Development of Methodologies and Approaches to Evaluate Agricultural Technologies in Target On-Farm Environments to Promote their Adoption in East and Southern Africa and the U.S.

Thematic Area of Activity: T6. Enhancing grain productivity and quality through research and extension

Principal Investigators and Institutions:

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Justification:

Over the last two decades, the Bean/Cowpea CRSP has developed improved bean varieties in East Africa. However, adoption of these varieties is low. Although varieties have been developed following participatory research methodologies, farmer exposure to breeding lines and new varieties through on-farm testing has been limited. The key to successful rapid adoption of new varieties is the involvement of the farm community in variety selection and a sensitization of farmers and marketers to variety attributes prior to variety release. In the U.S., new technologies developed by the Bean/Cowpea CRSP have generally been targeted towards large-scale production systems, and large-scale producers have mainly benefitted from these innovations. Small-scale, direct market production is common throughout the U.S., is gaining in popularity and demand, and provides higher returns per unit area to farmers especially when farms are located near urban centers. Dry beans are ideally suited for small-scale direct market production and there is a growing demand for niche-market varieties. Preliminary studies in Washington have shown that many small-scale farmers who grow dry beans in western Washington are women, which contrasts with the large-scale farmers in central Washington because they feel the climate is not suitable or they are not aware of the market potential of niche-market varieties. Preliminary variety trials indicate that more the 50 varieties of dry beans can be grown in western Washington but further on-farm testing is required to develop variety and production recommendations and to develop marketing and promotional information for niche-market dry bean production. In East Africa and the U.S., health and nutritional qualities of beans can be promoted to increase bean consumption and demand.

Objective 1: Establish participatory research on-farm trials in Tanzania, Malawi, and Washington to evaluate perceptions of variety performance and to improve feedback to breeders to promote an effective bean selection and breeding process.

Collaborators:

Susan Nchimibi-Msolla, Sokoine University of Agriculture, Tanzania
James Bokosi, Bunda College, Malawi

Approaches and Methods:

In collaboration with local extension officers, NGOs and CIAT in Tanzania, Malawi, and Washington, develop trial designs that link researcher-controlled replicated trials with on-farm

trials that are managed and evaluated by individual farmers or farmer groups. On-farm trials will follow a 'replication by location' design and will be hosted by innovative farmers who are respected community leaders, especially women farmers. CRSP varieties will be compared with local varieties in on-farm trials to demonstrate the productivity and benefits of the improved varieties and to facilitate their adoption. Field locations will be measured with GIS systems to precisely determine variety adaptation to altitudes and latitudes. Data collection will include plant stand, plant height, number of pods per plant, plant yield, and total yield. Researchers will collect quantitative information about farmers' perceptions of variety performance along with biophysical performance data, and feedback will be provided to breeders. Farmer field days will be held at on-farm trial sites to further promote improved varieties in the farming communities. In Washington, we will also evaluate niche-market dry bean varieties in on-farm trials and we will target women small-scale farmers as trial hosts. Data collection will include days to flowering and maturity, plant stand, plant height, number of pods per plant, plant yield and total yield.

Indicators of Research Progress:

On-farm trials will be established in three primary bean growing regions of Tanzania and Malawi. We will conduct three on-farm trials in each region for a total of nine on-farm trials in each country. Local extension personnel, farmer trial hosts, and field day participants will be sensitized to new improved varieties. Participants will be made aware of yield potentials of CRSP varieties, and they will be able to recognize and name CRSP varieties. We will measure sensitization by asking participants to identify CRSP varieties before and after the field day. In Washington, we will establish field plots in Vancouver, Olympia and Seattle. We will determine how many of the varieties that are included in the experiment are suitable for production in the region. We will host field days or workshops and will present our results to farmers and extension agents. We will survey participants to determine how many are growing dry beans and will estimate their intent in growing dry beans in the future. A database of variety characteristics and performance in western Washington will be posted on the project website and made available to farmers and seed company representatives.

Objective 2: Host taste panels and cooking demonstrations to promote the end-use qualities of improved CRSP varieties.

Collaborators:

Agnes Mwangwela, Bunda College, Malawi
Henry Laswai, Sokoine University of Agriculture, Tanzania

Approaches and Methods:

Establish cooking time information of improved varieties relative to common varieties included in on-farm trials. In Tanzania, *mama lishe's* (small-scale women cooks-vendors), farmers, marketers and general consumers will participate in taste panels and cooking demonstrations to evaluate CRSP and local varieties.

Indicators of Research Progress:

Target populations of farmers, marketers, and consumers will be aware of the cooking time qualities and the flavor attributes of CRSP varieties.

Networking and Linkages with Stakeholders:

In Tanzania and Malawi, we will collaborate with extension officers, NGOs and CIAT to conduct on-farm trials. We will involve *mama lishe's* (small-scale women cooks-vendors), farmers, marketers and general consumers in taste panels and cooking demonstrations.

Anticipated Outputs:

Through on-farm trials, improved varieties will be multiplied and disseminated in target environments and we will determine effective, farmer-appropriate methods to improve seed selection and production, seed quality, and promotion of improved varieties. Through taste panels and cooking demonstrations, stakeholders will be aware of the end-use attributes of improved CRSP varieties.

Innovative Tools to be Used:

___ Biotechnology

_ _ GIS

_ _ Participatory research approaches
___ Cutting edge research technologies and/or analytical tools

_ _ Internet-based networking, databases, information exchange

_ _ Human subject surveys

Budget:

PI	U.S./HC Institution	U.S. University	Amount Budgeted (Direct cost)
Carol Miles	WSU	MO	$12,600
Charles Masangano	Bunda	WSU	$ 5,158
Flavianus Magayane	SUA.	WSU	$ 5,646
Total			$23,404