Transforming Smallholder Agriculture in Kenya in the Context of Climate Change, Devolution & Increasing Land Constraints

Conference Overview and Objectives

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Tegemeo Conference 2015: Transforming Smallholder Agriculture in Kenya, Kenya School of Monetary Studies, Nairobi
Introduction & Objectives

- The contribution of the agricultural sector to overall economic growth and food security in Kenya cannot be overemphasized.

- The sector is a key driver of economic growth
  - Economic pillar of the Kenya Vision 2030.

- Currently, the sector contributes about 27% of the Gross Domestic Product (GDP) (Economic survey, 2015).
Introduction Cont....

- About 80% of the farmers in the country are smallholders
  - About 75% of agricultural production is by smallholder farmers

- However, these farmers face multiple challenges that affect their production, including;
  - Climate change and variability
  - Increasing land constraints
  - Limited access & high costs of key inputs
  - Poor access to agricultural information and other services

- Changing service delivery structure occasioned by devolution

- Tegemeo continues to conduct research to address these challenges and provide evidence-based options/ inform policy formulation
Introduction Cont….

- Tegemeo Institute
  - Policy research institute under the Division of Research and Extension of Egerton University
  - Established through Egerton University’s Statutes under the University Act, 2012 (no. 42 of 2012).
  - Policy research and analysis since 1990
    - Leading centre in agricultural policy research
    - Reservoir of knowledge on rural livelihoods
    - Large network of collaborators/partners
<table>
<thead>
<tr>
<th><strong>Mandate</strong></th>
<th><strong>Vision</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>To conduct policy research and disseminate the findings in an objective manner</em></td>
<td><em>A people forever free from hunger and poverty</em></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mission</strong></th>
<th><strong>Values</strong></th>
</tr>
</thead>
</table>
| *To conduct pro-active policy research and advocacy that enhance food security, create wealth and sustain the environment* | ✓ *Commitment to quality*  
✓ *Integrity, transparency and accountability*  
✓ *Teamwork*  
✓ *Empowerment*  
✓ *Consultation* |
Tegemeo’s Main Themes

- **Policy Research:** To generate and promote evidence-based research to inform and influence policy direction on Kenya’s agriculture and rural sectors.
  - Topical/emerging issues
  - Long term research

- **Outreach/advocacy** – work with policy makers and other stakeholders to identify appropriate policy options
  - Breakfast Policy Forums
  - Workshops
  - Conferences
  - Publications – Policy briefs, working papers, technical papers/bulletins, journals, etc
Tegemeo’s Main Themes

- **Monitoring and Evaluation:** to monitor changes in the Ag sector and assess impacts of alternative policies for Government, development partners and other stakeholders
  - Household panel surveys – general trends and patterns
  - M & E Studies
  - Evaluations/Impact assessment
  - Creation of an MLE Unit

- **Training/ Capacity Building:** seek to build capacity in data collection and management and policy analysis for public sector and other stakeholders
Some government interventions….  

- To address existing and new challenges and transform smallholder agriculture, the government has launched a number of interventions, such as:
  - Input subsidy programs
  - Large scale irrigation e.g. Galana Kulalu scheme
  - Climate smart agriculture programmes
  - Innovations e.g. the e-Extension programme
  - Land reforms & policy e.g. the minimum and maximum land holding law

- Our analysis gives evidence on effects of some of these programs on smallholder agriculture
Broader questions

- How can the agricultural sector achieve this transformation in the face of the increasing land constraints?
  - Land subdivision due to population growth
  - Emerging land issues and implications for policy
  - Land reforms and policy -- effectiveness?

- What are the effects of climate change on smallholder farmers?
  - Likely impacts of climate change on crop production & household welfare
  - Status and viability of existing coping mechanisms
    - Economic viability of irrigation in the Kenyan context?
    - Potential contribution and challenges of crop insurance in Kenya?

- Use of inputs is crucial in improving agricultural productivity and livelihoods -- has this been achieved in Kenya and what has been the performance of the relevant interventions?
  - How have subsidy programs (NAAIAP) performed in meeting its objectives?
  - Does off-farm work enhance the use of inputs to increase productivity?
Broader qns cont..

- How is the agriculture sector performing after devolution?
  - Are County Governments prioritizing agriculture?
  - Has the new structure led to improved service delivery in the sector?
  - What are the lessons after devolving majority of the functions in agriculture to County Governments?

