Division of Environmental Health | UCT

School of Public Health
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Sweden
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UCT PESTICIDE NETWORK DISCUSSION FORUM

2024
DIGEST COMPILATION

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CONTENTS

Acknowledgement: Financial assistance from the Swedish International Development Cooperation Agency (SIDA) has been arranged by the Swedish Chemicals Agency (KemI)

INTRODUCTION TO THE PESTICIDE NETWORK

The University of Cape Town's Pesticide Network (PN) includes an online forum, the Pesticide Discussion Forum (PDF), a Community of Practice established in 2009 for stakeholders and other individuals working with or interested in pesticides, such as regulators, resource persons, non-government organisations (NGOs), intergovernmental organisations (IGOs), academics, industry, and others working in the field. The PN is run by the Division of Environmental Health (DEH) in the School of Public Health at the University of Cape Town (UCT), South Africa.

The PN aims to provide a platform for a diverse community to exchange knowledge and information on the different aspects of managing pesticide risks, preventing risks, and implementing risk reduction strategies. The intention is to promote a toxic-free environment to protect the health of all, in particular, vulnerable populations (e.g., women, children, and farmworkers). It also aims to encourage in-depth discussions of a broad range of issues regarding health, the environment, labour, policy, and emerging issues (e.g., drones and RNAi pesticides), particularly to promote effective pesticide regulation in low- and middle-income countries (LMICs). Discussions are hosted online, not as webinars but rather as an engaging online platform which participants join to listen to presentations from global experts, regulators, and key stakeholders, and then respond to questions and polls.

MEMBER STATISTICS

At the end of 2024, the UCT Pesticide Network had an overall active membership of 740 people, 90 of whom joined in 2024. Members represent various sectors including government, academia, non-governmental organisations, intergovernmental organisations, and industry. Just over a third of members represent the government sector, and nearly two thirds are from Africa.

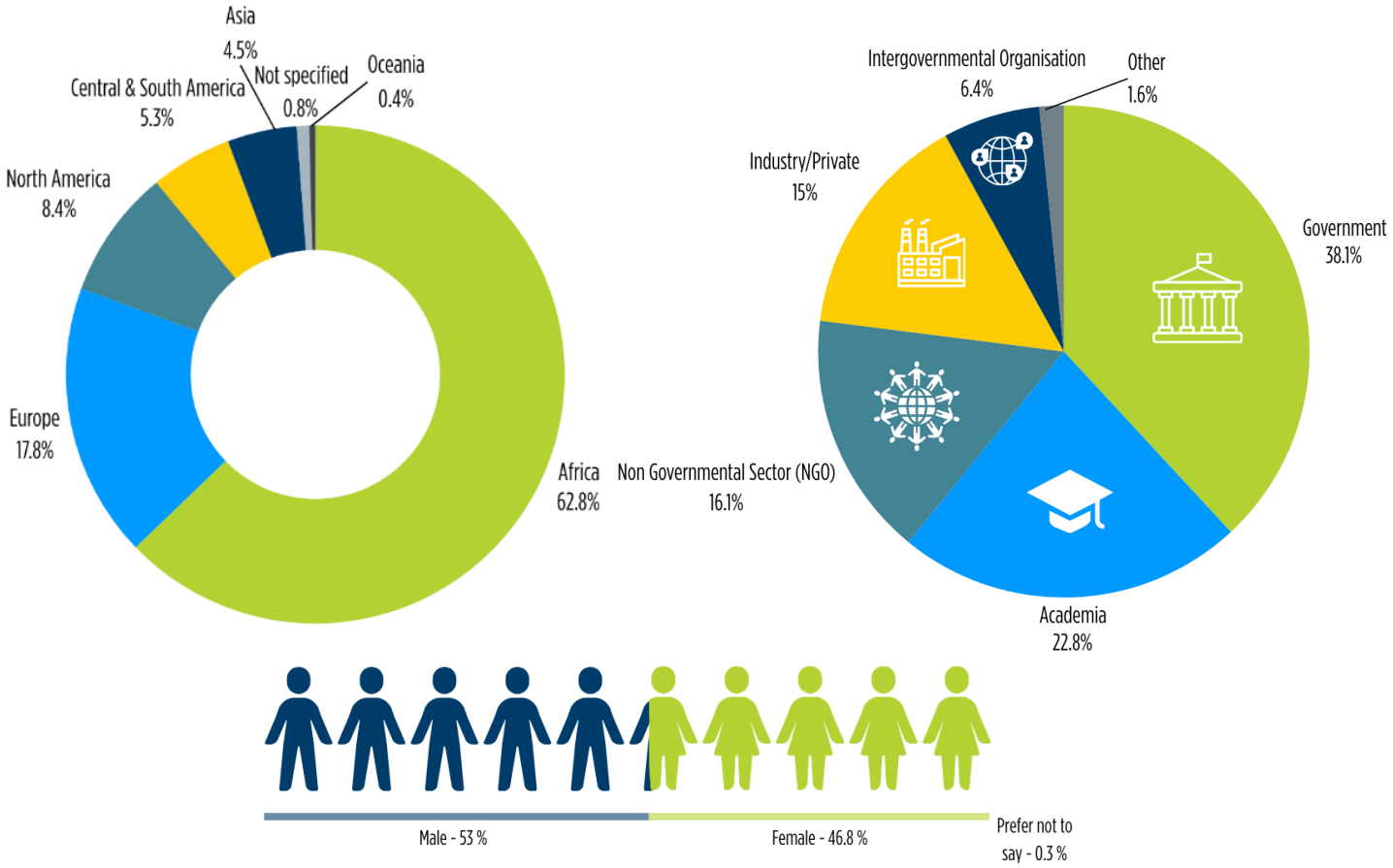


Table 1: Pesticide Network Membership Breakdown as of December 2024 (n = 740)

Category	*Sub-Category*	*%*
Gender	Female	46,8
	Male	53,0
	Other/not specified	0,3
Sector	Government	38,1
	Academia	22,8
	Non-Governmental Organisation	16,1
	Industry/Private	15,0
	Intergovernmental Organisation	6,4
	Other	1,6
Region	Africa	62,8
	Europe	17,8
	North America	8,4
	Asia	4,5
	Central & South America	5,3
	Oceania	0,4
	Not specified	0,8

PDF Discussion Schedule of 2024

The PDF hosted 6 online discussions between February and November 2024, and summary digests were produced and disseminated after each discussion. This document is a compilation of these digests. To view the different digests from 2024, refer to the table of contents. For all other documents, previous discussion digests, recordings, and slides, and previous PN newsletter issues, visit the UCT Environmental Health Projects website here.

