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SUPPORT TO ENHANCE NATIONAL CAPACITY FOR THE MANAGEMENT OF FALL ARMYWORM (FAW) IN UGANDA

May 2020

SDGs:



Countries:

Uganda

Project Code:

TCP/UGA/3605

FAO Contribution

USD 483 000

Duration:

1 December 2017 – 31 October 2019

Contact Info:

FAO Representation in Uganda

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Implementing Partner

Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

Beneficiaries

Primary beneficiaries are smallholder farmers and staff of the Crop Protection Department in MAAIF and the National Crops Resources Research Institute. Intermediate beneficiaries include district/sub-county local government staff.

Country Programming Framework (CPF) Outputs

CPF 2015-2019: To promote enhancement of household income through commercialization of agriculture.



BACKGROUND

Fall Armyworm (*Spodoptera frugiperda*, J.E Smith) is a pest of maize and other crops that has recently become an invasive species in West, Central and Southern Africa, with outbreaks being recorded for the first time in 2016. In Uganda, MAAIF first received reports of an unknown pest on 40 percent of maize crops in three districts in July 2016. Identified as FAW by the National Agriculture Research Organization (NARO), by August 2017 the pest had been reported in all 115 districts of Uganda. Given the importance of crop production to household food and nutrition security, the spread of the pest is a major concern in the country, where maize is the third most important food crop in terms of production, with 4 million tonnes produced by about 3.6 million farmers. Concerted efforts are required to reduce the impact of FAW on maize production in the country in order to ensure food and nutrition security and better livelihoods. The project was designed to contribute to protecting the livelihoods and food security of populations living in FAW-affected areas and to develop the capacities of the main stakeholders in the surveillance, monitoring and management of FAW.

IMPACT

By building the capacity of farmers, the project has been instrumental in increasing the household incomes and food security of maize-growing households in Uganda. The management and control of FAW has been enhanced, leading to increased farm yields and ensuring greater food security and improved incomes from maize. Farmers are keen to monitor and apply control measures in time to minimize destructive effects of the pest.

ACHIEVEMENT OF RESULTS

The overall objective of the project was to significantly reduce FAW infestation and damage, and to strengthen strategies for future mitigation and adaptation. To this end, the project supported the establishment of a community-based FAW monitoring and forecasting system by revitalizing, forming and strengthening 50 farmer field schools (FFSs) across the ten project host districts of Mukono, Iganga, Bulambuli, Nakapiripirit, Lira, Amuru, Adjumani, Kibaale, Kiryandongo and Kasese. The FFSs acted as a platform for the implementation of the Fall Armyworm Monitoring and Early Warning System (FAMEWS) application. Data on FAW moth catches were collected by FFS lead farmers on a weekly basis and transmitted to the cloud-based database operated by FAO. These data were essential in guiding the country's FAW seasonal outbreak management. In terms of capacity building, 606 agricultural extension workers (AEWs), researchers and key stakeholders were trained in FAW biology, management and control. The training highlighted issues of FAMEWS and the safe use and handling of pesticides. As FAW is a migratory pest, extension workers from districts across the country were also trained. National field surveys conducted in 2019 showed a reduction in the incidence of FAW from over 80 percent to approximately 45 percent.



IMPLEMENTATION OF WORK PLAN

Most activities were implemented in the envisaged timeframe despite delays in the procurement process of some items. No budget revisions were required.

Potential risks included low commitment from local governments to assign and facilitate technical personnel, the failure of the Government to implement jointly agreed recommendations and weak coordination among key actors. These risks did not materialize or were successfully managed by the project. With regard to social and environmental risks, the supported enterprises involved women and men, including youth, and most technologies promoted were environmentally friendly and did not pollute the environment. The project spearheaded integrated pest management (IPM) strategies, with the use of pesticides as a last resort.

FOLLOW-UP FOR GOVERNMENT ATTENTION

Proposed follow-up actions to be taken include the periodic technical monitoring of FFSs, above all with regard to FAMEWS data collection and transmission, and the cascading in FAW control of push-pull technology.

SUSTAINABILITY

1. Capacity development

The project was implemented with the constant involvement of district-level government staff, responsible for pest and disease control, as strategic and operational allies. MAAIF will provide backstopping should any challenges arise. The sustainability of the project is also supported by current policies, including the agricultural policy, the National Development Plan II, the Plant Protection and Health Act, 2016, and the Agricultural Chemical (Control) Act, 2006.

2. Gender equality

The project emphasized inclusive development, with a strong emphasis on women and youth involvement. Key challenges, including lack of access to inputs like pesticides and financial services, and poor knowledge of FAW management, were addressed during implementation. During mobilization and group formation activities and training in appropriate technologies, gender equality underpinned all project activities.

