PRISMA Australia-Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture

Kementerian PPN/ Bappenas

Australian Government

BRIEF

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Fall Armyworm in Indonesia: Response, lessons learned and next steps

Summary

Fall Armyworm (FAW) is a highly destructive moth that feeds on a range of crops. Since it was first detected in Indonesia in 2019, FAW has become endemic, although the infestation rate is decreasing (80,000 ha in 2020 to a forecast of 30,000 ha in 2022).

PRISMA supported swift action to combat FAW, engaging with the Ministry of Agriculture, the Food and Agriculture Organisation (FAO), and CSIRO early in 2019. PRISMA continues to fight FAW at the farmer level by disseminating information and promoting crop protection products through the private sector.

PRISMA's early detection and advocacy accelerated the CSIRO's preparations for a FAW response in Australia. CSIRO also consulted PRISMA on genome sequence research to identify the Indonesian FAW strain's resistance toward insecticide-active ingredients.

The response to FAW in Indonesia has generated lessons that can inform other pest and disease responses. These lessons include: (i) the government lacks a system to rapidly respond and disseminate information on pests; (ii) the systems of the private sector should be leveraged to reach scale in communicating to farmers; (iv) development programs can act as market facilitators for pest and disease control, particularly in outbreak scenarios; (v) functional research laboratory facilities are needed for timely responses to outbreaks and (vi) farmers are fast to adapt, even if a pest is new and unknown.

Background

The Australia-Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture (PRISMA) is a development partnership between the Government of Australia (Department of Foreign Affairs and Trade, DFAT) and the Government of Indonesia (Bappenas). PRISMA works with the private sector to increase smallholder farmers' competitiveness and access to new markets, better inputs, know-how, and technology. One of the main commodity crops PRISMA works with is maize. In this capacity, PRISMA worked directly with its partners to combat the outbreak of FAW in Indonesia. This document outlines the support offered to the private sector by PRISMA and the lessons learned.

Context

Fall Armyworm (FAW) is a highly destructive moth that feeds in the larval stage and large numbers on the leaves, stems, and reproductive parts of more than 80 economically valuable crops. FAW is native to tropical and subtropical regions of the Americas. It has been steadily moving east since 2016, causing up to US$3 billion worth of damage to maize and other crops in Africa.

The moth can fly long distances; a female moth can fly up to 100 kilometers overnight. While the caterpillars can cause significant loss to various crops, they prefer maize and other sweet crops.

FAW damage levels vary depending on the country. Farmers in Ghana reported an average yield loss of 26% (max 40%), while farmers in Zambia reported 35% (max 50%).

Farmers' ability to respond to the infestation impacts the damage level. The damage level is also determined by the stage at which the FAW infects the maize crop. The damage is usually significant if the infestation happens during the vegetative stage (i.e., <45 days).

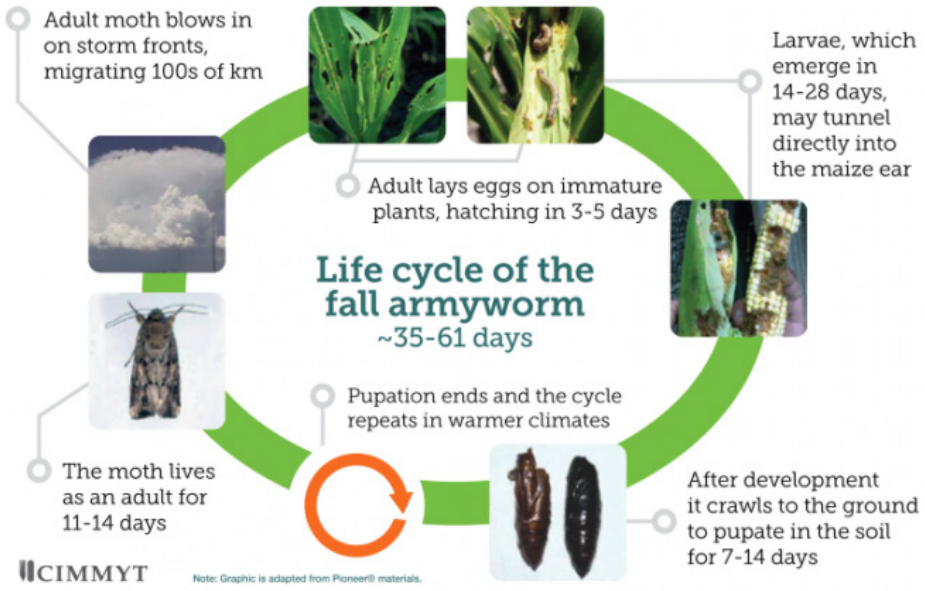

Figure 1. Life cycle of the fall armyworm.
(Source: https://www.cimmyt.org/news/tackling-the-deadly-fall-armyworm-infestation-devastating-maize-in-southern-africa/)

FAW spread to Indonesia

FAW was first discovered in the Indonesian provinces of Sumatra, Java, and Papua in early 2019. The outbreak was confirmed by physiological and biomolecular tests by Indonesian Universities, supported by crop protection companies. Since the initial spread, crop protection companies and the Government of Indonesia (GoI) have received pest reports in Sumatra, Java, Papua, NTB, and NTT. The Ministry of Agriculture (MoA) estimates the damage to Indonesia's maize production ranges from 15% to 73%1.

