

REPORT ON CAPACITY BUILDING AND IMPLEMENTATION OF INTEGRATED PEST MANAGEMENT (IPM) STRATEGIES AND MIGRATORY/TRANSBOUNDARY PESTS MANAGEMENT VIRTUAL WORKSHOPS

12 – 16 OCTOBER 2020



INTRODUCTION

With increased global trade, travels, agricultural intensification and climate change, the emergence of plant pests and disease outbreaks has been increasing. Plant pests and insects, such as locusts, Fall Armyworm (FAW) and Red Palm Weevil (RPW) can easily spread from one country to another, affecting crops and entire rural livelihoods. Globally, annual crop losses due to plant pests and diseases is estimated to be 20 – 40 % and those due to transboundary / migratory pests and diseases is even worst. Additionally, transboundary plant pests are the major barriers to safe trade, often causing closure of trade borders such as fruit flies and the cassava virus disease. It is against this backdrop and with the objective of proper management of transboundary/migratory pests and prioritization of IPM that the Inter-African Phytosanitary Council (IAPSC) organized a virtual workshop with the member states of the African Union from the 12th to the 16th of October 2020.

1. OPENING SESSION

1.1. Opening remarks, director AU-IAPSC

This started with opening remarks from Jean Gerard Mezui M'Ella, director of AU-IAPSC who thanked all present for this very important workshop. Despite challenges of travel due to COVID-19, he appreciated the presence of all and the fact that several member states could take part in this since it is virtual. He went ahead to mention the recent challenges that have impacted agriculture and trade in Africa while justifying the holding of these very important workshop. He wished for a continued collaboration between AU-IAPSC and partner institutions in providing much needed support to NPPOs of member states.

1.2. Opening remarks, Commissioner for Rural Economy and Agriculture

The Commissioner for Rural Economy and Agriculture of the African Union, her Excellency Mrs. Josefa Sacko followed with opening remarks. She thanked all present and expressed her joy with the fact that great strides are being done towards achieving agenda 2063 of the African Union. She mentioned the fact that the African continent harbours some of the most devastating migrant pests and is increasingly becoming a victim of invasive alien species. Management of these species requires special skills related to proper communication policies, incidence reporting, data management, risk analysis, early warning techniques, appropriate intervention options, preparedness and eventually disaster management. The commissioner remarked that the launch of the Africa Continental Free Trade Area (AFCTA) will boost agricultural trade between our Member States. The timing for these workshops to strengthen member states' capacities as in the management of migratory and transboundary pests is perfect. She pledged the continuous support of the commission towards enhanced trade in the

continent and mitigating any impediments to achieve expected results. She thanked all present and wished for fruitful deliberations and outcomes during the workshop.

1.3. Opening remarks, Minister of Agriculture and Rural Development, Cameroon

On his part, the Cameroon's Minister of Agriculture and Rural Development Mr. Gabriel Mbairrobe welcomed participants to these important workshop. He raised the point that African agriculture has experienced several threats from transboundary pests and diseases such as locusts, armyworm, fruit flies, banana diseases, cassava diseases and wheat rusts which are among the most destructive pests and diseases of transboundary plants. Transboundary pests and diseases of plants can easily spread to several countries and reach epidemic proportions. Epidemics and outbreaks can cause enormous losses to crops and pastures, threatening the livelihoods of vulnerable farmers and the food and nutrition security of thousands of people at once. The objectives of these workshops include building the capacity of the Member States you are on integrated pest management strategies and the implementation of integrated pest management with the aim of achieving sustainable agriculture. The workshops will also aim to strengthen the capacities of Member States in the management of migratory and transboundary pests. According to the Minister, the timing for these workshops couldn't be better. He wished for useful deliberations over the workshop days and, at the end, fruitful results that will go a long way in reducing the negative effects of these pests and diseases, which pose a major threat to food security and poverty reduction in Africa. It was on his note that he declared open the workshops.

2. Meeting arrangements

This session was led by Luiza Munyua of AU-IAPSC. It was agreed by participants that the role of moderator and rapporteur be taken by IAPSC for easy coordination as it is a virtual workshop. The agenda was presented and adopted by participants.

Ms Chipiliro Kansilanga reminded participants to use their names and institutions as their zoom ID so it is easier to identify participants. Participants were informed that interpretation (French and English) was available and reminded to mute their microphones except when talking to avoid background noise and echo.