TABLE 2: Pesticide Network Discussion Schedule of 2024

#	*DATE*	*TITLE*	*PRESENTERS*	*# ATTENDED*
1	07 Mar	Implementing Pesticide Alternatives in Urban and Agricultural Contexts	**Silke Bollmohr** (EcoTrac Consulting/INKOTA) **Stephanie Williamson** (Pesticide Action Network United Kingdom) **Alexander Stuart** (Pesticide Action Network United Kingdom)	74
2	24 Apr	RNA Interference-Based Pesticides (RNAi): Exploring gene-silencing pesticides, their benefits & concerns	**Jack Heinemann** (University of Canterbury) **Magda Sachana** (Organisation for Economic Co-operation and Development)	54
3	23 May	Mechanisms for Preventing the Illegal Pesticides Trade	**Rorisang Mantutle** (Ministry of Agriculture, Food Security & Nutrition, Lesotho) **D'Arcy Quinn** (CropLife International) **Bill Garthwaite** (United Nations Food & Agriculture Organization)	89
4	18 Jul	Addressing Vector Control Challenges Including DDT Use	**Professor Basil Brooke** (National Institute for Communicable Diseases & South African Malaria Elimination Committee) **Chadwick Sikaala** (SADC Malaria Elimination 8 Secretariat) **Dr Nosiku Munyinda** (SADC Elimination 8 Technical Working Group & University of Zambia)	95
5	12 Sep	Understanding & Implementing the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide	**Dr Piumee Bandara** (World Health Organization) **Dr Cindy Stephen** (Poisons Information Centre, Red Cross Children's Hospital) **Debbie Muir** (Department of Forestry, Fisheries and the Environment, South Africa)	65
6	24 Oct	Options for Reducing Risk When Phasing Out Pesticides	**Andrea Rother** (UCT) **David Kapindula** (Independent Consultant, Senior Advisor for Africa Region MEAs, and Former Pesticides Registrar (ZEMA) Zambia) **Helena Casabona** (Kemi)	109

Implementing Pesticide Alternatives in Urban and Agricultural Contexts

Issue 1 of 2024
Discussion: 07 Mar 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 7th of March 2024, titled 'Implementing Pesticide Alternatives in Urban and Agricultural Contexts'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to three questions prepared by the presenters:

- **Silke Bollmohr** (EcoTrac Consulting/INKOTA)
- **Stephanie Williamson** (Pesticide Action Network United Kingdom – PAN UK)
- **Alexander Stuart** (Pesticide Action Network United Kingdom)

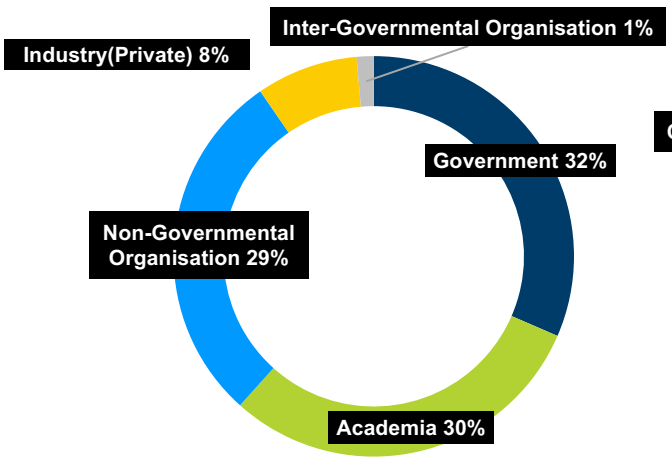
Silke described the concept of systems thinking, as it relates it to pesticide alternatives. Farming should be considered as a whole system, part of nature, understanding all parts are interconnected. In permaculture, a concept which incorporates systems thinking, the emphasis is on holistic design principles, focussing on natural pest control methods, with the goal of a self-sustaining system.

Stephanie talked about a PAN UK project aimed at reducing the high and unsustainable use of highly hazardous pesticides (HHPs) around Ziway Lake in Ethiopia. This included a "food spray" technique, which builds up natural biological control, and integrated pest management (IPM), empowering farmers to utilise agroecological practices on their farms.

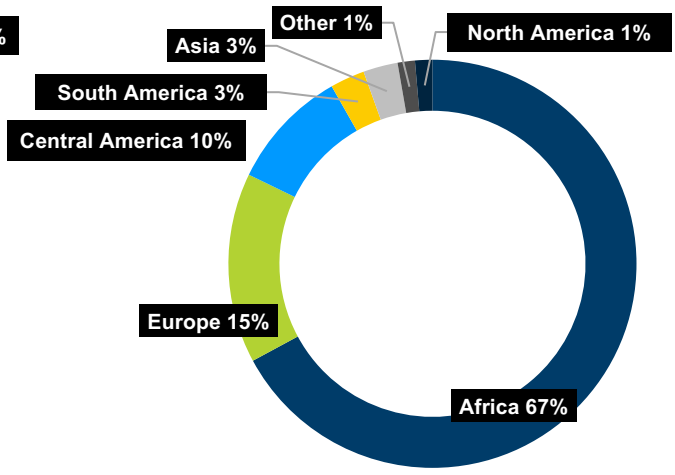
Alex discussed rodent control, explaining that the majority of chemical rodenticides are HHPs, with rodents becoming increasingly resistant to many of them. Reliance on chemicals alone is unlikely to achieve long-term control of rodent pests. Many alternatives exist, including cultural, control, and biological control methods. An integrated approach is most likely to be successful.

