Scaling Agricultural Technologies: Bringing Research to Farmers and the Market

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Sahara Moon Chapotin is Division Chief for Agricultural Research at USAID. She joined the agency in 2006 as a Biotechnology Advisor. Prior to this, she worked at the Biosafety Institute for Genetically Modified Agricultural Products (BIGMAP), Iowa State University, where her work focused on resolving regulatory issues for genetically engineered crops, especially those intended for small and niche-markets. Chapotin holds a B.S. in Biology from Stanford University, a Ph.D. in Plant Physiology from Harvard University and has completed the AAAS Science and Technology Policy Fellowship Program.
Jerry Glover
USAID Bureau for Food Security

Jerry Glover is a National Geographic Society Explorer and Senior Sustainable Agricultural Systems Advisor for USAID. He earned bachelor degrees in soil science and philosophy and then a PhD in soil science at Washington State University in 2001. Prior to his work at USAID, Jerry studied native grasslands and farming systems, including no-till, perennial, organic and integrated systems. He has published the results of his work in Science, Nature, Proceedings of the National Academy of Sciences and Scientific American and has been highlighted in National Geographic, Nature, and three documentary films.
Bob Nanes
IDE

Bob Nanes has been working in agriculture and irrigation development for more than 30 years. During that time he has run two private businesses and managed more than 50 projects as a country director of non-profit, IDE. He contributed to the development of IDE’s core agricultural methodology, PRISM (Poverty Reduction through Irrigation and Smallholder Markets), a value chain approach oriented specifically to the needs of smallholder farmers and high value crop production. Nanes is currently living and working in Denver, Colorado and continues to work for IDE as VP of Technology and Innovation.
Steve New
Fintrac

A founding Fintrac team member, Steve New has three decades of agriculture development experience across four continents. He has managed multi-year USAID programs, led FAO, EU and other donor evaluation teams, and advised government ministries and producer associations on issues ranging from codes of practice to market infrastructure. New is particularly adept at forging partner alliances with private companies, locally and internationally, to synergize value-chain development and create new opportunities for women, youth, and other disenfranchised groups. He has a Ph.D. in postharvest physiology.
Scaling Sustainable Intensification

Jerry Glover
Bureau for Food Security
Office of Agriculture, Research & Policy
Montpellier Panel Report 2013

SUSTAINABILITY MEASURES
- Same or less land and water
- Efficient, prudent use of inputs
- Minimised GHG emissions
- Increased natural capital
- Strengthened resilience
- Reduced environmental impact

INPUTS
- INDIRECT:
  - Financial capital
  - Knowledge
  - Infrastructure
  - Technology
  - Markets
- DIRECT:
  - Labour
  - Water
  - Inorganic chemicals and/or organic matter
  - Biodiversity

FARMER & COMMUNITY

INTENSIFICATION PROCESS
- Ecological
- Genetic
- Socio-economic

OUTPUTS
- PRODUCTION
- INCOME
- NUTRITION
- Integrate available technologies with best practices
- Integrate “demand-driven” research with development interventions
- CSISA
  - Rice-Wheat system of South Asia
- Africa RISING
  - Wheat-based system of East African highlands
  - Maize- and rice-based systems of East & Southern Africa
  - West African Guinea Savanna systems

Transforming Key Production Systems
Challenges to scaling: ‘Patchiness’

(Tittonelle & Giller, 2012)
Challenges to scaling: ‘Non-responsive’ soils

…”smallholder farmers are unable to benefit from the current yield gains offered by plant genetics.

The lack of immediate response to increased inputs of fertilizer and labor in such soils constitutes a chronic poverty trap for many smallholder farmers in Africa.”

(Tittonelle and Giller, 2012)
Variable responses (on-farm)

- Responsive fields
- Poorly-responsive fertile fields
- Poorly-responsive infertile fields

Crop yield vs Nutrient input graph.
Challenges to scaling: Farm diversity

- Grain legumes
- Green manures
- Agroforestry
- Fodder legumes
- Manure
- Fertilizers

Giller et al., 2006
Doubled-up Legume Systems

- Multi-functional
- Improves yield of protein-rich grains
- Provides fuel & feed
- Reduces soil erosion (Glover et al. 2012)

**DOUBLED-UP LEGUME SYSTEM**

1. Year 1:
   - Soya or groundnut
   - Pigeon pea

2. Year 2:
   - Maize
On-farm, farmer-driven research (100s of farmers)
- CGIAR scientists
- University of Malawi
- Ministry of Agriculture
- U.S. universities

