



Pesticide Discussion Forum Summary Digest

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Drones in Pesticide Application

The Organisation for Economic Co-operation and Development (OECD) Working Party on Pesticides Drones subgroup is undertaking work that will enable regulatory authorities to assess the risks of applying pesticides by drone. An important aspect of evaluating the risks is understanding and promoting working practices of those planning and carrying out the application of the pesticides. An industry task force has developed draft best management practice (BMP) guidelines setting out suggested working practices. The presenter for this discussion, Grant Stark, from the UK Health & Safety Executive and chair of the OECD subgroup, gave us an update on current work to help assess the risks associated with drone spraying, and led a discussion on the draft best management practice guidelines.

BMP guidelines are being created to facilitate the safe adoption of drone technology in pesticide spraying. They will help users understand and mitigate potential human and environmental risks that may arise from the use of this technology. A key issue is managing exposures that may result from pesticide drift – this can occur when droplets or particles of the chemical being applied move through the air and can spread to unintended areas. Factors including drone speed/height, wind, precipitation, drone configuration, nozzle selection and the pesticide itself can all influence the amount and impact of drift when applying pesticides by drone. Work being done as a result of the OECD subgroup's work investigates these aspects and is attempting to establish models to estimate drift curves under various conditions. Additional work is also investigating various potential operator-related exposures.

During the session, the BMP draft guidelines were discussed, with conversation around its usefulness in various contexts, and the environmental concerns and local key issues the BMP could address. The discussion also looked at how well the information in the BMP was presented, whether the language was accessible, and if it could be relevant and useful to users in different countries. The contextual relevance of BMP guidelines was brought up by a few participants, where the concern was that climate and weather patterns may vary greatly regionally, impacting how useful the BMP could be. Many participants noted that their respective countries did not have regulations specific to drone use and that the BMP could be useful in addressing this gap. Human health exposure issues resulting from spray drift were a major concern for many participants, especially as many farms are very close to residents. Another important point brought up during the discussion was that as technology evolves, the guidelines would potentially have to change accordingly.

This document is a summary of the University of Cape Town's Division of Environmental Health's Pesticide Community of Practice held on the 8th of June 2023, titled: "Drones in Pesticide Spraying". This digest presents the issues and points raised and the information shared by participants in response to three questions prepared by the presenter, Grant Stark. A total of 90 participants joined the live discussion and 2 individuals blogged their responses. Of the participants, 59% were from Africa, 11% were from Latin America and the Caribbean, 10% were from Europe, 6% were from the Asian Pacific, 3% from Central America, 15 from the Middle East, and 10% from other regions. 49% of participants were from government sectors, 19% from academia, 14% from industry, and 13% from NGOs.

About the Presenter



Grant Stark is the head of the evidence committees and new technologies team in the Chemicals Regulation Division of the United Kingdom Health and Safety Executive. He has worked in a variety of roles related to pesticide regulation for almost thirty years: preparing authorisation documentation; setting maximum residue levels in foodstuffs and arranging monitoring programmes; and promoting more sustainable use of these chemicals. His current role includes the regulation of new technologies. Grant is chair of an OECD subgroup that is currently developing guidance for regulatory authorities on how to assess human and environmental risks arising from the application of pesticides by drone.

DISCLAIMER: The information below represents the opinions of members participating from different countries expressed during the discussion and shall not necessarily be taken to reflect the official opinion of the DEH, UCT or Keml.

PRESENTED BELOW ARE THE THREE QUESTIONS AND RESULTING DISCUSSION INPUTS FROM PARTICIPANTS:

Question 1: What are the key topics and challenges associated with drone spraying in your country that best management practices can help address?

Regulations
<ul style="list-style-type: none"> ➤ Lack of/weak regulations ➤ Lack of control and/or enforcement ➤ Best management practices can help operators adhere to safety guidelines and regulatory requirements
Human Factors
<ul style="list-style-type: none"> ➤ Low uptake (willingness, knowledge) ➤ Safety concerns and risk mitigation ➤ Concerns of exposure during cleaning, spraying ➤ Help operators adhere to safety guidelines and regulatory requirements
Pesticide Factors
<ul style="list-style-type: none"> ➤ Product labelling ➤ Drone application needs to be registered on the pesticide label as a method of use (South Africa only has one, which can only spray one crop in southern KZN legally). Chemical companies would then have to apply for label amendments
Environmental Factors
<ul style="list-style-type: none"> ➤ Environmental risk mitigation ➤ Understanding the area that can be covered by drone spraying ➤ Means/methods to assess the impacts ➤ Addressing variability of conditions (e.g. wind, temperature) ➤ Controlling drift, especially as farms are often close to residents
Drone Factors
<ul style="list-style-type: none"> ➤ To ensure that the system is efficient, standardised, and adequately maintained, thereby reducing downtime, and improving productivity ➤ Flight height ➤ Use of appropriate nozzles

Question 2: What do you see are the specific environmental risks that arise from drone spraying compared to other methods of application?

