



FAW GUIDANCE NOTE 5

FALL ARMYWORM EARLY ACTION POLICY GUIDE

Fall Armyworm (FAW) continues to spread into new territory, moving further east and north in Asia, as well as north from sub-Saharan Africa. As it spreads, more governments are faced with decisions about how to react quickly and sustainably to the arrival of this new crop pest. Fortunately, they can benefit from over two years' worth of experience gleaned from across sub-Saharan Africa as well as decades of experience from the Americas. The lessons learned there by governments, resources partners and farmers can help guide decision-makers now being affected by FAW. This policy guide reviews the experiences and lessons learned from over 40 countries that have had to make quick policy and technical decisions that have set the groundwork for sustainable management of FAW.

Eradication?

When FAW arrives, many governments and farmers first think of eradicating the pest. Newly invasive pests can sometimes be completely eliminated, but FAW has several characteristics that make eradication extremely difficult. First, FAW is very mobile. Adult moths can travel 100 km in a night, and individuals can fly over 1 000 km in a lifetime. Second, FAW is very polyphagous – it feeds on, and can reproduce on, many different species of plants. This means that it can rapidly spread across many environments and cropping systems, and isn't restricted by diet. Finally, as the damage caused by FAW is sometimes confused by farmers with damage from other pests, confirmation of initial reports of FAW may at times be slow, allowing FAW to spread from its entry point before action is taken.

The reality is that FAW rapidly moves across millions of hectares of maize and other plants and quickly becomes a problem for farmers. Unfortunately, there is no way for them to eradicate or eliminate FAW; once the pest is established, it will always be nearby.

Farm management

The widespread, or diffuse, nature of FAW infestations requires a different approach than many governments might be accustomed to if their experience has been in dealing with gregarious pests, such as locusts, which lend themselves to central government control methods. Such an approach works when the pest is aggregated into defined areas, which can then be targeted. But with a pest such as FAW, diffuse and widespread, centralized control is not effective. Instead, farmers must learn how to sustainably manage FAW in their cropping systems, and great attention should be given to working with farmers in the context of their production systems.

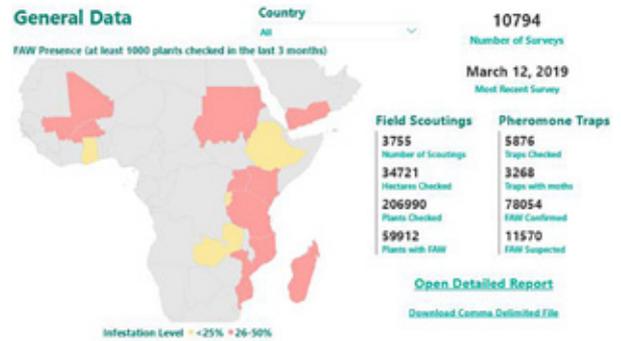
Pheromone traps

Early detection of FAW can be efficiently done using pheromone traps. FAO has developed guidance on their use. Much is known about the pheromones that attract the male moth to traps, where they can be counted and monitored. FAO has reviewed the results from various companies that sell pheromones and makes recommendations about which pheromones attract the FAW moths only. FAW

pheromones and traps are used for monitoring purposes, not controlling the pest. Pheromones and traps will not reduce the population of female moths that lay eggs, and do not sufficiently reduce the numbers of male moths to affect FAW populations.

Fall Armyworm Monitoring Early Warning System (FAMEWS)

Monitoring FAW population levels over time and space is very important to better understand its ecology so that early warnings are received, and action can be taken. FAO, in partnership with PlantVillage at Penn State University in Pennsylvania, has developed the Fall Armyworm Monitoring and Early Warning System (FAMEWS) to help farmers, communities, local authorities, as well as national and international leaders make the best use of resources to manage FAW. The FAMEWS mobile app should be used every time an infested field or a pheromone trap is checked for FAW, as described in the guidance notes on FAW



scouting and FAW trapping. Data entered into the app are displayed on the FAMEWS global platform. All countries are encouraged to use the system by entering all available data on a regular basis to ensure the best possible early warnings, to better analyse FAW movements and trends, and to improve FAW management. The more data provided, the better the results.

