Pesticide Discussion Forum Summary Digest

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Environmental effects of chemical control of migratory pests

In almost all of Africa, in large parts of Asia and the Americas, migratory pests such as locusts, granivorous birds and armyworm occur. They distinguish themselves from other pests by the limited predictability of the place where they occur and the extreme damage they can do. The impacts of chemical locust and Fall armyworm control have been relatively well researched. This contrasts with bird control where environmental data are quite limited, and only locally well documented. Important here are the negative effects of treatments using organophosphates on fish, reptiles and raptors, vertebrate scavengers and non-target granivorous birds. Discussion Forum members explored these issues by addressing three questions.

About the Presenter

James Everts has been a research worker and teacher of ecotoxicology at the Wageningen University (Netherlands) for 14 years. He worked during 15 years for FAO in West Africa on capacity building projects related to the environmental safeguards in Locust control and pesticide use in crops in general.

Disclaimer

Disclaimer: The information below represents the **opinions** of members participating from different countries expressed during the discussion.

Question 1: Provide examples of control programmes for migratory pests (e.g. birds, locusts, FAW) in your country or the country you work in? What measures are put in place in these programmes to reduce negative impacts on the environment, workers' health and exposed community's health?

Country	Control programmes for migratory pests	Measures put in place to reduce negative impacts
UGANDA	**Chemical control:** Fenitrothion 96% ULV has been used on locust out break control. Pesticides have been used for the recent invasion. Appropriate PPE's should be provided. We do capacity building to equip farmers and extension staff's knowledge and skills to clearly identify and effectively control migratory pests. **Biological control**: Biological control: Monitoring and forecasting using pheromone traps, surveillance reports especially for FAW. Programmes that uses entomopathogenic fungus commercially available as Green Muscle to control locusts and grasshoppers.	Appropriate PPE's should be provided. We do capacity building to equip farmers and extension staff's knowledge and skills to clearly identify and effectively control migratory pests.
ESWATINI	**Chemical control:** When there are FAW incidences (usually not very severe and managed as they emerge), the Ministry of Agriculture recommends that pesticides be used as a last resort. . In case a farmer notices the presence of the pest they are advised to create a 2m boundary in the direction of the movement of the pest to limit the damage. Molecular identification of the invasive strain was used to identify the strain.	The Ministry rolls out awareness raising programmes for farmers, train them on early detection and on cultural methods. Pesticide use: farmers are trained on PPE and how to properly spray pesticides. A list of recommended pesticides is given to avoid the usage of HHPs.
SOUTH AFRICA	**Chemical control:** With chemical methods use of insecticides like carbamates, organophosphates. **Biological control:** IPM is being implemented. Integrated pest control methods are used including genetic modification, use of pheromones as warning signals.	The teams applying the pesticides are provided with PPE and the communities are notified when the spraying will occur.
BELIZE	**Biological control:** There are programmes like the Regional Pink Hibiscus Mealybug Project operated by the International Regional Organization for Health in Agriculture (OIRSA) and the Belize Agricultural Health Authority (BAHA) that reproducing thousands of its biological control agents to be released in the fields to alleviate the levels of infestation.	None provided.
MALAWI	**Control:** Cases of migratory pests are not common. When they do occur especially with African armyworms and locusts, the Department of Crops takes charge. I understand they have a task force, which works with the military, and Department of Disaster Management.	Extension workers are mobilized to alert locals in affected areas to stay in doors during spraying
TANZANIA	**Chemical and biological control:** Birds (e.g. Quelea quelea): use of avicides to destroy bird's breeding sites and control massive of bird pests invading crops. Locust: use of synthetic insecticides to control nymph in the sites of reproduction and adult locusts on crops by both ground and aerial sprays. Fall armyworms: use of synthetic insecticides, biocontrol methods such as biopesticides (Microbials, Macrobials, botanicals and semiochemchicals) by ground and aerial sprays.	Encourage good agricultural practices, the use of biopesticides and Integrated pest management strategies (Crop rotation, use of repellant crops, use of crop resistant varieties if available and insecticides with low toxicity).
TOGO	**Control:** The fight is done by the Ministry of Agriculture through the Plant Protection Directorate. Togo is supported by the FAO and the African development bank (especially north of Togo). Free distribution to farmer's victims of attacks, insecticides, phytosanitary treatment devices.	Personal protective equipment.
ZIMBABWE	**Control:** Programmes exist for the red locusts, quelea birds and fall armyworm. Quelea birds are being controlled through aerial and ground spraying. The control of quelea birds and red locusts involves aerial spraying with pesticides. Aerial spraying covers large tracks of land, including non-targeted areas.	Workers involved in ground application of pesticides are well protected, although the PPE may not be sufficient. Aerial spraying is done away from nearby communities. Where there is proximity of communities, ground spraying is conducted.

Question 2: Does your country or the country you work in have a warning system for migratory pests (e.g., bird and locust)? What are your thoughts on its effectiveness?

Zambia: Zambia has an early warning system for migratory pest such as red locusts. It is very effective as there is a dedicated team that deals with out breaks and ensures control measures such as spraying is done.

Nigeria: The Ministry of Agriculture, Nigeria in Collaboration with FAO are working on a Technical Cooperation Project, to train some strategically located states in Nigeria in early detections and control of FAW. Another project is developing an IPM and Biorational Program for Control and Containment of the Invasive Pest of Tomato.

Tanzania: Yes, there is a warning system for migratory pests such as birds, locusts and FAW. The plant health services under the Ministry of Agriculture conducting mapping by collecting data from the agricultural extension officers located in different regions of the country.

