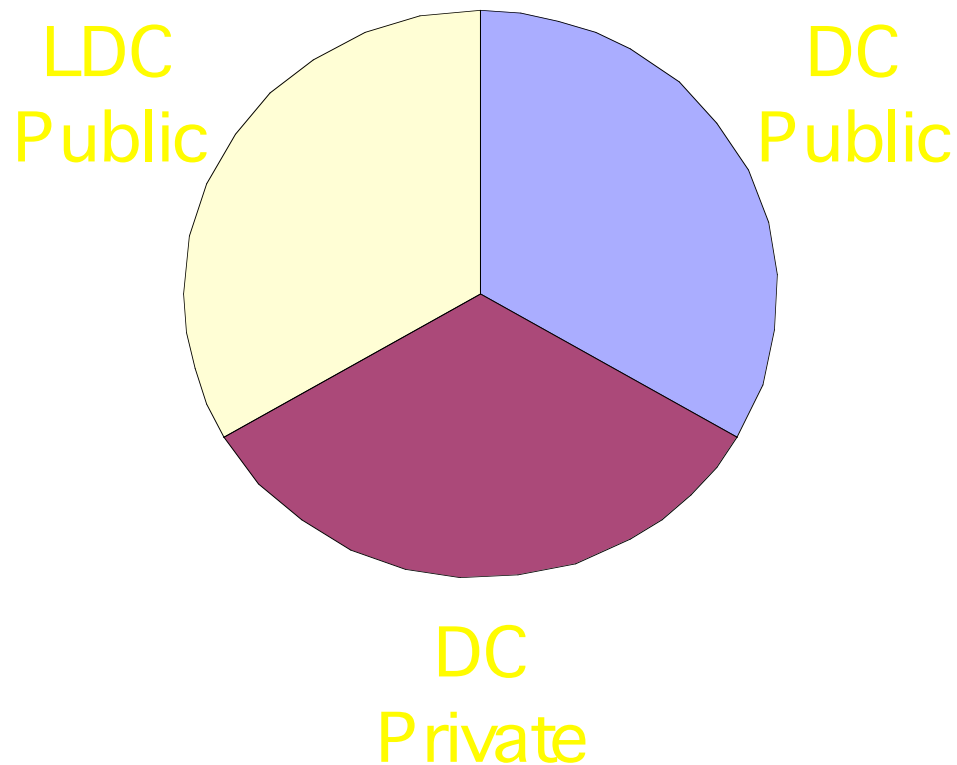
**Table 5: Rates of Return by Commodity Orientation**

Commodity orientation	Number of observations	Rate of Return		
		Mean	Minimum	Maximum
	<i>(count)</i>		<i>(percentage)</i>	
Multicommodity	436	80.3	-1.0	1,219.0
All agriculture	342	75.7	-1.0	1,219.0
Crops and livestock	80	106.3	17.0	562.0
Unspecified	14	42.1	16.4	69.2
Field crops	916	74.3	-100.0	1,720.0
Maize	170	134.5	-100.0	1,720.0
Wheat	155	50.4	-47.5	290.0
Rice	81	75.0	11.4	466.0
Livestock	233	120.7	2.5	5,645.0
Tree crops	108	87.6	1.4	1,736.0
Resources <sup>a</sup>	78	37.6	0.0	457.0
Forestry	60	42.1	0.0	457.0
All studies	1,772	81.2	-100.0	5,645.0

Source: Alston et al. (2000).

Note: <sup>a</sup> Includes fishery and forestry.