- Are smallholder farmers accessing timely ag information to influence their production choices?
  - What innovations are propelling smallholder farmers towards higher productivity and incomes?
  - Are there successful innovations that can be up-scaled?

- Role of Monitoring, Learning and Evaluation (MLE) in agriculture --- how can a broadened MLE better address these questions?
Data

- Research uses the below datasets:
  - Existing Tegemeo data sets
    - TAPRA Panel Survey Data
    - TAPRA Household survey 2014
    - Additional/specific data
      - Value chain analysis
      - Cost of production/profitability
  - Other secondary information
# TAPRA Household Panel

<table>
<thead>
<tr>
<th>Cropping Year</th>
<th>No of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/97</td>
<td>1534</td>
</tr>
<tr>
<td>1999/00</td>
<td>1,428</td>
</tr>
<tr>
<td>2003/04</td>
<td>1,324</td>
</tr>
<tr>
<td>2006/07</td>
<td>1,275</td>
</tr>
<tr>
<td>2009/10</td>
<td>1,245</td>
</tr>
</tbody>
</table>
### Distribution of TAPRA Household Panel

<table>
<thead>
<tr>
<th>Agro-regional zones</th>
<th>Counties/Districts</th>
<th>No. of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal lowlands</td>
<td>Kilifi, Kwale</td>
<td>74</td>
</tr>
<tr>
<td>High potential maize areas</td>
<td>Bungoma, Kakamega, Bomet, Nakuru, Narok, Trans-Nzoia and Uasin-gishu</td>
<td>331</td>
</tr>
<tr>
<td>Western lowlands</td>
<td>Kisumu and Siaya</td>
<td>149</td>
</tr>
<tr>
<td>Central Highlands</td>
<td>Meru, Nyeri and Muranga</td>
<td>241</td>
</tr>
<tr>
<td>Marginal Rain shadow</td>
<td>Laikipia</td>
<td>34</td>
</tr>
<tr>
<td>Western transitional</td>
<td>Bungoma (Kanduyi), Kakamega (Kabras/Mumias)</td>
<td>145</td>
</tr>
<tr>
<td>Eastern lowlands</td>
<td>TaitaTaveta, Kitui, Machakos and Makueni</td>
<td>141</td>
</tr>
<tr>
<td>Western Highlands</td>
<td>Kisii and Vihiga</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1,243</strong></td>
</tr>
</tbody>
</table>
TAPRA Household Survey 2014

- Sample frame developed after 2009 population census by the Kenya National Bureau of Statistics (KNBS).

- Two-stage stratified cluster sampling
  - 350 rural clusters from the KNBS household-based sampling frame (NASSEP V) using equal probability selection method (EPSEM).
  - Second stage randomly selected a uniform sample of 20 households in each cluster.

- A total sample of 6512 households interviewed
# Distribution of TAPRA Household Survey 2014

<table>
<thead>
<tr>
<th>Agro-ecological zone</th>
<th>Counties</th>
<th>n</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Lowlands</td>
<td>Kilifi, Kwale, Taita Taveta, Tana river</td>
<td>609</td>
<td>331,342</td>
</tr>
<tr>
<td>Lower Highlands</td>
<td>Baringo, Bomet, Bungoma, Elgeyo Marakwet, Kakamega, Kericho, Kiambu, Kisi, Laikipia, Makuenei, Muranga, Nakuru, Nandi, West Pokot, Uasin Gishu, Trans Nzoia, Nyandarua, Nyeri, Nyamira</td>
<td>1,125</td>
<td>1,412,807</td>
</tr>
<tr>
<td>Lower Midland (1-2)</td>
<td>Bungoma, Busia, Homabay, Kakamega, Kisumu, Migori, Siaya, Vihiga</td>
<td>921</td>
<td>856,815</td>
</tr>
<tr>
<td>Lower Midlands (3-6)</td>
<td>Baringo, Busia, Elgeyo Marakwet, Embu, Homabay, Kajiado, Kirinyaga, Kisumu, Kitui, Machakos, Makuenei, Meru, Migori, Muranga, Samburu, Taita Taveta, Tharaka, West Pokot</td>
<td>1,082</td>
<td>1,355,318</td>
</tr>
<tr>
<td>Upper Highlands</td>
<td>Elgeyo Marakwet, Kiambu, Laikipia, Meru, Muranga, Nakuru, Narok, Nyandarua, Nyeri, Uasin Gishu, West Pokot</td>
<td>698</td>
<td>441,709</td>
</tr>
<tr>
<td>Upper Midlands(0-1)</td>
<td>Bomet, Bungoma, Embu, Kakamega, Kericho, Kiambu, Kirinyaga, Kisi, Kisumu, Muranga, Nandi, Nyamira, Nyeri, Tharaka, Vihiga</td>
<td>854</td>
<td>748,319</td>
</tr>
<tr>
<td>Upper Midlands (2-6)</td>
<td>Baringo, Bomet, Bungoma, Busia, Elgeyo Marakwet, Embu, Kajiado, Kakamega, Kericho, Kiambu, Kismu, Kitui, Laikipia, Machakos, Makuenei, Meru, Muranga, Nakuru, Narok, Nyamira, Nyeri, Tharaka, Trans Nzoia, Uasin Gishu, West Pokot</td>
<td>1,223</td>
<td>1,776,961</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>6,512</td>
<td>6,923,271</td>
</tr>
</tbody>
</table>
## TAPRA 2014 HH Data: Household Characteristics by AEZ

