Innovation and Intellectual Property Policy in the Agri-Food Sector in Uganda: Finalizing the WIPO-Uganda Agri-Food Study

Travis J. Lybbert, University of California - Davis, USA
Sacha Wunsch-Vincent, World Intellectual Property Organization (WIPO)
Motivation

- Uganda relies heavily on agriculture...
- ...and has vast untapped agricultural potential
- To realize this potential, Uganda’s agri-food sector must become...
  - more dynamic
  - more innovative
  - and more responsive to market opportunities
- This transformation will be multi-faceted, but innovation and intellectual property (IP) policy will have to contribute to the enabling environment
- Seeing agricultural value chains through an *Innovation Systems* lens can provide an insightful perspective on these policy possibilities
Broad Motivating Research Questions

1. What constraints prevent innovations emanating from national and international agricultural research and development from benefiting agricultural producers and consumers in Uganda?

2. What role does innovation and intellectual property policy play among these constraints or as a means of alleviating them?
Workshop Objective & Overview

Objective

Explore and discuss your perspectives on these questions as we refine and finalize the scope and structure of this study as part of the broader UNCST mandate to inform Ugandan policy

Overview

Three group sessions, each with an assigned session chair:

- 30 minutes of small group discussion on a given topic
- 10-15 minutes of reports in plenary by a representative from each group
- 10-15 minutes of open discussion

Panel discussion with session chairs moderated by Julius Ecuru
Presentation Outline

1. Conceptual framework and potential elements of the study
2. A sampling of recent insights into Ugandan agri-food value chains
3. The innovation and IP policy landscape in Uganda
4. Data sources and descriptive stats for the Ugandan agri-food sector
5. Introduction of topics and questions for group sessions
Agricultural Value Chains

**Production**
- Smallholder farmers
- Farmer associations
- Input providers

**Harvesting and transport**
- Smallholder farmers
- Farmer associations

**Primary processing and storage**
- Primary processors
- Machinery suppliers

**Secondary processing**
- Secondary processors
- Machinery suppliers

**Distribution, packaging, and handling**
- Packaging companies
- Logistics companies

**Wholesale and retail markets**
- Grocery stores and supermarkets
- Food and beverage companies

Source: A.T. Kearney analysis
Parallel Systems in African Agri-food Sectors
An Innovation Systems Perspective on Agricultural Value Chains
Informal institutions, practices, behaviors, and attitudes
Examples: Organizational culture; learning orientation; communication practices

Agricultural research and education systems
- Agricultural education system
  - primary/secondary
  - post-secondary
  - vocational/technical
- Agricultural research system
  - public sector
  - private sector
  - civil society

Bridging institutions
- Political channels
- Stakeholder platforms
- Agricultural extension system
  - public sector
  - private sector
  - civil society
  - Cooperatives, contracts, and other arrangements

Agricultural value chain actors and organizations
- Consumers
- Processing, distribution, wholesale, retail
- Agricultural producers (of various types)
- Input suppliers

Agricultural innovation policies and investments
- Links to science and technology policy
- Links to international actors
- Links to other economic sectors

General agricultural policies and investments
- Links to political system

Source: Spielman and Birner 2008; adapted from Arnold and Bell 2001.
Conceptual Framework for Study

- Private
- Public
- Public
- Private

Intl. R&D
Domestic R&D

Agri-Food Value Chain Innovation
“upstream”
“downstream”

Constraints and Distortions
INNOVATION & INTELLECTUAL PROPERTY POLICY

Benefits to Producers and Consumers in Uganda

Return on R&D Investment
Domestic Spillovers
Potential Elements of Study

- **Agri-food sub-sectors to be included**
  - Maize - improved inputs (upstream)
  - Coffee - improved inputs (upstream) and value-added processing (downstream)
  - Fruit Processing (drying, juicing of pineapple, mango, banana, jack fruit, etc.) - value-added processing (downstream)

- **Methodological approaches**
  - Tap existing agricultural household data (LSMS, IFPRI, etc.)
  - Analyze existing R&D and Innovation survey data (UNCST and IFPRI)
  - Collect structured survey data of upstream input supply chain actors
    - wholesalers and retailers of different sizes
    - Both formal and informal sector actors
    - Statistical sampling frame, including geographic stratification
  - Case studies of 1-2 downstream actors
Recent Insights into Ugandan Agri-food

- Ugandan agricultural R&D and public research capacity is relatively strong
- Supply chains for inputs such as seed, fertilizer, and chemicals often weaken before they deliver inputs to rural farmers
- Input quality concerns, including counterfeiting, are serious constraints
  - In maize growing regions, on average 30% of labeled nutrients were missing from fertilizer; less than 50% of hybrid maize seeds were authentic (Bold et al. 2015)
  - Most farmers do not know what maize seeds they are using
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  - In maize growing regions, on average 30% of labeled nutrients were missing from fertilizer; less than 50% of hybrid maize seeds were authentic (Bold et al. 2015)
  - Most farmers do not know what maize seeds they are using
- ~10% of maize farmers use inorganic fertilizers or improved seeds
  - Some soils may be relatively unresponsive to inorganic fertilizer due to low organic matter or acidity
  - In Western Kenya, the return on fertilizer purchased on the open market may be negative
- Some promising experimentation with new ways of integrating smallholder producers into viable output markets
Innovation and IP in Uganda