Breakdown of Discussion Participant Demographics

Regional Representation



Sectoral Representation

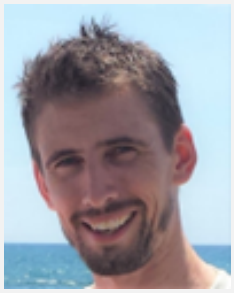


Total = 73 participants live, 4 responses posted on the Google Form

PRESENTERS

Dr Silke Bollmohr is an ecotoxicologist with a PhD in environmental science and specialised expertise in permaculture design. Throughout her diverse career spanning various sectors, she has contributed to pesticide risk assessment and mitigation efforts across multiple African nations. For the past decade, Dr. Bollmohr has operated her consultancy, EcoTrac Consulting, to advocate for evidence-based policies concerning pesticide risk assessment. Her role involves providing scientific guidance to shape advocacy strategies aimed at promoting sustainable agricultural practices and advocating for the restriction of Highly Hazardous Pesticides (HHPs) globally. Dedicated to community empowerment through permaculture design principles, Dr Bollmohr has conducted training sessions in regions facing agricultural challenges, including South Africa, Kenya, and Somalia, intending to reduce reliance on agrochemicals and promote sustainability. Dr Bollmohr also serves as a senior policy advisor for global agriculture at the INKOTA (INformation, KOordination, TAgungen) network in Berlin, advocating for the prohibition of HHPs and promoting agroecological approaches on a global scale.

Dr Stephanie Williamson trained as an ecologist/biologist, with a Master of Science in Integrated Pest Management (IPM) and a PhD on pesticide use and impacts on African smallholders. Stephanie was formerly at the Centre for Agriculture and Bioscience International (CABI) working on biological control and IPM training. She joined Pesticide Action Network UK in 2000. She has over 30 years of experience relating to pesticide issues and sustainable agriculture, working in Africa, Latin America, Asia, and Europe. Stephanie's work covers the promotion of ecologically informed alternatives to hazardous pesticides, pesticide policy assessment, and advising food and fibre sustainability standards and companies on strategies for pesticide use and risk reduction. Along with an extensive bibliography, she has written numerous training materials including modules for the postgraduate Diploma in Pesticide Risk Management run by University of Cape Town, South Africa.



Dr Alex Stuart is an agroecologist at Pesticide Action Network (PAN) United Kingdom (UK). He has over 10 years of experience conducting research and training in agroecology and sustainable crop management and conducted his PhD on rodent ecology and management. Before joining PAN, Alex worked at the International Rice Research Institute, based in the Philippines and Indonesia.

CONTRIBUTIONS FROM PARTICIPANTS

Disclaimer: The information in this digest represents the opinions of members participating from different stakeholder groups expressed during the discussion. The views expressed in this document do not necessarily represent the opinion or the stated policy of the Swedish Chemicals Agency (KemI) or DEH UCT, nor does citing trade names or commercial processes constitute an endorsement

The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
Have there been any efforts within your work/sector to shift away from reliance on pesticides? Give examples, including your sector and country in your response

Guyana

- There are several non-pesticide methods used to deal with pests, ranging from traps to natural repellents such as flowers and plants
- The sugar industry uses flood fallowing for 6 months (i.e. covering the fields with 12 inches of water). This helps nitrogen fixing in the soil, and weed control as a form of regenerative agriculture

South Africa

- In some workplaces, interior plants are cleaned and serviced frequently as a means of pest management by interior landscaping services. Bait stations, regularly serviced by pest control companies, are used for rodent control
- Vineyards use ducks to eat pests off vines. Ducks also produce fertiliser
- There is great interest in regenerative farming where farmers try to use more natural or organic means to protect their crops
- Research institutes conduct research and mass-rearing of biological control agents. Instead of using herbicides to control invasive plants, these institutes release viable agents. However, a challenge persists as many believe the process to be slow
- Efforts are common among backyard/subsistence farmers, but more challenging on a larger scale
- Biocontrol is used on invasive species like water hyacinth and cactus species to reduce the use of herbicides
- Industry: One company places significant emphasis on regenerative agriculture with growers. They are workshopping with growers, to implement a determination limit for all crops sold. The primary focus is on soil health, along with IPM programmes for each crop. Given the major challenge of pesticide resistance, there is a heavy focus on highlighting findings and driving biological alternatives

Malawi

- Biopesticides have been incorporated into the regulations. Guidelines for their registration (data requirements) are available but have not yet been adopted for use
- An IPM strategy has been developed and validated. This will help farmers reduce reliance on synthetic pesticides
- More than 16 farmer field school trainers, 700 agricultural staff, and 800 farmers have been trained on pesticide risk reduction strategies including IPM through the Food and Agriculture Organization (FAO) Pesticide Risk Reduction Project between 2017 and 2023

Burkina Faso

- Various initiatives and strategies are in place to find alternatives to pesticides. These include legislative and administrative measures, promoting cultivation practices such as crop rotation to reduce pesticide use, and employing biological control methods that utilise living organisms to combat pests
- In 2018, an "agroecology" focal point was appointed within the Ministry of Agriculture and, in 2022, the Burkina Faso government officially adopted a National Strategy for the Development of Agroecology, which provides a

reference framework for all stakeholders to synergise their efforts

Iran

- For some years back in the 20th Century various ecosystem services and applied ecology concepts (now known as agroecology) were used for IPM to control agricultural pests under Economic Injury Lines to reduce the use of agrochemicals

Zimbabwe

- Intercropping vegetables with plants, such as Mexican marigolds and garlic, to reduce insect pests and nematodes
- Conservation agriculture, or "pfumvudza", looks at natural mechanisms for plant protection including the removal of plant residues to prevent pest breeding
- An Italian company is in the process of registering biopesticides

Nigeria

- Integrated pest control has been utilised
- There has been permaculture design training for college students, mostly piloted by the private sector

Ethiopia

- Attempts for natural pest control based on plants

Tanzania

- IPM programmes

Madagascar

- There have been efforts to reduce reliance on pesticides, but information on the extent of these efforts is limited