3. Justification and expected outcomes of the workshop (Maryben Chiatoh, AU-IAPSC)

Justification

- Transboundary pests directly affect: production, price and market effects; trade; food security and nutrition; human health and the environment.
- In tropical agricultural systems, pesticides are increasingly expensive and pose risks to farmers and consumers;

- Reduced use of pesticides through IPM has many economic and social as well as environmental advantages.
- Reduced use of chemicals implies reduced cash and other capital inputs into production systems, and for this reason IPM approaches tend to be more sustainable in small-scale agricultural systems.
- IPM strategies minimize environmental damage and health risks

Expected outcomes

- Sharing information and establishing partnership for a broad IPM approach;
- Discuss and share information on existing IPM strategies in various countries;
- Capacity building and Implementation of IPM and sustainable management of transboundary plant pests in MS;
- Promote regional cooperation in the management of migratory and transboundary pests;
- Identify existing gaps on IPM and management of transboundary pests in the region;
- Strengthen the framework for sound pest and crop management
- Pest status in the AU Member States (major pests, pest list)

At the end of the workshop, IAPSC in collaboration with member states will prepare and adopt recommendations stemming from the workshops and finally circulate workshops report to all participants.

4. Implementing Integrated Pest Management Strategies – Continental, Regional and National Approaches

4.1. Capacity building and Implementation of IPM strategies (Saliou Niassy, icipe)

Questions and remarks

- Dr Nying Charles from Cameroon asked the other cultural methods that can be used within IPM apart from pheromones in the case of Fall Armyworm

The IPM management package for FAW includes monitoring, pheromone trapping (available), scouting (pheromone available). For control, there is the use of biopesticides which control both the eggs and larvae of the pest. Two biopesticides have been released at the level of icipe. There is also the use of the Push-Pull technology and use of parasitoids.

Participants wanted to know is awareness raising and sensitization through virtual means as presented by Dr. Niassy of icpe reach target audience.

- What strategies can be used to control pests such as Coleoptera meloidae which attack maize (corn ears) at flowering

More focus should be given to cultural control measures. There is the need to standardize local control practices through research.

- Mr. Copperfield from Ghana, Push Pull technology is being promoted by icipe but the protocol has yet to be sent to member countries.

In response, Dr. Niassy said that an evaluation of this technology has just been concluded with some institutions in Ghana and has yielded very encouraging results. Further details will be provided eventually on this.

4.2. IPM Strategies and Management of Migratory /Trans-boundary Pests: case studies (FAO/ RAF - Jean Bahama)

Integrated Pest Management

He started his presentation with information on why a new approach to pest management is needed (Pesticide resistance, secondary pest outbreaks, environmental concerns).

He defined Integrated Pest Management (IPM) as a dynamic, integrated approach involving a combination of control techniques and best agricultural practices to manage pest populations with the least disruption to the environment. It involves the use of biological control, cultural practices and chemical applications. IPM requires constant and thorough monitoring of the population levels: the choice of the path of action is dependent on the information collected. This contrasts strongly with the 'calendar spraying' conventional approach to pest control.

IPM utilizes all suitable pest management tactics including cultural, mechanical, sanitary, biological control and host plant resistance. Pesticides as last resort.

Migratory transboundary plant pests

Transboundary pest: migratory insects, plant diseases and weeds that can spread to several countries and reach epidemic proportions, causing significant losses to farmers, threatening food security and cause damage to biodiversity and environment

Pathways: environmental forces (DL, fall armyworms and rusts), International trade, tourism and people's migrations.

FAO control strategies on IPM and migratory pests include

- Coordination,
- Prevention,
- Monitoring, early warning and response,

- Capacity development.

Some examples of successful IPM programs

- In Philippines, IPM farmers obtained 4.7 to 62% higher rice yield and reduced pesticide use by 15% compared to non-IPM.
- In India in, IPM farmers obtained 6.2 to 42.1% increased rice yield, and reduced pesticide use by 50% compared to non-IPM farmers.
- In Argentina, IPM in cruciferous against the diamondback moth, *Plutella xylostella*: plowing to eliminate crop residues, and rotation with non-host crops, careful inspection of nursery plants for diamondback moth eggs and larvae to prevent accidental introduction of diamondback moth into the field, use of native parasitoid species and the introduction of effective exotic species.
- In Thailand in 1993 adoption of IPM technology resulted in 145% increase in net profit in IPM fields over non-IPM fields in cruciferous vegetables.
- IPM of fruit flies, *Ceratitis capitata* in Mexico.
- Eradication of the oriental FF in Mauritius.

