VILLAGE-BASED BIOLOGICAL CONTROL OF FALL ARMYWORM IN

ZAMBIA

Locations Zambia

Dates 01/05/2023 - 30/06/2026

Summary

The damage caused by fall armyworm leads to significant yield losses for Zambian smallholder farmers during every crop cycle. While chemical pesticides are used against fall armyworm, these can cause overarching negative effects. This project aims to increase food security and safety for smallholder farmers in Zambia, by providing nature-based solutions to manage this devastating pest in maize crops.

The problem

In recent years, fall armyworm, *Spodoptera frugiperda*, has become one of the most damaging invasive species in Zambia. The pest causes enormous damage to maize, the key staple food for 300 million African farmers, posing a significant threat to food security and livelihoods.

At least 98% of smallholder Zambian farmers are affected by fall armyworm every cropping cycle, leading to significant yield losses. This approximates to an economic loss in the country, estimated at about US $159 million. Resource-limited smallholder farmers, especially women, are most affected as they are most directly dependent on environmental services such as insect pollinators for their crop production and have less access to extension services.

Fall armyworm is largely managed through the use of conventional chemical pesticides using a field-by-field approach. In Zambia, nearly 43% of farmers use pesticides every season. Of these 43%, 9% use highly hazardous pesticides, some of which are listed in the Rotterdam Convention.

The excessive use of pesticides impacts food quality, the natural environment, farming communities' health and food safety, and can lead to insecticide resistance.

Non-chemical practices, as part of Integrated Pest Management (IPM), could help tackle fall armyworm and reduce the need for chemical pesticides. However, these non-chemical practices (biopesticides) are rarely used because they are too expensive or unavailable.

What we are doing

The aim of this project is to increase food security and safety for smallholder farmers in Zambia, by providing nature-based solutions to manage fall armyworm in maize.

Biological control, a lower-risk control approach based on biopesticides, could provide an environmentally-friendly and more sustainable strategy for managing fall armyworm, while supporting greater yield, and reducing reliance on pesticides.

Possible options for biological control of fall armyworm include baculoviruses and entomopathogenic fungi alongside 15 local parasitoid species that have been identified to develop successfully on the pest.

The project will focus on achieving three main objectives:

1. Increase maize yields among smallholder farmers in project sites

2. Reduce chemical pesticide use in maize production among smallholder farmers in project sites
3. Increase decision-making amongst women farmers on pest management, production and income in the maize in project sites.

The project is expected to reach a minimum of 5,000 farmers. It aims to optimize field trials of Zambian isolates of *Metarhizium rileyi*, demonstrate baculovirus compatibility for control of fall armyworm with other fall armyworm IPM strategies, and increase knowledge on tackling fall armyworm through research partners and farmers. It also plans to increase women and youth involvement and their knowledge in agriculture related to fall armyworm and biocontrol.

The project will conduct surveys to understand farmers' knowledge and attitudes towards biopesticides, determine the field efficacy of farmer-produced baculovirus mixture, establish field rates for the application of the Zambian *Metarhizium rileyi* strain, train smallholder farmers to gain a novel understanding of the development and application of biopesticides for fall armyworm, document the co-design process for biocontrol implementation and adoption by farming communities and conduct business and economic analysis of village-produced biopesticides.

Results so far

Preliminary activities, under PlantwisePlus, to investigate *Metarizhium rileyi* have increased our knowledge of the fungus biology.

Additionally, a project funded by CGIAR investigated a village-based use of the commercial product Fawligen® (AgBiTech), a specific baculovirus of fall armyworm, which can be multiplied by farmers within communities. This project was piloted with farming communities in Kenya and Zambia where it helped to improve fall armyworm management techniques and raised awareness of biocontrol products.

As part of CABI's role in increasing decision-making amongst women farmers on pest management, production and income, a participatory video, 'Challenges in agriculture faced by women in Chirundu,' was created by 17 women from two camps (Kapululira and Gota Gota) in Chirundu district (Southern Province), Zambia. The innovative approach – which uses participatory video as a tool to bring people together to explore issues and voice their concerns through simple games and exercises – ultimately aims to support women in using low-risk biological control options for fall armyworm. Find out more about the video and how it has empowered women in this blog.

Donors Australian Centre for International Agricultural Research

Partners Zambia Agricultural Research Institute (ZARI), University of Zambia (UNZA)

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