Drift
<ul style="list-style-type: none"> ➤ Drift is possibly reduced but still a noteworthy risk

<ul style="list-style-type: none"> ○ Increases the effect that pesticides might have on other organisms ○ Significant exposure to non-targets ➤ Buffer zones are not always indicated on pesticide labels ➤ Specifications for buffer zones are not applicable to tropical zones and will need to be revised for different climates due to heat and inversion layers, such as in Africa and South America
Pollution
<ul style="list-style-type: none"> ➤ Air pollution ➤ Noise pollution <ul style="list-style-type: none"> ○ Buzzing sound can stress wildlife, humans, and livestock ➤ Spray droplets might be bigger and not stick to the crop leaves, dropping down into the soil and leading to soil pollution
Pesticide Product Issues
<ul style="list-style-type: none"> ➤ Possible higher product concentration ➤ Overapplication of product – how good is monitoring of application ➤ Potential for overuse of pesticides, ultimately negatively impacting the environment
Technology Issues
<ul style="list-style-type: none"> ➤ Technology/equipment failure or pilot error <ul style="list-style-type: none"> ○ Can result in spills or unintended release of pesticides ➤ Off-target spraying <ul style="list-style-type: none"> ○ Potential to miss the target ○ Can easily be blown off course by wind, increasing the risk of pesticides drifting off-target ○ Drones can accidentally spray non-target species, such as insects and beneficial plant species, which can have knock-on effects on entire ecosystems ➤ Drone operator mistakes could cause significant damage ➤ No standards on the technical specifications of drones to minimise drift/address other challenges
General
<ul style="list-style-type: none"> ➤ Unstable weather conditions ➤ Gaps in stewardship systems/best management practices in countries with less robust regulatory systems, in general, presents challenges in risk management. ➤ Current pesticide regulations do not make provision for the use of drones when applying pesticides. Only aerial spraying is currently regulated in many countries

Question 3: What guidance is currently available to users of pesticide products in your country on the importance of, and how to conduct, calibration of pesticide application equipment?

Lesotho	
➤ No guidance	
South Africa	
➤ Calibration of pesticide spraying is taught in courses for the registration of a Pest Control Officer in South Africa to legally apply pesticides BUT does not include calibration for drones	➤ An equipment calibration handbook is published by the Department of Agriculture, Land Reform and Rural Development
Nigeria	
➤ The National Agency for Food and Drug Administration and Control provides guidance to users of pesticide products on the importance of, and how to conduct, calibration of pesticide application equipment through various means	➤ Not a lot of guidance on calibration specific to drones
Zambia	

➤ In Zambia, calibration of pesticide application equipment is guided by the Weights and Measures Agency. However, drones, and particularly for use in pesticides, is quite new but being used	➤ Training for use of spray equipment including calibration, but not for drones
Kenya	
➤ No specific guidelines on calibration	
Canada	
➤ There are rules regarding license of drone operators, pesticide application certificates, and rules for each product	
Tanzania	
➤ The calibration of pesticide equipment is regulated by Tanzania Plant Health and Pesticide Authority, though drones are not yet included in the existing regulations	

Additional: Are drones being used for pesticide application in your country, and does your country have guidelines or regulations specific to this purpose?

Drone Use for Pesticide Application	Regulations
Zimbabwe	
➤ Minimal but on the rise	➤ Drone use requires a licence from the Civil Aviation Authority
South Africa	
➤ Currently in use, but not widely	<ul style="list-style-type: none"> ➤ Civil aviation regulations and laws govern the use of unmanned aerial vehicles ➤ Current pesticide regulations do not specifically relate to drone use
Zambia	
<ul style="list-style-type: none"> ➤ Drone use has not been embraced by farmers ➤ High costs of drones as a key reason 	<ul style="list-style-type: none"> ➤ Drone use requires a licence from the Civil Aviation Authority ➤ Also requires a licence from the Zambia Environmental Management Agency for Aerial Spraying of Chemicals
Uganda	
➤ Drones have been shown to be effective for pesticide spraying in Uganda especially for fall armyworm	
Ethiopia	
<ul style="list-style-type: none"> ➤ No ➤ Has been used once in locust control 	
Kenya	
➤ Unsure	➤ Pest Control Products Board regulates all pesticides products, providing guidelines on application of pesticides using drones or other technologies
Nigeria	
➤ No	➤ No clear regulations

	➤ Will take a lot of capacity building to be able to properly manage drones for agriculture in Nigeria
Lesotho	
➤ No ➤ Not much technological advancement in agriculture	➤ No explicit regulations on drone use from the Civil Aviation Department
Sri Lanka	
➤ Drone use still in its infancy	
Tanzania	
➤ Uncommon but has been used on sugarcane	➤ Civil Aviation Authority manages drone operator licences
Malawi	
➤ Very little but has been used on small-scale sugarcane farms	
Madagascar	
➤ No	
Gabon	
➤ No	
Europe	
➤ Used on grapes	➤ Aerial spraying in the European Union is generally prohibited (with very limited and strict exemptions) and the pesticides used must be explicitly approved for aerial spraying following a specific assessment addressing risks from aerial spraying
Canada	
➤ In use	➤ There are rules regarding licences of drone operators and pesticide application certificates, and special rules for each product

RESOURCE LIST

1. Draft Best Management Practice guidelines
<https://docs.google.com/document/d/1fWyYoxf1OjvDjPet7dwQrvLHEI1apwIW/edit?usp=sharing&oid=109143694485858046835&rtpof=true&sd=true>
2. OECD (2021), Report on the State of the Knowledge – Literature Review on Unmanned Aerial Spray Systems in Agriculture, OECD Series on Pesticides, No. 105, OECD Publishing, Paris
<https://www.oecd.org/chemicalsafety/pesticides-biocides/literature-review-on-unmanned-aerial-spray-systems-in-agriculture.pdf>

If you are not a member, we invite you to join UCT's Pesticide Discussion Forum:

<https://forms.gle/NzYH5REfUruL3jdm6>

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 postgraduate Professional Masters in Chemical Risk Management (MCRM) and Diploma in Pesticide Risk Management (DPRM). Our aim is to provide support for managing pesticide risks and implementing risk reduction strategies.

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