Zambia

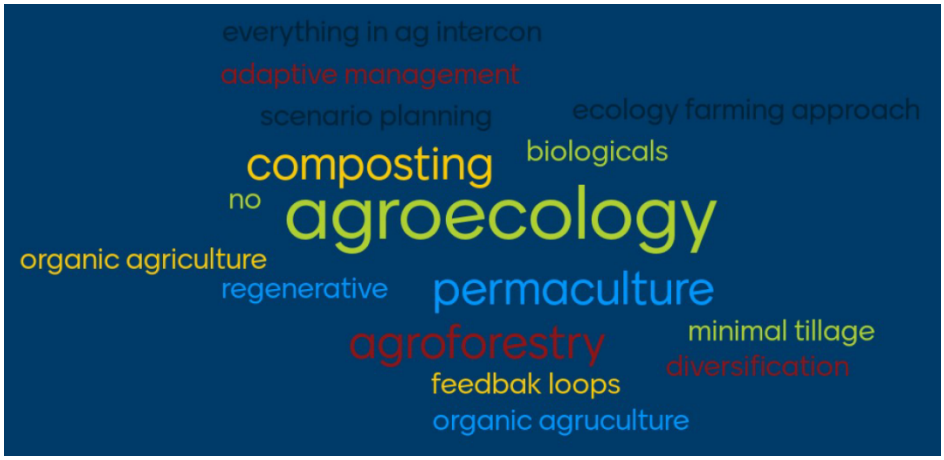
- There has been an effort from the Environmental Agency. An example is the provision for information on the risks of the use of pesticides, and the need to embrace alternatives

Switzerland

- At the policy level, no encouragement is given to farmers to consider other options

POLL RESULTS

POLL 1: What systems thinking approaches in agriculture are you familiar with?



POLL 2: Which permaculture principles do you already include in your efforts to shift away from reliance on pesticides?

Observe and interact	4
Apply self-regulation and accept feedback	3
Use and value diversity	6
Integrate rather than segregate	13

QUESTION 2
Describe what actions specific stakeholders* could take to enable farmers to benefit more from the pest control contribution by natural enemies? *e.g., pesticide regulators, policymakers, industry, non-government organisations, academics, and intergovernmental organisations

Regulators and policymakers

- Ensure farmers are informed about the advantages of natural pest predators
- Develop policies and regulations that promote the conservation and enhancement of natural predators. These may include incentives for adopting agroecological practices and restrictions on harmful pesticides
- Lobby for the necessary finances to implement natural control initiatives
- Limit harmful pesticides and promote biopesticides
- De-register/ban of Highly Hazardous Pesticides and publicise the effects of these pesticides

Government

- Conduct training and publicity to increase uptake. In KwaZulu-Natal, a province in South Africa, the Durban Metro has an Agroeconomic department which offers such training to small-scale farmers
- Ensure that capacity-building is a priority to inform farmers about new technologies
- Lower import tax for green alternatives, and implement high import tax implications for highly toxic pesticides
- Support research, documenting, and promotion of indigenous knowledge as a means of reducing dependence on pesticides
- Redirect subsidies towards biopesticides rather than traditional pesticides and fertilisers
- The Canadian Food Inspection Agency, along with other federal departments such as Pest Management Regulatory Agency, Agriculture and Agrifood Canada, and Natural Resources Canada, has established a regulatory and management framework for numerous parasitic and predatory organisms used as biological control agents. The effectiveness of these organisms in pest control may vary regionally, but a link is provided for further consideration: https://inspection.canada.ca/plant-health/invasive-species/biological-control-agents/eng/1514956211166/1514956212112

Farmers

- Learn how to use natural predators to control pests
- The transfer of knowledge from farmer to farmer has proven highly effective in adopting various methods
- Scale up the utilisation of proven effective alternatives

Industry

- Development of effective strains of natural predators and biodiversity-friendly products
- Ensure farmers are informed about alternatives to synthetic chemical representatives commonly found on farms

NGOs

- Help with training and capacity-building programs for farmers to identify and conserve natural predators on their farms/gardens
- Raise awareness and assist farmers in sustainable practices and the use of alternatives, while discouraging the use of pesticides
- Advocate for use of natural predators

Academia

- Conduct studies on the effectiveness of alternatives like natural predators that can easily be utilised by farmers
- Share knowledge to optimise the use of natural predators

IGOs

- Facilitate standardisation of practices and information-sharing

General

- Farmers and regulators may not be aware of alternative methods or may lack the knowledge to implement and regulate them effectively. Therefore, it is necessary to sensitise them with coordinated action from the Ministries of Environment, Health, and Agriculture

- Government departments and private entities can collaborate to share information through symposiums, thereby equipping professionals working in the same sector
- Agricultural Extension Officers, along with the responsible Ministries and pesticide authorities, should collaborate to raise awareness about non-chemical pesticide alternatives
- Stakeholders could collaborate to provide incentives for farmers who adopt integrated pest management practices. These could include training, research support, and policy frameworks that prioritise the conservation and enhancement of natural predators for effective pest control
- Promote IPM practices that prioritise the conservation of natural predators. This could involve providing training and resources to farmers on how to identify and protect beneficial insects, as well as creating incentives for farmers to adopt IPM strategies
- Create farmer field demonstration centres where farmers can observe the results of the alternatives used

POLL RESULTS

POLL 1: Which methods to encourage more natural enemies into crops have you heard of before?

Using food sprays to attract predators to crops	10
Leaving some natural vegetation at field edges	16
Sowing strips of flowering plants/crops within the field	12
Avoiding the use of insecticides which harm natural enemies	15
Providing perches for insect-feeding birds	5
On-farm or in-field rearing of native predatory insects or parasitic wasps	6
Adapting an agronomic practice to avoid disturbing/provide more food/shelter for natural enemies	8
Another method (explain in the chat)	1

POLL 2: How aware are agricultural extension staff in your country about natural enemies?