FAMEWS uses artificial intelligence (AI) and integrates data from many sources, including satellites, to provide farmers with offline advice and recommendations. FAO's collaboration with PlantVillage at Penn State and Norway's VIPS service puts precise agricultural information, predictions and recommendations for FAW management into the hands of smallholders via their smartphones.



Use of pesticides

Often, the first reaction to FAW infestation in new areas is to find pesticides and get these into farmers' hands. Although some pesticides do kill FAW, their use for FAW management should be carefully analysed as there are a number of important considerations.

Consider first and foremost the cost and benefit of pesticides. While FAW can cause some yield reduction, plants have a capacity to compensate for foliar damage and the yield loss is often less than farmers or extensionists expect. Studies show that even under high levels of infestation, yield loss is rarely over 20 percent and often closer to 10 percent. Another economic consideration is the value of the lost yield – farmers often receive low prices for their cereals sold locally. These two factors combined – low losses and low prices – means it makes little economic sense for farmers to invest very much in pesticides. One calculation from Malawi showed that a farmer, to be economically sensible, should invest only USD 7 per hectare to manage FAW. This amount wouldn't cover the cost of pesticides in many cases.

Another consideration with pesticides is the fact that older, dangerous chemicals are often still available and used in programmes against FAW. One African country was purchasing and giving away carbosulfan, a pesticide de-authorized in the European Union 10 years ago due to human health hazards.

Often, the pesticides don't work. Recent studies from Ethiopia demonstrate that older compounds in pesticides result in very low mortality of FAW larvae in the laboratory. Even with compounds that do work in the laboratory, effectiveness in the field is often low, as the FAW larvae burrow deep into maize and sorghum whorls and cover the entrance



with frass, making delivery of pesticides to the FAW larvae very difficult.

Therefore, a hasty reaction to FAW by giving away or subsidizing pesticides is not sustainable in most cases, and leads farmers and government officials down the wrong road in their search for solutions.

Role of natural control

FAW has many “natural enemies” – those organisms that are naturally in the environment and kill FAW eggs, larvae and pupae. These organisms include predators (ants, earwigs, birds, etc.), parasitoids (tiny wasps that kill FAW eggs, larvae or pupae) and pathogens (bacteria, virus, fungi and nematodes). The cumulative effect of these agents on FAW can be very high. Farmers can take actions to conserve



and attract these organisms to their fields, increasing the mortality of FAW.

In the Americas, natural mortality in the field from these naturally occurring organisms has been consistently measured at between 30 per cent and 90 percent. Although FAW is moving into new territories, most of its natural enemies are already in the cropping systems. This has been observed in Africa and the Near East, where natural mortality

has already been documented in the field. One study from Ethiopia found one parasitoid killing 34 percent to 45 percent of FAW larvae two years after the confirmed arrival of FAW in the country.

Unfortunately, many of these organisms are killed by pesticides. However, farmers can undo that damage and increase populations of these organisms by providing them with habitat and food sources. Farmers and researchers report very good results from maintaining plant diversity through intercropping and maintaining weedy plot borders. Some farmers report attracting and feeding natural enemies of FAW through the use of sugar water (to attract parasitoids) or fish soup and kitchen grease (for ants).

National efforts: farmers and researchers working together

There is still much to be learned about how to manage FAW sustainably in local contexts. Research and co-creation in this regard should be conducted on both research stations and in farmers' fields. Farmer Field Schools (FFS) provide an optimum setting for farmers and researchers to work together to test innovative solutions and learn together. National FAW Task Forces have a role to play in bringing together national researchers with FFS to design and implement a joint co-creation and research programme.

CONTACT US

Plant Production and Protection Division
 Food and Agriculture Organization of the United Nations
 Viale delle Terme di Caracalla, 00153 Rome, Italy
 E-mail: AGP-Director@fao.org

MORE INFORMATION

Fall-Armyworm@fao.org
Food-chain-crisis@fao.org
<http://www.fao.org/fall-armyworm/en/>



Some rights reserved. This work is available under a CC BY-NC-SA 3.0 IGO licence