ASSESSING THE POTENTIAL ADOPTION OF QUINOA FOR CONSUMPTION IN CENTRAL MALAWI

L. Morgan Gardner
M.S., Environmental Science Dept.
School of the Environment

BACKGROUND/SETTING

GEOGRAPHY

- Small, Landlocked
- Malawi… Pennsylvania
- Lake Malawi…Vermont
- Population: 15,380,000 (2011)
- Mostly subtropical, Rainy/Dry season
- Rainy season (95% of rainfall): November-April
- Dry/cool season: May-October
- Drought

SIGNIFICANCE OF MAIZE IN MALAWI

- Malawians largest consumer per capita of maize in the world (FAO, 2007).
- Maize occupies 90% of cultivated land from October/ December to harvest in April/ June (McCann, 2001).
- "*Chimango ndi moyo*"… "maize is our life"
- Maize is highly sensitive to deprivation of sunlight, water, and nitrogen and rots easily in tropical storage conditions (Galwey, 1993).
- 2005 drought = 30% drop in maize harvest

www.usaid.gov, 2013

CHALLENGES

- Soil degradation
- Vulnerability to climate change
- Drought
- Poor Nutrition
  - Deficiencies: iron, iodine, vitamin A, protein
  - 39% children under 5 are underweight

Reuters, 2005

WHY QUINOA?

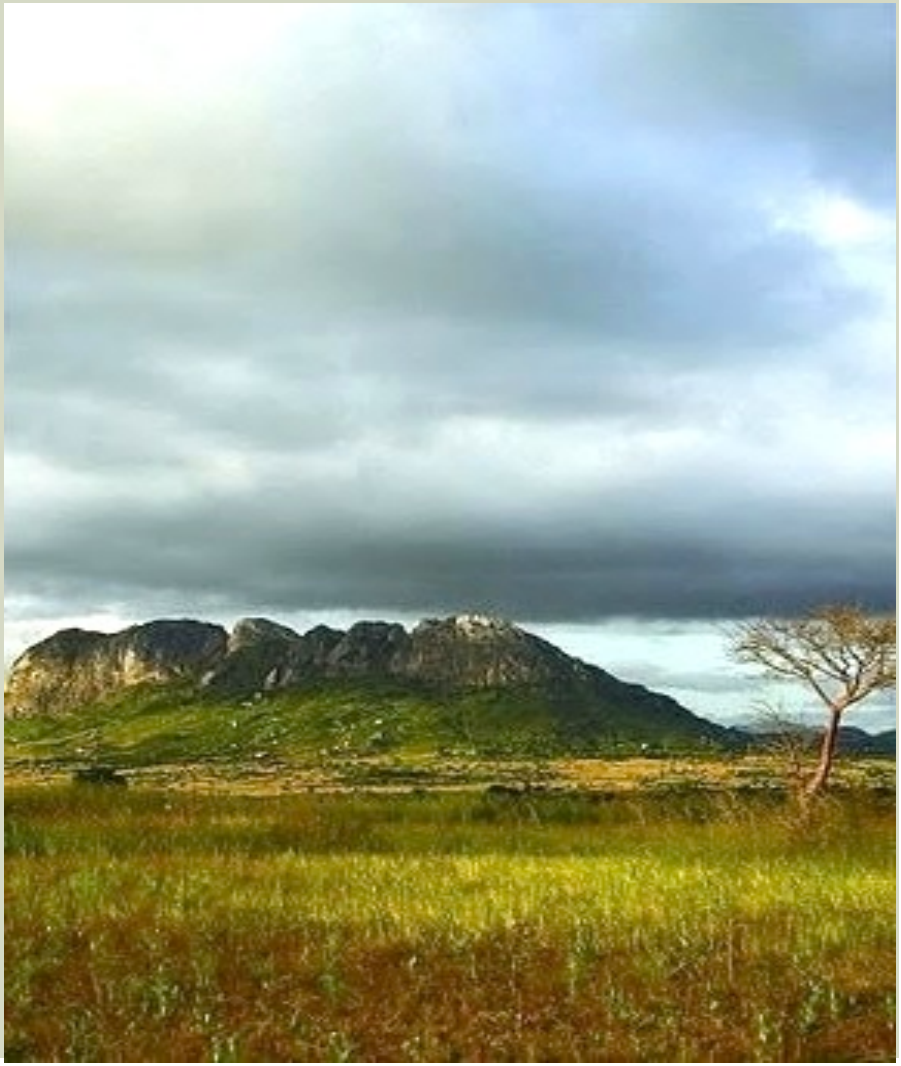
- Dr. Kevin Murphy is working with Dr. Moses Maliro at the Bunda College of Agriculture to test different quinoa varieties (Central Malawi).
- Nutritional composition… complete protein (all 9 amino acids), gluten-free, fiber, magnesium, manganese, copper, zinc, calcium, etc.
- Strong tolerance to marginal soils
- Drought-tolerant crop
- Has been designated a “super crop” by the United Nations