3. Environmental sustainability

The project emphasized the use of IPM strategies, with the use of pesticides in FAW control to be considered only when all other methods had failed. In terms of technology, the project promoted the use of eco-friendly technologies such as solar dryers, and the safe application of chemicals.

4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

The project emphasized mitigation measures against the destruction of the maize crop by FAW, ensuring food security for people in the country. Reduced damage by FAW means increased maize yields, while commercialized agriculture provides employment to many youths across the value chain, as processing units have increased in maize production areas.

Sensitization to the safe use and handling of agricultural chemicals will protect vulnerable groups such as women from performing tasks that involve a high exposure risk to such chemicals.

5. Technological sustainability

Affordable technologies to control FAW, such as the use of ash, crop rotation and early planting, were promoted. In addition, training and capacity building revolved around existing indigenous knowledge to ensure easy adoption. At the end of the project, the supported smallholder farmers had a good grounding in the targeted mitigation measures. Any remaining gaps will be backed up by MAAIF.

6. Economic sustainability

It is expected that the Government will find resources to enable the emergency control of FAW in the rest of the country's districts, making full use of the lessons learned from the project. The technologies developed through research (biopesticides, natural enemies, effective pheromone blend) will be rolled out and disseminated to farmers.



DOCUMENTS AND OUTREACH PRODUCTS

- Enhancing National Capacity for the Management of Fall Armyworm in Uganda. Report by Project consultants on Integrated Pest Management.
- Report on farmer field school consultant.

ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	Food security and livelihoods of households and communities protected from FAW infestation and crop damage	
Outcome	FAW infestations and damage significantly reduced and strategies for future mitigation strengthened	
	Indicator	<ol style="list-style-type: none"> 1. Number of community-based FAW monitoring and forecasting units established and linked to national monitoring system. 2. Proportion of maize crops with good FAW management increased. 3. Crop losses caused by FAW infestation reduced. 4. Proportion of agriculture sector national institutions with better understanding of FAW increased.
	Baseline	<ol style="list-style-type: none"> 1. 0 2. 20% 3. 65% average yield loss in maize. 4. 20%
	End Target	<ol style="list-style-type: none"> 1. 50 2. 60% 3. 10% average yield loss in maize. 4. 50%
	Comments and follow-up action to be taken	<ol style="list-style-type: none"> 1. Achieved. Five units were set up in each of the ten districts. Traps and smartphones loaded with the FAMEWS application were provided to farmers at FFSs. 2. 63% achieved, as a result of increased awareness and training of extension workers on best management practices for FAW. 3. Below 10% in maize achieved as farmers adapted to control measures extended to them. 4. There was close collaboration with all agricultural sector actors. Some of these actors were represented on the national taskforce. The training conducted had participants from both public and private sectors. <p>The overall project objective was to significantly reduce FAW infestations and damage, and to strengthen strategies for future mitigation and/or adaptation. Although no terminal assessment was conducted, anecdotal evidence suggests that this was achieved. The project supported the establishment of a community-based FAW monitoring and forecasting system by revitalizing, forming and strengthening 50 FFSs in the ten project host districts. These acted as a platform for the implementation of FAMEWS. Data on FAW moth catches were collected by FFS lead farmers on a weekly basis and transmitted to the cloud-based database operated by FAO. These data were essential in guiding the country on FAW seasonal outbreak management.</p> <p>A total of 606 AEWs, researchers and key stakeholders received training in FAW biology, management (adaptation measures) and control (mitigation measures). The training highlighted issues of FAMEWS and the safe use and handling of pesticides. The latter was vital as the country was in emergency response mode and saw the increased importation and use of synthetic pesticides as a short-term solution during the initial stages of the FAW outbreak in 2016 and in the medium term for commercial farmers.</p> <p>As FAW is a migratory pest, extension workers from districts across the country (beyond the ten focus districts) were trained. The project thus had a national outlook, augmenting government efforts to manage FAW in the country. National field surveys on FAW conducted in 2019, using non-project funds, showed a reduction in the incidence of FAW from over 80% to about 45% in 2019. Maize leaf damage declined from more than 50% in 2016 to about 10% in 2019; with high incidences at times not resulting in significant leaf damage and minimizing yield losses. This is an important advance. Despite fluctuating incidences, the project was instrumental in building the national capacity of farmers through the training in FAW management provided by AEWs. As a result, higher incidences no longer lead to high leaf damage in maize. Farmers are keen to monitor and apply control measures in time to minimize the pest's destructive effects.</p> <p>Proposed follow-up actions include periodic technical monitoring of FFSs especially on FAMEWS data collection and transmission, and cascading push-pull technology in controlling FAW.</p>

