INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

# *How innovative is your agriculture?*

A framework for designing an agricultural innovation indicator system

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## Overview

- **Purpose**
  - Discuss the use of innovation indicators as a tool to guide innovation policy and improve innovation performance in developing-country agriculture
- **Outline**
  - Why measure innovation?
  - Towards a conceptual framework
  - Indicators, indices, scorecards, and other tools
  - Agriculture-specific indicators
  - Project goals



## Why measure innovation?

- **Innovation measurements and indicators** are often used in industrialized countries to
  - improve national innovation and economic performance
  - guide science, technology and innovation policymaking
  - inform national and global deliberations on science, technology, and innovation

→ **demand for information to improve competitiveness, particularly in knowledge-intensive sectors and economies**

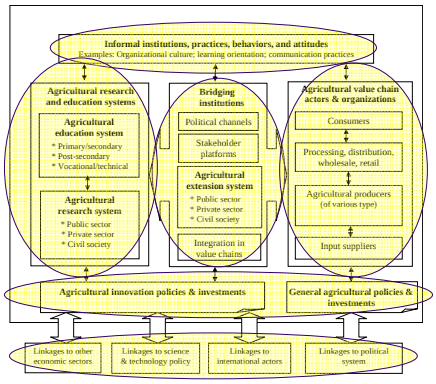
## Why measure innovation *in agriculture*?

- **Developing-country agriculture must change rapidly**
  - Growth of *markets* as driver of technological change
  - Demographic and agroecological pressures
  - Trade liberalization and new economic regimes
  - Growing private investment in knowledge & technology
  - Expanding information & communication technology
  - Increased availability of qualified expertise

**→ demand for information on ways to promote dynamic, competitive, and *innovative* agriculture in developing countries**



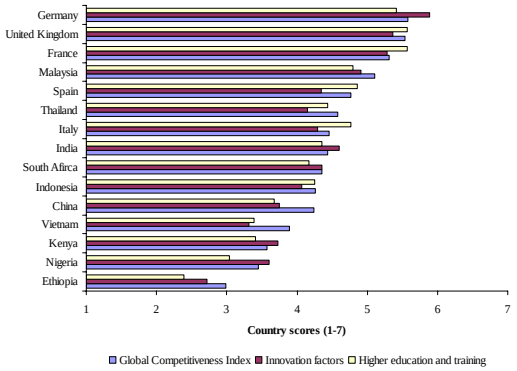
## A "systems" approach helps identify *what* to measure




## Indicators, indices, scorecards & other tools

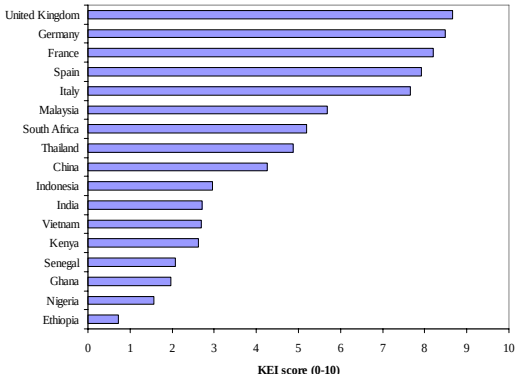
- **Different tools used to measure innovation include**
  - Indicators (e.g., OECD S&T Indicators)
  - Indices (e.g., World Bank Knowledge Economy Index)
  - Scorecards (e.g., EC European Innovation Scoreboard)

## Ex: Global Competitiveness Index, 2006



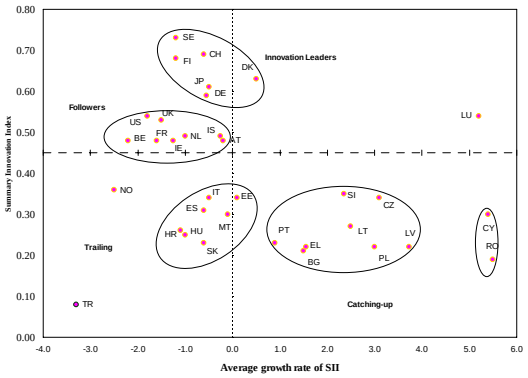

Source: WEF 2006

## Ex: Knowledge Economy Index, 2006




Source: KAM 2006

## Ex: European Innovation Scoreboard



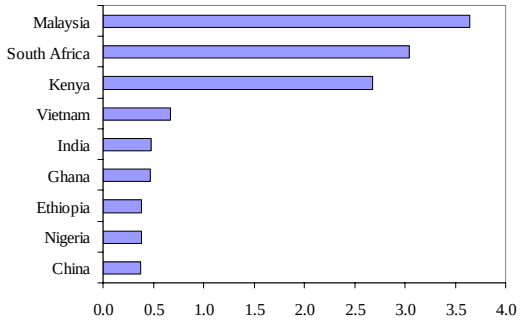

Source: CEC 2006; Hollanders, pers. comm.