Fully aware, can identify the main groups and are actively working to encourage them in farmers' fields	2
Some awareness, can identify the best-known groups but knowledge mainly in theory, no practical experience	13
Very little or no awareness, do not appreciate their importance	6

QUESTION 3
In your country, what successful non-chemical techniques/methods have you come across to manage rodent pests in urban/domestic areas? Include your country in your response

Burkina Faso

- Trapping is a common technique where mechanical traps are set up to capture rodent pests. Natural predators are also used to manage their presence, and there has been experimentation with plant extracts as alternatives to pesticides in vegetable farming

Malawi

- Use of different methods including predators such as cats, traps which are placed in areas where rodents are active e.g. in storerooms, and sealing cracks and holes with cement to prevent their entry

South Africa

- The City of Cape Town has placed bait stations as a means of rodent control in the city
- Live-capture traps have been used in the country, but in rural areas and informal settlements glue traps have been used which are readily available in the streets
- Some keep cats as pets
- Sticky boards are used but might not be legal

Iran

- Rodent-proofing buildings by sealing cracks and holes
- Using traps such as snap traps or live traps to capture rodents
- Keeping food stored in rodent-proof containers and cleaning up spills promptly
- Removing clutter and debris that can provide hiding spots for rodents
- Using ultrasonic devices that emit sound waves to deter rodents

Guyana

- The use of sticky boards is widespread. Families tend to use these more as they are affordable and less toxic to use in households
- A campaign initiated a few years ago, which continues to this day, involves the chemical authority of Guyana conducting training sessions across different regions of the country. The aim is to raise awareness about the hazards associated with using illegal rodenticides
- Bird resting sticks are placed in sugar cane fields to control rodents

Germany

- A limited number of poster campaigns discourage the open disposal of rubbish or leftover food in open bins. These posters feature slogans such as "Don't feed rats" and provide information on the risks associated with discarding leftover food down toilets, as rats can gain access into households through swimming and diving
- An example of information on managing rats to the general public by the city of Kiel (Northern Germany): https://www.kiel.de/de/umwelt_verkehr/tiere/_dokumente_Ratten/Ratten_Flyer_web.pdf

Zambia

- Use of mechanical traps
- Keeping cats as natural predators
- Good sanitation
- Designing crop storage that discourages rodents

Madagascar

- Trapping using wire cages to capture rats alive

POLL RESULTS

POLL 1: Do you think rodents in urban/domestic areas are being successfully managed in your country?

Yes	2
No	14
Don't Know	1

POLL 2: What barriers are there to large-scale non-chemical rodent control?

- Resistance to non-chemical control methods: rodents may adapt to non-chemical control methods over time, reducing their effectiveness
- Lack of funding to implement large-scale non-chemical rodent control
- Lack of information for government departments implementing rodent control on non-toxic measures
- Education and institutional building
- Time-consuming and labour-intensive
- Poor governance is the main barrier
- Greater intent is required by municipalities
- In Uganda: lack of mass sensitisation on alternatives, ignorance, foreign influence, and lack of finance, access, and effectiveness
- Reliance on chemical methods, particularly by the government. An outbreak of rodents is handled by the

Ministry of Agriculture in Tanzania, but they always opt for chemical methods
- Lack of organised efforts, low level of awareness, and low level of knowledge
- Limited public awareness and education: many people are not aware of non-chemical rodent control methods or may not understand their effectiveness, leading to a lack of support for these measures
- People need to change their behaviour and the way they manage waste
- Government support in terms of providing proper sanitation and waste management practices is lacking, so most people resort to "effective" pesticides which seems to be the quickest method of eradicating pests
- Lack of information on chemical dangers and the benefits of non-chemical approaches, limited research, and neo-colonialism

RESOURCES

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If you are not already 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.

DEH is based in the School of Public Health at the University of Cape Town (UCT). environmentalhealth@uct.ac.za

This Digest was produced by: Natasha Lalloo | natasha.lalloo@uct.ac.za

Prof Andrea Rother | Forum Moderator | andrea.rother@uct.ac.za

Acknowledgement: *Financial assistance from the Swedish International Development Cooperation Agency (**SIDA**), has been arranged by the **Swedish Chemicals Agency (Kemi)***

RNA Interference-Based Pesticides (RNAi): Exploring gene-silencing pesticides, their benefits & concerns

Issue 2 of 2024
Discussion: 25 April 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 25th of April 2024, titled 'RNA Interference-Based Pesticides (RNAi): Exploring gene-silencing pesticides, their benefits & concerns'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to questions prepared by the presenters:

- **Jack Heinemann** (University of Canterbury)
- **Magda Sachana** (Organisation for Economic Co-operation and Development - OECD)

Magda introduced the session providing the historical context of how an OECD ad hoc Expert Group was established in 2015 out of the **need to answer regulatory questions around ribonucleic acid (RNA) interference-based (RNAi-based) pesticides.** This included issues around **whether or not current risk assessment approaches and existing data requirements are applicable**. She pointed out to the participants the one-stop OECD webpage that contains all the material and documents that the Expert Group has produced.