Output 1	FAW surveillance, monitoring and early warning system established		
	Indicators	Target	Achieved
	1. Number of community-based FAW monitoring and forecasting units established and linked to national monitoring system. 2. Number of traps, pheromone lures procured. 3. Number of smartphones procured. 4. Number of farmers trained in FFSs. 5. Number of pheromone lure blends tested for effectiveness.	1. 50 2. 300 traps, 3 000 lures. 3. 70 4. 1 500 5. 6	Yes
Baseline	0		
Comments			
Activity 1.1	Support establishment of community-based FAW monitoring and forecasting system – 50 villages in ten districts		
	Achieved	Yes	
	Comments	Fifty community-based FAW monitoring and early warning units were established in all ten project host districts. Each district had five established units hosted within identified FFSs. Each unit was provided with a bucket trap and periodically with pheromone lures to attract the moths. Lead farmers recorded the trap and general crop data using an application installed in smartphones provided by the project. The collected data were transmitted to an FAO-managed repository and accessed by the country data manager for validation and analysis. The project procured 70 smartphones that were used to implement FAMEWS, with focus on ten districts.	
Activity 1.2	Provide forecasting/surveillance material and equipment (1 000 traps with pheromone lures, rain gauge, stationery, record sheets and information materials and leaflets written in appropriate local languages)		
	Achieved	Yes	
	Comments	Three hundred pheromone traps and 3 000 pheromone lures were procured and distributed to farmers in FFSs. A total of 56 smartphones loaded with the FAMEWS application was procured and issued to community focal persons selected from the FFSs identified in the respective villages. These tools and equipment facilitated FAW data collection and transmission to the community monitoring system, where extension workers at local, district and national levels will advise farmers in their locality on FAW control. During implementation it was noted by the technical team that the original number of 1 000 traps was unnecessarily high and that 300 traps were sufficient; resources were thus refocused to awareness and technology adaptability.	
Activity 1.3	Carry out hands-on training for 1 500 farmers (from 50 FFSs) to equip them with practical knowledge for surveillance materials and equipment use		
	Achieved	Yes	
	Comments	In the ten host districts alone, 1 651 farmers were trained in FAW management and control through FFSs. This exceeded the target of 1 500 farmers. The intense effect of FAW on the livelihoods of the communities enhanced farmers' willingness to participate in training.	
Activity 1.4	Carry out a study to evaluate the capture of commercial pheromone blends and trap designs to inform the monitoring of FAW in vulnerable crops		
	Achieved	Yes	
	Comments	<p>Between January and October 2019, NARO conducted a study to assess the effectiveness of different pheromone blends in capturing the moths. The assessment covered six commercial pheromone blends. An assessment was also made of the losses associated with FAW and the effectiveness of different insecticides to control FAW. Although conclusive results have not yet been released, preliminary results indicate that:</p> <ul style="list-style-type: none"> – Lures from Russell IPM and Chemtica were best for FAW monitoring of maize crops in Uganda. – FAW pheromone lures need to be replaced at intervals of 4-6 weeks, in line with most manufacturers' recommendations. – Percent yield loss fluctuated depending on the spray regime and geographical location. – Insecticide application is effective in controlling FAW infestation and damage. However, early application at ten days after emergence (DAE) and at shorter intervals of ten DAE is recommended when infestation persists. Amdocs and Prove (emamectin benzoate) resulted in lower damage, while Amdocs and Laraforce had the highest yields among insecticide treatments. <p>The study recommended further research to understand the variable performance of lures with regard to agroecological zones. When deployed with appropriate traps, the lures should facilitate the scouting of FAW populations in the field in order to strengthen the current FAW management programme.</p>	

