Food and Agriculture Organization of the United Nations

# REPORT

# 2022 Mid-year Meeting on the Implementation of FAO Global Action (GA) for Fall Armyworm (FAW) Control in Asia and NENA regions

**8 June 2022**

**FAW Secretariat, Global Action for FAW Control**

## Contents

## 1. Opening Remarks

[1] Mr Jingyuan Xia, Executive Secretary of the Fall Armyworm (FAW) Secretariat and Director of Plant Production and Protection Division (NSP), opened the meeting and welcomed the 56 participants and observers. He emphasized the important contributions of the 54 pilot countries and eight demonstration countries participating in the Global Action (GA) for Fall Armyworm (FAW) Control. Mr Xia highlighted China as an example of a success story where integrated pest management (IPM) packages, applied with support under the GA, has yielded higher farming profitability compared to previous practices.

[2] In 2016, only six African countries reported the insect pest; now, over 79 countries across Africa, the Near East, Asia and the Pacific are reporting FAW. That includes reports this year of the pest in the Kingdom of Saudi Arabia and in New Zealand. In Africa alone, FAW is estimated to have caused annual losses as high as USD 9.4 billion; FAW introduction also intensifies the use of chemical pesticides in many countries, risking human and environmental health.

[3] At the most recent meeting of the GA Steering Committee, chaired by FAO Director-General QU Dongyu, it supported an extension of the GA for an additional year, through 2023. This will provide the time to double-down on the dissemination of IPM technologies for FAW control and will also be used to prepare for the expansion of the GA's scope, said Mr Xia. This means that lessons learned in the fight against FAW can be applied in managing other invasive pests and diseases. This is essential as each year, invasive insect pests alone cost a minimum of USD 70 billion globally. Beyond 2023, it is hoped that a new global initiative on Plant Health Management could be launched, tackling multiple pests and diseases and contributing directly to the One Health issue, he said.

[4] Meanwhile, the GA is already showing very encouraging reports from the field level with positive impacts in the Asia and Near East North Africa (NENA) regions four demonstration countries. As well, the Centre for Agriculture and Biosciences International (CABI) is commencing its Global Impact Study, developing a methodology to assess the impact of FAW and the GA, and piloting the methodology in India and Kenya. The FAO GA Secretariat is also collaborating with World Agroforestry Center (ICRAF) to create a globally-standardized protocol for field experiments and data collection. The online data collection tool was to be launched in mid-2022.

[5] Mr Xia said that since 2022 is the year of action in the field, greater emphasis must be placed this year on field studies, field demonstrations and farmer field schools (FFS). Regional information exchanges, in-person or as hybrid events, must also commence, wherever possible.

[6] Mr Xia outlined four important objectives for this meeting: first, participants would report on progress in GA implementation and major achievements in the first semester of 2022, from January through June. Second, they would share information and planning for the second semester of 2022, at the global, regional and national levels; third, an analysis would be made of the major challenges ahead; and fourth, the way forward, including direction and tasks ahead, would be outlined.

## 2. Adoption of the Agenda

[7] Ms Anne-Sophie Poisot, Agricultural Officer and Deputy Director of Plant Production and Protection Division (NSP), outlined the agenda *(Appendix 1)*, which was adopted.

## 3. Report from Demonstration Countries

[8] Demonstration countries in the Asia and NENA regions reported on the FAW situation, their major activities and achievements of the first semester of 2022, core activities planned for the second semester, and suggestions for the GA.

[9] **3.1 China**. Ms Juan Zeng, Division Director of the National Agriculture Technical Extension and Service Centre (NATESC) Ministry of Agriculture and Rural Affairs (MARA), presented on behalf of Mr Fuxiang Wang, Deputy Director General of NATESC. Air temperatures were significantly lower due to cold weather in southern China from January to March 2022, resulting in a reduced occurrence of FAW and its dispersal distance and speed were limited and slower than in previous years, she said.

[10] Two case studies were described. One reviewed cross-ocean and transboundary migration between China and Republic of Korea, where FAW moths were observed in Korea's Jeju Island on 17 and 18 May 2022. A southwesterly wind prevailed between the two countries and a low-level jet stream was the key transport condition. The second case study, from the same time and location, analysed FAW migration trajectories and found the insect took advantage of southwesterly air currents; the source populations of FAW observed on 17 May 2022 were mainly from Jiangsu province, China; and source populations of FAW observed on 18 May 18 2022 primarily originated from Shanghai.

[11] Other key activities in China under the GA included control efficacy by releasing natural enemies, such as *Telenomus remus*, and setting up pheromone and food attractant traps; demonstration plots were established in Xundian, Anning, and Jinning in Yunnan province; and in Hepu, Hengxian, Xing 'an in Guangxi region; and technologies of pheromone trapping, biological control, and chemical control were demonstrated. More than ten field days were conducted in association with the demonstration plots and over 300 people attended these trainings.

[12] Increased profitability or environmental impact at plot/farm level were measured with corn yields in a controlled field twice that of yields in an uncontrolled field. In addition, the use of pesticides, the occurrence area, and the number of FAW generations was reduced two- to three-fold due to forecasts and recommendations. After control, toxins (fumauma toxin, vomitoxin, aflatoxin and other mycotoxins) in corn grain was significantly reduced to one-in-ten, effectively protecting the safety of the environment, human and livestock.

[13] Ms Zeng recommended strengthening online communication and information-sharing and increasing expert visits and field investigations once pandemic restrictions allow travel.

[14] Core activities in the second semester of 2022 will include: multiplication and release strategies with natural enemies of FAW; crop-loss modeling involving different seasons, varieties and growth stages; evaluation on small-scale rotating pesticide application; and small-scale demonstration of drones in FAW prevention and control.

