

# BioNetAgro: Reducing pests and improving microclimate for small-scale vegetable production in Africa

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## Project Summary

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. This severe malnutrition leads to many chronic diseases among the populations. Vegetable growers, mainly small holders are poor and 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 and extended drought conditions. 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<sup>1,2,3</sup>.

## Project Goals

- Optimize and adapt EFN (Eco-friendly net) and other row cover technologies for year-round production of vegetables under diverse local conditions (climate, crop/cultivar, irrigation, pests and pathogens).
- Determine the costs, benefits, and socio-economic viability of EFN and row cover technologies.
- Increase local human capacity, women empowerment, adoption and use of locally adapted adaptable eco-friendly nets and other row covers in target communities.

Our partner A to Z is currently developing strategies for appropriate recycling of end-of-life nets and covers.



Photo: M. Thibaud  
Fig. 1. Net use in Benin to protect cabbage against insects

## Focus countries

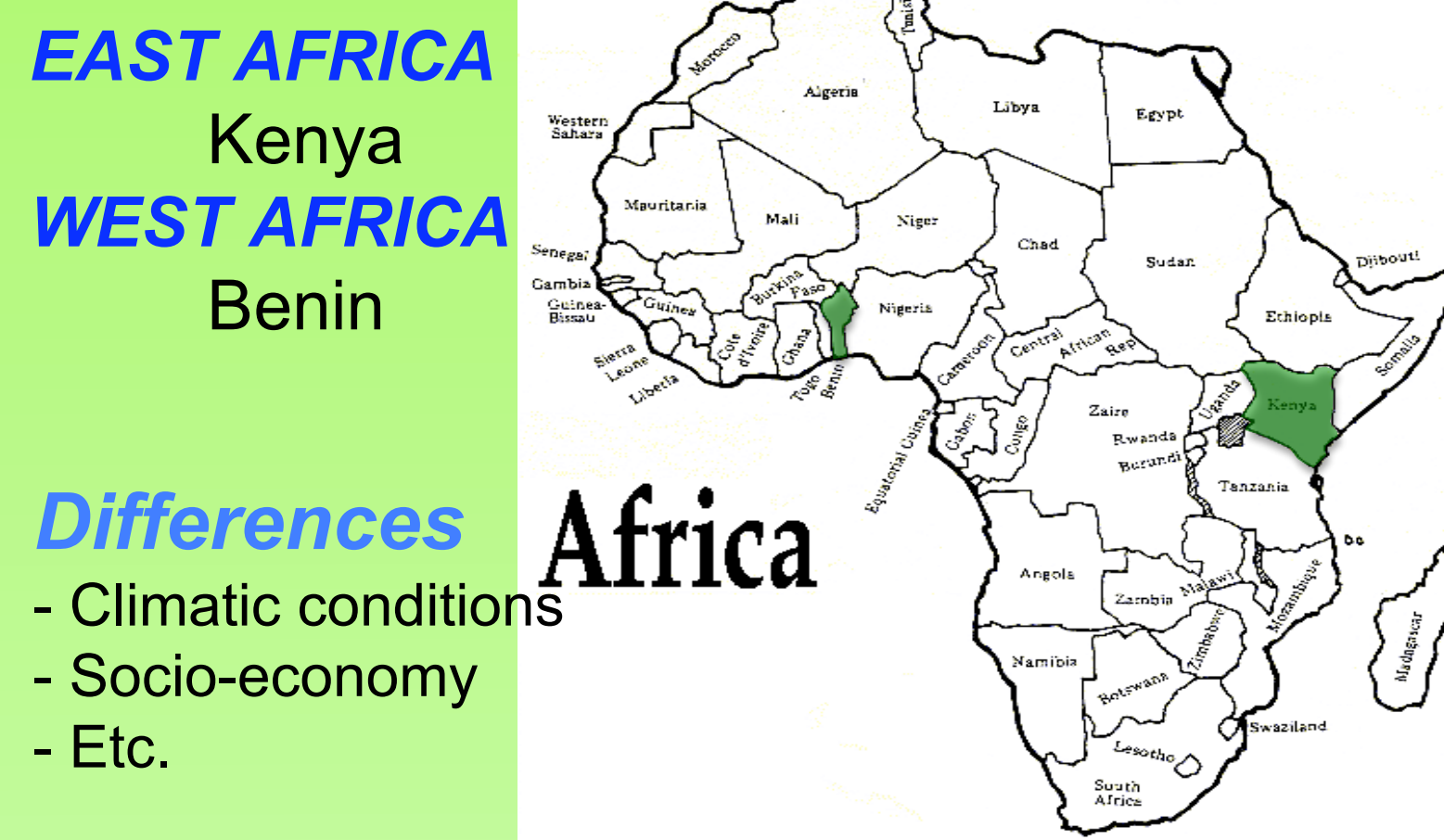


Figure 2. Benin and Kenya are the two focus countries in Africa

## Project Website



Fig. 3. Project Website launched in March 2011. URL: <http://www.bionetagro.org/>



Photo: M. Kasina  
Fig. 4. Hort CRSP headquarters' visit with Kenyan team on 18 March 2011.



Fig. 5. Project launching in Benin Jan. 2011

## Partnership and Collaboration

- USAID: United States Aid for International Development
- Hort CRSP: Horticulture Collaborative Research Support Program, UC Davis, California.
- MSU: Michigan State University, East Lansing, Michigan, USA
- CIRAD: Agricultural Research Centre for International Development, Montpellier, France
- KARI: Kenya Agricultural Research Institute, Nairobi, Kenya
- icipe: International Centre of Insect Physiology & Ecology, Nairobi, Kenya
- Egerton Univ.: Egerton University, Egerton, Kenya
- INRAB: Institut National des Recherches Agricoles du Bénin, Cotonou, Benin
- UAC: University of Abomey Calavi, Cotonou, Bénin
- APRETECTRA: Association des Personnes Rénovatrices des Technologies Traditionnelles
- A to Z: A to Z Textile Mills, Arusha, Tanzania.

