Post-Harvest Technology
Commercialization Initiative
Innovations for Agricultural Value Chains in Africa

The World Bank: Seminar

October 19, 2010
1. Mission:
   • To help people solve problems, make informed decisions, and find solutions to some of society’s most complex and controversial issues.
2. Expertise:
   • Applying collaborative problem-solving approaches including process design, facilitation, mediation, and other strategic consultation services.
3. Experience:
   • Work at local, national, and international levels.
   • Focus on a wide range of issues related to agriculture and food security, natural resources and environment, science and technology, sustainability, global stability, and health.
Innovations for Agricultural Value Chains in Africa

Purpose and Approach

- Meridian Institute developed the Innovations for Agricultural Value Chains in Africa project (http://merid.org/value-chain-innovations/) with a grant from the Bill & Melinda Gates Foundation.

- The initial purpose of the project was to:
  1. Bring together leading scientist and innovators with key players in the maize, cassava, and dairy value chains in Africa in order to identify innovative post-harvest management and processing technologies that would add significant value for smallholder farmers by reducing inefficiencies in these value chains in Africa.

- Presented with 22 promising concepts, BMGF asked Meridian to continue developing a several concepts and:
  2. Develop strategic and structural recommendations to BMGF and other potential donors for supporting and accelerating the commercialization of post-harvest technologies in Sub-Saharan Africa (including, but not necessarily limited to, innovations developed by participants in the Meridian project) to improve smallholder farmer food security and income in sub-Saharan Africa.
Innovations for Agricultural Value Chains in Africa
Rationale

• Large post-production losses impact food security and incomes of smallholder farmers
  o Post-production losses can be physical, qualitative, and economic losses.
  o Annual physical (weight) losses of cereal grains in Eastern and Southern Africa during 2003 – 2007 are equivalent to 10 – 20% of production.
  o Various parts of SSA are seeing similar physical losses in root and tuber crops; fruits and vegetables; milk; and fish

• Technologies – in combination with other interventions – can help improve food security and opportunities to generate income.
Innovations for Agricultural Value Chains in Africa
Technology Concept Example – Modified Plastic Tank

Concept: use existing plastic water tank technology to create: 1) hermetic storage vessels for on-farm storage of maize; 2) low-cost dryer for on-farm use; and 3) agri-business storage, handling, and drying system (including silage making).
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Technology Concept Example – Diagnostics

Concept: create disposable, rapid, portable, inexpensive, easy to interpret diagnostics for:
• Milk safety
• Reproductive health diagnostic
• Aflatoxins
• Vector-borne diseases
• Milk quality
• Etc.
Concept: create stackable milk containers that are easily cleanable and have anti-microbial properties.
Past failures and limited scaling of successes indicate a need for systemic change in research, design, development, and deployment of technological solutions to address the problems of poverty in developing countries.* Challenges include:

- Market failures: lack of private sector investment
- Complex coordination of diverse partners
- Inadequate alignment of roles for both public and private sectors
- Difficult access to appropriate financing
- Lack of end user engagement in product development

Meridian and our partners analyzed the commercialization pathway to develop options for an efficient approach to commercialize multiple post-harvest agricultural technologies to benefit smallholder farmers and other value chain actors in sub-Saharan Africa. Meridian found that:

- Investment in post-harvest technologies is limited;
- Post-harvest technology commercialization projects are often conducted as ad-hoc or isolated efforts.
- Little information is being shared between projects, which means that little is known about the factors that contribute to successful adoption at scale as well as what can be done to overcome adoption constraints.
- As a result, adoption of relevant technologies is limited and significant value continues to be lost as a result of post-harvest losses.
- Options for moving multiple technologies forward include: sponsoring individual projects; engaging and expanding existing initiatives to take on post-harvest technologies; or create a new initiative.

*Source: PIPRA, 2010, Getting Better Technologies to the Poor: A Landscape of Commercialization Challenges & Opportunities by Sara Boettiger and Sarah Alvarez
E.g., RIU’s Africa work points very clearly to the fact that there is currently a missing piece of architecture in African agricultural innovation systems: innovation brokers who can broker alliances around different topics.
Post-Harvest Technology Commercialization Initiative

Opportunities for a Proposed Investment

I have a possible solution. Where do I find funding for prototyping and field testing?