[15] **3.2 India.** Ms Sunita Pandey, Deputy Director (Entomology) Ministry of Agriculture and Farmers Welfare, presented on behalf of Mr OP Verma Deputy Director, Plant Quarantine Division, Directorate of Plant Protection Quarantine and Storage (DPPQS), Ministry of

Agriculture and Farmers Welfare. She said that most states were reporting the presence of FAW. As of March 2022, the percentage area of maize affected by FAW was less than 5 percent of total planted, and maize with severe FAW infestation was 1 to 2 percent.

[16] The Directorate fights FAW via its 36 Central Integrated Pest Management Centres (CIPMCs) throughout the country, and via extensive communications. Advisories promote the use of pheromone traps, as well as multiplication and distribution of biocontrol agents such as parasitoid *Trichograma spp* and *Telonomus spp* and EPF *Metarhizium anisopliae* and *Nomeria riley*. Recommendations include raising awareness among farming communities through regular surveys, training programmes, and FFS.

[17] FAO, in collaboration with CABI, is conducting a study under the GA in Kenya and in India's Karnataka State to assess yield losses due to FAW and changes in farmers' practices, including socio-economic impacts and the introduction of innovations.

[18] The IPM Division DPPQS has organized eight FFS to focus on FAW management in maize crops for the season Kharif 2022 with a manual on IPM in FFS; and a guide for facilitators of FFS in maize with special emphasis on FAW was published jointly by DPPQS and FAO.

[19] The 2022 work plan includes: evaluating technologies suitable for intercrops in different agro-ecological zones at a small scale; study fields established for FAM management in FFS using bio-intensive pest management (BIPM) modules developed by National Bureau of Agricultural Insect Resources (NBIAR); IPM modules provided by the Indian Council for Agriculture Research-Indian Institute of Maize Research (ICAR-IIMR) and BIPM in FAW FFS curriculum, both in kharif and rabi seasons. IPM modules will be evaluated/validated in different states by ICAR through establishing FAW FFS. Data collection and analysis will highlight beneficial organisms, natural enemies, pollinators.

[20] Large-scale field demonstrations will facilitate participatory on-farm evaluation of FAW management techniques and technologies, and DPPQS will coordinate and facilitate five FFS in different zones. Field testing of technologies by farmers will be set up in each FFS. The BIPM module developed and validated by ICAR-NBAIR for large-plot demonstration: three IPM plots will test regional IPM packages, two in Kharif (BIPM plots), and one in Rabi.

[21] **3.3 The Philippines.** Ms Wilma Cuaterno, Chief of Crop Pest Management Division, Department of Agriculture, presented on behalf of Mr Jonar Yago, Assistant Director of the Bureau of Plant Industry, Department of Agriculture. In the first half of 2022, FAW infested about 1.11 percent of corn, mainly in OPV corn. About 97 percent of FAW-infested areas were treated with subsidized FAW-registered pesticides. Some farmers were reportedly using pesticides registered for local armyworms and other corn pests, due to considerably lower costs.

[22] Protocols were developed on biological control agents: Nuclear Polyhedrosis Virus; EPFs: *Beauveria bassiana, Metarhizium anisopliae*, and a native *Metarhizium rileyi* from FAW; EPNs: *Heterorhabditis indica* and *Steinernema abbasi*; *Bacillus thuringiensis*; and *Trichogramma sp*. Fourteen pesticides at different levels of effectiveness were tested, as well as cultural control, including landscape management and crop rotation and intercropping, and host plant resistance. Insecticide resistance management was also tested. Recommended biological control agents should be augmentatively released, requiring efficient mass production and distribution support. Mass production and distribution protocols should be part of the regional package which should include FAW damage or loss assessment protocols.

[23] Field visits by policy-makers and extension officers, farmer leaders and farmer cooperatives and extension are planned from geozone countries to field demonstration sites on FAW IPM-PAMS and farmer-led, municipal-level FAW M&S systems; and applied field research for technical evaluation of FAW IPM-PAMS strategies and technology options planned. FFS are to be scaled-up nationwide in partnership with local governments; a regional webinar training series with geozone countries on farmer awareness and public information campaigns on FAW planned, as well as production and distribution of harmonized FAW information, education and communications materials, including a video series on sustainable FAW management practices.

[24] Challenges and opportunities in the first semester of 2022 included: linking with geozone countries for knowledge generation and sharing good practices on the sustainable management of FAW and other crop pests, insecticide-resistance management (IRM) strategies for control of FAW and other crop pests and diseases, and research for development (R4D) efforts to effectively control and manage transboundary crop pests and diseases.

[25] Regional collaboration opportunities included linking with geozone countries for knowledge generation and sharing on: transboundary plant pest and disease monitoring and EWS; information exchanges.

[26] **3.4 Egypt.** Mr Mohammed Abdel Meguid, Head of the Committee on Pesticides and Committee of FAW control, Ministry of Agriculture and Land Reclamation, said that maize is the most infested crop in most Egyptian governorates and FAW infestation has been recorded on small areas of wheat, sugar cane, and sugar beet crops.

[27] In the first semester of 2022, assessments were made of the impact of agricultural practices in Sohag, Luxor, and Aswan governorates (Shandaweel, Mataana, and Comombo stations). That included: maize hybrids tested for resistance/tolerance to FAW; planting dates; plant density; mineral fertilizers; intercropping maize with other legumes; eight tested pesticides (including chemical, biological and botanicals).

[28] Surveys of natural enemies of FAW were conducted in three locations in each of Qena and Sohag governorates; infrastructure was improved and holding capacities increased for biocontrol units and natural enemies lab production in Shandaweal and Giza (MOALR). Field surveys showed the presence of parasitoids (*Telenomus remus*), which are effective against FAW. These are being propagated for release in Egyptian fields for potential control of FAW. Other natural enemies found were *Trichogramma sp., Pseudogonia sp., Exorista sp., Phoridae, Microplitis sp*. Three experts from Syrian Arab Republic were being trained on mass rearing of FAW natural enemies and production of FAW biopesticides.

