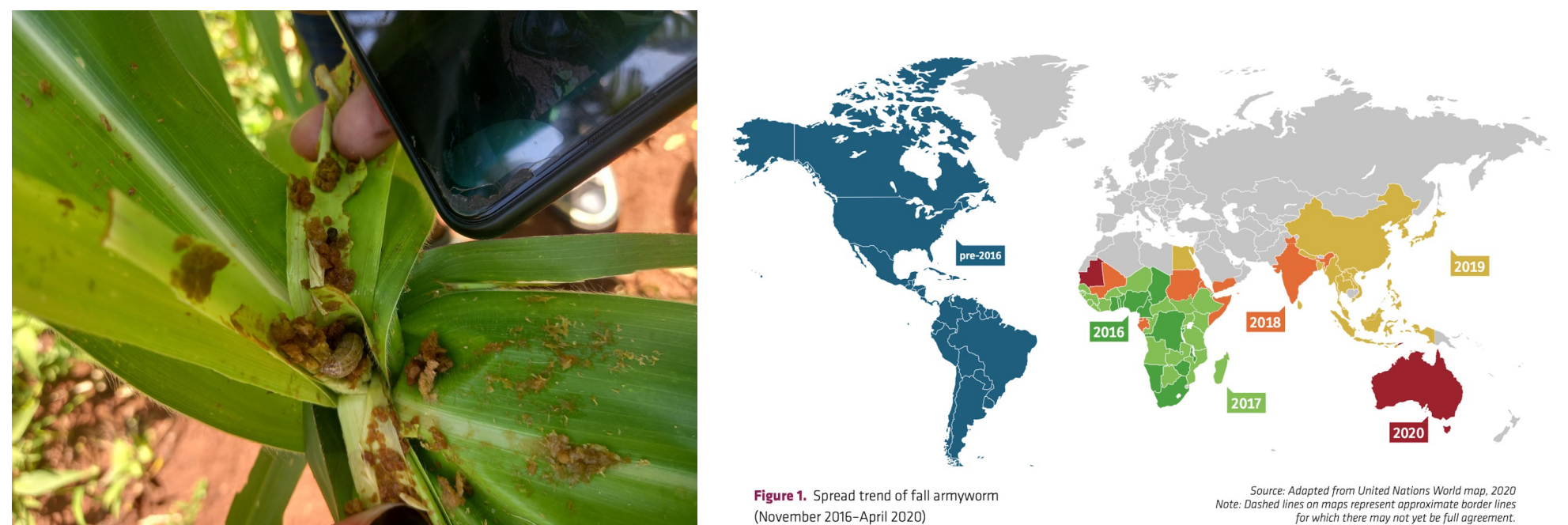


Sustainable Management of Crop Threats through Youth-Led Business: The Example of FAW in Kenya

Introduction

The Fall Armyworm (FAW) has posed a significant threat to maize cultivation in Africa since its first reported invasion in 2016. Rapidly spreading across the continent, FAW continues to cause significant crop losses. Motivated by the economic, environmental, and health concerns associated with pesticide use and the need to address the FAW challenge affecting maize farmers in Kenya, the Current and Emerging Threats to Crops Innovation Lab (CETC IL) developed a locally led, sustainable response.



Collaboration with local actors is crucial for culturally appropriate, economically feasible, and environmentally sustainable solutions. Local youth, deeply invested in these initiatives, directly impact their communities' livelihoods and food security. PlantVillage Kenya, a youth-led organization, has been at the forefront of this initiative for four years. Leveraging research results on the potential of biological control methods, specifically egg parasitoids, to manage FAW, the USAID Feed the Future Innovation Lab for Current and Emerging Threats to Crops (CETCIL) and PlantVillage Kenya has developed a model that empowers local youth and farmers, showcasing the importance of local knowledge and resources in creating effective solutions.

Locally Led Approaches

PlantVillage Kenya engaged with local farmers, youth, and extension officers to understand the specific challenges posed by FAW and the limitations of existing solutions



"Due to Fall armyworm infestation, my family experienced food insecurity and struggled to pay school fees for my children. We spent more money trying to control the pest using chemicals and got minimal yield in return." Everylne Wafula (picture above), a farmer from Bungoma county.