Indonesian response to FAW

In early 2019, the UN Food and Agriculture Organisation (FAO), USAID, agribusiness, and Croplife, held an event for the private sector, GOI representatives, and other Asian countries to learn about FAW and how to combat it.

The MoA followed up with several activities, including a plenary meeting that recommended active ingredients (for insecticides) for FAW, a handbook for farmers, and; a series of internal workshops with experts from universities and the FAO. From the workshops, the MoA produced an internal circular for the local Pest and Disease Control Laboratory (LPHP) and recommended control methods.

PRISMA supported partners in the pesticide business, including Corteva, FMC, Syngenta, Bayer, BASF, Nufarm, and Agricon, to collect and disseminate FAW-related information through their vast network of field staff. These pesticide companies also promoted products that contained the active ingredients recommended by the MoA to mitigate the impact of FAW attacks. Preventive and curative actions to combat FAW were also included in training materials for field staff and distribution networks.

1 Suhendi, N, "Waspadai dan Kenali Invasi OPT Spodoptera frugiperda" http://ditlin.tanamanpangan.pertanian.go.id/berita/36, accessed 18 January 2020

Table 1. Products registered by the MoA to treat FAW by year

Name	Year	Quarter
PROCLAIM 5 SG	**2019**	**Q3**
AMMATE 150 EC	**2019**	**Q4**
BELT EXPERT 480 SC	**2019**	**Q4**
ENDURE 120 SC	**2019**	**Q4**
FENITE 150 OD	**2019**	**Q4**
FORTENZA 600 FS	**2019**	**Q4**
LARVIN 75 WP	**2019**	**Q4**
PLETHCRA 97.5 SC	**2019**	**Q4**
PREVATHON 50 SC	**2019**	**Q4**
RAMPAGE 100 EC	**2019**	**Q4**
VALETUDO 600 SC	**2019**	**Q4**
VOLIAM TARGO 63 SC	**2019**	**Q4**
REATIS 480 FS	**2019**	**Q4**
VAYEGO 200 SC	**2019**	**Q4**
ABENZ 22 EC	2020	Q1
AMURON 70 EC	2020	Q1
BESCLAIM 30 EC	2020	Q1
CRUMBLE 100 EC	2020	Q1
DECIS 25 EC	**2020**	**Q1**
ENIGMA 21 EC	2020	Q1
FOKKER 500 EC	2020	Q1
GORDON 320 EC	2020	Q1
KLENSECT 200 EC	2020	Q1
MATCH 50 EC	**2020**	**Q1**
MEURTIEUR 30 EC	2020	Q1
SIKLON 5,7 WG	**2020**	**Q1**
TRONTON 50 EC	2020	Q1
TUREX W	2020	Q1
VIRTAKO 300 SC	**2020**	**Q1**
KATANA 200 SC	**2020**	**Q2**
RIMON FAST 100 SC	**2020**	**Q2**
ROYALCYPER 250 EC	**2020**	**Q2**
MINECTO XTRA 200 SC	**2020**	**Q2**
ACEMAIN 75 SP	**2020**	**Q3**
CRUMBLE CARB 150 SC	2020	Q3
LUMIVIA B 625 FS	**2020**	**Q4**
ZYLO 240 SC	2020	Q4
DANGKE 40 WP	2020	Q4
TORNUE 50 EC	2020	Q4
EMACEL 30 EC	2021	Q1
GAMECTIN 30 EC	2021	Q1
PROVIDE-X 21/45 SC	2021	Q1
SYMPHONY 100 EC	2021	Q1
TUMAGON PLUS 240 EC	2021	Q1
XENTARI WG	2021	Q1
AVALON 500/50 EC	2021	Q1
ENKOUNTER 15/24 WG	2021	Q1
GRACIA 103 EC	**2021**	**Q1**
BT PLUS WP	2021	Q2
EMAZO 75 EC	2021	Q2
GUSANG 40 EC	2021	Q2
CAKRA 160/20 OD	2021	Q2
"SAGRI-BEAT 7/30 WP"	2021	Q3
BROFREYA 53 SC	2021	Q3
OXAR 100/50 SC	2021	Q3

* BOLD indicate products owned by companies that PRISMA contacted in early 2019

PRISMA actions in responding to FAW

PRISMA developed three strategies to respond to FAW:

1. Increase the awareness of farmers and market actors about the impact of FAW and build their capacity to prevent FAW;
2. Support the private sector to promote registered and safer products, including the correct use of crop protection practices, to prevent and combat FAW; and
3. Support policymakers with field findings and research.