[29] Coordination activities in Egypt in 2021-2022 include meetings of the NTF to plan and implement the GA; the first geozone coordination meeting on implementation of the GA in the NENA region was held, as were 22 monthly meetings for FAW NFPs. A TCPf project under GA strengthened national capabilities to prevent spread of FAW included four trainings; two stakeholder meetings; 100 trained specialists; 1 500 traps were distributed, plus 9 000 lures, 12 000 killing strips, and 50 smart phones. Another project reached 905 stakeholders, provided 40 trainings; 25 000 copies of awareness-raising materials were distributed; tools for monitoring procured, as well as pheromones traps and mobile phones; training of 400 specialists in FAW control; a national action plan was supported in 27 governorates; trainings

for 23 FFS facilitators on FAW in Egypt; and a FAW-natural enemy laboratory in southern Egypt was supported with the necessary tools.

[30] The FAW infestation rate increased in 2019 through 2021 and most Egyptian governorates are currently infested by FAW. However, natural enemy populations also increased during that period, surveys showed, and farmers' capacity was increased through various awareness projects, FFS, and training programmes.

[31] In the second semester, reviews will be made of results obtained from a maize intercropping experiment implemented in 2021 using legume (soybean and fodder cowpea) crops; and results reviewed from a maize planting distance experiment.

[32] Trials of a chemical pesticide will be reviewed to identify effects on egg-laying behaviour under local conditions; and a trial of the correlation between infestation and yield losses to determine the suitable time for the chemical control. Field scouting campaigns will be activated as a base for FAW monitoring and surveillance, and a team formed including researchers and specialists in pest control to scout maize fields and other cultivated crops over an entire season.

[33] **3.5 Bangladesh (pilot country).** Mr Golam Faruq, Director-General, Bangladesh Wheat and Maize Research Institute (BWMRI) (or his representative Dr Md Mostafizur Rahman Shah, Senior Scientific Officer) said that FAW was first detected 20 November 2018 at Bogura and spread gradually and now is reported across almost the entire country. In 2022, however, the infestation level is lower than 10 percent, possibly due to natural biological agents. The environment of Bangladesh is suited to FAW infestation, said Mr Faruq.

[34] Through the GA, an awareness-raising session was held with BWMRI, Bangladesh Research Institute (BARI) , Department of Agricultural Extension (DAE), universities, FAO, CIMMYT, USAID, and NGOs; monitoring and scouting has been conducted using the faw-monitor.firebaseapp by the DAE with the help of CIMMYT; solar-power Trapview devices have been used to capture photos of FAW adults, with weekly data generated. An NTF has been established in Bangladesh with 17 members and an agenda to develop a FAW monitoring system; research and extension planning for FAW management; assistance with necessary FAW management tools (registration of FAW management inputs); and an awareness programme on FAW outbreak and management among stakeholders developed. Safe and effective pesticides against FAW were registered, such as Cyantraniliprole (Fortenza, Syngenta), a seed-treating chemical; and SfNPV (Fawligen, Ispahani Agro. Ltd.), a biopesticide. Results from using those in a variety of combinations and applications suggest an efficacy rate of over 90 percent against FAW, he said.

[35] Core activities in Bangladesh in the second semester of 2022 include: assessment of yield losses due to FAW on maize in various locations; validation of IPM package/biorational management to control FAW in 22 Upazilas subunits under 12 districts; farmer training; training of trainers; two seminar/workshops and two field days.

[36] **3.6 Palestine (case study).** Mr Ibrahim Al-Jboory, President, Arab Society of Plant Protection and NENA Regional Plant Protection Consultant, described the project: 'Emergency Preparedness and Response to Strengthen Capacities of NENA Countries to Mitigate the Risk of FAW in the Region' (TCP_RAB_3803). He said that FAW was reported in 2020 in Palestine at the same time as in Jordan and Israel. An intensive chemical spray was the only control measure available to suppress the pest population; however, after a TCP project inception

workshop in February 2021, intensive efforts were conducted in the four project countries: Syrian Arab Republic, Lebanon, Jordan, and Palestine. Since then, about 1 746 individuals have been trained through FFS, including 680 in Palestine. Demonstration fields were planned in the four countries, and infestation is now stable, with farmers learning how to identify and control the pest with the recommended biorational insecticides.

*[37]* Mr Al-Jboory outlined FAW-control measures from demonstration and control fields and treatments tested that yielded profits in the Northern and Southern Gaza Strip (Beit Hanoun and Khan Yunis, respectively); in the Kardala in Northern Jordan Valley, Tubas Governorate; and in the Al-Jiftlik-Central Valley-Jericho region. He said that in its first year, the emergency project achieved distinct and positive results that. Farmers learned how to analyze and assess a field's agro-ecosystem by collecting data, defining natural enemies, insecticides' toxicity, pheromone traps for monitoring.

## 4. Report from Regions

*[12]* **4.1 Asia.** Mr Yubak GC, Regional Coordinator for Asia Pacific, Global Action for FAW Control, FAO Regional Office for the Asia Pacific (RAP), described the overall FAW situation in the region, as the pest has spread; damage was also reported in rice in the northern Philippines. Some new larval parasitoids were reported from Nepal (but not yet identified). Pesticides were the dominant control measure, with alternatives not gaining momentum as desired, he said. Slow or weak progress was seen in mass production, efficacy tests and registration processes and slow action in household/community mass production of local products.

*[13]* Major achievements of the first semester of 2022 included continuing activities in demonstration and pilot countries; a regional IPM package under review; technical supports, webinars and the FAMEWS app used in Pakistan, Nepal, and China. Interest was shown in technical guidance on FAW, including the Plant Protection Outlook for the Asia-Pacific region with an in-depth study of FAW (https://www.fao.org/documents/card/en/c/cb7502en). Some level of FAW containment was achieved in some countries (Indonesia, the Philippines, India, Viet Nam).