Design and Implementation

In 2021, PlantVillage Kenya, in collaboration with CETC IL, sent three research extension officers for training at the International Centre of Insect Physiology and Ecology (ICIPE). These officers were trained in the mass production of parasitoids, a critical component of Integrated Pest Management (IPM) strategies. A parasitoid rearing facility fully runned and managed by the PlantVillage Kenya team was set up after this initial training (Figure below).



"As a local youth, being trained in parasitoid production not only provided me and others with valuable skills but also ensured the sustainability of the FAW control measures. Coming from a farming background, understanding the FAW challenge and being able to provide solutions at scale to farmers who are our parents was key," Brenda Cheptoo, (Picture above) Researcher at PlantVillage Kenya.

The established parasitoid rearing facility at Alupe University College in Busia, Kenya, focused on producing natural enemies like parasitoids to combat FAW, providing hands-on training for 10 additional youths in parasitoid pre-release assessment and release techniques.



"This is one example of how youths can be involved in Integrated Pest Management (IPM), and more of this kind of initiative needs to be there across the country and in various countries in Africa. We contributed, and we have a mass production facility at ICIPE. We had members of the PlantVillage Kenya visiting us in Nairobi; we trained them on producing the Fall armyworm and also the natural enemies, which they have now taken forward here, and they are now actually producing on a more commercial scale, bigger than what we have currently at ICIPE," Dr. Subramanian Sevgan (left picture above with Brenda Cheptoo and Frankilne Areba), principal scientist at ICIPE, during his visit to the parasitoid rearing lab in Busia County.

Monitoring, Evaluation, and Learning (MEL)

During the 2022 long rain season, the facility produced and distributed 35 million parasitoids across 750 maize fields in 10 counties. These fields served as demonstration farms for experiment-based learning, emphasizing the importance of continued experimentation beyond initial demonstrations.



A: USAID and CETCIL team visiting parasitoids treated fields in Busia county, Kenya. B: PlantVillage Kenya team checking the efficiency of the parasitoids with the farmer

Outreach

CETCIL and PlantVillage Kenya partnered with Mediae company to create educational content for farmers through television programs and short messaging services. The collaboration with the Shamba Shape Up TV program reached over 9 million viewers, significantly increasing awareness and demand for parasitoids.

"Using television and SMS to educate farmers has been incredibly effective in spreading awareness and driving the adoption of new practices." Mercyline Tata ,Media Coordinator, PlantVillage Kenya



