Farmer Survey Results Capture the Impact of Changing Weather Patterns on Zambian African Indigenous Vegetable Production

Xenia K. Morin (Rutgers), Ramu Govinawamy (Rutgers), Surendran Arumugam (Rutgers), Sakhiti Ramu (Rutgers), David Byrnes (Rutgers), Steve Weller (Purdue), Emil Van Wyk (AgriSmart, Zambia), Inonge Sizaya (AgriSmart, Zambia), Kenneth Chali (AgriSmart, Zambia), Dan Hoffman (Rutgers), and Jim Simon (Rutgers)

Abstract

Zambia is a sub-Saharan country of 16 million people, many of whom suffer from malnutrition due to a lack of diversity in their diet. One strategy to diversify the diet is to increase the local production and consumption of African indigenous vegetables (AIVs). However, climate change may negatively impact these efforts.

In our IRB-approved 2015 baseline survey of AIV producers in Zambia, we asked producers if changes to local weather patterns had been observed.

Almost all Zambian farmers surveyed reported changes in their local weather patterns and seasonal cycles: 100% reported higher temperatures, 99.6% increased frequency of drought; 100% delayed onset of rainfall; and 100% reported increased erratic rainfall. When AIV producers were asked if weather patterns were impacting agriculture, 100% of AIV producers reported decreases in yield in 8 out of the 9 most common AIVs; 92-100% of AIV producers reported increases in pests and diseases; and 97-100% of AIV producers reported increases in weeds; and 92-100% of AIV producers stated that changing weather patterns had a direct impact on agriculture.

These observations are consistent with climate change, and confirms that approaches which incorporate resiliency to ensure high yields with a changing climate are needed with AIVs.

Results

Results of the farmers survey are shown in Figure 1 and 2.

Fig 1 Farmer Observations: Weather Patterns

- 99.6% of Farmers Observed: More frequent drought
- 98-99% of Farmers Observed: Delayed onset of rainfall
- 99% of Farmers Observed: Erratic rainfall in the form of: 
  - Too much rain
  - Too little rain
- 98-99% of Farmers stated that changing weather patterns had a direct impact on agriculture.

Fig 2. Impacts of Changing Weather Patterns on Zambian Agriculture

- Crop Yields Down
- Pests, and Plant Diseases Up
- Weeds Up
- Decrease in variety of crops grown

Conclusion

The overall goal of this program is to improve the production and to increase consumption of AIVs in communities in an effort to improve nutrition, income and health outcomes of people at risk for malnutrition. These improvements must also take into account impacts by climate change.

Farmers are already seeing the impact of climate change on agricultural production and, therefore, additional adaptation strategies need to be taken. This result is consistent with other surveys and with recent reports of data collected from other weather stations in Zambia (Mulenga et al., 2017).

Our findings suggest that resilient adaptations to climate change are needed in order to ensure improvement in nutrition, yields, and control of weeds, pests and disease in Zambia in the years ahead.

Methods

To document and analyze existing patterns of AIV production in Zambia, farmers were surveyed in person using a structured questionnaire by AgriSmart.

A total of 300 farmers were selected from Lusaka (50), Katete (50), Chipata (75), Lundazi (75), and Petauke (75), located in the Lusaka and Eastern Provinces. Most questions had 270 responses.

The data were collected in October and November 2015. Those questions related to farmer observations on crop growth and weather changes are reported here.

The surveyed region contains the most fertile soils and consistent rainfall and is home to over 40% of the populations (Mulenga et al., 2017).

Maps: CC BY-SA 3.0

References


Acknowledgements

This survey was made possible by the generous support of the American people through the United States Agency for International Development (USAID EPA-A-00-09-00004). The contents are the responsibility of the Horticulture Innovation Lab and do not necessarily reflect the views of USAID or the United States Government. This survey was completed under Rutgers IRB # E16-092.