If quinoa is grown successfully in Central Malawi, will it be accepted as a new food by the local population?

What are the factors affecting the adoption potential?

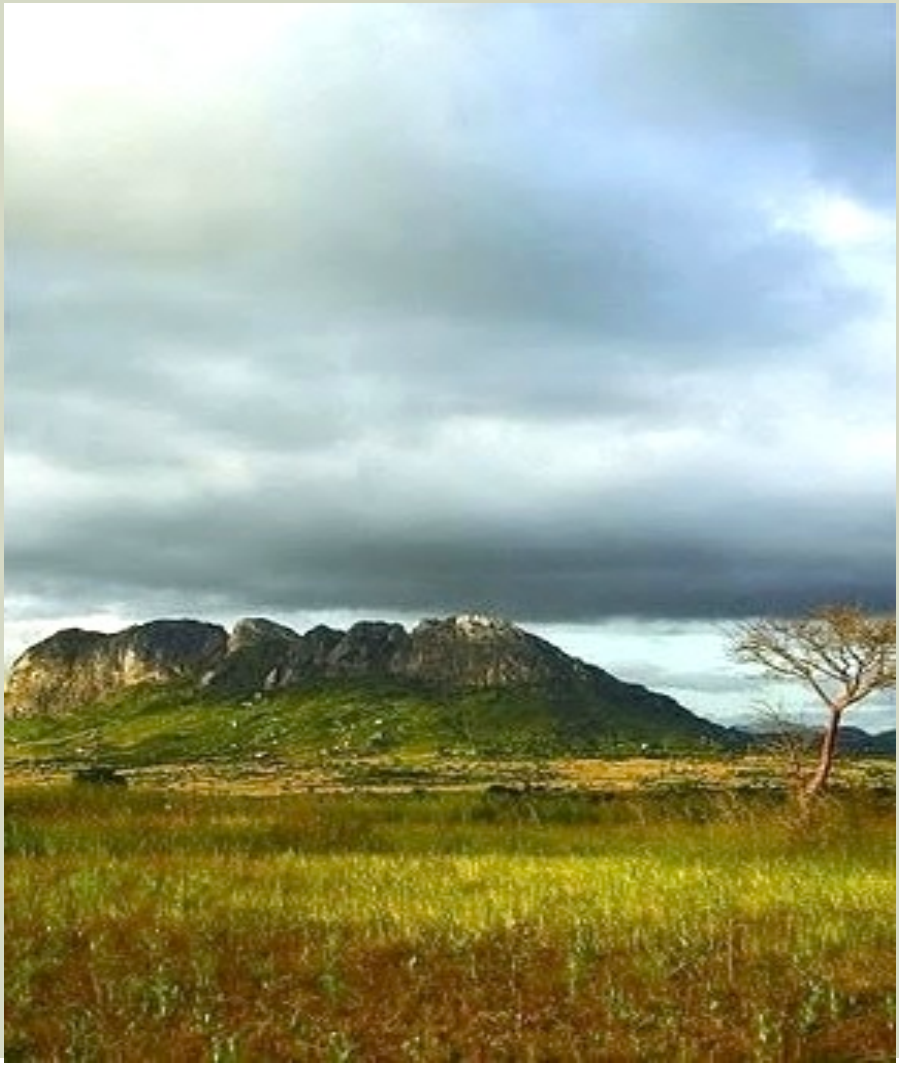
RESEARCH SITE

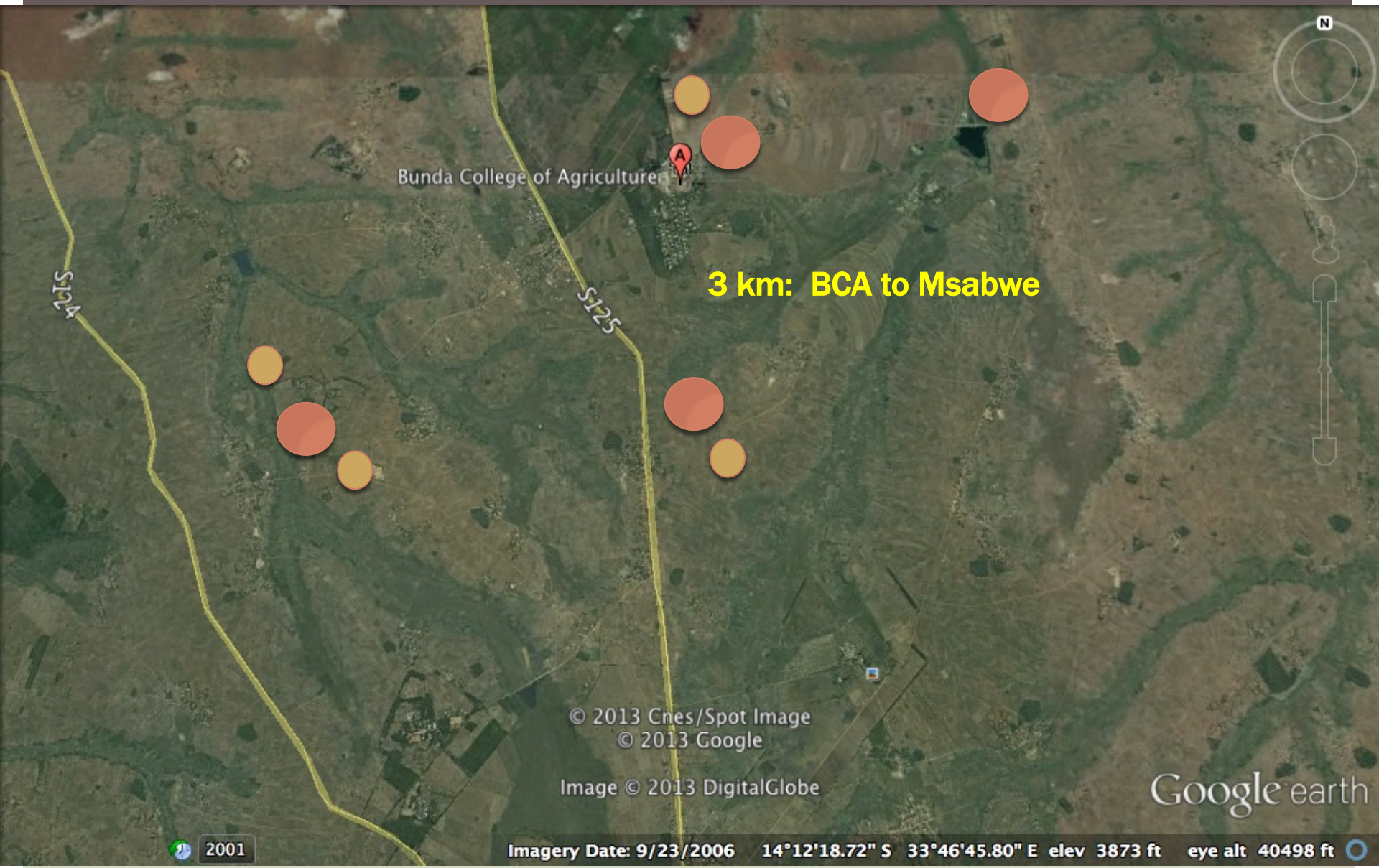
- Bunda College of Agriculture, 20km from Lilongwe
- Interviews
  - 5 week period during most of July, early August 2012
  - 4 villages/4 sub-villages
  - 16 villagers, five extension or extension-related agents
  - One focus group at the Total LandCare (TLC) office in Lilongwe