I have a possible solution. Who do I partner with to develop a commercializable and impactful product?

I have a possible solution. How do I avoid unintended consequences?

I see a number of problems. Are there appropriate technologies that can be part of solutions?

How do I know what will make smallholder farmers decide to adopt this solution?

I have a possible solution. Would it be commercially feasible and still impact smallholder farmers?

How do I find out what the demand is for this technology?

Who can bring technologies to scale?

Who do I turn to in order to compare solutions and quickly identify the most promising investment opportunities?

Where do I find growth financing?

What is my exit strategy?

Where do I find micro-finance to enable adoption?

I have a possible solution. How do we structure our partnership to make sure we achieve both commercial and humanitarian objectives?

Who has the capacity, knowledge and networks to move many technologies forward?

Who can help me find information?
# Post-Harvest Technology Commercialization Initiative

## Principles for a Proposed Initiative

### Sustainability
- Leverage existing capacity to quickly establish prerequisite functions and minimize overhead.
- Build early successes and remain flexible in exploring a variety of models for the initiative to ensure long-term sustainability and success.

### Scalability
- Start with focused investments in priority areas to make commercialization pathway stronger and more efficient.
- Focus initially on a limited number of technology concepts; build pipeline overtime.
- Create learning systems (including feedback loops, monitoring, and evaluation) to improve and adapt the commercialization and adoption process over time.

### Adoption
- Ensure early and ongoing engagement of end users and implementation partners to create sustainable business models for manufacturing and distribution and develop appropriate adoption strategies.

### Inclusivity
- Engage implementation partners and end users to ensure that women, as well as men, can contribute to, participate in, and benefit from the commercialization pathway and post-harvest technology concepts.
Post-Harvest Technology Commercialization Initiative
Organizational Model

Numerous post-harvest technology concepts

Advisory Committee includes:
- Farmers and other value chain actors
- Private sector
- Technology developers
- African agricultural initiatives
- Funding and finance institutions?

Project teams are based in country to be close to development, implementation, and adoption partners. Project teams involve tech developers, users, Champions, and potentially but not necessarily Core Team members.

Knowledge and Learning – Connecting Project Teams and Researchers

Virtual Resources

Core Team

Project Team A
Project Team B
Project Team C
Project Team D

Meridian Institute
Connecting People to Solve Problems
# Post-Harvest Technology Commercialization Initiative Organizational Model – Key Responsibilities

<table>
<thead>
<tr>
<th>Core Team</th>
<th>Project Teams</th>
<th>Virtual Resources</th>
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<tbody>
<tr>
<td>• Provide leadership.</td>
<td>• Implement projects in areas where the technologies will be deployed.</td>
<td>• Rather than building “in-house” capacity where it already readily exists, the Core Team will connect Product Development Partners with experts, as needed, in the areas of: design, finance, market analysis, policy, and gender issues.</td>
</tr>
<tr>
<td>• Identify and vet specific technology concepts.</td>
<td>• Conduct design and commercialization activities with local partners and stakeholders.</td>
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<tr>
<td>• Build strong networks with local (business) leaders and potential project partners.</td>
<td>• Project Teams are set up for the duration of specific technology design, development, and commercialization projects.</td>
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<tr>
<td>• Ensure that lessons learned are exchanged between projects and linked to expert networks.</td>
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<td>• Develop an evidence-based communications strategy (i.e., to demonstrate the value of the Initiative and engage Champions).</td>
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<tr>
<td>• Help maintain Virtual Resources, as needed.</td>
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An independent Advisory Committee would provide high level expertise and guidance on the Initiative’s project portfolio. The Committee would include individuals who could ensure that the Initiative is well aligned with other relevant activities and initiatives.

The Advisory Committee and/or an Investor Committee would provide a mechanism for investors’ to provide advice and guidance to the Initiative and to engage, as appropriate, in the development of individual technology concepts.