<table>
<thead>
<tr>
<th>AEZs</th>
<th>Household Size</th>
<th>Age of HH head</th>
<th>Gender of head (% female)</th>
<th>Education of head (Years of schooling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Lowlands</td>
<td>7.2</td>
<td>51.0</td>
<td>22.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Lower Highlands</td>
<td>5.2</td>
<td>49.7</td>
<td>23.6</td>
<td>8.0</td>
</tr>
<tr>
<td>Lower Midlands 1-2</td>
<td>5.8</td>
<td>50.7</td>
<td>28.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Lower Midlands 3-6</td>
<td>5.3</td>
<td>52.1</td>
<td>23.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Upper Highlands</td>
<td>5.5</td>
<td>49.6</td>
<td>19.9</td>
<td>7.4</td>
</tr>
<tr>
<td>Upper Midlands 0-1</td>
<td>5.4</td>
<td>52.2</td>
<td>29.5</td>
<td>7.2</td>
</tr>
<tr>
<td>Upper Midlands 2-6</td>
<td>5.2</td>
<td>49.5</td>
<td>18.8</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>5.4</strong></td>
<td><strong>50.6</strong></td>
<td><strong>23.4</strong></td>
<td><strong>7.1</strong></td>
</tr>
<tr>
<td>AEZ</td>
<td>NCPB depot</td>
<td>Extension advice</td>
<td>Fresh produce market</td>
<td>Motorable road</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Coastal Lowlands</td>
<td>39.4</td>
<td>11.5</td>
<td>10.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Lower Highlands</td>
<td>23.2</td>
<td>6.5</td>
<td>3.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Lower Midlands 1-2</td>
<td>18.4</td>
<td>5.3</td>
<td>2.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Lower Midlands 3-6</td>
<td>31.7</td>
<td>11.1</td>
<td>5.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Upper Highlands</td>
<td>23.7</td>
<td>7.3</td>
<td>4.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Upper Midlands 0-1</td>
<td>16.6</td>
<td>5.3</td>
<td>2.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Upper Midlands 2-6</td>
<td>24.0</td>
<td>7.3</td>
<td>4.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>24.2</td>
<td>7.6</td>
<td>4.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>
### TAPRA 2014 HH Data: Access to Services

<table>
<thead>
<tr>
<th>AEZ</th>
<th>Piped water source</th>
<th>Health center</th>
<th>Electricity supply</th>
<th>County/sub County headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Lowlands</td>
<td>6.5</td>
<td>4.1</td>
<td>3.0</td>
<td>27.0</td>
</tr>
<tr>
<td>Lower Highlands</td>
<td>2.1</td>
<td>2.3</td>
<td>1.0</td>
<td>14.5</td>
</tr>
<tr>
<td>Lower Midlands 1-2</td>
<td>3.8</td>
<td>2.1</td>
<td>0.8</td>
<td>10.3</td>
</tr>
<tr>
<td>Lower Midlands 3-6</td>
<td>5.0</td>
<td>3.6</td>
<td>3.2</td>
<td>16.9</td>
</tr>
<tr>
<td>Upper Highlands</td>
<td>3.0</td>
<td>3.8</td>
<td>1.8</td>
<td>15.2</td>
</tr>
<tr>
<td>Upper Midlands 0-1</td>
<td>2.1</td>
<td>2.0</td>
<td>0.5</td>
<td>8.0</td>
</tr>
<tr>
<td>Upper Midlands 2-6</td>
<td>2.7</td>
<td>2.9</td>
<td>1.4</td>
<td>15.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.3</strong></td>
<td><strong>2.8</strong></td>
<td><strong>1.6</strong></td>
<td><strong>14.6</strong></td>
</tr>
</tbody>
</table>
TAPRA 2014 HH Data: Fertilizer Use (% farmers)