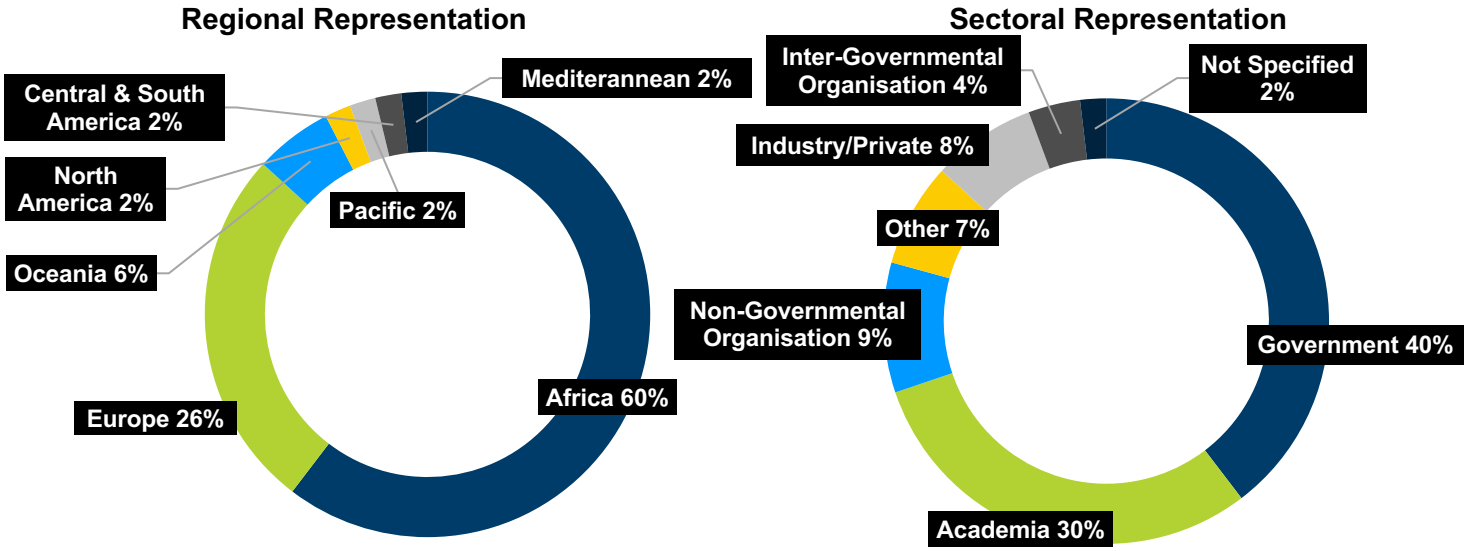
Jack described how RNAi-based pesticides work. The key molecule in these pesticides is the **highly stable double-stranded RNA** (dsRNA), which enters a target organism's cell following application, aided by a carrier, e.g. nanoparticles, viruses, and chemicals. RNAi causes gene silencing through either pre- or post-transcriptional processes. The former results in changes to deoxyribonucleic acid (DNA)that inhibit transcription of a gene and the latter results in changes to RNA that prevent production of protein. RNAi can create **smaller pieces of RNA, which may then produce secondary and tertiary RNA molecules which may independently induce RNA interference even though they do not share a sequence similarity with the original dsRNA**. Modified DNA in some cases can be **inherited** through cell division or reproduction. **Effects can vary** between organisms, species, and lineages, and in some cases **can last for an organism's lifetime and be inherited, sometimes for many generations**.

Jack also discussed mechanisms of action of RNAi-based pesticides that raise **concerns about off-target effects** (e.g., impacts on non-target organisms, unintended effects in target organisms, trophic transfer) and other issues from the use of RNAi-based pesticides. He explained the **difficulty of testing for and predicting both unintended and intended effects**.

The OECD released two consideration documents on environmental (2020) and human health (2023) risk assessment approaches for regulating RNAi-based pesticides. Magda discussed several key conclusions within these documents. She highlighted that although **government agencies should regulate RNAi-based pesticides using the experience acquired from registering chemical and biological pesticides, some specific considerations apply to these pesticides**. She explained the concerns around using bioinformatics in isolation without testing to assess

potential non-target effects. It was highlighted that vertebrates have protective mechanisms that may prevent the uptake of exogenous RNAs, but **specific product formulations or chemical modifications may be designed to overcome these barriers. The risk assessment should go beyond assessing only the active ingredients to include product safety as a whole**.

Breakdown of Discussion Participant Demographics



Total = 53 participants live, 4 responses posted on the Google Form

PRESENTERS

Jack Heinemann: Professor Heinemann currently works at the School of Biological Sciences, University of Canterbury, as director of the Centre for Integrated Research in Biosafety. He previously worked at the United States National Institutes of Health. He holds a Bachelor of Science with honours from the University of Wisconsin-Madison (1985); a PhD from the University of Oregon (1989) and is a fellow of the Higher Education Academy. He was on the United Nations (UN) Roster of Biosafety Experts (until 2009), and the Cartagena Protocol for Biosafety's Ad Hoc Technical Expert Group (2009-2016, 2020). Professor Heinemann is an author for the International Panel on Climate Change (6th report) on biotechnology for climate change mitigation and is an author for the United Nations International Assessment of Agricultural Science, Knowledge, and Technology for Development. He was an expert witness to the New Zealand High Court (gene technology) (2013-14) and the Employment Court (academic freedom) (2022-ongoing). He is also the proud mentor of many graduate students. His current research is on One Health, antimicrobial resistance in the environment, effective teaching practice, and biotechnology regulation and policy.

Magdalini Sachana: Dr Sachana has been a policy analyst within the Environment Health and Safety Division of the OECD's Environmental Directorate since 2015. She manages the development and implementation of policies in the field of chemical safety and contributes to the OECD Test Guidelines and the Pesticide and Hazard Assessment Programmes. Among other projects, Dr Sachana manages the OECD project on biological and RNAi-based pesticides. She is a trained veterinarian with a Master of Science in Biotechnology and a PhD in Toxicology.

CONTRIBUTIONS FROM PARTICIPANTS

Disclaimer: The information in this digest represents the opinions of members participating from different stakeholder groups expressed during the discussion. The views expressed in this document do not necessarily represent the opinion or the stated policy of the Swedish Chemicals Agency (KemI) or DEH UCT, nor does citing trade names or commercial processes constitute an endorsement

The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
What are your thoughts around RNAi-based pesticides? Are they a substitute for chemical pesticides?

Yes

- RNAi-based pesticides are a substitute for chemical pesticides
- They are a good substitute for chemical pesticides, considering human health and the environment
- RNAi-based pesticides are pesticides that target specific genes in pests. Because of this, they could be associated with having fewer negative externalities which essentially makes them a suitable substitute for chemical pesticides which often have negative effects on non-target organisms

Possibly/Maybe

- It's interesting to think that RNAi-based pesticides can target only the intended pests. This could very well be a good alternative to the traditional chemical pesticides
- They are promising, but more research needs to be done particularly bearing in mind our differing climatic conditions in Africa
- It is worth investigating RNAi-based pesticides further to substitute the use of chemical pesticides. More research especially on the specificity is needed
- There are areas that may need attention before scaling up such as the possibility of multiple targets and mutations

No/Unlikely

- They may be an expensive means of pest management for low and middle-income countries (LMICs) with the amount of research that has to be undertaken to understand their stability in African countries and to assist in sensitising adaptation to African people who are more used to conventional pesticides
- The limitations challenging greater adoption of RNAi based biopesticides include certain factors which influence efficacy. Effectiveness may be limited by the speed and persistence of pesticidal action as well as the significance of timing applications with respect to target pest life cycle and population dynamics

Other

- There are concerns surrounding RNAi-based pesticides, such as the potential for off-target effects and the development of resistance in pest populations
- This is a new approach, and we don't know much about it

Poll Questions

Poll 1. Have you ever heard of RNAi-based pesticides before this discussion?