The Project Teams and the Virtual Resource will rely on existing organizations with significant relevant expertise.
Post-Harvest Technology Commercialization Initiative

**Financial Model**

- Most likely requires grants and other public/charitable funding to support Core Team activities, including knowledge sharing.
- Possibly generate fee-based revenues and royalty income, depending on the technology and potential for developed country markets.
- Core Team could possibly fade out over time as capacity, processes, and systems to support post-harvest technology commercialization in SSA become more robust.
## Post-Harvest Technology Commercialization Initiative

### Questions for Discussion

<table>
<thead>
<tr>
<th>Need</th>
<th>Independence</th>
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| • Would the proposed Initiative provide sufficient value to draw support from the broad range of stakeholders needed to make the Initiative a success?  
• Should this be structured as a new initiative or strengthening and linking existing initiatives? | • How could the Initiative best organize a Core Team of individuals with strong business acumen, financial skills and the ability to take technologies through a rigorous commercialization process?  
• What are the appropriate incentives (financial and otherwise) for members of the small Core Team? |

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<thead>
<tr>
<th>Scope</th>
<th>Location and Scale</th>
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| • Should the proposed Initiative start with an explicit focus on post-harvest technologies or more broadly?  
• Could it be scaled to extend beyond the post-harvest agriculture sector into other areas of agriculture and beyond to, for instance, energy and health? | • Should the Core Team be set up as a collocated entity? Or, should the Core Team be a virtual team?  
• Where should the Core Team be located?  
• Could the small Core Team realistically build credibility and deep local networks across SSA? |

<table>
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<tr>
<th>Partners</th>
<th>Financial Model</th>
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| • Which organizations have strong relevant experience and expertise and could be part of an Initiative?  
• Given the range of existing experts, should the Core Team be housed in an existing institution or set up in a new location in order to achieve independence?  
• Should the Initiative set up a separate Advisory Committee and separate Investor Committee?  
• Which organizations or institutions should be included in an Advisory and/or Investor Committee? | • What would it cost to set up and operate the Core Team and a typical Project Team?  
• How likely is it that the Core Team can eventually be supported in part or completely through revenue from commercializing technologies? Would this jeopardize the Core Team’s independence?  
• If the Initiative can demonstrate it is leveraging other resources, will that justify on-going investment by donors?  
• Could the Core Team fade out over time as capacity, processes, and systems to support technology commercialization in SSA become more robust? |
Please provide feedback

Online at:
http://www.surveymonkey.com/s/postharvestTechnologyCommercialization

Or by contacting us directly:
Rex Raimond (rraimond@merid.org; +1 970 389 5541)

Thank you!
# Innovations for Agricultural Value Chains in Africa

## Milestones

### Past Activities

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Description</th>
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<tbody>
<tr>
<td>Mar - Apr 2009</td>
<td>Science Team members and Value Chain Partners engaged</td>
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<tr>
<td>Jun 2009</td>
<td>Papers describing 3 value chains and identifying key constraints published; lessons learned paper published</td>
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<tr>
<td>Jul 2009</td>
<td>Papers discussed during teleconferences</td>
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<tr>
<td>Aug 2009</td>
<td>Science Team and Value Chain Partners on Field Trip to Western Kenya and Central Ghana to meet with farmers and processors and generate technology concepts</td>
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<tr>
<td>Sep - Nov 2009</td>
<td>Further development of 22 technology concepts (interactions among Value Chain team, interactions with colleagues, secondary research, prototyping, design work, etc.)</td>
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<tr>
<td>17-18 Nov 2009</td>
<td>Presentation and review of 22 technology concepts; preliminary discussion about a strategy and structure to support commercialization</td>
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### Current Activities

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Description</th>
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<tbody>
<tr>
<td>Nov 2009 – Sep 2010</td>
<td>Develop 5 Concept Briefs to take concepts to the next level of specificity</td>
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<tr>
<td>Nov 2009 – Nov 2010</td>
<td>Continue development of concepts (modified plastic tank for feed and grain storage; cassava tube dryer; plastic milk container with anti-microbial properties; reproductive health diagnostics; milk quality diagnostics)</td>
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<tr>
<td>Nov 2009 – Nov 2010</td>
<td>Develop recommendations for a Post-Harvest Technology Commercialization Initiative</td>
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</tbody>
</table>
# Post-Harvest Technology Commercialization Initiative Options Development Process