METHODS

- Data Gathering
  - Qualitative, semi-structured interviews
  - *Qualitative analysis:* in depth understanding of human behavior
  - *Grounded theory:* identify themes that emerge from interviews
  - *Snowball sampling:* sample subjects advise/recruit interviewees
  - Local interpreter, Chichewa
  - Guided questionnaire
  - Coded results using ATLAS.ti
  - Challenges: BCA protests, malaria

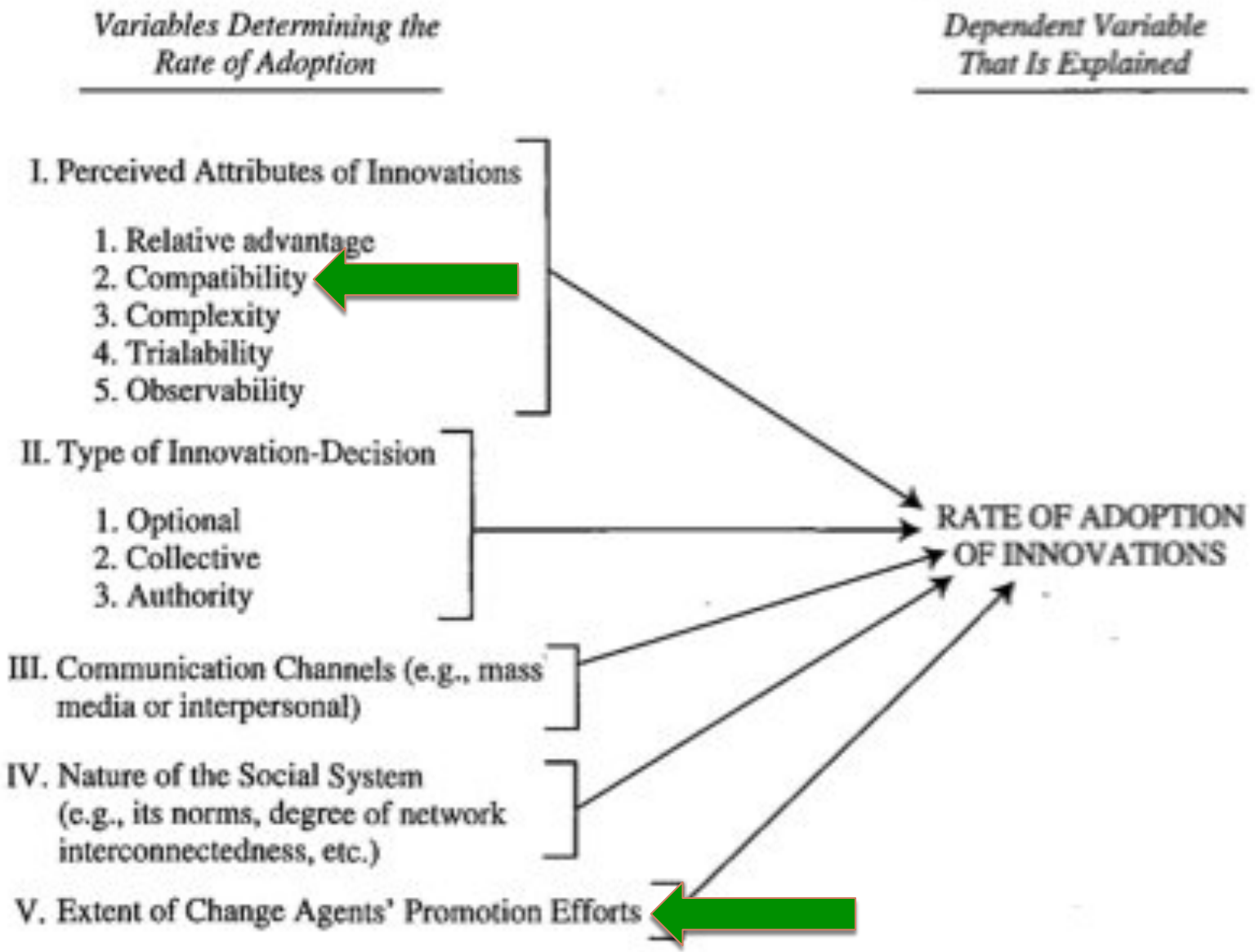



Bunda College of Agriculture
3 km: BCA to Msabwe
S124
S125
© 2013 Cnes/Spot Image
© 2013 Google
Image © 2013 DigitalGlobe
Google earth
2001
Imagery Date: 9/23/2006 14°12'18.72" S 33°46'45.80" E elev 3873 ft eye alt 40498 ft

FRAMEWORK: DIFFUSION OF INNOVATIONS

- Everett M. Rogers, 1962 book: Popular framework to explain how new ideas and technologies are **spread and adopted** in a community.
- Seeks to explain how, why, and at **what rate individuals or cultures adopt new ideas** and technology over time.

Figure 6–1. Variables Determining the Rate of Adoption of Innovations



COMPATIBILITY

- Compatibility *is "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters"* (Rogers, 2003).
  - **Values and Beliefs:** An incompatibility with cultural values can block adoption.
  - **Previously-Introduced Ideas**: Compatibility of an innovation with a preceding idea can either speed up or decrease rate of adoption.
  - **Needs:** Compatibility based on the degree to which it meets a felt need.

EXTENT OF CHANGE AGENTS' PROMOTION EFFORTS (THE CHANGE AGENT)

4.

personnel

- **Four factors in change agent success:**
  - ★ 1. **Change agent effort**
  - 2. **Client orientation**
  - ★ 3. **Compatibility with a client's needs**
  - 4. **Change agent empathy** (Rogers, 2003)

RESULTS: DEMOGRAPHICS

- Average years of schooling: 3.9 yrs (2/3 women reported no formal education)
- Average age: 39.7 (range 18-65)
- 16/16 identified farming as the occupation: subsistence level
- 8 villagers claimed to work odd jobs when possible to earn money

RESULTS: DEMOGRAPHICS

All had maize as main crop, also soya, sweet potato, some cassava, pigeon peas

- 14/16 did not produce enough maize to last the year
- 16/16 reported some kind of crop failure in past years: drought, disease, insects, not enough fertilizer
- 5 extension-related personnel (4 male, 1 female)