## Research and Extension Plan

The new technology has not been experimented on tomato in Benin or on tomato and cabbage in Kenya. Therefore, the first step will focus on research station trials to identify and address technical constraints. The second step will involve a limited number of innovative farmers to identify constraints to adoption. The final step will be large-scale on-farm implementation of the technology with over 50 farmers per country.

Previous studies have demonstrated efficacy of nets for production of cabbage in Benin<sup>1,2</sup>. Most technical constraints have been identified and the technology is currently in the extension phase. In 2011 a total of 40 farmers have volunteered to host demonstration sites. In 2012 and 2013 the number of farmers cooperators will be scaled up to 100.

### Benin: Tomato Kenya: Tomato + cabbage

<b>Year 1 &amp; 2</b> On-Station Research & Training (3 sites)	<b>Year 2</b> On-Farm Innovative farmers (15 sites)	<b>Year 3</b> On-Farm Full scale extension (>50 sites)
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### Benin: Cabbage

<b>Year 1</b> On-Farm Innovative farmers (40 sites)	<b>Year 2</b> On-Farm Innovative farmers (40 sites)	<b>Year 3</b> On-Farm Full scale extension (>100 sites)
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## Expected Outcomes

- Improve vegetable quality and productivity by developing innovative technologies adapted to climate change
- Improve pest control by strengthening IPM strategies
- Reduce the dependence on pesticides and their negative environmental impacts
- Create new jobs around the production and the recycling of EFN



Photo: M. Thibaud  
Fig. 6. Project launching in Benin Jan. 2011. Discussion with a growers during field visit

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## References

- Licciardi S., F. Assogba-Komlan, I. Sidick, F. Chandre, JM Hougard and T. Martin 2008. A temporary tunnel screen as an eco-friendly method for small-scale growers to protect cabbage crop in Benin. *International Journal of Tropical Insect Science*, 27, 152-158.
- Martin T., Assogba-Komlan F., Houndete T., Hougard J.M. and Chandre F. 2006. Efficacy of mosquito netting for sustainable small holders' cabbage production in Africa. *Journal of Economic Entomology*, 2006, 99, 450-454.
- Nair, A. and M. Ngouajio. 2010. Integrating row covers and soil amendments for organic cucumber production: Implications on crop growth, yield, and microclimate. *HortScience* 45(4):566-574.