<table>
<thead>
<tr>
<th>Steps in the Process</th>
<th>Partners and Stakeholders Involved</th>
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<tbody>
<tr>
<td>Investigated Lessons Learned from past agricultural technology introductions</td>
<td>Meridian Institute, New Growth International, Value Chain Partners</td>
</tr>
<tr>
<td>Convened Steering Committee</td>
<td>Bob Adams (consultant), John Morrell (Yale), Sara Boettiger (PIPRA), Tom Carroll (Dalberg), Cristina Manfre (gender consultant), Jeff Carbeck (MC10), Carmichael Roberts (Northbridge Venture Partners), Seth Ayers (InfoDev), Mark Huisenga (USAID), Hameed Nuru (GALVmed)</td>
</tr>
<tr>
<td>Analyzed steps in the commercialization pathway</td>
<td>Meridian Institute, Bob Adams (consultant), John Morrell (Yale), Sara Boettiger (PIPRA), Tom Carroll (Dalberg), Cristina Manfre (gender consultant)</td>
</tr>
<tr>
<td>Reviewed draft analysis and developed draft recommended options</td>
<td>Meridian Institute, Steering Committee, and participants in Progress Review Meeting (March 2010)</td>
</tr>
<tr>
<td>Refined recommendations and sought broad stakeholder input</td>
<td>Meridian Institute has interviewed more than 35 individuals with expertise in technology development and commercialization.</td>
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<tr>
<td>Discuss and further develop recommendations</td>
<td>Participants in the meeting on a Post-Harvest Technology Commercialization Initiative for Sub-Saharan Africa to be held on 26-27 May 2010 in New York, NY.</td>
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<tr>
<td>Finalize recommendations</td>
<td>Meridian Institute with input from partners (due at the end of June 2010)</td>
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</table>
### Innovations for Agricultural Value Chains in Africa

#### Partners and Participants

**Science Team:**
- Robert L. Adams, Robert Adams Consulting, USA
- Patrick Beattie, Diagnostics For All, USA
- Jeffrey Carbeck, MC10, Inc., USA
- Luiz Alberto Colnago, Embrapa Agriculture Instrumentation, Brazil
- Paula Hammond, Massachusetts Institute of Technology, USA
- Frans Kampers, Bio-NanoTechnology, Centre for Food and Health Innovations, Wageningen University, The Netherlands
- John Morrell, Yale University, USA
- Moses Kizza Musaazi, Makerere University, Uganda
- Godwin Ndossi, Tanzania Food and Nutrition Centre, Tanzania
- Thalappil Pradeep, Indian Institute of Technology, India
- Carmichael Roberts, North Bridge Venture Partners, USA
- Christina Smolke, Stanford University, USA

**Steering Committee – Post-Harvest Technology Commercialization Initiative:**
- Bob Adams (consultant)
- John Morrell (Yale)
- Sara Boettiger (PIPRA)
- Tom Carroll (Dalberg)
- Cristina Manfre (gender consultant)
- Jeff Carbeck (MC10)
- Carmichael Roberts (Northbridge Venture Partners)
- Seth Ayers (InfoDev)
- Mark Huisenga (USAID)
- Hameed Nuru (GALVmed)

**Value Chain Partners and Experts:**
- CSIR - Food Research Institute, Ghana
- International Livestock Research Institute and East Africa Dairy Development Project, Kenya
- Eastern Africa Grain Council, Kenya
- International Institute of Tropical Agriculture (IITA), Nigeria
- Natural Resources Institute (NRI), UK
- International Center for the Improvement of Maize and Wheat (CIMMYT), Mexico
- ICIPE - African Insect Science for Food and Health, Kenya