*[14]* **In the Asia region**: Core activities in second semester 2022 include**:** plan FAW activities in demonstration and pilot countries; finalize regional IPM package; RAP funds for collaborative works with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and with FAO headquarters on climate-smart FAW control; scientific advances on FAW to be systematically assessed; literature review to be conducted, covering 2020-2022. Some 317 FAW-related papers have been produced from Asia-Pacific region, 75 percent of which are from China and India; there is a critical lack of research from southeast Asia and insufficient attention to cultural control, biological control and host plant resistance, he said. Links are to be built to climate-change mitigation; a scoping study is underway for 'climate-smart' crop protection; survey questions developed and work ongoing with national plant protection organizations.

*[15]* **Regional issues in the Asia-Pacific**: Continuous challenges of TPP, impacting the operational quality in the region; the region has the second-highest level of pesticide use among all regions, the average application rate of pesticide per cropland area is 1.04 kg/ha; old pesticides, including organophosphates, are still common herbicides in the region. New pests (besides FAW) continue to emerge and spread, such as *Fusarium* on banana, Tuta on

tomatoes, and fungal disease Magnaporthe oryzae pathotype Triticum on wheat (wheat blast).

[16] Critical needs in FAW management include: establish formal links with research institutes and national partners; carry out a regionally coordinated assessment of natural enemies; establish radar, light-trap monitoring sites to forecast FAW invasion dynamics and pest outbreaks; support countries in their revision of Plant Health policies to prioritise preventative measures and agro-ecological solutions. Priorities include: strengthen farmers' agro-ecological education through FFS; access resource and capacity building (biology and tactical control); provide policy support to reduce carbon footprint of pesticide use in agriculture; strengthen local data on crop losses (yield loss) versus FAW damage in corn; improve forecasting/early detection of FAW; improve current control actions: prophylactic vs curative (NBS and agro-ecology); biocontrols must be made available, now hampered by availability, efficiency, cost effectiveness issues; avoid cumbersome processes of registration and regulation of biopesticides; organize season-long FFS on FAW in countries; improve village-level mass production of BCAs, now limited or non-existent; enhance coordination of pilot and demonstration countries through workshops/programmes.

[17] **4.2 NENA.** Mr Thaer Yaseen, Regional GA Coordinator for Asia in the FAO Regional Office for Near East and North Africa (RNE), said that 12 countries in the region had reported FAW infestations, which threaten food security in seven. FAO's response under the GA has included support to develop early warning systems, FAW monitoring, and IPM. In the seven countries where FAW has not been reported, work has focused on FAW prevention, improving phytosanitary measures and monitoring and early warning systems.

[18] Across the NENA region, a national focal points (NFP) network was developed to support 17 NFPs. Biological control efforts included a survey for potential natural enemies in five countries: Syrian Arab Republic, Palestine, Yemen, Lebanon and Egypt; and biocontrol labs strengthened, including a new construction in Jordan, an existing lab in Shandweel-Egypt, and three fermenters, one in Egypt and two in Syrian Arab Republic. Training projects in the region involved 3 556 people and FFSs in the region include two in Palestine, three in Jordan and three in Egypt.

## 5. Report from FAO FAW Secretariat

[38] Mr Buyung Hadi, Coordinator, FAW Secretariat in FAO's Plant Production and Protection Division (NSP), said research into FAW genetics by USDA reviewed/validated data from 22 sub-Saharan countries (2016-2019) and indicated a new introduction of the pest into Africa was possible, and a near-absence was found of the FAW strain that prefers rice, millet, and pasture grasses. Furthermore, a second entry of FAW likely occurred in western Africa from a new source, which better explained its rapid spread. It also suggests western Africa continues to be at high risk of future introductions of FAW, which could complicate mitigation efforts.

[39] Another genetic study indicated complex introduction events of FAW to Africa, including multiple introductions from different sources, such as a movement from Asia. That implies similar pathways are likely to be used by other exotic and related pest species, official pest-reporting dates might not be the same as incursion dates, and global cooperation to ensure robust monitoring/detection systems is needed. Emerging evidence on control options has included big-data collection on FAW occurrence through the FAMEWS app, the cropping system and climatic information. These offer the possibility to develop monthly or quarterly

risk maps in Africa which, along with recommendations, can then be disseminated to stakeholders.

*[40]* Mr Hadi said that during the first semester of 2022, the Global Action SC and TC strongly endorsed the extension of the GA for another year, citing its significant accomplishments, including a "big tent" of multiple technical partners and the fact that, despite implementation delays due to COVID-19, the GA continue to serve as a learning community for evidence-based control options. The GA extension also offers the potential to expand its scope to include other pests; and an impact evaluation by CABI may flag lessons to build upon, said Mr Hadi. The FAW Secretariat could consider using the GA momentum, and its ecosystem of connected actors, to integrate work into a broader plant health arena, contributing to One Health.

*[41]* Major global initiatives of 2022 include: global protocols for technology evaluation, development of a mobile data collection tool by ICRAF, training for research teams in each demonstration country in July 2022, storing data in a common database, and country- and global-level data analysis. As part of the CABI study, focus has turned to the socio-economic impact of FAW, changes in IPM practices over time, and the impact of GA on management practices and yield losses due to FAW. Household surveys and key informant interviews through the CABI study were planned for July 2022, and piloting the methodology in Kenya and India conducted for potential scale-up in other countries in 2023.

*[42]* A global mapping of Plant Health Initiatives in 2022 includes an ongoing, broad survey of FAO regional offices, TC members, Regional Plant Protection Organizations (RPPOs), and professional societies with an eye to soon starting plant health initiatives to identify gaps, avoid duplication, and create synergies. A niche must be defined for the newly positioned GA on Plant Health Management.

*[43]* Major country/regional Initiatives for 2022 include regional/geozone IPM packages/strategies; technology validation; a global database; field demonstrations and field days; awareness raising, FFS, and a geozone training and information exchange.

## 6. Open Discussion

*[44]* Mr Hadi, in response to a question, said that research cited suggested FAW is more successful at completing its life cycle on maize crops compared with other crops including rice. Thus, maize seems to be the optimal host for the pest.