Never heard of it	9
Have been approached about it	5
Have worked on regulating it	2
Have heard of it but have not needed to do any work on it	2

Poll 2. Regulating RNAi-based pesticides should be similar to:

Conventional chemical pesticides	0
Biological pesticides	8
Genetically modified organism	10
Something else (clarify in the chat)	3

QUESTION 2
What questions do you have in relation to RNAi-based pesticides, and/or to assessing their risks?

[Several of these questions were answered live (highlighted in grey) (recording here) or in the Q&A on page 6]

Assessments

- How are the approval assessments done regarding approval of these products especially in LMICs where capacity is considerably low?
- How can the off-target risks to humans, animals, and the environment possibly be tested or assessed, as there seems to be so many potential off-targets?
- Regarding predictability: dsRNA is quite stable as a compound but the effects on organisms (non-target also) are not necessarily predictable (e.g. abrasion effects and increasing exposure pathways). How will the regulatory framework deal with these unknowns? How do you do an adequate and robust risk assessment on these products?
- What methods can be used to assess the persistence and bioaccumulation of dsRNA molecules in the environment?
- How can long-term environmental impacts be assessed and mitigated?
- How can the potential for dsRNA molecules to enter food chains be evaluated in risk assessments for RNAi-based pesticides?

Issues for LMICs

- Are RNAi Pesticides affordable and easily accessible to LMICs?
- What is their use extent in Sub-Saharan Africa/SADC?
- Why should we commercialise a technology whose environment and human health effects are not fully known, especially for LMICs?

Other

- What are good databases to refer to for RNAi-based pesticides?
- If RNAi-based pesticides show some indicators of chemical pesticides and or risks, should they be registered as a biopesticide?

Poll Questions

Poll 1. Are you familiar with how the pesticides work and confident in your knowledge to be able to confirm or challenge claims of safety or efficacy?

Yes	8
Somewhat	8
No	2

Poll 2. Does the diversity of RNAi responses to active ingredients alter how you would regulate these pesticides?

Yes	9
Unsure	3
No	2

Poll 3. What type of testing methods for potential adverse effects (acute, chronic, NOEL, etc.) would best suit your needs?

- All 3 methods are necessary to do
- In vitro, in vivo, non-target organism testing, field trials
- Both acute and longer-term testing for human health and the environment should be conducted
- Acute, NOEL, ARfD, AOEL, OEL,
- Unsure
- Both but environmental issues are critical

QUESTION 3
How should RNAi-based pesticides be regulated in your country?

Tanzania

- RNAi-based pesticides are a new thing. Capacity-building to the regulatory authority is required before considering approval of these products

South Africa

- Based on the risks, as a chemical pesticide
- The RNAi-based pesticides should be regulated as any new protection product; the registration and approval should go through the risk assessment process. The risk assessment should assess the potential risks to humans, the environment and also the non-target organisms
- It should be considered an HHP until proven otherwise

Lesotho

- Regulations should be made based on well-collected evidence and well-studied effects of RNAi-based pesticides on the environment and human health. Should they be as minimal as possible, I don't believe they have to be regulated, but countries have to find ways of teaching their citizens about RNAi pesticides, their use and safe application

Nigeria

- RNAi-based pesticides will be new even to the regulatory authority, so they need to be educated on this first. Also, environmental, and human risk assessments should be done before regulating RNAi as a genetically modified pesticide

Country not Specified

- Beware! Some countries are de-regulating at least some forms of dsRNA. Then, no matter what risk assessment framework you think is best, these actives may not be regulated. E.g. if naked dsRNA is deregulated and the formulation is water, then these pesticides might escape review
- To take the precautionary principle as the data is limited
- If the manufacturers remain responsible for assessing and providing safety information for their own products, we will be in the same situation as with the current pesticide paradigm
- Given the significant existing challenges with pesticide regulations in developing nations, the introduction of RNAi-based pesticides further complicates the situation

Poll Questions

Poll 1. Does your country have the expertise or capacity to regulate RNAi pesticides?

Yes (elaborate in chat)	0
Unsure	5
No	11

Poll 2. Are your safety concerns about RNAi based pesticides more related to human health or environmental issues and why?

- Both human health and environmental issues
- Both
- Both. The unknowns seem to outweigh the benefits
- Both
- Human health. The RNAi may be able to modify genes in human
- Both. The unknowns seem to outweigh the benefits
- Both are of great concern because there is inadequate data on the effects of such pesticides in Zambia
- Possible outcomes are more uncertain on biodiversity than on human health. Yet both are of concern
- Both, but environmental issues are critical
- Both. Human health and environmental health
- Both human health and the environment. There is need for more information on their impact so that there isn't a regrettable substitution
- Both human and environmental issues. No research has been presented to indicate the two have been addressed
- Both. Because the fate of these pesticides in the environment, like most pesticides, may have an effect on human health in the long run
- Chronic health issues and environmental fate and ecotoxicity
- Both
- Both, because they are interlinked

Q&A

Q: From research carried out on RNAi, do you think there are any chances of resistance in the future?
A (Jack): Yes, I believe that resistance will be an issue with these as it is with any other pesticide

Q: Any study on human gene modification or mutation when exposed to RNAi?
A (Jack): There have been many studies of the type you suggest and many findings! Yes, there are some studies that find RNAi can be induced from ingestion exposures. But they are not uniform findings. That is up in the air. In my opinion, a very important exposure for people would be inhalation (for a systemic effect) and contact (for a local effect).

Q: Are there any studies on the long-term effects of exposure to RNA-based pesticides?
A (Jack): Not really, other than, for example, in *C. elegans* where heritable effects were measured for ~200 generations.

