



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



USAID ADVANCE

FALL ARMYWORM INTERVENTIONS



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I. BACKGROUND

Fall Armyworm (FAW), or *Spodoptera frugiperda*, is an insect with origins from Central and South America, first identified in West Africa in January 2016. The pest is the larval form of the Fall Armyworm Moth and has an indiscriminate appetite, consuming more than 100 different plant species, including leafy crops as well as cereals like maize. The recent invasion of this species of FAW in Ghana gives cause for concern, because the pest eats the plants' reproductive parts, and through the cob—in the case of maize—resulting in significant crop loss. Since mid-2016, the FAW infested several maize farms in Ghana; the FAW can negatively impact the achievements made by Feed the Future (FTF) initiatives, including those by the USAID Ghana Agricultural Development and Value Chain Enhancement (USAID ADVANCE) project. The pest, from the *noctuidae* family, is a menace and threatens food security.



Fall armyworm on a maize leaf

In 2016, the USAID ADVANCE project recruited an international expert in entomology, Dr. Dan McGrath, to advise on how to control black ants (*Messor galla*); this assignment coincided with the first observed incidence of the FAW. Dr. McGrath's support was twofold: first, USAID ADVANCE enlisted Dr. McGrath's support to identify the armyworm species and the black ant pests affecting farmers in the three northern regions of Ghana, and second, USAID ADVANCE recruited Dr. McGrath to help design a mitigation plan for FAW in the 2017 crop season.

2. INTERVENTIONS

The mitigation plan included the following:

- a. Organizing an awareness campaign on the pest through radio broadcasts, posters, and a call center to provide direct technical support to farmers
- b. Setting up a monitoring system using pheromone traps (a type of insect trap that uses a secreted or excreted chemical factor that triggers a social response in members of the same species) and standard field scouting in the five regions of the project's zone of influence (ZOI)
- c. Establishing an alert system through radio stations' Live Presenter Mentions (LPM) and jingles

As part of the FAW mitigation plan, USAID ADVANCE conducted field training on: 1) biology, population dynamics, and armyworm control, and 2) monitoring with pheromone



USAID ADVANCE facilitating a FAW training on a demonstration field

traps, field scouting, and early detection. Staff from 53 projects working in northern Ghana participated in the training.

Implementation of the following action plans and activities is in effect:

a. Organizing an awareness campaign on FAW to reach millions of farmers in the zone of influence.

RADIO JINGLES: In May 2017, USAID ADVANCE developed radio jingles in English and 11 local languages to communicate to farmers the threat that the FAW represents and the mitigation actions. Radio stations in the Brong Ahafo Region broadcasted the jingles from mid-May 2017, and by June, other radio stations in the north started broadcasting the jingles as well.

POSTERS: USAID ADVANCE printed and distributed over 37,000 posters to farmers to enable them to identify the pest on their farms.

MAPS: USAID ADVANCE developed weekly maps with information gathered from callers on locations where farmers reported infestations. This enabled project staff to focus awareness activities in those locations.

DEDICATED HOTLINES: the project acquired three hotlines (**0266222002**, **0577662000**, and **0201212121**) and put them on the posters for farmers to call in for technical advice. As of September 2017, the call centers registered 411 calls from 393 men and 18 women.



b. Setting up a monitoring and scouting system in USAID ADVANCE's zone of influence

The project imported 50 pheromone traps and lures for the FAW and African armyworm. Twenty-seven traps were initially set up in the five regions where USAID ADVANCE operates, to monitor the presence of egg-laying moths. After training 53 Agricultural Extension Agents (AEAs), routine weekly field scouting was conducted to complement data on moth counts from the pheromone traps. Data collected through the monitoring system received analysis weekly to determine if an alert should be sent out to farmers in a particular locality to intensify scouting their farms for signs of the worm and/or the need to take a specific mitigation action. So far, the project has collected data on one cycle of maize production in the Brong Ahafo, Northern, Upper West, and Upper East Regions.

Pheromone trap moth counts and field scouting data pooled across multiple sites enabled the project to detect regional changes in the FAW population over time. Average regional moth counts (pheromone trap data) were highly correlated with average percent of infested plants (field data). Moth counts represent the egg-laying stage of the moth, while small and fresh window panes represent egg-hatching. Egg-laying and egg-hatching provide early detection of the FAW infestation threat.

In August 2017, the project shared initial data from the monitoring exercise with regional and district officials of the Ministry of Food and Agriculture (MOFA) and the AEAAs who supported the project with the data collection. Given the confidence in the monitoring data generated and its effectiveness in providing information to farmers, USAID ADVANCE, in collaboration with the Centre for Agriculture and Biosciences International (CABI), extended the monitoring exercise to cover the rest of the country. Thirty-two additional AEAAs received training in August 2017 to set up and monitor pheromone traps and conduct field scouting in 32 new locations.