# Sources of Agricultural R&D Expenditures: Uniquely Diverse



# Most countries North and South spend little on ag. research.

Major exceptions:

1. USA, Japan, France and Germany spend 66% of DC total
2. China, India, Brazil Sth. Africa spend 40% of LDC total
  - But *intensity* not correspondingly skewed in LDCs

# Recent effect of IPR on agricultural research

- Privatization of breeding of a handful of crops in the North
- Public sector responsible for the rest, North and South
- South is **BIG** in ag research

# Dynamics of protection of inputs in crops where IPR prominent

- “**Anticommons**” problem in ag. biotech
- “**Freedom to operate**” a problem for public sector, nonprofits, private startups
- Licensing access: Private sector will not risk its reputation, resources in negotiation for low-value uses by public, north *or* south
- Public and nonprofits cannot solve anticommons problem by integration

# Internationalization of IPR for Agriculture

- Originated in US in 1980s
  - motivated in non-ag US sectors (pharma, electronics, apparel, entertainment)
- Trade-Related Intellectual Property Rights (TRIPS):  
Minimum IPR requirements worldwide
- Concessions allow *sui generis* system for plants: e.g. UPOV plant breeders' rights
- Doha: concessions on price discrimination and generic pharma, not extended to ag

# What does the future hold for Asian Agricultural R&D?

- Comparative advantage in ag. Biotech R&D in intermediate-income countries?
  - Cheaper scientists
  - Cheaper testing?
- Generic drugs as an analogue?

# What does the future hold for Asian Agricultural R&D?

- Indian pharmaceuticals as an example?
  - emerged as global input supplier for generics after Italian patent reform
  - Indian public research institutes **formed the human capital, but failed as commercial enterprises**

# What does the future hold for Asian Agricultural R&D?

- Indian pharmaceuticals as an example?
  - Success in global generics sales
  - Failure to address Indian needs
    - **Not serving the majority of Indians**
    - **Ignoring diseases important to India and other LDCs**

# TRIPS

- Will stronger patents benefit the “South?”
- Wrong question!
  - Too general

## Notable fact 1:

- Discussions of TRIPS distinguish interests and effects by *stage of development*
- Do not distinguish by ***size of economy***

# Size Matters!

- Internalization of benefits relate to size of global share
- In agriculture, problems solved by larger countries tend to be more distinct from those of others
  - because environment/resources/ecology more different
- Human capital less transferable because problems more different

## Notable fact 2:

A monotonic link between patent strength and

- ***FDI***
- ***Product introduction***

***has not been established at all by economists***

(See Lanjouw econometric study, Chaudhuri case study on Indian Pharma industry)

## Notable fact 3:

No country believes in complete private appropriation of IP

e.g. USA:

- Anthrax incident – compulsory license threat before mass deaths
- Appropriation of trained human capital  
Saxenian: CA labor law gives Silicon Valley an advantage over Route 128

If Asia ag industry has freedom to operate, what will it work on?

- Problems of its rural poor?
- Optimization of its rural resources?
- Most profitable innovation markets?

# What did Indian Pharma work on?

- Most profitable global markets: illnesses of rich in the North
- Comprehensive failure to:
  - Provide drugs to the poor
  - Address diseases unique to the South
- Can we expect more from private profit maximizers?

# Lesson: Intranational heterogeneity

- **What Indian Pharma wants is not what Indian health necessarily needs**
- But India may get what Indian Pharma wants

# Would Asian private ag. with strong IP behave differently from pharma?

- Globalized incentives, global freedom to operate would mean globally similar focus
- Would all good biotech seed producers behave like (an intelligent version of) Monsanto?
- Why not?

# Conflict: **Globalization vs. Market Segmentation**

- In staple foods, **consumer benefits come from lowering the price of food**
- In drugs, consumer benefits for large countries come from improvements in human health
- Neither necessarily consistent, **on a global scale**, with global profit maximization

# Emerging Conflict: Globalization vs. Segmentation of IP Laws

- Doha: access to drugs
  - merely an “emotional issue?”
  - delay in implementation of Doha has affected health and survival of humans

# Conflict: **Globalization vs. Market Segmentation**

- Without market segmentation, globalization plus IP is a threat to the welfare of vast numbers of people
  - **Profit maximization cannot serve all in need at one price**
- Similar issue may arise in **biofuels vs. global food access**

# Implications

- Patents are only one instrument in an optimized innovation landscape
- Upstream IP can be effective without patents: revisit Bayh-Dole?
- Future world IP negotiations must not be left to IBM, Phizer, Levi's and Disney

# Final Question

- Have you heard of the substantive patent law treaty?