PRISMA detected FAW's spread to Indonesia very early and prepared Indonesian maize farmers for the potential impact. In 2019, PRISMA held meetings with Tier one partners in the pesticide business, including Corteva and FMC, to develop strategies and action plans to mitigate the impact of FAW. PRISMA worked with the private sector to build materials and promotion activities on FAW prevention and eradication, including the marketing of pesticides with the active ingredients recommended by the MoA.

PRISMA engaged with the FAO, the Department of Agriculture, Water and Environment (DAWE), and CSIRO to confirm the presence of FAW in Indonesia and discuss a response plan.

Impact of PRISMA's actions

By the end of 2019, stakeholders in Indonesia were well positioned to control the spread of FAW:

- MoA disseminated information on FAW and its control methods to farmers, including the recommended active insecticide ingredients.
- Private companies could register and promote their products suitable to control FAW.
- Farmers gained timely access to information from the MoA and pesticide companies on how to react to the FAW spread and prevent total harvest loss.

FAW has since become one of the most significant recognized pests for maize by the MoA. The Forecasting Center for Plant Pest Organisms (Balai Besar Peramalan Organisme Pengganggu Tumbuhan, BBPOPT) periodically tracks affected land and forecasts potential attacks.

These outcomes were not simple to achieve. PRISMA continued to work with partners to disseminate information on FAW while lobbying to the relevant government departments in collaboration with FAO.

CSIRO consulted with PRISMA on the possibility of conducting genome sequence research to identify the Indonesian FAW strain's resistance toward insecticide-active ingredients. PRISMA was able to direct CSIRO to a relevant expert on this subject, and their collaboration continues.

During the 2020-2021 COVID-19 pandemic, PRISMA supported the private sector partners in conducting FAW-focussed online

webinars and social media marketing. The online marketing approach was new to Indonesia, and PRISMA partners, such as FMC, were the early movers in this space and provided the trigger for other pesticide companies to follow suit.

PRISMA continues to monitor the FAW spread in Indonesia and works with the private sector to develop market responses to the pest.

Lessons learned

The response to FAW has generated lessons learned that can inform other pests and disease responses.

1. **The government lacks a system to rapidly respond to and disseminate information on pests**. This gap has meant stakeholders, especially GoI, responded much slower than they could have if such a system existed. In addition, the GoI only reacted when it had evidence from other GoI sources. This slowed down the response to the outbreak. PRISMA has found that businesses are a valuable source of up-to-date information. Businesses operating in the sector have comprehensive field information collection systems. If a multi-stakeholder partnership existed between the GoI, businesses, relevant associations, and relevant NGOs, this could enhance the response to future pest and disease outbreaks.

2. **The systems of the private sector should be leveraged to reach scale in communicating to farmers**. Businesses and their intermediary service providers are at the farmer's coalface. Rather than using traditional direct intervention methods favored by development agencies and government, existing market systems can be leveraged to disseminate information and message on disease outbreaks and prevention. Because of their existing networks, businesses can reach large numbers of farmers very quickly. Government and development agencies should be encouraged to use market systems to assist in pandemic responses.

3. **Development programs and NGOs can act as market facilitators**. Development programs and International NGOs are often well connected to GoI agencies. These programs can be used to facilitate multi-stakeholder responses. Programs working directly with market actors can be used as market facilitators. For example, PRISMA helped to inform MoA of the presence of FAW. PRISMA also provided information on FAW to other relevant stakeholders, including sector experts. PRISMA was also able to leverage its connection with the private sector to develop response strategies aligned with GoI directives.

4. **Functional research laboratory facilities are needed for timely responses to outbreaks**. Indonesia is mainly reliant on overseas labs to undertake genomic sequencing. Having the domestic capacity to undertake this testing would significantly improve response times to outbreaks.

5. **Farmers are fast to adapt to any new outbreak**. The speed at which farmers react is a double-edged sword. Farmers will use anything and everything to respond to an outbreak of pest or disease. However, if the correct product or information is not available, farmers may be using products or services that will have no impact, or worse, an adverse impact on the outbreak. If governments can act quickly to declare an outbreak and the private sector is given leeway to respond quickly, then the quick uptake by the farmers will be highly effective in controlling any outbreak.

PRISMA provides ongoing support to smallholder farmers by disseminating information on FAW and promoting products to protect crops.

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