*[45]* Activities led by demonstration countries are helpful and these could be shared through more regional and geo-zone meetings and information from demonstration countries can be incorporated into national work plans to make the most of that information. Although countries can share knowledge and experiences, it is important to recognize that individual countries can have unique circumstances that may require unique responses and approaches.

*[46]* Mr Maged ElKahky, Agricultural Officer (NSP), said it will be important that all national governments interested in managing and fighting FAW commit to continued work in this regard and commit to resource management to support this work. The importance of monitoring for FAW and reporting obligations aimed at controlling the pest was emphasized.

## 7. Concluding Remarks

*[47]* Mr Xia described the meeting as very successful and said progress made under the GA is particularly evident in its strong coordination and technical achievements. FAW continues to pose a very serious threat but control efforts under the GA were heading in the right direction.

The GA provides an excellent platform for information-sharing among FAW community in general, he said. An efficient coordination mechanism from field level to sub-regional to regional to global levels exists, but much more is needed including research in FAW migration patterns, adding that more technology, and strong government policies, including regulations of pesticides, is required.

*[48]* Demonstration and first-line pilot countries in the next semester must place a renewed emphasis on field demonstrations to help farmers understand and use good technology for FAW control; data collection and standardization for analysis; and all countries must ensure they can demonstrate impacts including economic, social, and environmental benefits. Such information is also useful for encouraging resource mobilization.

*[49]* At the regional level, he said, effective coordination between demonstration countries and first-line pilot countries is important; effective communication and outreach as well as resource mobilization are critical. A global meeting is being planned and the Technical Committee and the Steering Committee of the Global Action will each hold its seventh meeting to review the three years of the GA. At the global level, a technical impact study of the GA is underway; data standardization is being developed; and global mapping of plant health is also being developed, said Mr Xia.

## Appendix 1: Agenda

**2022 Mid-year Meeting on the Implementation of FAO Global Action (GA) for Fall Armyworm (FAW) Control in Asia and NENA regions**

*08 June 2022 (10.00-12.30, CET)*

**AGENDA**

| AGENDA ITEMS | DOCUMENTS | PRESENTER | PROPOSED TIME |
|---|---|---|---|
| **1. Opening Remarks** | | Mr Jingyuan Xia<br>Executive Secretary of FAW Secretariat and Director of Plant Production and Protection Division (NSP), FAO. | 5 minutes |
| **2. Adoption of the Agenda** | | Ms Anne-Sophie Poisot, Agricultural Officer (NSP), FAO | 5 minutes |
| **3. Report from Demonstration Countries** *(FAW situation; Major activities and achievements of the 1st Semester; Core activities for the 2nd Semester; Suggestions)* | | | |
| 3.1 China | PPT | Ms Juan Zeng<br>(on behalf of Mr Fuxiang Wang)<br>Division Director<br>National Agriculture Technical Extension and Service Centre (NATESC), Ministry of Agriculture and Rural Affairs. | 10 minutes |
| 3.2 India | PPT | Ms Sunita Pandey<br>(on behalf of Mr OP Verma)<br>Deputy Director (Entomology)<br>Ministry of Agriculture & Farmers Welfare. | 10 minutes |
| 3.3 The Philippines | PPT | Ms Wilma Cuaterno<br>(on behalf of Mr Jonar Yago)<br>Chief of Crop Pest Management Division, Department of Agriculture. | 10 minutes |
| 3.4 Egypt | PPT | Mr Mohammed Abdel Meguid<br>Head, Committee on Pesticides and Committee of FAW control, Ministry of Agriculture & Land Reclamation. | 10 minutes |
| 3.5 Bangladesh (Pilot) | PPT | Dr Golam Faruq<br>Director-General,<br>Bangladesh Wheat and Maize research Institute (or his representative Dr Md Mostafizur | 10 minutes |

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|---|---|---|---|
| | | Rahman Shah, Senior Scientific Officer). | |
| 3.6 Palestine (Case study) | PPT | Dr Ibrahim Al-Jboory<br>President, Arab Society of Plant Protection & NENA Regional Plant Protection Consultant | 10 minutes |
| **4. Report from Regions** *(FAW situation; major achievement of the 1st Semester; Core activities for the 2nd Semester; Suggestions)* | | | |
| 4.1 Asia | PPT | Mr Yubak GC<br>Regional Coordinator for Asia, Global Action for FAW Control,<br>FAORAP | 10 minutes |
| 4.2 NENA | PPT | Mr Thaer Yaseen<br>Regional Coordinator for NENA, Global Action for FAW Control,<br>FAORNE | 10 Minutes |
| **5. Report from FAO FAW Secretariat** *(FAW situation; major achievement of the 1st Semester; Core activities for the 2nd Semester; Suggestions)* | PPT | Mr Buyung Hadi<br>Coordinator, FAW Secretariat<br>Plant Production and Protection Division (NSP), FAO | 10 minutes |
| **6. Open Discussion** | | All Participants | 30 minutes |
| **7. Concluding Remarks** | | Mr Jingyuan Xia | 10 minutes |

**Note:** The meeting was moderated by Ms Anne-Sophie Poisot, Agricultural Officer (NSP), FAO

## Appendix 2:

***Planting data***

| Country | Year | Total maize/corn area planted (ha) | Area affected (ha) | Area under control (ha)/*Maize area scouted* | Yield loss estimate |
|---|---|---|---|---|---|
| China | **2022 (Jan-June)** | 40 000 000 | 522 000 | 613 000 | 2% to 4% |
| | **2021** | 41 470 000 | --- | 2 168 000 | 2% to 4% |
| | **2021** | 41 264 000 | --- | 2 169 000 | 2% to 4% |
| India | **2022 (Jan-March)** | 1 178 427 | 48 416 | | --- |
| | **2021-2022** | --- | 8 340 000 | *34.0 (scouted)* | --- |
| | **2020-2021** | --- | 9 860 000 | *32.2 (scouted)* | --- |
| The Philippines *(note: figures colored red indicate corn, not maize)* | **2022 (Jan-May) (corn)** | 294 099 | 3 274 | 3 168 | --- |
| | **CY 2021 (corn)** | 809 257 (Q2)<br>522 727 (Q3) | 2 161 (Q2)<br>7 113 (Q3) | 1 665 (Q2)<br>6 919 (Q3) | --- |
| | | | | | |
| Egypt | **2021** | 1 203 042 | 10 586 | 10 586 *(under treatment)* | --- |
| | **2020** | 1 045 151 | 2 155 | 2 155 *(under treatment)* | --- |
| | **2019** | 1 115 747 | 800 | 800 *(under treatment)* | --- |
| Nepal | **2019** | 957 650 | --- | --- | --- |
| | **2020** | 954 158 | --- | --- | 6.51 |
| | **2021** | 957 000 | --- | --- | 9.68 |