- National Science, Technology and Innovation Policy (2009)
- National Science, Technology and Innovation Plan (2012)
- Ministry of Science and Technology (2016)
- Intellectual property rights (IPRs)
  - Very few patents
  - More trademarks, especially in recent years
  - Geographic Indications Act (vanilla, coffee, shea butter, cotton)
  - Plant variety protection law passed in 2014; not yet implemented
- Uganda ranks 99/126 countries in the 2016 Global Innovation Index
The GII 2016 on Uganda

The graph illustrates the relationship between GII score and GDP per capita in PPP$. The points are color-coded to indicate different performance levels: innovation achievers, performers at the level of development, and performers below the level of development. The upper and lower bounds are also shown for context.
The GII 2016 on Uganda

- Creative outputs: 107
- Market sophistication: 107
- Human capital and research: 102
- Global Innovation Index: 99
- Knowledge & technology outputs: 92
- Institutions: 85
- Infrastructure: 83
- Business sophistication: 61
Data Sources and Descriptive Statistics on Ugandan Agri-food

- Data in Global Innovation Index
- Data from R&D and Innovation Surveys (UNCST /World Bank)
- Data gathered from national farm/household surveys
  - Ugandan Agricultural Census / Enterprise survey
  - World Bank Enterprise Surveys and Living Standards Measurement Survey - Integrated Survey on Agriculture
- IP Statistics (URSB and WIPO)
# Agriculture Science Technology and Indicators (ASTI) by IFPRI

## Key Indicators, 2000–2011

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<tr>
<th></th>
<th>2000</th>
<th>2008</th>
<th>2011</th>
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<tr>
<td><strong>Total Public Agricultural Research Spending</strong></td>
<td></td>
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<tr>
<td>Ugandan shillings (million constant 2005 prices)</td>
<td>24,253.0</td>
<td>57,705.4</td>
<td>66,204.3</td>
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<td>PPP dollars (million constant 2005 prices)</td>
<td>39.1</td>
<td>93.1</td>
<td>106.8</td>
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<td><strong>Overall Growth</strong></td>
<td>138%</td>
<td>15%</td>
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<tr>
<td><strong>Total Number of Public Agricultural Researchers</strong></td>
<td></td>
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<tr>
<td>Full-time equivalents (FTEs)</td>
<td>254.1</td>
<td>312.5</td>
<td>353.9</td>
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<tr>
<td><strong>Overall Growth</strong></td>
<td>23%</td>
<td>13%</td>
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<td><strong>Agricultural Research Intensity</strong></td>
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<tr>
<td>Spending as a share of agricultural GDP</td>
<td>0.76%</td>
<td>1.29%</td>
<td>1.22%</td>
</tr>
<tr>
<td>FTE researchers per 100,000 farmers</td>
<td>3.02</td>
<td>3.00</td>
<td>3.13</td>
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## Share of total crop researchers (%)

### UGANDA

- Cassava
- Maize
- Bananas and plantains
- Soybeans
- Coffee
- Vegetables
UGANDA INNOVATION FOLLOW-UP SURVEY

Source: Appendix B Tables 3.1 to 3.3

Figure 3.2: Innovative Enterprises by Industrial Sectors (%), 2008-2010
Factors that shape business environment.

Uganda - Enterprise Survey

- Innovative Capability
  - % of Firms with Internationally Recognized Quality Certification
  - % of Firms with Annual Financial Statement Reviewed by External Auditor

Percent of Firms

Uganda | SSA | Low Income
WORLD BANK LIVING STANDARDS MEASUREMENT STUDY

- multi-topic panel household survey
URSB AND WIPO - INTELLECTUAL PROPERTY DATA
Constraints with current databases

- Problem of capturing agricultural sector, agricultural inputs and downstream processes comprehensively
- Problem of agricultural or household surveys not detailed on innovation or adoption of technology
- Problem of innovation surveys mostly outside AG sector
- Problem of informal sector
- Difficulty of matching household/firm data with existing innovation data
Lingering Data Questions

- How to deal with the delimitation of the agricultural sector properly (AG sector versus food sector)
- Are we missing data sources, in particular as the result of sectoral academic studies or surveys?
- What data to produce or garner for now?
Introduction to Group Session 1

- **Group session 1**: Map the innovation ecosystem of Uganda’s agri-food sector or maize, coffee or fruit processing sub-sectors.
  
  (i) who are the key private and public players?
  (ii) how do they interact?
  (iii) what dynamics and trends characterize this ecosystem?
  (iv) how does the ecosystem interact with broader domestic and international markets?
Introduction to Group Session 2

- **Group session 2**: Identify, characterize and prioritize the key constraints that prevent innovations in the agri-food sector or target sub-sectors from benefiting producers and consumers in Uganda.
  
  (i) how to improve spillovers from public R&D to private enterprise?
  
  (ii) how to foster innovation relevant to domestic needs and domestic agricultural varieties, including in the wider East African region?
Introduction to Group Session 3

- **Group session 3**: Identify the gaps in our knowledge and understanding that could be specifically addressed by this study.
  - What more do we need to know in your target sub-sector to inform innovation and intellectual property policy?
  - How would you recommend we address these knowledge gaps?
  - Are there other experts, firms or organizations we should be contacting?