Activity 1.5	Assess qualitative and quantitative impacts of FAW on maize; this will involve survey to assess damage caused by FAW and its impact on food security and livelihoods	
	Achieved	No
	Comments	With regard to the qualitative and quantitative assessment of FAW impact on maize, it was established that NARO was to conduct a similar study. To avoid duplication, it was decided that the project would not undertake this activity and the funds initially allocated were used to scale up other activities and to cover activities that were under-costed.
Output 2	FAW integrated management/control strengthened	
	Indicators	Target
	<ol style="list-style-type: none"> 1. Research on low-risk pesticides (biopesticides) for control of FAW in place. 2. Number of frontline extension workers trained in safe use and handling of pesticides. 3. IPM strategies in place for FAW. 4. Number of protective gear sets procured and distributed. 5. Number of knapsack spray pumps. 	<ol style="list-style-type: none"> 1. 6 2. 120 3. N/A 4. 200 5. 80
		Yes
Baseline	0	
Comments		
Activity 2.1	Support identification, quick testing and registration of low risk pesticides with special focus on bio-pesticides	
	Achieved	Yes
	Comments	<p>Biopesticides and botanicals are essential elements in integrated FAW management. Farmers used botanicals to control FAW. Although some biopesticides are recommended for pest management, concrete evidence on their efficacy for FAW was not available. NARO identified and assembled some biopesticides/botanicals to test their efficacy for FAW control. This activity leveraged ongoing research activities of NARO. The biopesticides studied included <i>Beauveria bassiana</i> and <i>Metarhizium anisopliae</i> obtained from Kinyara sugar works. Other bio-agents were <i>Isaria Fumosorseus</i>, <i>Purpureocillium Lilacinus</i>, <i>Lecanicillium lecanii</i> and <i>Bacillus thuringiensis</i>, sourced from Milkweed Biologicals in Wakiso District. Initial tests for most of these agents had been conducted by NARO. The bio-agent <i>P. Lilacinus</i> showed promise for FAW control and was enrolled for field activities under the Agricultural Cluster Development Project. Other products, such as Lufenuron, pyrethrins, Spinetorum and Spinosad, were not available from dealers in Uganda. The only botanical accessed for testing was Nimbecidine, a product derived from Neem. Given the damage caused by FAW, farmers used the immediate control option of chemicals. However, some pesticides applied have high toxicity and present dangers to human beings and the environment. There was a need to identify low-risk pesticides for farmers' use in FAW control. NARO identified some low-risk pesticides (Emamectin abamectin, Abamectin 18g/l + Acetamiprid 30g/l, Azadirachtin, Lambda-cyhalothrin 2.5% EC, Emamectin benzoate) and undertook experiments in three districts (Butaleja, Kasese and Hoima) to assess their effects on FAW and quantify losses associated with FAW. The results from yield data were collected and analysed. Insecticide application increased maize yield from 10 to 19%, depending on the timing of first and subsequent applications. Earlier and short application intervals when infestation occurs were more efficient than delayed and extended application intervals. Applications above three sprays did not result in a significant yield advantage over the untreated control: two or fewer spray applications are advisable.</p>
Activity 2.2	Develop materials and carry out training on safe use of pesticide and pesticide risk reduction approaches	
	Achieved	Yes
	Comments	Aware of the increased use of pesticides for FAW control despite the associated health and environmental hazards, training was provided to promote the safe use of pesticides and thus protect the health of smallholder farmers and reduce risks to the environment. Altogether, 146 AEWs were trained in the safe use and handling of pesticides. Two hundred sets of personal protective gear and 80 knapsack spray pumps were procured and distributed to local governments to demonstrate the safe use and handling of pesticides. Alongside the training, information, education and communication (IEC) materials were printed and disseminated. The materials form part of the IEC materials reported under Output 3.

Activity 2.4	Develop and promote alternatives to pesticide use methods, such as physical, cultural and biological measures		
	Achieved	Yes	
	Comments	The equipment and training provided by the project bolstered the IPM strategy emphasized by MAAIF in crop pest and disease control. During training, alternatives to pesticide use in FAW control and management were presented. At farmer level, IPM options were demonstrated through the FFSs.	
Activity 2.5	Establish and promote standard operating procedures linking surveillance/monitoring and control		
	Achieved	Partially	
	Comments	The guidelines developed by FAO on FAW surveillance/monitoring and linkages with FAW control were applied and promoted. Village focal persons and extension workers from the ten focus districts and other districts were held at district and group level. Several products (biorationals and biopesticides) were listed for testing but not all were tested as they were not available on the market at the time the funds were released. Some operational challenges, such as untimely fund flows for field operations, impacted the delivery of activities to some extent.	
Output 3	Improved public awareness about FAW		
	Indicators	Target	Achieved
	1. Number of IEC materials printed and disseminated. 2. Number of radio talk shows and spot messages aired.	1. 2 000 posters, 5 440 brochures, 950 branded T-shirts. 2. 18 radio talkshows, 1 040 spot messages.	Yes
Baseline	0		
Comments			
Activity 3.1	Access, prepare, print and disseminate FAW IEC materials (leaflets, posters, newspaper articles) to target different communities		
	Achieved	Yes	
	Comments	To improve public knowledge, FAW IEC materials (leaflets, posters, newspaper articles) were accessed, prepared, printed and disseminated to target different communities. The use of radio and television over two production seasons was also planned for a widespread public awareness campaign. The dissemination of IEC materials and awareness campaigns on FAW to the widest possible range of communities and stakeholders was essential to stimulate the actions needed to reduce the potential impact of FAW on food security and livelihoods. At the onset of the FAW outbreak, MAAIF developed FAW posters containing information on biology and control. With support from the project, the materials were reviewed and printed along with the FAW FFS guide produced by FAO. A total of 2 000 posters and 5 440 brochures was printed and disseminated. The posters were distributed to over 40 districts, disseminating the work of the project beyond the focus districts. The activity supplemented government efforts to increase awareness of FAW management in the whole country.	
Activity 3.2	Conduct widespread general public awareness campaign – use of radio and television over two production seasons		
	Achieved	Yes	
	Comments	Ten radio stations with high farmer audiences at country level were identified to broadcast talk shows (18) and spot messages (1 040) with information on FAW control. These were aired in farmers' local languages to make the messages as accessible, effective and impactful as possible. Over 300 000 farmers are estimated to have been reached by these media interventions. As part of the awareness package, 950 branded T-shirts with information on FAW were distributed to agriculture extension workers, farmers and other relevant actors in FAW management. The Government will continue to raise awareness using various media channels to ensure that farmers have ongoing access to information on FAW management and control. IEC materials such as brochures, posters and fact sheets will continue to be reproduced and disseminated to farmers across the country.	