***Activities and achievements***

| Country | First semester 2022 | | | | 2022 |
|---|---|---|---|---|---|
| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| **China** | Progress in monitoring and early warning systems with such highlights as high precision meteorological data based on the weather research and forecasting model (WRF); insect radar networking platform and flight trajectory simulation technology based on insect radar; and a real-time online trajectory analysis system. Digital estimation by multiple analysis included occurrence dynamics of FAW: biological behaviors/searchlight traps/field abundance; atmosphere conditions: meso-scale numerical simulations of atmospheric circulations; an atmospheric trajectory analysis; and Geographic Information System (GIS). A FAW trend forecast was developed. | Conducting field research challenging due to COVID-19 pandemic restrictions, with official meetings and visits among pilot countries suspended or canceled. | | Season-long sessions of training of trainers for 20 agricultural technicians is planned, 10 FFS for 300 farmers will be organized, and one national FAW prevention and training workshop is planned. Information and education campaigns will aim to reach 20 000 maize farmers through various means, and geozone meetings are being organized for sharing information and expertise. | A GA meeting and national training event in July and December 2022 in Beijing and Guangxi respectively; and an FFS session on safe and effective pesticide application, UAV demonstrated at a small scale. Northeast Asia. China will also upgrade its FAW early warning system (EWS) and pest migratory monitoring; more trapping of FAW moths; as well as establishing an insect radar network along southeast China's borders. Demonstrations of innovative technologies in FAW prevention and control. |
| **India** | Progress on monitoring and EWS; CIPMCs were conducting regular surveys for FAW monitoring and issuing advance warnings of the pest; and pest surveillance, monitoring | Broad host range, FAW voraciousness, rapid flying capacity; staggered sowing; early development of resistance. | Facilitate training of trainers on FAW management through 100 two-day trainings to | Research institutes, network projects, agricultural universities under National Agricultural Research System, extension workers, | Continuous surveillance of cultivated maize areas, identification of areas prone to FAW infestation, educating and raising awareness among farmers and stakeholders though FFS |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | and reporting was conducted by some state governments. National and geozone trainings were held for farmers, extension workers and input dealers, and awareness trainings and meetings organized by state governments and CIPMCS. Progress on monitoring and EWS; CIPMCs conducting regular surveys for FAW monitoring and issuing advance warnings of the pest; and pest surveillance, monitoring and reporting was conducted by some state governments. National and geozone trainings held for farmers, extension workers and input dealers, and awareness trainings and meetings organized by state governments and CIPMCS. | | cover 5 000 farmers. Three IPM plots will be developed including two in Kharif and one in Rabi. | and agriculture officials, to proactively create FAW awareness and management. | and HRD; promotion of IPM techniques for FAW management e.g., use of pheromone traps and other ecofriendly methods. Identifying NFPs to engage with the steering group and establish coordination and communication channels with regional and global coordination bodies. DPPQS to coordinate and establish monitoring network to support FFS in five maize agroecological zones with field scouting using FAMEWS app in FFS study plots during various crop stages (vegetative stage and flowering stages of the crop); in field scouting using the FAMEWS app and prepare FAW status report for each season. FAW monitoring to be carried out in established FFS study plots during various crop stages in five maize agroecological zones. Applied research platform to be developed to validate new technologies for FAW management involving public technology providers and private sector. |
| **The Philippines** | Capacity development activities resulted in 792 | Evaluating and re-engineering FFS | Farmers' training programmes and | | Large-scale field demonstrations on |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | corn farmers (around 40% female) graduating from 32 pilot season-long FFS in FAW-IPM PAMS in eight municipalities of Pangasinan. A webinar training series organized for geozone countries on the regional IPM package of technology strategies and options for the sustainable management of FAW. A farmer-managed and community-based FAW monitoring and surveillance (M&S) system in eight municipalities in Pangasinan involving some 320 Bantay Peste farmers, around 40 % of those were female. As a result, minimal damage from FAW was observed in corn fields as farmers immediately acted on the monitoring information. A regional IPM package of technology strategies and options for the sustainable management of FAW was finalized, including IPM for prevention, avoidance, monitoring and suppression of the pest. | activities, particularly, agro-ecosystem analyses (AESA), group work, given COVID-19 safety protocols. Designing various FFS modules to be relevant to farmers facing threat but not affected yet by FAW; farmers minimally affected by FAW; farmers facing FAW infestation at outbreak levels. Challenges in up-scaling farmer training to benefit more farmers facing FAW infestation under a decentralized extension system; strengthening community-level FAW, other crop pest and disease forecasting systems; complementing farmer field scouting, monitoring activities; developing appropriate farmer pest risk identification, management applications; knowledge generation, sharing on FAW IPM-PAMS. | mass communication campaign to facilitate uptake of FAW management techniques, technologies by developing communication material folders/leaflets/ brochures manuals/ for extension officers and farmers; sharing success stories and information with bio-agents and a biopesticide protocol with other countries and coordinating inputs from other countries. | | farmer-led and corn-cluster level FAW M&S systems planned. Bantay Peste will include corn-cluster farmers in six municipalities in South Cotabato (August-November 2022) and eight municipalities in Pangasinan (December 2022-March 2023). Electronic applications for M&S of major corn pests and diseases, including FAW, will be provided. FAW forecasting and EWS will be developed at the national, regional, and provincial levels, and a regional webinar training series on monitoring and managing transboundary pests, including EWS for geozone countries, planned. |