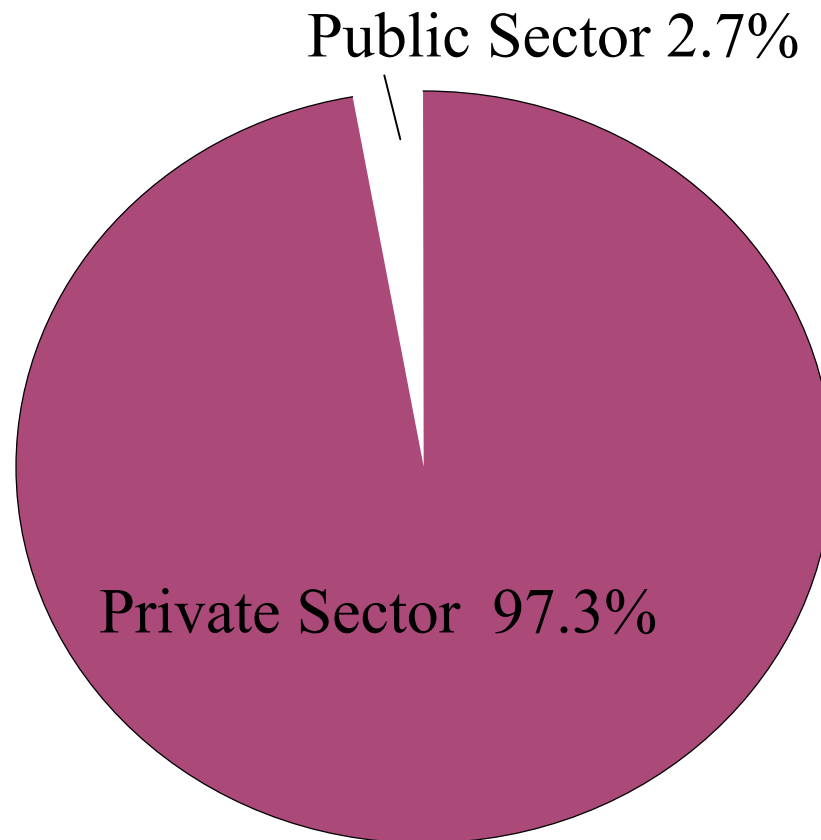
# Implications

- Have you heard of the Substantive Patent Law Treaty?
  - Get informed beyond the platitudes of the articulate uninformed!

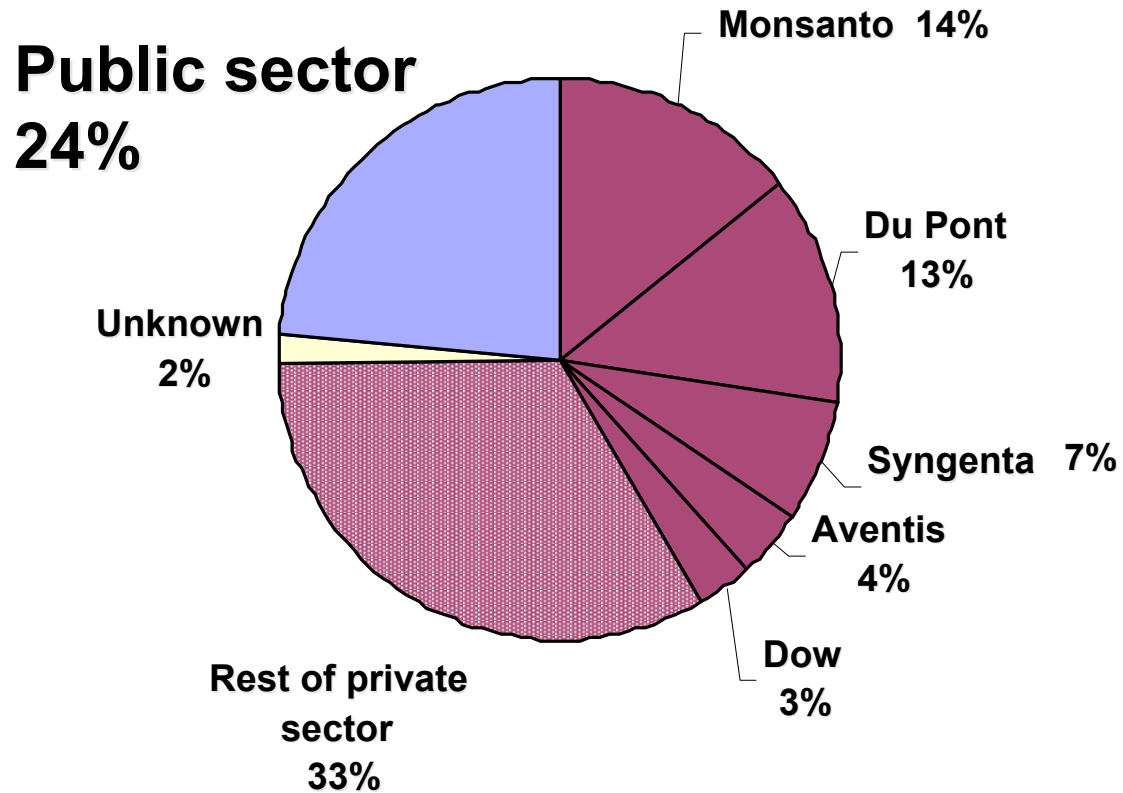
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# Public Sector Share of All US Patents is Small