Inorganic only | Organic only | Both Inorganic and Organic | None
--- | --- | --- | ---
CL | 75.2 | 20.2 | 0.7 | 0
LH | 36.9 | 41.3 | 13.7 | 0.2
LM 1-2 | 37.5 | 39.4 | 19.5 | 0.6
LM 3-6 | 45.8 | 18 | 3.4 | 0.4
UH | 40.9 | 5.6 | 4.8 | 0.1
UM 0-1 | 51.2 | 6.9 | 8.5 | 0.1
UM 2-6 | 28.9 | 19.7 | 9.1 | 0.2
Overall | 34.6 | 23.4 | 11 | 0.7

Inorganic only | Organic only | Both Inorganic and Organic | None
--- | --- | --- | ---
CL | 75.2 | 20.2 | 0.7 | 0
LH | 36.9 | 41.3 | 13.7 | 0.2
LM 1-2 | 37.5 | 39.4 | 19.5 | 0.6
LM 3-6 | 45.8 | 18 | 3.4 | 0.4
UH | 40.9 | 5.6 | 4.8 | 0.1
UM 0-1 | 51.2 | 6.9 | 8.5 | 0.1
UM 2-6 | 28.9 | 19.7 | 9.1 | 0.2
Overall | 34.6 | 23.4 | 11 | 0.7
TAPRA 2014 HH Data: Maize yields (90 Kg bags/acre) by AEZ
TAPRA 2014 HH Data: Income Share by AEZ

[Bar chart showing income share by AEZ zones, with labels for Share of Crop Income, Share of Livestock Income, and Share of offfarm Income.]
TAPRA 2014 HH Data: Poverty Head Count by AEZ (%)
Conference objectives

- Present our research findings to stakeholders and experts with a view to eliciting debate and feedback from the participants.

- Lay some background for a wider discussion on policies and interventions that could help transform smallholder agriculture to effectively address food insecurity and poverty challenges.

- Provide a forum for open discussion among stakeholders on appropriate policy options.
Tegemeo conference 2015

- Core theme: “Transforming Smallholder Agriculture in Kenya in the Context of Climate Change, Devolution & Increasing Land Constraints”

- Sub-themes

Day 1
- Land Access & Policy
- Climate Change and Livelihoods
- Input Intensification, Subsidies and Off-farm Work

Day 2
- Agriculture & Devolution
- Agricultural Services & Innovation
- Monitoring, Learning & Evaluation
## Program

<table>
<thead>
<tr>
<th>Morning Session</th>
<th>Day 1</th>
<th>Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(November 10)</td>
<td>(November 11)</td>
</tr>
<tr>
<td>Session I: Opening</td>
<td>Session I: Recap of Day 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session II: Agriculture and Devolution</td>
<td></td>
</tr>
<tr>
<td>Session II: Keynote Address</td>
<td>Session III: Agricultural Services and Innovations</td>
<td></td>
</tr>
<tr>
<td>Session III: Land Access and Policy</td>
<td>Session IV: Monitoring Learning and Evaluation</td>
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</tr>
<tr>
<td></td>
<td>Session V: Panel Discussion</td>
<td></td>
</tr>
<tr>
<td>Lunch Break</td>
<td>Lunch break and departure</td>
<td></td>
</tr>
<tr>
<td>Afternoon Session</td>
<td>Session IV: Climate Change and Livelihoods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session V: Input Intensification &amp; Subsidies</td>
<td></td>
</tr>
</tbody>
</table>
Acknowledgements

- On behalf of Tegemeo/Egerton University, support from various organization and institutions are recognized
  - Government of Kenya --MoAL&F, MoENR, County Governments, KNBS, KMS, etc
  - USAID for the support of the TAPRA program under which most of this research work falls. More specifically for their support in the collection and maintenance of the household panel data
  - Support from Other Donors
    - Bill & Melinda Gates Foundation
    - Rockefeller Foundation
    - Ford Foundation, among others
  - Michigan State University for the long standing partnership in research
  - Other Universities/ Research organizations
  - Private sector
  - Civil Society esp farmer organizations – CGA, KENAFF, EAFF
  - Farmers & other actors along value chains

- Most of all appreciation to you all for being part of this important conference
Thank you