TCI Investment Days 2012
Plenary - Innovations to improve agricultural productivity

Emerging Knowledge on Agricultural Innovation Systems

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Outline of the Presentation

• Basic approach - Agricultural Innovation System
• Importance/role of private sector in agricultural innovation
• Key approaches/instruments to invest in PS-led innovation
• Implications for the World Bank projects
• Project examples

www.worldbank.org/ARD/AIS
What is Agricultural Innovation and an AIS?

Innovation - the process of creating and putting into use combinations of knowledge from many different sources.

Beyond inventions – technical, organizational, process innovation.

AIS can be considered a network of public, private, civil, FA actors engaged in the generation, dissemination and use of knowledge and information for innovation, together with the institutions, policies and the wider enabling environment that affect their behavior and performance.

Emphasis on actors & context – why?
Ability to innovate ... besides technical skills and R&D, is closely related e.g., to collective action and knowledge exchange, skills, incentives and resources for collaboration, conditions that enable adoption and innovation. → organizations, skills, mechanisms, processes and incentives.
Past efforts on investing in agricultural innovation

**Technology**

- Early 1980s and beyond: Bricks and mortar for research systems
- Late 1980s: Management of research systems
- Mid- to late 1990s: Down to the grassroots
- Current: Innovation systems

**Inclusiveness, growth agenda, agri-food system**

Successes in inclusiveness, relevance & accountability:
1. Stakeholder participation in research governing boards and advisory panels ...
2. Decentralizing research, to bring scientists closer to clients and better focus ...
3. Decentralized extension services...
4. Competitive funding ...
5. Producer organizations ...
6. Mixing public and private systems ...

→ ... a growing spectrum of initiatives to engage farmers and others more fully in the R&D process
The key Elements of Effective AIS - What ‘should’ and could be the areas of focus?

Overall fundamentals:
- Investments in science and technology are still a key
- Builds on good lessons from research, extension and education but with complementary interventions & other enabling conditions

Six overall elements of AIS (institutional approach):

1. **Policy coordination and collective action** for innovation:
   - Investments must be context specific and respond to the stage, vision and resources for development in a particular country-sector → Mechanisms for priority setting, assessments, M&E
   - Facilitating collective action & sector governance – governance, research/sub-sector/VC platforms, POs
2. **Extension & advisory services** as an integral part of the innovation continuum – pluralism & demand-driven, integrated services & brokering for functioning of AIS
3. **Research systems** : basics (infra and HR), management, resource balance, plus institutional mechanisms that enable demand articulation, partnerships, resource leveraging – co-innovation, market integration
4. **Private sector as an innovator** – views, needs, skills and resources for implementation
5. **Policy and enabling environment** - incl. regulatory frameworks, synergistic finance, markets and infrastructure investments
6. **Technical (incl. policy) & professional skills** – role of formal & informal AET in meeting modern agriculture-business needs (tertiary, vocational, on-the-job)
Importance and role of private sector in agricultural innovation?

1. Private sector investment in agriculture R&D has been rising for the increasingly high value and marketed oriented production systems in emerging economies.

2. Market-driven innovations often dominant - Transformative role of private sector in producing **goods and services** - **through innovation, partnerships and enterprise development**.

3. Strong links between knowledge and business development are a good indication of the vitality of an IS
   1. e.g. innovation & TFP and employment;
   2. pro-business environment, access to information, export opportunities and BDS & greater innovation

4. Main categories:
   • Knowledge and services
   • Technology development and commercialization
   • Other business related innovation.

→ Long-term strategy for Agriculture-Rural Sector Development: Building on the power of the private sector to drive innovation and economic growth
Public investments to promote private sector-led agricultural innovation - why?

Public investments for business development:
- ... important as they can accelerate and improve the quality of growth
- ... can direct private investments towards areas of public interest and areas where the private sector alone would under-invest

**Most important** - Innovation and business development by different stakeholders does not occur without a supportive environment.