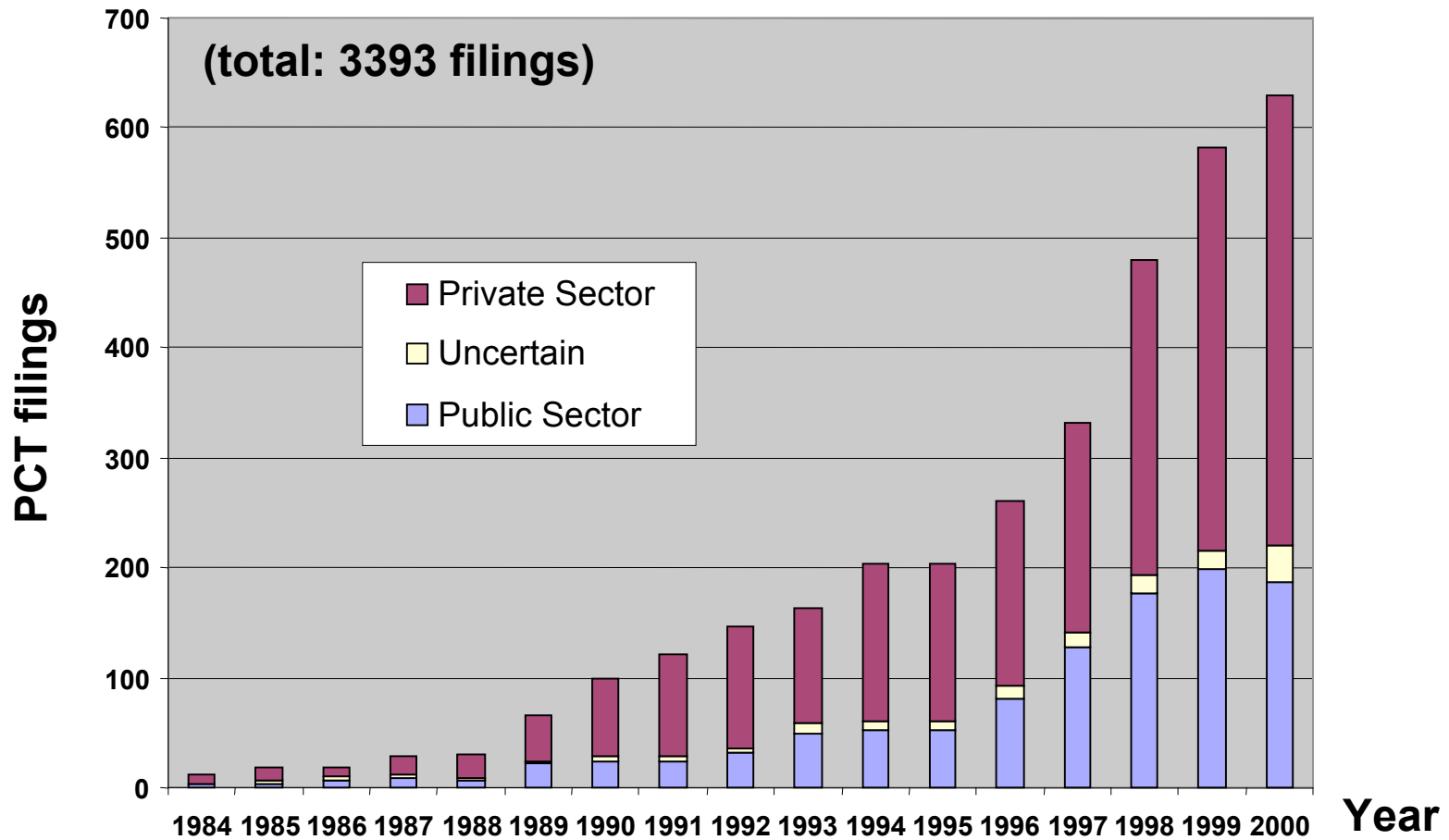


# Ag Biotech Is A Special Case Public Sector Patent Share is *Large* in USA

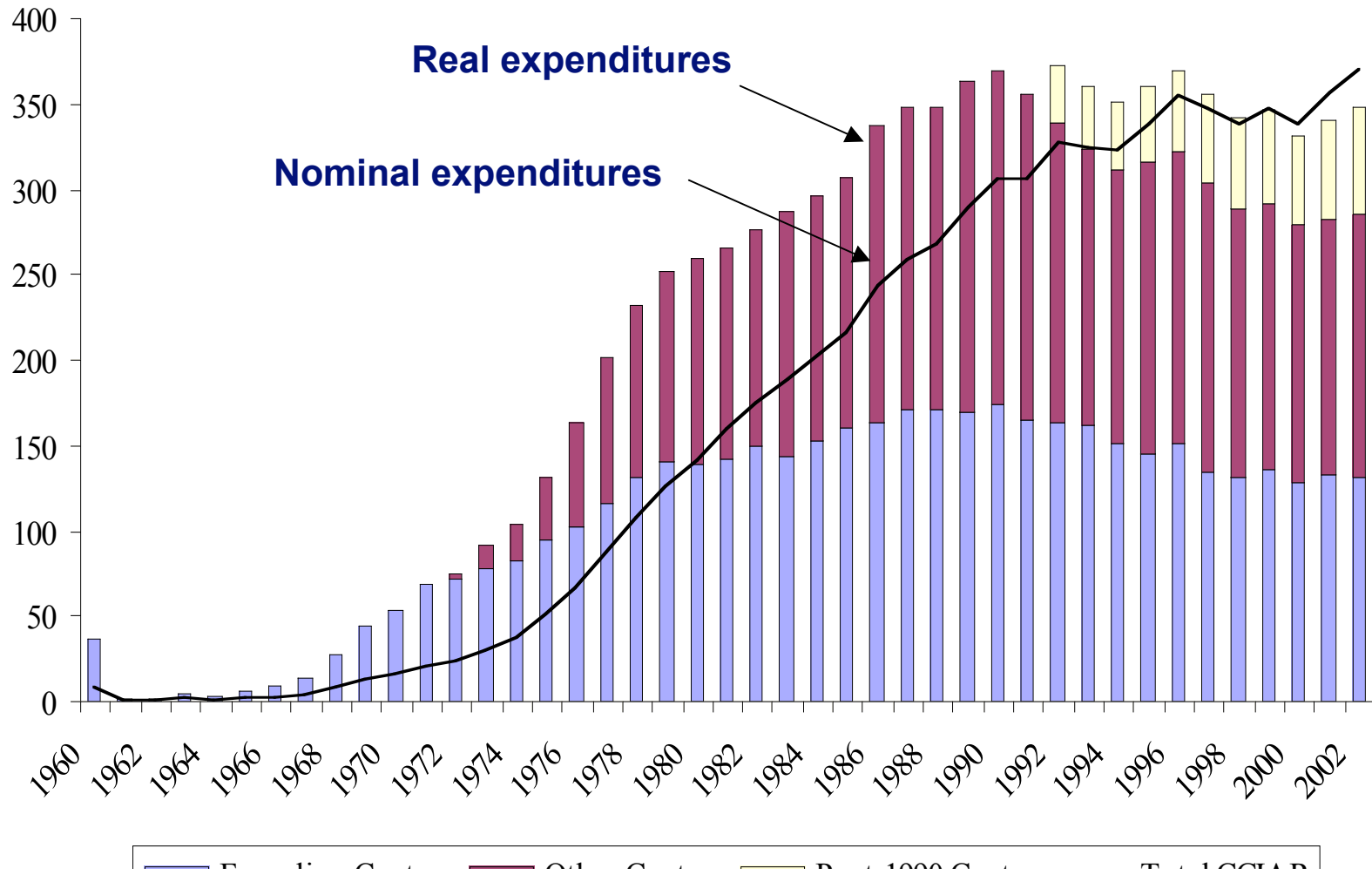