Uganda: Internally early warning systems depend on the previous history of invasion, local population observations surveillances and reports. Externally, Uganda is a member of Desert Locust Control Organisation of Eastern Africa. This system is very effective on pests like FAW, Quelea birds and locusts. The warning system in Tanzania is not effective due to inadequate capacity of the Agricultural extension officers on the knowledge of pests identification.

Zimbabwe: Yes, through the Civil Protection Unit. It is fairly effective but poorly equipped, therefore not that effective on reaction and control of the Migratory pests. Farmers monitor and inform local extension workers if migratory pests are sighted. Local Extension workers raise alarm through their district offices until a national response is instituted. It is effective in detecting the emergency of migratory pests.

South Africa: Warning systems in place are at regional level where there is cross border liaison. Weekly the number of locust targets to be controlled with locality data is received from locust officers of the National Department of Agriculture. The intensity of control actions is then mapped onto a quarter-degree grid. Data is incorporated into a geographic information system (GIS) for use as a locust outbreak Early Warning System. The system is effective, the relevant stakeholders get the information on time to tackle the problem.

Belize: Regional Organization for Health in Agriculture and the Belize Agricultural Health Authority are the organizations/institution that work collaboratively on phytosanitary measures for the country. The plant health department of the BAHA carries out surveys using GPS and GIS technology for endemic and regulated pests organisms to update the existing database and for early detection for rapid pest control response. However, it takes too much time.

Malawi: For African armyworms, the warning system we rely on is the Media (read newspaper, TV news). It is effective to some extent, that it gives people information quicker.

Togo: Yes within the Ministry of Agriculture, more precisely the Plant Protection Directorate. However, the big question is if it's functional.

Eswatini: A good distribution of pheromone traps are undertaken in all four regions of the country to effect network of an early warning system for out-breaks of armyworms. The Ministry of Agriculture usually conduct workshops for pheromone traps operators, on Army-worm and other migratory pests.

Question 3: What do you think is the role of Eco-toxicological monitoring important especially in relation to equipping services with specially trained agents? What other organizations should be involved in migratory pest control to reduce negative environmental and health risks and why?

ROLE OF ECO-TOXICOLOGY:

EVALUATION AND CONTROL:
Evaluate results of environmental impact assessment and make recommendations to the national pest control team onesticides to be used in the control programme in terms of efficacies, doserates.

PROTECTING THE ENVIRONMENT
Focuses on toxic substances, how they affect species and ecosystems. This is important for the sound management of water quality, by protecting water sources. Ecotoxicological monitoring helps find remedial measures to mitigate harmful effects of chemical treatments.

CONTROL OF MIGRATORY PEST
To reduce the use of harmful pesticides.

STAKEHOLDERS

MULTISECTORIAL GOVERNMENT DEPARTMENTS
Environmental specialists, Plant Health ministry, Department of Agriculture, Labour Department.

ACADEMIA AND RESEARCHERS
To conduct experiments on how to avoid invasive pests.

PESTICIDE INDURSTRIES
Environmentally less harmful and more selective active ingredients.

LAND USERS AND FARMERS
Should be the front runners in the control of these pests and not the government alone.

FAO
Provide guidance on quality, efficacy and selectivity of pesticides; develop IPM and biological control methods, be an international early warning systems, train on environmental health and safety of controls. Financial resources and subcontracting capacity.

ROLE OF ECO-TOXICOLOGY:

TRAINING
Ecotoxicological monitoring as well as training of personnel is very important to any programme established by a country.

ASSIST PESTICIDE RISK MANAGERS
To develop targeted risk management strategies. It is important to equip the trained agents in a way that they would know the risks associated with exposure and the control options available.

METHODS:
To be able to qauntify and measure ecotoxicological effects in the field and in the lab, as well as methods for estimating, predicting, and modelling.

Resources:

Resources and Further Reading

1. Alert: Brown locust outbreak in SA. https://www.agriorbit.com/alert-brown-locust-outbreak-in-south-africa/
2. Five million quelea quelea birds killed in Tanzania. https://thetimesofafrica.com/five-million-quelea-quelea-birds-killed-in-tanzania/
3. https://www.pressreader.com/south-africa/landbouweekblad/20200409/282806423414592
4. Early warning systems and training for improved quelea bird management in eastern and southern Africa.https://assets.publishing.service.gov.uk/media/57a08c3ae5274a31e00010a0/R8426_FTR.pdf
5. International red locust control organisation for central and southern Africa (IRLCO-CSA0 January 2019 (Attached to email notification).

6. CROP PROTECTION PROGRAMME: Quelea birds in Southern Africa: protocols for environmental assessment of control and models for breeding forecasts. https://assets.publishing.service.gov.uk/media/57a08c82ed915d3cfd00142c/R8314_FTR.pdf
7. Desert Locust Guidelines 6. Safety and environmental precautions. http://www.fao.org/ag/locusts/oldsite/PDFs/DLG6e.pdf
8. http://www.fao.org/ag/locusts/common/ecg/812_en_FightingDLsafelyE.pdf

Questions and themes that emerged from the discussion needing to be addressed

Question: Have there been any efforts to unify relevant stakeholders to address migratory pest control? Did this face challenges? What were these and were there solutions?

Answer: No current info is forthcoming on this and this is an area for future research.

Disclaimer

Disclaimer: The views and opinions expressed in this document shall not necessarily be taken to reflect the official opinion of the DEH, UCT, SIDA or KemI.

The **Division of Environmental Health** (DEH) Pesticide Discussion Forum is a bi-monthly online seminar for pesticide regulators and resource persons, as well as students in the Post-Graduate Diploma in Pesticide Risk Management (DPRM). Our aim is to provide support for managing pesticide risks and implementing risk reduction strategies. DEH is based in the School of Public Health and Family Medicine at the University of Cape Town (UCT).
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