

PHASE II: Networks, Barriers and Broad Dissemination

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Sustainable Technologies to Benefit Africa

Two sustainable technologies now under development -- low-phosphorous soil-enhancing beans (Lynch 2007) and an evolution-proof malaria vector control (Read et al. 2009) -- share similar challenges for adoption/diffusion in vulnerable environments. Research in Mozambique shows that diffusion of the twin innovations may be dynamically related through access limitations and current distribution systems.

For low-P beans, thin or missing seed markets limit access to improved seed, despite beans being a critical protein source in family diets. Further, the agricultural cycle, driven by the rainy season, places malaria prevention in a difficult tension: Current prevention strategies entail action at a time when communities have the fewest resources (i.e., income and food security are lowest when malaria strikes).

Understanding local social/economic network typology and broader integrated systems has the potential to provide key insights into improved sustainable technology distribution approaches and food security-disease prevention strategies.

Theory & Background

The numbers of East African households caught in poverty traps continues to be staggering (Barrett, 2006). Despite the need, innovations, with strong potential for impact, may not be adopted (CGIAR, 2003), to the frustration of fund donors. Or, while adopted by some, innovations can remain trapped within elite networks. Knowledge of local and supply chain networks can be used to improve diffusion processes and distributional outcomes.

Scientific and social contribution. Of specific interest are
1) Differences in sharing behaviors when the good is an economic one (beans, with expectations of hoarding) vs a quasi-public one (malaria bio-insecticide, for which coverage of 80%+ of village households is expected to result in a village 'Safe Zone').
2) Implications of linkages (eg, temporal/spatial) between food security and disease dimensions of the problem. In a tightly coupled system, minimization of unintended consequences in vulnerable environments.

Dissemination

Current system models assume market presence

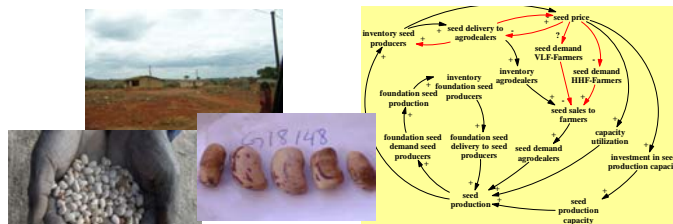


Fig 1. Bean seed system, CGIAR, adapted.

Field sites: 8 experimental (rural) field sites in Mozambique: 2 each in Angonia, Gurue, Lichinga, Sussundenga districts.

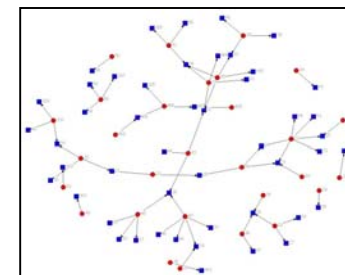
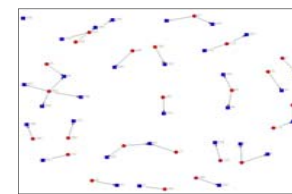
Established local networks: Using Google maps, Phase I baseline survey-based field work established existing networks related to sharing and adoption (kin, friendship, economic networks; opinion leaders). Networks and decision-making for household males, females separately documented

Common bean dissemination under Phase II: Following completion of local testing of selected varieties, experiments underway to assess a) impacts of distribution patterns through chief/village leaders, and b) a First Wave Infusion (FWI) approach, ie, broad distribution of small packets to villagers. Barriers to adoption/diffusion -- including access to selected seeds -- being assessed in follow-up Phase II survey across all sites.



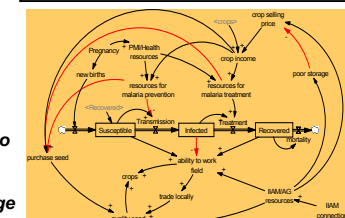
Observations & Policy

• **Bean seed sharing networks fragmented. Local networks not dense in majority of tested villages, as shown in example directly below. But not always the case, as shown (right below).**



• **Temporal linkages between food security and malaria, as shown in graphic below.**

• **Variation in intra-household (male, female) preferences, likely to influence nutrition.**



Source: R. Smith, PSU.

• **Women report being less likely to be reached by traditional dissemination approaches, and report lower levels of trust in village organizations than men.**

• **Implies different policy approaches: 1. to improved seed distribution, 2. food-health programs, 3. household nutrition vs. market focus**

NEXT STEPS – the recent availability of sufficient bulked up P-efficient seed allows the testing of alternative seed distribution approaches. The approach of distributing seed to traditional leaders for local dissemination is being evaluated first, with selected recipients matched to the baseline data. First Wave Infusion to be tested next. Surveys administered after experience with each approach will provide assessments of barriers and constraints.