# Public and Private Sector Patenting: USA

## Annual PCT filings of plant biotechnologies 1984-2000

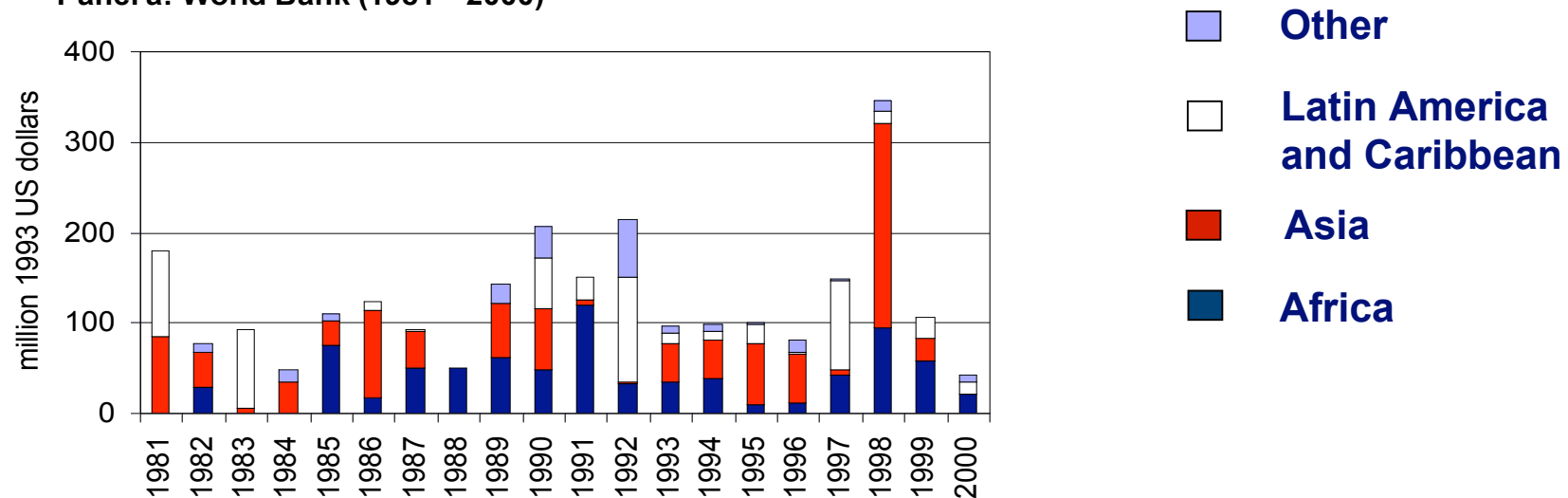


# CGIAR Spending, 1960–2002

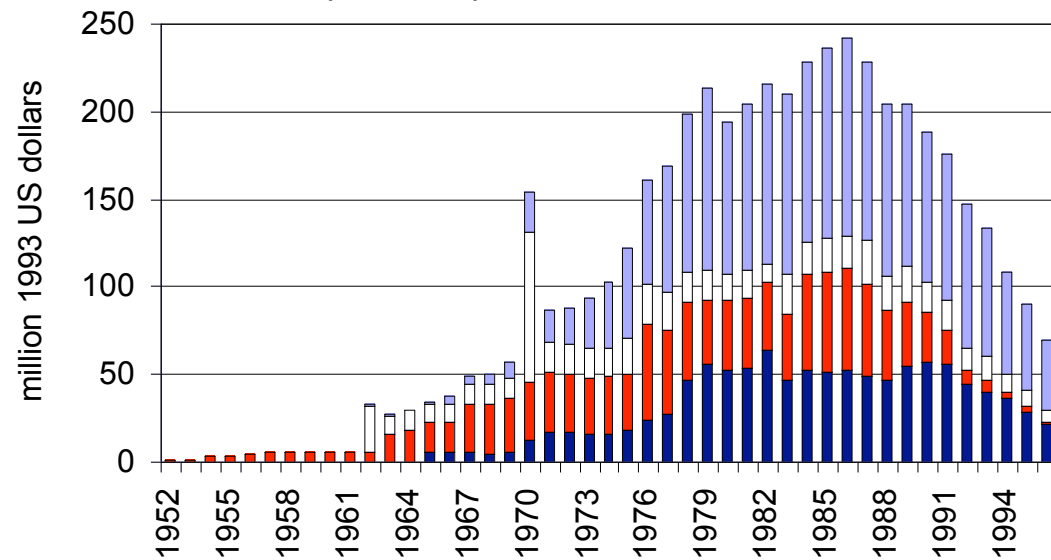