Enabling conditions in a given context depend on:
- A set of conducive policies for innovation (e.g. innovation finance, taxation, tariffs, etc)
- Conducive regulatory frameworks: quality & safety, IPR, and biosafety
- Synergistic infrastructure, market, and financial services
Summary - the main instruments for engaging private sector

**General:**
- Overall conducive policy, legal and institutional framework* - incl. access to finance
- Coordination – AIS governance, VC coordination, innovation platforms, business associations, etc

**Specific instruments:**
- *For Knowledge Services and R&D:*
  - PPPs for out-sourced services and R&D (contracts) *
  - Innovation funds (CRGs and MGs)*
    (for multi-stakeholder R&D consortia, PPPs, or technology upgrading & transfer...)
  - Tax incentives
  - Pull mechanisms (reward ex post)

- *For technology commercialization:*
  - Incubators (small or new firms)*
  - Technology Transfer Offices (legal, IPR, business)
  - Science parks (PPP for technology & products)

- *For innovation via other business development:* above plus BDS* and cluster development* (new)

- Currently the main ones used in the WB supported projects
### WB Agriculture Innovation Portfolio & Role of S&T&I and Private Sector

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<th>Local focus</th>
<th>Limited ST but innovation</th>
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<tbody>
<tr>
<td>Livelihood</td>
<td>Productive Partnership projects</td>
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<tr>
<td>Agr. Competitiveness/Agribusiness</td>
<td>Advisory Services and/or R&amp;D Regional centers of excellence</td>
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<tr>
<td>Sub-regional/National Significant ST&amp;I inputs</td>
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#### Projects with strong IS features:
- AIS projects
- Multi-sectoral IS

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<th>Local collective action – SHGs, councils...</th>
<th>Sub-national/Commodity specific; Coordination of sellers and buyers; RPOs &amp; brokering.</th>
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<td>Enabling environment - esp. for business development;</td>
<td>Ag technology-services with a strong ST focus, organizational change; end-user focus but limited / increasing PS input</td>
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<tr>
<td>Strong STI and/or PS focus; Moving beyond research to address growth – balance b/w basic and adapted R&amp;D but operations emphasis on the latter; Organizational change;</td>
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<th>Social, technical &amp; market focus</th>
<th>MGs for productivity, business, market</th>
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<td>Collective action for (sector) sub-sector;</td>
<td>Coordinated /inclusive agenda setting; Enhanced links b/w research &amp; extension;</td>
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<td>Increasing policy engagement, stakeholder coordination and mechanisms for (A)IS intelligence &amp; evaluation; Enabl. regulatory &amp; business env.</td>
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<th>MGs: business upgrade, market entry, technology...: BDS, finance, infrastructure...</th>
<th>GRGs &amp; TA; Rarely MGs plus incubation and IPR support. Gradual focus on AET: skills for the market &amp; long-term.</th>
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<td>Consortia/alliances &amp; PPPs; National STI Funds; Commercialization &amp; business innovation – via innovation Funds, Incubators/TTOs, Tech Parks.</td>
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How do we engage PS in agricultural productivity & innovation projects?

Main Approaches:

1. Research & innovation projects, applying consortium approach for R&D – India, Bolivia, ...
2. Research & innovation projects, promoting PPPs (CRGs and MGs) for agricultural technology and/or transfer – Colombia, Chile, China, Indonesia, Vietnam*...
3. Agribusiness/value chain development projects – supporting e.g., technology acquisition, transfer, business upgrading – Ethiopia, Zambia, ...
4. Productive partnerships – promoting demand-driven productivity and market links b/w large buyers and multiple small sellers – LCR, PNG, Vietnam, ...

* Africa regional research projects apply competitive research grants but have rather limited PS engagement (primarily on R&D on livestock, seeds but most focus on partnerships for dissemination)
NAIP fosters Innovation & Pluralism in Agricultural Research

**What:** a country wherein investment approach has evolved from separate research or extension to AIS & integrated tech. generation and uptake pathway & greater small-holder and PS focus

**NAIP Objective:** To accelerate the collaborative development and application of innovations between public research, farmers, private sector and other stakeholders.