**Additional Interviewees re: Initiative:**
- African Agricultural Technology Foundation
- African Enterprise Challenge Fund
- the Alliance for a Green Revolution in Africa
- Ashoka
- Cargill
- Compatible Technology International
- UK Department for International Development
- D-Rev
- ICRISAT
- IDE
- IEDO
- International Finance Corporation
- Kentainers
- Lemelson Foundation
- National Business Incubation Alliance
- Practical Action
- Rutgers Food Innovation Center
- SNV the Netherlands
- Technoserve
- U of Nebraska
- Villgro
# Post-Harvest Technology Commercialization Initiative Beneficiaries

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<tr>
<th>Beneficiaries</th>
<th>Benefits</th>
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| *Technology Users in Sub-Saharan Africa* – E.g., Smallholder Farmers, Processors, Transporters, Warehouse Operators | • Appropriate and relevant technologies are available and readily accessible to help reduce post-harvest losses, increase food security, improve food quality, and improve nutrition.  
• Appropriate and relevant technologies are available and more easily accessible to facilitate product marketing and generate income. |
| *Public and Private Sector Investors* – E.g., Foundations, Bilateral Institutions, Multilateral Institutions, Banks, Governments, Fund Managers | • African institutions have increased capacity to turn technology concepts into products that are appropriate, accessible, and adoptable.  
• There is more effective public-private collaboration to support design, development and commercialization of post-harvest technologies.  
• Investments in post-harvest technologies have greater impact on smallholder farmers and other value chain actors in SSA through a robust framework for technology commercialization and greater ability to take projects to scale.  
• Post-harvest technology design, development, commercialization, and adoption activities in support of continent-wide (e.g., Comprehensive Africa Agriculture Development Programme), regional, and national (e.g., Poverty Reduction Strategy Papers) agricultural development objectives are more effective. |
| *Technical and Commercial Partners* – E.g., Scientists, Companies, National Agricultural Research Systems, and Entrepreneurs | • Creation of a focal point for identifying promising technologies and attracting investments in product development, manufacturing and distribution capacity.  
• An increased pipeline of appropriate post-harvest technologies and partnership opportunities resulting in new market opportunities.  
• Increased access to finance to support technology design, development and commercialization. |
Innovations for Agricultural Value Chains in Africa 
Commercialization and Adoption Challenges

- Many other organizations have developed technologies that could contribute to improved post-harvest management by smallholder farmers and other value chain actors.
- Projects aimed at commercialization and adoption are complex and often expensive. The challenges to successful commercialization and adoption are numerous.

<table>
<thead>
<tr>
<th>Examples of Technology Commercialization and Adoption Constraints</th>
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<tbody>
<tr>
<td><strong>Examples of constraints affecting supply of technologies to farmers:</strong></td>
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<tr>
<td>Broad diversity of needs and conditions</td>
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<tr>
<td>Limited R&amp;D capacity, resources, institutions</td>
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<tr>
<td>Weak agricultural extension systems</td>
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<td>Limited (but increasing) engagement of the private sector (local, SMEs, MNCs) in innovation, manufacturing, and dissemination</td>
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<tr>
<td>Poor infrastructure</td>
</tr>
<tr>
<td>Inappropriate policies</td>
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<tr>
<td><strong>Examples of constraints affecting farmer demand for better technologies:</strong></td>
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<tr>
<td>Low profitability of technology innovation</td>
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<tr>
<td>Inadequate financial resources</td>
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<tr>
<td>Lack of access to capital</td>
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<tr>
<td>Lack of information</td>
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<tr>
<td>Poor infrastructure linking farms to inputs and to production markets</td>
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<tr>
<td>Lack of ready markets for excess production</td>
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<tr>
<td>Inappropriate policies</td>
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Innovations for Agricultural Value Chains in Africa

Cost of Introducing New Technology

-$ Cost/Sale

-# Sales/Month

Market Failure

Donor Subsidy Required

Economies of Scale Kick In

Word of Mouth Sales Take Off

Competition Kicks In

New Industry Created

No More Subsidy Required

Bigger Organization Required

Harder to Reach and Convince Adopters

Easy to Reach and Convince Very Early Adopters

Critical Mass

Time