Public sector:
- Extension Program Areas
- Health Clinics
- School lunch programs

USAID/Malawi:
Integrating Nutrition in the Value Chain
- Dairy
- Legumes

Private Sector
- Inputs
- Markets

Africa RISING

(1000s – 10,000s of farmers)
Additional Scaling Opportunities:

Alignment of USAID funding streams

- Pilot project on integrated Food Security, Sustainable Landscapes (GCC), & Biodiversity programming
  - Malawi & Zambia
  - On-farm production of shrubby legumes and tree crops for feed and fuel wood
- Increased crop yields
- Reduced deforestation pressures
- Reduced GHG emissions
- Addresses major Gov’t Malawi policies on fertilizer subsidies, green economy, & emissions reductions
SCALING AGRICULTURAL TECHNOLOGIES

Bringing Research to Farmers and the Market
Today’s Presentation

• Relationship Between Research & Dissemination
• Ag Water Management (AWM) Project
• Outputs of AWM Project
• What IDE Is Doing with the Outputs
• Some Principles Governing Dissemination
• What is Scale?
Research and Dissemination

• Quality interactions with the end-user/customer from the beginning
• Adapting existing technologies, not just creating new ones
• Research should include prototyping and test marketing.
• Dissemination based organizations as partners
AgWater Solutions Project

• Funded by B & M Gates Foundation
• Partners
  – International Water Management Institute (IWMI)
  – IFPRI
  – Stockholm Environment Institute (SEI)
  – FAO
  – IDE
  – CH2M Hill
AWM Focus Technologies

- Motorized Pumps
- Rainwater Harvesting
- Tapping Groundwater
Example: Research Into Use Motorized Pumping

• Learn what makes a good pump
• Determine set of criteria for making recommendations
• Create partnerships with private sector supply chain actors: Importers, wholesalers, retailers
• Create/Improve private sector service providers
• Promotional campaigns
Example: Research Into Use Manual Well Drilling

- Finding Appropriate Areas
- Training local well-drillers
- Apprenticeship
- Create service business model
- Help with promotion
Some principles

• Investment cost is critical
• Higher investment costs needs finance
• Private sector supply chains....don’t bypass
• Last mile distribution is critical
• R&D/Promotion/M&E need public funding
What is scale?

- Are we forced to sacrifice depth for breadth?

- Scale is only relevant if it produces impact

- Impact is only relevant if it reaches the right people and is sustainable
THANK YOU

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Constraints to Scaling Technology and How to Address Them

Steve New
Fintrac Africa Regional Director, COP for USAID-KAVES
July 2013
Agricultural solutions to end hunger and poverty

Fintrac Methodology

MARKET OPPORTUNITIES
GOOD AGRICULTURAL PRACTICES
INPUTS & SERVICES
WOMEN & YOUTH
INCREASED ADAPTABILITY

OFF-FARM EMPLOYMENT
HEALTH & NUTRITION
NEW TECHNOLOGIES
ENABLING ENVIRONMENT
MONITORING & EVALUATION
What are the major constraints?

- Limited access to markets
- Uncompetitive business models
- Knowledge and application of cost-effective technologies
- Finance and credit to purchase and scale up technology
How are these constraints being addressed?

**Smallholder Business Models**

- Has cost benefits for growers and buyers
- Reduces cost of production, quality control, and product aggregation
- Less risk for buyers and growers
- Allows for sharing of technologies, expertise, training, and marketing
- Bulk buying of inputs and technologies
- Increases opportunities for finance and credit
Dryland Seed Ltd

- High market demand for certified seed of grain legumes
- Strong smallholder network
- Producing high-quality seeds, certified by Kenya Plant Health Inspection Service (KEPHIS)
- Technology adopted on pilot scale by farmers
- Needs access to finance to scale up to meet demand
Past Successes

- Postharvest technology for the vanilla industry in Uganda
- Inputs for fresh vegetable exports in Kenya
- Plantation technology for smallholder banana production in Zimbabwe
Agricultural solutions to end hunger and poverty

Opportunities for Scale-Up Support

A USAID and Fintrac program focused on finding and commercializing agricultural technology that can help smallholder farmers

Expressions of Interest due July 31.

See www.partneringforinnovation.org/eoi for details
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