**Major thrusts:**
- Getting agricultural researchers to engage with diverse stakeholders
- Thinking commercially
- Increasingly pluralistic R&D (skills, resources, views), improved quality & relevance

**How - Four main components:**
- ICAR as the catalyzing agent for change & 3 competitive grants to R4D consortia w/ a helpdesk
- Relying on an evolutionary long-term approach – gradual sector experience; gradually increasing pluralism; scaling out via adjustable/replicable instrument (CRGs); mind set

**Results:** 187 consortia with 621 partners; 38% have actors beyond ICAR (10% firms); new products and innovations responding to demand; more focus on commercialization

A continuing story of Innovation & Change

**NATP**
1. Demand Led Extension
2. ICAR
   1. Institutional Capacity
   2. Mission Mode Research
   3. Ad hoc Competitive grants

**NAIP**
1. Pluralism
2. Innovation
3. Capacity
4. Blue Sky Research
5. Value Chains
6. Livelihoods

**NAEP ?**
“Value Add”
When E = entrepreneurship
China Agriculture Technology Transfer – leveraging collaboration between P-P-POs for commercially attractive technologies

Agricultural context changing fast …. small-holders vs markets.

Strategic Choice: Improved Agricultural Technologies-but how?
   Support the public sector research system?
   How to pursue co-financing with the agro-business sector?

Objective: Develop and test innovative PPP models for agricultural technology transfer in order to generate farm income in high value markets with potential for scaling up.

Component ($175 million) on bi- and tri-partite partnerships between private-public or private-public-FOs – to promote commercially attractive technologies and institutional change
   • Competitive MGs (public-PS-PO) targeting farm income (e.g., juice factory by PS; public funding for TA to POs implemented by PS);
   • Grants (public-PS) for profitable public good technologies for sale (e.g., water saving technology);
   • Grants for farmer-driven proposal development

Results to date – more than 200 sub-projects under implementation
   • Poor farmers adopting new, value-adding technologies and generating additional income by producing for high-value markets.
   • Public investments in agriculture are leveraged with complementary private investments from agribusiness.
   • Aside from developing new models to transfer technology, the project fosters better public–private partnerships in agriculture.
   • Clear signs of: Change of mentality; Impact on PPP policy and program; Institutionalization of project selection and management procedures; Capacity building;
Productive Partnerships: Incentivizing productivity improvement, service delivery & market inclusion of POs through MGs

Productive Partnerships approaches create favorable conditions for large buyers and small sellers to establish mutually beneficial and sustainable relationships.

- **How?** Facilitation and management support complemented with matching grants complement producer resources and/or funding from local governments, municipalities, commercial partners:
  - Producer organizations use the grants to obtain technical assistance and build their capacity (e.g. to meet quality standards, bargain, or enhance their entrepreneurial and negotiating skills).
  - Through the grants, producer organizations gain the ability and incentives to invest in collective goods such as storage facilities and packing facilities.
  - The grants enable individual small-scale producers to invest in productivity-enhancing infrastructure and gain startup capital to meet buyers’ requirements.

- The types of partners include food processors, wholesalers, supermarkets and retailers (for domestic and international markets).

The key lessons for success:

- **A particular set of incentives, infrastructure, and market conditions** is needed to create and sustain well-functioning, productive partnerships.
- **A stronger producer organization yielded a more successful partnership.** Social cohesion and business skills were difficult to achieve and are emphasized more strongly in the second phase.
- **A rigorous, transparent, and competitive selection process** ensured the credibility and integrity of the grant scheme.
- **Technical service providers as facilitators** are fundamental to building trust with commercial buyers.
- **Management and support of partnerships should be outsourced** to local service providers at the end of the project.
- **Emphasis needed on sustainability** – cohesion of the group, continuation of the partnerships, availability of funding (beyond grants)

**Colombia:**

- Of 136 initial partnerships, 118 were sustainably operating in a wide range of markets.
- The average income of small-scale producers increased by 77% and their employment by 70%.
- Success varied, but the relationship between buyer and producer was terminated only in 13%.
75% of the world’s poor are rural and most are involved in farming. In the 21st century, agriculture remains fundamental for poverty reduction, economic growth and environmental sustainability.

World Development Report 2008