| **Egypt** | Plant protection staff trained in use of FAMEWS | Late release of funds for | | Meetings of national focal | Testing impact of intercropping with other |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | app as well as in FAW field scouting and trapping. Phone devices and pheromone traps provided by FAO distributed for use in all maize cultivated area. FAW infestation recorded in small wheat areas as well as in sugar cane, estimated at about two hectares, in Luxor governorate. Implementation of awareness and training programmes in 13 governorates in Egypt including some infested with FAW for 850 stakeholders including farmers, FAW specialists and researchers: Aswan, Luxor, Sohag, Ismailia, Monufia, Kafr El-Sheikh for maize farmers; Alexandria, Giza, Mansoura and Kafr El-sheikh for rice farmers, as well as El-Gharbia, Beni Suif and Asyut. FFS established in three locations in two governorates as model for all governorates. | implementing GA activities for maize-growing season; because of financial issues, Egypt was not able to organize the annual extension conference for NENA region as a demonstration country for 2021; however, Egypt is willing to hold the conference in 2022 to exchange knowledge and discuss results from GA. | | points to support planning and GA implementation. First geo-zone coordination meeting for GA implementation held for NENA region; 11th meeting held for FAW national focal points. | legume crops in addition to fodder cowpea; impacts of other plant densities; research trial of the relationship between infestation and yield losses; field and lab trials on the effects of certain pesticides on FAW egg-laying behaviour; monitoring campaign for FAW in maize and other summer crops; a regional conference on GA results. |
| **Bangladesh** | 100 people participated in hands-on training on pheromone setting and management of FAW; mobile phones were distributed to support FAW monitoring and FAMEWS; a national taskforce on FAW | Encouraging and motivating Ministry of Agriculture and DAE; development of National Action Plan for FAW control and management. More formal communications | Season-long IPM training on FAW through FFS, training on advanced biological control methods. | Support the DAE's 15 000 well-educated, permanent field extension workers throughout the country. | Initiating FAW-focused FFS under the DoA; NTF capacity building; monitoring and EW support for DAE in developing FAW monitoring guidelines and EW system; survey and evaluation |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | management was established; research work under BARI and BMWRI for developing environment-friendly technology continued; fast-track registration of biopesticides for FAW control and management began; FAW management based on FFS, focusing on agronomic and biological control of FAW, began. | with Ministry of Agriculture, resource mobilization for TCPf project development and implementation. | | | of local FAW control practices and management; capacity development for DAE officials to adopt FAO training manuals for FAW control and management. Assessment of yield losses due to FAW on maize in various locations; validation of IPM package/biorational management to control FAW in 22 Upazilas subunits under 12 districts; farmer training; training of trainers; two seminar/workshops and two field days. |
| **Palestine Syrian Arab Republic, Lebanon, Jordan** | Under TCP project beginning in February 2021, intensive efforts conducted in the four project countries. Since then, about 1 746 individuals have been trained through FFS, including 680 in Palestine. Demonstration fields were planned in the four countries, and infestation is now stable, with farmers learning how to identify and control the pest with the recommended biorational insecticides. | | | | |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | Regional emergency TCP to manage FAW supporting national capacities in surveillance Pangasinan and IPM; four national work plans were developed for contingency and response measures against FAW. 12 FFS established, training projects supported, four demonstration fields initiated. | | | | |
| **Pakistan** | Trainings for 82 people, including eight women, on FAW agriculture research, extension and private-sector-produced pesticides; awareness/training held for 2 700 farmers through 24 awareness seminar/field days and FAMEWS; use of pheromones traps and effective surveillance of FAW; support for provincial agriculture departments through equipment and supplies; FAW IPM packages prepared in consultation with government departments, private-sector pesticide companies and CABI; engagement ongoing with Department of Agricultural Extension regarding FAW monitoring. | | | | |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| **United Arab Emirates** | FAO RNE has provided technical support training, 5 000 pheromone lures, 5 000 killing strips and 1 000 FAW traps. National action plan has been developed and support requested to establish a unit for production of FAW natural enemies. | | | | |
| **Saudi Arabia** | Training held in the city of Taif, a national action plan for management of FAW risks developed. | | | | |
| **Libya, Algeria, Mauritania, Morocco, and Tunisia** | March 2022: new one-year project for emergency preparedness and response to strengthen management capacities of Maghreb countries to mitigate FAW risks and impact began; inception workshop 31 May to 2 June 2022 in Nouakchott, Mauritania. | | | | |
| **Indonesia** | Socialization and technical guidance for eco-friendly pest management underway; intensive monitoring by farmers and pest observer officers; joint action to control FAW with field officers and local farmers; information provision on the main pests of food crops and their control; empowering farmers in the dissemination of IPM; mechanical techniques, biocontrol agents, botanical pesticides used. FAW-infested areas were | | | | |

| Country | First semester 2022 | | | | 2022 |
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| | **Outputs (# of people trained, knowledge products, etc.)** | **Challenges** | **Training needs** | **Opportunities** | **Planned core activities** |
| | smaller in 2021 and 2022 than during the initial period of FAW infestation in Indonesia in 2019 and 2020. | | | | |
| **Iraq** | 800 pheromone traps with 3 000 strips were provided under the GA. | | | | |
| **Yemen** | Emergency response project under the GA to enhance technical capacities supported 18 345 farmers; 3 204 ha were treated for FAW in 22 governorates; 4 800 pheromone traps with three refill kits each (total 14 400) provided; 7 400 liters of the biopesticide Neem also provided. | | | | |
| **Nepal** | FAW parasitoids tested and applied including egg and larval parasitoids. | | | | |