IPM strategies were also given on pests such as the Desert Locust, the Fall Armyworm and the Tomato Leafminer.

In conclusion,

IPM strategies can be successful for the management of migratory and transboundary pests

- Major emphasis on prevention and preparedness,
- Local participation, particularly in stakeholder consultation, is necessary for any successful programme.
- Coordination and Cooperation: either formally through regional organizations or informally through networking.
- Rapid and frank sharing of information on disease occurrences and pest outbreaks and the harmonization of quarantine and disease control programmes
- Capacity building (IPM is knowledge intensive)

Questions / comments

- Practically explain how the push-pull technology is carried out (Mezui M'Ella)

The push-pull technology was developed by icipe for the control of FAW. This is done through alternating *Desmodium* with maize, and *Bracharia* planted on the borders. *Desmodium* pushes the FAW while *bracharia* pulls them. This means that if intervention

is required, it will be at the level of the borders and not within the farm. It is also important to note that this will work only when the two species are present. Other options can also be used such as neem extracts.

- Update on the FAO regional conference for Africa?

This is still up coming and the invitations will be sent eventually.

- Senegal has problems with fruit flies and have limited funds and products for their control. Can the FAO help the country in the control?

There are possibilities to receive funding through FAO although these are generally small funds. There is an upcoming project with the African Development Bank. This could be taken as an opportunity to acquire funds to solve such challenges.

- What role does the FAO play in regards to border control posts to help member states fight against transboundary pests since this is a common challenge amongst member states?
- There is no clear linkage of the work of FAO with the private sector to enhance compliance on measures geared at reducing dissemination of pests. What strategies could be used to strengthen this linkage?

Day 2

The second day of the workshop started with a recap of day 1 and then country presentations.

4.3. Country presentations

We had presentations from Tunisia, Egypt, Lesotho, Senegal and Chad on IPM strategies for pest control. Presentations generally centered on the following topics:

- The main migratory / transboundary pests in the countries
- Problems posed by migratory / transboundary pests
- Management practices / response plan
- Challenges
- Interventions or programs

Questions / comments

- The use of pheromones in monitoring FAW in Tunisia, what is being done with the data obtained

Data is still being collected, but for the moment, FAW has not yet been found in areas where traps have been installed.

- Red weevils was discovered on ornamental palms. Three alternatives (surveillance, monitoring and control). Current control measures include biological and chemical methods.
- What active ingredient is used for the control of anthracnose in mangoes?

Biofungicides are being used against anthracnose in mangoes. Six biopesticides have been registered this year. *Bacillus thuringiensis* in one of the active ingredients used.

4.4. Implementation of IPM to manage trans-boundary pests (SADC – Eisaiah Tjelele)

4.5. Technological advances in the management of migratory and trans-boundary pests (Ivan Rwomushana, CABI)

He started his presentation with an introduction on the impact of migratory pests on crop production. One-third of global crop production lost every year to plant insects and diseases, including migratory insects and diseases, referred to as transboundary plant pests. These pests spread to a number of countries and can reach epidemic proportions in which control and management require cooperation between those countries. He then went ahead in briefing on the technological advances on major transboundary pests in Africa in the current decade as follows:

- The Asian fruit fly (*Bactrocera dorsalis*): monitoring, parasitoid, orchard sanitation, post-harvest, bait spray, mail annihilation, biopesticides and monitoring.
- Tomato leaf miner (*Tuta absoluta*): pheromones, monitoring and mass trapping (20 traps per acre in open fields), microbial pesticides (*Metarhizium* 69), botanicals (Azadirachtin, Nimbecidine, *Ocimum* sp. essential oils), biological control (mirid bugs e.g. *Macrolophus pygmaeus* commercialised in Kenya as MIRICAL), net tunnels, mating disruption.
- Fall armyworm (*Spodoptera frugiperda*): new methods for remote sensing, automatic counting of trap catches, Artificial Intelligence and image analysis of insects and damage, to improve monitoring; new biopesticides based on *Metarhizium* sp., *Bacillus* sp. and baculoviruses such as Fawligen, Littovir and Spodovir; insect-resistant maize, mating disruption – Pherogen; self-limiting fall armyworm (genetic modification).
- Papaya mealybug (*Paracoccus marginatus*): inoculative field releases of the parasitoid *Acerophagus papayae* in Ghana, Togo, Benin, Nigeria, Cameroon and Gabon (2010); by 2015, the parasitoid had spread to an estimated area of 0.6 million km²; the proportion of papaya trees that became entirely free of pest attacks increased from 66% in 2014 to 83% in 2015; CABI and KEPHIS working on a program for the release of this parasitoid in Kenya.

- Desert locust (*Schistocerca gregaria*): Use of biopesticide (*Metarhizium acridum* - GreenMuscle) developed by CABI and IITA. Locust swarms treated in Kenya and Somalia with promising results; using UAVs (drones) for treating small desert locust swarms, and swarms in agricultural and inhabited areas.

Questions / comments

- How can the Inter-African Phytosanitary Council be involved in the SADC project funded by the Africa Solidarity Trust Fund?

SADC is committed to working with IAPSC. The project implemented by SADC funded by the African Solidarity Trust Fund ended about two years ago. At the moment, there is no other project funded by this fund.

SADC is in the process of setting up an agricultural information management system that can be replicated among member states. Ground work has been done already and this system should be running soon. This can also be replicated by other regional economic communities.

- Do meteorological conditions affect the functioning of drones?

Meteorological conditions affect both the drone and the spray operations. Meteorological factors such as wind speed are determined before spray operations.

Day 3:

Day three of the workshop started with a recap of what was done on the second workshop day, followed by presentation on continental, regional and national strategies for migratory and trans-boundary pest management.

5. Migratory and Trans-boundary Pest Management - Continental, Regional and National Strategies

5.1. IPM for transboundary pests in Africa (Dr. Subramanian Sevgan, icipe)

The presentation focused on the management of the Desert Locust and the Fall Armyworm.

Desert locust had some catastrophic impacts in East Africa and South Asia from late 2019. The desert locust affected 11% of the lands in Ethiopia and 20% in Kenya. About 8.5 million people in Ethiopia and 3.5 million in Kenya face food shortages because of the catastrophic desert locust.

Pesticides such as fenitrothion are being used in the control of desert locust. The catastrophic phase of the desert locust is the gregarious phase where we can have up to 100000 individuals per 100 m², and their diet is quite broad. The solitary phase of the locust is harmless, we have less than 3 individuals per 100 m², the diet is restrictive, locust is non-migratory and is active just in twilight.

Current sustainable management options include:

- Exploiting semio chemicals for management of DL;
- Strengthening surveillance and monitoring;
- Biopesticides as alternatives for chemical pesticides;
- Locusts for food and nutritional security.

For fall armyworm, the sustainable IPM strategy includes:

- Effective monitoring;
- Conservation of indigenous and introduction of natural enemies;
- Use of biopesticides;
- The push-pull technology.

5.2. COUNTRY PRESENTATIONS

The following countries made presentation on national strategies in the management of transboundary / migratory pests: Kenya, Chad and Sierra Leone. Presentations focused on:

- The main transboundary pests in the different countries;
- Surveillance and monitoring;
- Management of pests (chemical control, biological control, cultural approach, push pull technology etc);
- Challenges in managing transboundary pests.

Questions / comments

- Are drifts from aerial spraying in the case of control of the desert locust not a threat to the population?
- What measures are taken for tomatoes meant for export with regards to *Tuta absoluta* in Kenya?

Tomatoes destined for exports undergo inspection, netting and other quarantine measures. Pest Free areas are also enforced

- How is neem applied as biopesticides?

Neem extracts are used by small scale farmers who crush the leaves and seeds, leave them overnight in water and apply the solution on the crops.

- The use of so many chemicals in controlling migratory pests have negative impacts on human health and the environment. What does icipe do to counter the use of so many chemicals?

At the moment especially with some pests such as the desert locust, other control measures are not available, thus the high use of chemical pesticides. There is the need for biopesticides which are safer alternatives. There is need for other management strategies that could be planned and implemented before locusts develop into swarms.