Output 4	Institutional coordination framework established/strengthened		
	Indicators	Target	Achieved
	1. Committee meetings of national taskforce on FAW supported. 2. Number of Training of Trainers (ToTs) trained in FAW management and control. 3. Number of AEWs trained in FAW basic biology and ecology, monitoring and reporting. 4. Number of FAO training manuals printed.	1. 4 2. 50 3. 120 4. 150	Yes
Baseline	0		
Comments			
Activity 4.1	Establish/support the national taskforce on FAW to oversee, coordinate and advocate for concerted stakeholder action to manage the pest, including monitoring, awareness-raising campaigns, resource mobilization		
	Achieved	Partially	
	Comments	The national taskforce on FAW was established in August 2016, immediately after the onset of the FAW epidemic in the country. Its initial role was to develop a National FAW Control Strategy and Action Plan. The FAW strategy under implementation was developed by this taskforce. Its role was expanded to include the provision of national technical guidance on FAW control, and the approval and harmonization of all information pertaining to FAW control. To support this role, two meetings were facilitated under the project. The meetings resulted in key decisions on FAW. In these meetings, members of the committee were updated on the implementation status of the project, the achievements registered and the challenges faced. The taskforce was also facilitated to conduct field visits to monitor project implementation in Mukono and Iganga districts, which enabled them to further appreciate the achievements of the project.	
Activity 4.2	Undertake ToT for 50 national extension personnel, researchers, civil society organizations and private actors on FAW basic biology and ecology, monitoring techniques, reporting and effective management options		
	Achieved	Yes	
	Comments	As FAW was a new pest in the country, knowledge about it was very limited even among MAAIF personnel and in national agricultural research institutions. At the time the project was made operational, few staff members had the capacity to train local government technical officers in FAW management and control. To quickly create a critical mass of technical officers knowledgeable about FAW, ToT was necessary. The project trained 53 technical officers from MAAIF, research institutions and some district agricultural officers from selected district local governments. Topics covered during training included FAW biology, identification, management and control. The trainers of trainers then served as key project trainers in the regional meetings later held in the country.	
Activity 4.3	Undertake training for 120 district agriculture extension officers on FAW basic biology and ecology, monitoring and reporting		
	Achieved	Yes	
	Comments	AEWs provide an important link between farmers and knowledge transfer as they train farmers in different technologies in the country. MAAIF implements a single spine agricultural extension system linked directly from the centre to sub-county and community levels. Regional (sub-national) level training was undertaken for officers within and outside the ten project focus districts. The aim of the training was to widen the national scope of the fight against FAW, above all because of its migratory nature. A total of 146 extension staff (exceeding the planned 120) received training in biology, identification, management and control during regional workshops. The training also covered FAW monitoring and early warning. To ensure continued strengthening of the capacity of AEWs on FAW management, the project printed 150 copies of the FAO training manual. This details FAW management through FFSs. Delays in procurement on some occasions affected workshop timelines. Of the approximate total number of 2 000 AEWs, 606 were trained in FAW management and control. As a follow-up, MAAIF will continue to prioritize the training of AEWs in order to achieve at least 80% coverage.	

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