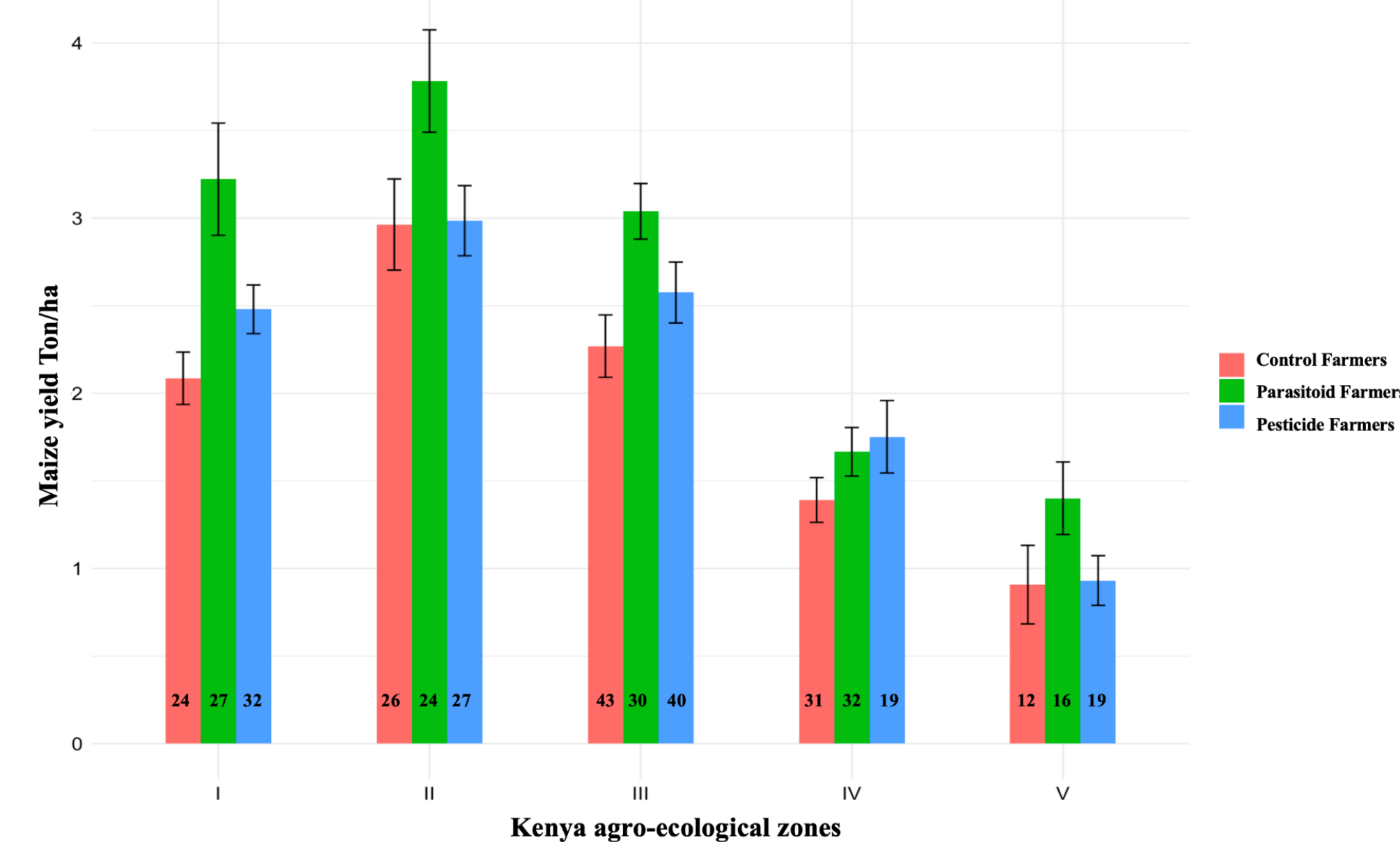
Shamba shape up TV show shooting (left); Mercyline Tata (right) ,Media Coordinator, PlantVillage Kenya.

Results and Impact

PlantVillage Kenya data scientists with Penn State University entomologists and agricultural economists develop an economic model for cost-benefit analysis, evaluating the economic benefits of using parasitoids.

"We continuously collaborated through various meetings and constant communication with Penn State University to prepare data collection tool and collect field data from the established experimental and control plots in various counties," said Brian Otieno, PlantVillage Kenya data scientist.

Parasitoid users reported a 62.5% higher yield than farmers who did not employ such management practices and a 30% higher yield than those relying on chemical pesticides in Kenya agroecological zone I



Maize yield in the five agroecological zones of Kenya. Control farms (red); Parasitoid treated farms (green) and pesticides treated farms (blue)

Economic and Environmental Impact

The success of the initial phase led to the establishment of two additional labs at Moi University in Eldoret and Tala in Machakos County in 2023. This expansion trained and employed 12 more youths, producing and releasing over 104 million parasitoids in 916 maize fields across 12 counties.

In 2024, PlantVillage Kenya established two micro-parasitoid rearing facilities in Kisii and Meru counties to address the high demand for these agents, training and employing 11 more youths. To date, over 140 million parasitoids have been produced and released, significantly aiding in FAW control.



Technological Integration

Creating a market for parasitoids as input: In collaboration with PlantVillage+, CETC IL has developed a sustainable crop threat management program. At the heart of this program is the PlantVillage platform, a software solution that equips local companies with the necessary tools to support farmers and enable timely tracking of sales and farm health data. This platform facilitates prompt responses to FAW outbreaks, making it a crucial component of the program.



Conclusion

CETC IL's locally led initiative not only addresses the immediate challenge of FAW but also creates a sustainable model for other regions facing similar agricultural threats. By empowering local youth, leveraging local knowledge, and integrating technology with biological control methods, this initiative boosts local economies and creates employment opportunities. The collaborative effort between PlantVillage Kenya, local farmers, international research institutions, and private media companies highlights the importance of locally led development in achieving sustainable agricultural solutions.



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