RESULTS: FOCUS GROUP

Table 3. Quinoa taste results from a focus group of 12 participants at TLC in Lilongwe

Gender	Would try again	Would not try again	Did not participate
Male	4	2	2
Female	2	1	1

Feedback included:

- Put sugar on top to eat as a morning porridge
- Too difficult to pick up with hands to scoop up *ndwino*
- Prepare as a flour, to mix with *nsima*

COMPATIBILITY: VALUES/BELIEFS

- .
- "*chimango ndi moyo*"- maize is our life
  "*chimango cha makola*"-maize of the ancestors
- Interviewee #11; "*Nsima* is the food of Malawi"
- Interviewee #2: "we have not eaten if we have not eaten *nsima*"
- Interviewee #18: "*Nsima* is not tasty. It's

- More than just a staple food dish. It's associated with deep social and cultural pride. It's used as a utensil. It's used as a gathering point.
- However… 16/16 villagers reported a positive response to a new food due to food shortages.
- Potential of quinoa to be eaten as a flour, to be mixed with *nsima.*

COMPATIBILITY: PREVIOUSLY INTRODUCED IDEAS

Previously-Introduced Ideas: Compatibility of an innovation with a preceding idea can either speed up or decrease the rate of adoption.

- 12/16 had ongoing contact with BCA or EPA extension. All reported positive interactions with extension agents
- Extension reported slow but positive results when introducing a new crop (soybeans)
- EPA officers visit 3-4x a week
- BCA is less frequent, but focuses on one or

COMPATIBILITY: NEEDS

the degree a need is met

- All village interviewees showed interest in the possibility of a new crop. Interviewee #6, "we are very poor. We would like any new

8/16 were already making adjustments to diet in July/Aug (hungry season typically Dec/Jan)

- Malnutrition and crop failures

THE CHANGE AGENT: EFFORT

- **Effort: amount of effort spent in communication activities**
  - "Most people are used to eating nsima, so they feel that the new product you are introducing is not important. One of the ways we overcome the resistance is by using nutrition groups." -Interviewee #21
  - "The women in the village needed to be familiar with the food item [soybeans] and how to cook it." –Interviewee #21
  - "Efforts like making snack foods, different flours, are important when making a shift from maize." –Interviewee #17

THE CHANGE AGENT: EFFORT

Cont'd….