## Agriculture-specific indicators

- **In general, there are very few initiatives that compile and analyze *agriculture* innovation indicators specific to developing countries**
- **Examples include**
  - Agricultural Science & Technology Indicators (ASTI) initiative
  - One-off research studies on key innovation domains (research, extension, value chain up-gradation)

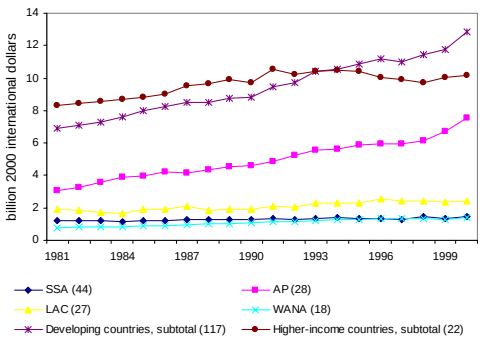


## ASTI: Public AgR&D intensities, c. 2000



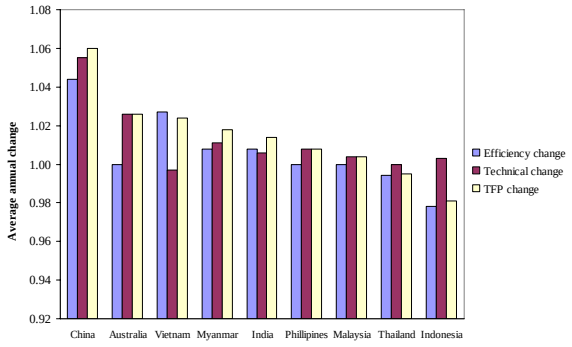

Source: ASTI 2006

## ASTI: Public Ag R&D spending, 1981-2000




Source: Pardey et al. 2006

## Coelli & Rao: Ag TFP growth estimates




Source: Coelli and Rao 2003

## Ex: Extension estimates, 1988

| | Expenditures on extension as a share of AgGDP (%) | | | Farmers per extension agent (1988) | Hectares of arable land per extension agent (1988) |
|---|---|---|---|---|---|
| | 1980 | 1985 | 1988 | | |
| Africa | 1.17 | 0.98 | 0.98 | 1,809 | 2,245 |
| Asia & Pacific | 0.48 | 0.68 | 0.56 | 2,661 | 1,075 |
| of which China | -- | -- | 0.44 | 2,455 | 629 |
| Latin America | 1.22 | 0.90 | 1.40 | 2,940 | 3,983 |
| Near East | -- | 0.96 | 1.00 | 2,499 | 5,403 |
| USA | 1.00 | -- | 1.15 | 325 | 19,441 |
| Japan | 0.42 | 0.37 | 0.37 | 407 | 337 |

Source: Roseboom 2004

## Ex: Value chain indicators

- Indicators of representative value chains in food staple crops, high value crops, and livestock include
  - Share/growth rate of agricultural value chains as a % of GDP
  - Share of farm output marketed commercially
  - Value of private firms operating in agricultural sector
  - Share of value added domestically to a commodity within a specific value chain
  - Share of FOB price retained by farmers for specific value chains
  - Degree of price volatility for a specific commodity

Source: Kaplinsky & Morris, 2001; authors

## Project goals and methods

- To design, compile, and analyze indicators to capture key domains of an agricultural innovation system
- Key features
  - Combination of hard and soft data
  - Capturing innovation inputs, outputs, *and processes*
  - Focusing on a range of innovation agents and institutions
  - Accessible data/methods for country/cross-country analysis
  - Packaged to serve *both* researchers and policymakers

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## Data and data sources

- The biggest challenge: finding reliable data and data sources
  - International sources
  - Government sources
  - Industry sources
  - Market- and firm-level analysis
  - Expert sources
  - Other sources

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## Questions for discussion

- Can innovativeness in agriculture be measured?
- Are data available? can they be collected/compiled?
- Can measurements of agricultural innovativeness inform policymaking in a given country?
- Can data be gathered on a regular basis to ensure long-term relevance and value?
- Who will gather it, and at what level?
- What are the cost implications?

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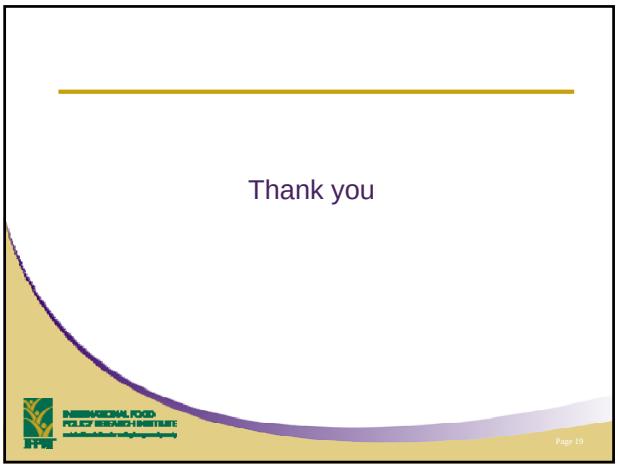
Thank you
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