USAID ADVANCE and AEAAs setting up a pheromone trap

c. Establishing an Alert System through radio stations' Live Presenter Mentions (LPM) and jingles

When the project team detects a high number of egg-laying moths and reports them through the field data, the project communicates the information to radio stations covering the various districts. The stations make Live Presenter Mentions (LPM) for a maximum of five times a day for a week. The project also created an email account (doctorarmyworm@yahoo.com) to receive questions from participants of FAW trainings and they receive feedback from Dr. Dan McGrath. Through this email, Dr. McGrath supported AEAAs, Plant Protection and Regulatory Services Directorate (PPRSD) staff, and other trainees. He puts the inquirers in touch with sources of information, including USAID ADVANCE.

In collaboration with MOFA and the National FAW Taskforce, USAID ADVANCE organized a one-day workshop on January 25, 2018 to sensitize and update both the print and digital media personnel on FAW. Twenty-three media houses across the three northern regions participated. With the training, media houses are expected to pass on the information to their audience to appropriately educate farmers and the general population in the best approaches to manage the pest.

3. ACHIEVEMENTS AND LESSONS LEARNED

By September 2017, follow-up calls took place to 277 farmers who called into the call center for technical advice. The follow-up calls enable the project determine the status of the farms after receiving technical advice from the call center. The project teams then classify the status of farms into poor (virtually no improvement), average (up to 50 percent improvement), good (up to 70 percent improvement), and very good (above 70 percent improvement). Most farmers reported improvements between “average” and “very good.”

IMPORTANT LESSONS:

- a. Most interventions carried out to support farmers initially focused on the growth stages of the crops. However, interventions now include the reproductive stages of the crop to minimize infestation of maize ears. Farmers take a while to mobilize money to undertake mitigation actions when FAW infestation is detected on their farms. Because FAW infestation can be very rapid, by the time farmers are normally able to mobilize and act, the infestation already advanced. Therefore, early detection is important to forewarn farmers to start mobilizing.
- b. Heavy rainfall washed away the eggs and killed small worms. Hence, during early infestation, there are chances of no or minimal infestation, if there are heavy rains.
- c. Average regional moth counts (pheromone trap data) were highly correlated with average percent of infested plants (field data).
- d. The project conducted “pesticide observation,” when farmers complained that they used chemicals that did not work well. The lessons learnt from the observation plots indicated the following:
 - Some farmers did not use the right quantity of pesticides.
 - Some farmers did not use the right nozzle for the sprayers.
 - Some farmers did not spray at the right time, preferably after 4:00 pm because the worms are more active at night; and too much heat during the day may destroy active ingredients sprayed during that timeframe.
 - Some farmers, although they used the right dosage, did not apply them well on the plants.



4. CHALLENGES

FAW is an invasive pest; therefore, its introduction, as well as its biological and ecological adaptation are still speculative. More research, expertise, and time are necessary to establish best practices to manage the pest.

FAW is a migratory pest. To develop a good mitigation and management plan, one may need to carry out research that covers the entire nation, as well as the West Africa subregion. It is not possible to gain a full understanding of the FAW’s biological and ecological adaptation by focusing solely on the project’s ZOI.

FAW is spreading faster than the rate at which farmers receive information on the pest and how to mitigate its effects. A very efficient and effective communication system with farmers and agricultural officers is needed.

5. OPPORTUNITIES

Some of the key management practices that USAID ADVANCE is exploring to inform and collaborate with relevant stakeholders (especially the research centers and universities to brainstorm on solutions) include economic threshold, ecological and biological adaptation, efficacy of pesticide, use of least toxic products, and use of biological control.

Early detection, which is a key aspect in controlling FAW, remains a major challenge for many farmers. There is, therefore, the opportunity to organize additional trainings for key agricultural professionals as well as lead farmers.

Safe application of pesticides may pose challenges to farmers. Drone spraying emerged as a new trend for safe application of pesticide in a timely manner, which the project may explore further, after establishing its feasibility.

6. COLLABORATION



Collaboration with the MOFA through the National Taskforce has helped to synthesize the activities being managed by stakeholders on the field, thereby avoiding duplication.



Through collaboration with the Taskforce, media training was successfully organized for 23 media house personnel in the Northern, Upper West and East regions.



Farm Radio International is currently conducting a survey to evaluate FAW communication in the southern part of Ghana. USAID ADVANCE has initiated collaboration with Farm Radio International in the Northern Ghana to have an integrated report covering the entire country.



In collaboration with CABI and MOFA, USAID ADVANCE has set up 37 pheromone traps outside of the project's zone of influence.

7. NEXT STEPS

Streamlining and expanding existing strategies; adding new activities such as stakeholder coordination, additional trainings and awareness campaigns; as well as monitoring, evaluating, learning, and adapting to fill current knowledge gaps about FAW biology and management.

Training agricultural professionals and lead farmers to detect early signs, interpret scouting data, and build their confidence to possibly make "no spray decisions" (e.g., during rainfalls) to maximize resources.



Early scouting and detection of Fall Armyworm infestation of 20 acres of mixed cropping in Jawia in the Sissala West district by USAID ADVANCE team and an outgrower business, Fuseini Meke