- "It takes three to five years for a farmer to adopt a new crop or idea. It takes time, and supervision and guidance." -Interviewee #18
- "[New foods] are worth promoting so people can start helping with the problem of malnutrition." – Interviewee #19
- There is a high amount of effort and involvement in extension in the region surrounding BCA. This relates to a high potential for adoption

THE CHANGE AGENT: COMPATIBILITY WITH NEEDS

Compatibility with a client's needs: the more a change agent can diagnose a client's needs, the more likely adoption will occur

- "Even if you say it has a lot of nutrients, it doesn't matter. It's what fills you up that matters."- Interviewee #18
- "It [quinoa] is worth promoting so people can start using other foods to help with malnutrition." – interviewee #20
- Extension personnel seem to be in touch with the nutritional needs of the surrounding villages. Adoption is more likely.

CONCLUSIONS

- Using Rogers' model of "compatibility" and "change agents" to evaluate research results…
  - Results from interviews confirmed a strong motivation to add a new food item to the local diet in spite of strong cultural ties to nsima.
  - The network of extension personnel in this central region of Malawi is key in integrating a new food like quinoa. Researchers, extension, villagers.

CONCLUSIONS

- Strong involvement with women in nutrition groups, field days, interviews, and as food preparers should be a focus when working with villagers.
- The feedback of grinding quinoa as a flour to be mixed with nsima was very strong and frequent. This is a great next step in the process of adoption evaluation.

FUTURE RESEARCH

- Food taste trials at Bunda College of Agriculture: preparing quinoa as a flour and different recipes
- Side-by-side comparison of maize vs. quinoa preparation
- “Field Day” with quinoa and women in the nutrition groups
- Program implementation of outreach programs at Bunda College of Agriculture and the Extension Planning Areas (government)

Questions?

SOURCES

- Reuters, 2005. http://blogs.cfr.org/coleman/files/2012/08/malawi-food-insecurity-crops-drought-joyce-banda.jpg
- Silva, 2011. http://green.blogs.nytimes.com/2011/06/07/can-the-yield-gap-be-closed-sustainably/
- 2011. Food and Trees for Africa project as featured on the South African Social Investment Exchange http://www.agfax.net/radio/detail.php?i=424
- Bruntse, Anne. (August 12, 2011). Crop Rotation. Retrieved December 3, 2012 from http://www.infonet-biovision.org/default/ct/251/soilfertilitymanagement.
- Dorward, A., & Chirwa, E. (January 01, 2011). The Malawi agricultural input subsidy programme: 2005/06 to 2008/09. *International Journal of Agricultural Sustainability, 9,* 1, 232-247.

SOURCES

- Francis, C. A., American Society of Agronomy, Crop Science Society of America., & Soil Science Society of America. (2009). *Organic farming: The ecological system*. Madison, WI: American Society of Agronomy.
- Kerr, R. B. (April 01, 2012). Lessons from the old Green Revolution for the new: Social, environmental and nutritional issues for agricultural change in Africa. *Progress in Development Studies, 12.*
- FAO Malawi Background (2012). *Food and Agriculture Organization of the United Nations.* Retrieved December 3, 2012 from http://www.fao.org/isfp/information-par-pays/malawi/fr/.
- McCann, J. (2007). *Maize and grace: Africa's encounter with a new world crop, 1500-2000*. Cambridge, Mass: Harvard University Press.
- Ngwira, A. R., Thierfelder, C., & Lambert, D. M. (August 24, 2012). Conservation agriculture systems for Malawian smallholder farmers: long-term effects on crop productivity, profitability and soil quality. *Renewable Agriculture and Food Systems,* 1-14.