# USAID and World Bank Funding of Agricultural Research by Region

Panel a: World Bank (1981—2000)

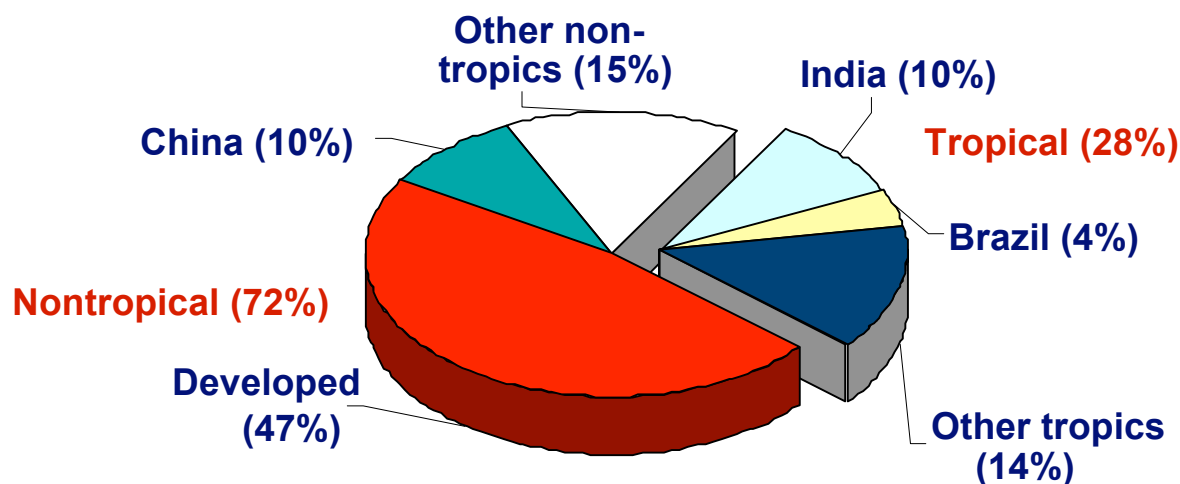


Panel b: USAID (1952—96)



# Agricultural R&D and Agro-ecologies

1995: \$21.7 billion in total



## Tropical countries (in 1997)

Share of agricultural land – 62 percent (1.44 billion hectares)

Share of population – 45 percent (2.6 billion)