- Sierra Leone mentioned the use of wood ash and neem as biological pesticides. How is wood ash used and has there been any scientific publications on the use and effectiveness of neem?

Wood ash is mixed with kerosene (1 kg of wood ash to 6-12 spoons of kerosene). The document on the use of neem has been developed and is at the level of the Ministry of Agriculture, however, the protocol on neem is being used.

Day 4

A recap of day three was given after which there was a presentation from Dr Lava Kumar of IITA

5.3. IPM innovations and technologies for surveillance and control of transboundary pests (Dr Lava Kumar, IITA)

He started his presentation with some examples of major plant health project at the level of IITA. He mentioned the IPM of Fall Armyworm, the biological control of the Cassava Mealybug and the biological control of the Cassava green mite. He mentioned that the preventive measures for COVID-19 are basically same as those for the prevention of transboundary pests.

The main modes of pathogen dispersion include natural and human activities.

The management approaches of transboundary pests include:

- Surveillance and early warning;
- Pesticides options;
- Biological control;
- Cultural and mechanical control;
- Host plant resistance;
- Quarantine, policy and regulation.

He presented IITA's innovations in diagnostics and surveillance with an example of the use of satellites and drones for the surveillance of the banana bunchy top disease.

Questions / discussions

- Participants wanted to know how the IITA technology could be transferred to member states

This technology like all other technologies developed by IITA is available and interested countries can contact and follow up with IITA on this.

- The proposals of standards to the IPPC should be risk based. Africa has lots of resource challenges (human and infrastructure), few border staff etc, thus priority should be given to commodities that are high in risk;
- Senegal succeeded in the use of drones for the application of pesticides this year. Drones help reduce waste and over-application of pesticides, thus protect the environment;
- African countries should not relent efforts in transposing and updating existing regulations to be aligned with phytosanitary standards;
- Chad complained that the country has problems with the implementation of standards because of the lack of a standards committee. Internet connection is a challenge as well in accessing the online commenting system (OCS);
- At the level of ECOWAS a pest list is released in a timely manner that reflects the pest lists of member countries; however, there is still a strong need for capacity building when it comes to diagnostics;
- Africans must also be very strict and request for pest list when products are imported into the countries;

Day five

This started with a recap of day 4 and then recommendations of the workshop.

6. WORKSHOP RECOMMENDATIONS

The session on recommendations was moderated by Mr Nana of the AU-IAPSC. He presented recommendations that were captured during the workshop, and they were discussed and amended by participants. At the end of the workshop, the following recommendations to member states, stakeholders and IAPSC were adopted by participants;

a) Member States:

1. Member State should better recognize the contribution of IPM to sustainable agriculture and consider integrated and sustainable crop production and the pertinent drivers for sustainable agriculture in all systems. Therefore, they should put the infrastructure in place to facilitate the adoption and implementation of IPM.

2. Member States should develop indicators and ways to measure implementation and impacts of IPM.
3. Each member state should set up a standards committee which can identify phytosanitary challenges at country levels and propose topics for submission into new standards.
4. Member States should carry-out IPM-communication activities.

b) Stakeholders (CABI, ECIPE, FAO, IITA)

5. Stakeholders should carry-out research on and contribute actively to the adoption of the entire IPM system in the continent and communicate on the benefits of IPM and sustainable agriculture.
6. Stakeholders should undertake environmental performance evaluation of pesticides usage and other IPM tools develop or support demonstration plots/farms and investigate better options for research funding on IPM and share experiences.
7. Research institutions such as IITA and ICIPE should create platforms for the transfer of technologies on surveillance, monitoring and diagnostics to Member States for better management of migratory and trans-boundary pests.

C) AU-IAPSC

8. IAPSC should encourage / support African countries and Regional Economic Communities to strengthen their capacity on IPM and migratory and trans-boundary pests management and to implement the recommendations made by the workshop participants to Member States and stakeholders (**see above**).

Closing remarks

Dr. Jean Gerard Mezui M'Ella, director AU-IAPSC thanked all participants for attending these workshops. He appreciated the presence of member states who have been committed in attending workshops despite the COVID-19 pandemic. He pledged the support of AU-IAPSC and its commitment to support African Member States in towards improving safe agricultural trade especially with the upcoming African Free Continental Trade Agreement.