## Appendix 3: List of Participants

| | **Given name, surname** | **Role, Organization/Institution** |
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| **Mid-year Meeting (Asia and Near East) Attendees** | | |
| 1. | Mr Jingyuan Xia | Director, Plant Production and Protection Division (NSP), Executive Secretary of the FAW Secretariat, FAO |
| 2. | Mr Buyung Hadi | Agricultural Officer, FAW Secretariat, Plant Production and Protection Division (NSP), FAO |
| 3. | Mr Maged Elkahky | Agricultural Officer, FAW Secretariat, Plant Production and Protection Division (NSP), FAO |
| 4. | Ms Anne Sophie Poisot | Agricultural Officer, FAW Secretariat, Plant Production and Protection Division (NSP) , FAO |
| 5. | Ms Mekki Chouibani | Executive Director, Near East Plant Protection Organization (NEPPO), |

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| | | Morocco |
| 6. | Ms Sunita Pandey | Deputy Director (Entomology), Directorate of Plant Protection, Quarantine & Storage, Ministry of Agriculture and Farmers Welfare, India |
| 7. | Mr Mohamed I. Abd Elmegeed | Chairman of Agricultural Pesticide Committee (APC), Ministry of Agriculture and Land Reclamation, Egypt |
| 8. | Mr J.C. Sekhar | Principle Scientist, Indian Institute of Maize Research, India |
| 9. | Ms Wilma Cuaterno | Division Chief, Crop Pest Management Division, Bureau of Plant Industry, Department of Agriculture, the Philippines |
| 10. | Mr Golam Faruq | Director-General, Bangladesh Wheat and Maize Research Institute |
| 11. | Ms Zeng Juan | National Agriculture Technical Extension and Service Centre (NATESC), Ministry of Agriculture and Rural Affairs, China |
| 12. | Mr Zhenying Wang | Department of Agricultural Entomology, Chinese Academy of Agricultural Sciences (CAAS) |
| 13. | Mr Jie Liu | Agronomist, National Agriculture Technical Extension and Service Centre (NATESC), Ministry of Agriculture and Rural Affairs, China |
| 14. | Mr Ibrahim Al-Jboory | President, Arab Society of Plant Protection & NENA Regional Plant Protection Consultant |
| 15. | Mr Jaouadi Imed | Ministry of Agriculture, Tunisia |
| 16. | Mr Kamel Khalifa | Ministry of Agriculture, Tunisia |
| 17. | Mr Md Mostafizur Rahman Shah | Senior Scientific Officer, Bangladesh Wheat and Maize Research Institute |
| 18. | Mr Imad Eid | Palestine Technical University, Palestine |
| 19. | Ms Rana Samara | Palestine Technical University, Palestine |
| 20. | Mr Ahlam Gaga | Libya |
| 21. | Mr Ali El Badri | Libya |
| 22. | Mr Mohamed AbdulAziz | Assistant Undersecretary for Agriculture Affairs Ministry of Works, Municipalities and Urban Planning, Kingdom of Bahrain |

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| 23. | Mr Sadek Abbass | National Plant Protection Organization,<br>Iraq |
| 24. | Ms Meryem Afifi | Morocco |
| 25. | Mr Yamam Hadj Hassan | Qatar |
| **Food and Agriculture Organization of the United Nations (FAO)** | | |
| 26. | Mr Rajendra Aryal | FAO Representative, Indonesia and Timor Leste |
| 27. | Ms Jasmine Magtibay | Programme Assistant, FAO the Philippines |
| 28. | Ms Fu Rong | Programme Officer, FAO China |
| 29. | Mr GC Yubak | Senior Agriculture Officer, FAO Asia-Pacific |
| 30. | Mr Yaseen Thaer | Agricultural Officer, FAO Near East |
| 31. | Mr Rajesh Dubey | National Operations and Programme Officer, FAO India |
| 32. | Mr Kim Haekoo | Programme Specialist,<br>Plant Production and Protection Division (NSP), FAO |
| 33. | Mr Jean Claude Rwaburindi | Programme Specialist,<br>Plant Production and Protection Division (NSP), FAO |
| 34. | Ms Verena Wilke | Programme Specialist,<br>Plant Production and Protection Division (NSP), FAO |
| 35. | Mr Fidel Rodriguez | National Programme Assistant,<br>FAO, the Philippines |
| 36. | Mr Abdoulaye Saley Moussa | Plant Protection and Production Officer,<br>FAO Sub-Regional Office for Gulf Cooperation Council States and Yemen (SNG) |
| 37. | Mr Ashraf Saber Alhawamdeh | Agricultural Officer, FAO Yemen |
| 38. | Ms Yosra Ahmed | Agriculture Specialist (Plant protection and production) FAO RNE |
| 39. | Ms Zinette Moussa | National Consultant-Plant Protection, FAO Libya |
| 40. | Mr Gianni Palmerio | Office Assistant, FAW Secretariat,<br>Plant Production and Protection Division (NSP), FAO |
| 41. | Ms Sandra Cordon | Communications Consultant, FAW Secretariat,<br>Plant Production and Protection Division (NSP), FAO |
| 42. | Ms Svetlana Velmeskina | Office Assistant, FAW Secretariat,<br>Plant Production and Protection Division (NSP), FAO |
| 43. | Mr Qingpo Yang | Programme Specialist, FAW Secretariat,<br>Plant Production and Protection Division (NSPD) |
| 44. | Mr Hichem Asses | Spécialiste en Production Végétale et Protection des Plantes, (SNE) FAO |
| 45. | Mr Maclean Vaqalo | National Consultant on FAW Management, FAO |

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| 46. | Mr Mohamed El Hady Sidatt | Agricultural Officer, (SNE) FAO |
| 47. | Ms Ying Tu | Volunteer Operations, China, FAO |
| 48. | Mr Anil Das | National Programme Consultant, Bangladesh, FAO |
| 49. | Mr KamalElhalag | National Plant protection and production,<br>FAO Egypt |