

Low-cost pest exclusion and microclimate modification technologies for small-scale vegetable growers in East and West Africa

The Problem

Rapid urbanization in Sub-Saharan Africa (SSA) has resulted in an increase in demand for food. Almost 33% of the SSA population, close to 200 million people, is undernourished. Fruit and vegetable consumption in SSA remains 22-82% below the intake value threshold of 400 g/day recommended by the World Health Organization and Food and Agricultural Organization. Vegetable growers, mainly small holders, have no access to inputs for improved germplasm, pest and disease control tools, and improved crop production techniques. Vegetable farms are routinely devastated by pests. We propose to harness alternative pest management techniques, micro-climate modifications, and growers' education and training to improve small-scale vegetable production in East and West Africa



The Approach

A participatory approach was used to demonstrate efficacy of 1) Eco-Friendly Nets (EFN; insect barrier nettings, either treated or not with insecticides) at protecting vegetables against pests and associated viral diseases, 2) floating row covers at improving crop micro-climate and enhancing yield and produce quality, 3) assess and address farmers' perception of EFN to increase the adoption/use of the technology. Experiments were conducted in Benin and Kenya from 2010 to 2013. The first set of experiments was conducted at research stations to refine the net and row cover technologies. In 2013, large scale demonstrations were undertaken in collaboration with producers. The crops evaluated include tomato, cabbage, French bean and watermelon. Training activities for farmers, extension educators, scientists and students were conducted.

The Impact

- This study, conducted at multiple locations with different climatic conditions, showed that the efficacy of the nets and row covers is site-specific.
- The technologies showed significant benefits for transplant production at all locations and climates.
- Under hot environments like the dry season in Benin, the technologies showed serious limitations mainly due to the fact that the nets increase air temperature around the crop.
- Under cool climate (Egerton, Kenya) the technologies reduced pest populations, and enhanced yields.
- Many farmers have already adopted the technologies in both Benin and Kenya, and many others have shown interest. Also, the industry partner (A to Z Textile Mills, Tanzania) is refining the net technology for possible mass production.
- Farmers and Extension educators are more aware of the impact of the nets on crop microclimate, pest population dynamics and crop yields.
- Scientists from Benin, France and Kenya received training on IPM and Agro-Ecology at Michigan State, and are currently using the knowledge to better understand and explain the impact of the nets.
- More than 25 students have been trained (or are currently enrolled) by this project at the BS, MS, and PhD levels in Benin and Kenya.