Q: Potential off-target effects of dsRNA pesticides could include lethality (death) to the non-target organism, including human or animal consumers of the plant. Is that correct?
A (Jack): Yes, non-target effects can be lethal. I showed examples in this workshop too. I'm also concerned about sub-lethal effects that undermine human health and environment health on broad scales but are weak on the individual scale.

Q: There are single-stranded stabilised RNAi like phosphorothioate antisense used in medicine. Has this been tested as a pesticide? A lot of people say it is safer than chemicals. Is it theoretical?
A(Jack): I'm not sure what chemical modifications and structures are in use or development other than those I've encountered in the literature.

Q: It would be nice to have the data on effects of RNA-based pesticides on the environment and humans. This would be very helpful when considering local registration of such pesticides.
A (Jack): I agree. This is the responsibility of the manufacturer to provide to regulatory authorities.

Q: It seems clear that there are many unknowns of RNAi technology, not only effects on target pests but also non-target organisms and ecosystem functions generally; to add, there is a lack of national capacity to conduct an adequate and robust risk assessment with different regulatory frameworks and sometimes weak. How do you suggest we actually access the safety of and regulate the product? How do we ensure safety for our environment with so many unknowns? Do we have those tools, as Dr Magda claims? Are they exhaustive?
A (Jack): The US National Academies recommends detailed risk assessments for RNAi pesticides. We have also published on this. My reference paper has links to some of these.

Q: Do we know enough to have principles or general conclusions about where risks outweigh benefits?
A (Jack): Not in my opinion. Case by case.

Q: How many products have been already registered and where?
A (Magda): Just one in the United States.

RESOURCES

1. OECD Conference Dedicated webpage, including programme, speakers, abstracts, presentation files and other related material from the conference. http://www.oecd.org/chemicalsafety/pesticides-biocides/conference-on-rnai-based-pesticides.htm
2. OECD conference report containing a summary of input from presenters and participants. https://www.frontiersin.org/articles/10.3389/fpls.2020.00740/full
3. Heinemann, J. A. (2019). Should DsRNA Treatments Applied in Outdoor Environments Be Regulated? Environ. Int, 132, 104856. DOI: 10.1016/j.envint.2019.05.050. https://pubmed.ncbi.nlm.nih.gov/31174887/
4. Frontiers Research Topic: RNAi Based Pesticides. https://www.frontiersin.org/research-topics/11066/rnai-based-pesticides
5. OECD considerations documents: Working Document on Considerations for the Environmental Risk Assessment of the Application of Sprayed or Externally Applied ds-RNA-Based Pesticides (No. 104) released in September 2020. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2020)26&doclanguage=en
6. Working Document on Considerations for the Human Health Risk Assessment of Externally Applied ds-RNA-Based Pesticides (No.110) released in June 2023. https://one.oecd.org/document/ENV/CBC/MONO(2023)26/en/pdf
7. US EPA's registration of Novel Pesticide Technology for Potato Crops released in December 2023. https://www.epa.gov/pesticides/epa-registers-novel-pesticide-technology-potato-crops

If you are not already a member, we invite you to join UCT's Pesticide Network to receive discussion updates and newsletters: http://eepurl.com/ijR8DX

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.

DEH is based in the School of Public Health at the University of Cape Town (UCT). environmentalhealth@uct.ac.za

This Digest was produced by: Natasha Lalloo | natasha.lalloo@uct.ac.za

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Mechanisms for Preventing the Illegal Pesticides Trade

Issue 3 of 2024
Discussion: 23 May 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 23rd of May 2024, titled 'Mechanisms for Preventing the Illegal Pesticides Trade'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to questions prepared by the presenters:

- **Rorisang Mantutle** (Ministry of Agriculture, Food Security, and Nutrition, Lesotho)
- **D'Arcy Quinn** (CropLife International)
- **Bill Garthwaite** (Food & Agriculture Organization of the United Nations)

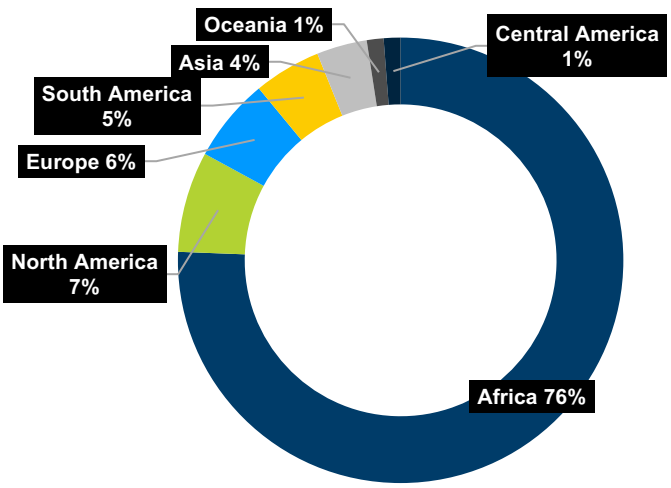
Rorisang began by explaining **what is meant by illegal pesticides and the trade thereof**. She highlighted multiple **reasons for concern** around the illegal pesticides trade, including human health, economic and environmental risks, cost to government, users and industry, and undermining government risk reduction schemes. She described some of the roles of government and regulators in preventing the illegal pesticides trade, such as strengthening regulatory action, awareness-raising, training (including on identification of counterfeits), and stakeholder collaboration. She **illustrated a case of counterfeit pesticides** encountered in Lesotho and the complexity in the investigation thereof.

D'Arcy described the **pervasive issue of counterfeiting in multiple industries**, and that 10-14% of products on the European Union (EU) market are counterfeit. He highlighted the issue of illicit, even more than counterfeit, pesticides being sold and purchased on the internet through e-commerce platforms. He **described one strategy to combat this being that the burden of due diligence should be placed on these platforms to verify the sellers' licences**, mentioning the Transnational Alliance to Combat Illicit Trade (TRACIT) report on this issue. He also mentioned that CropLife is working with Interpol to create an e-training course on counterfeit pesticides which will be released globally.

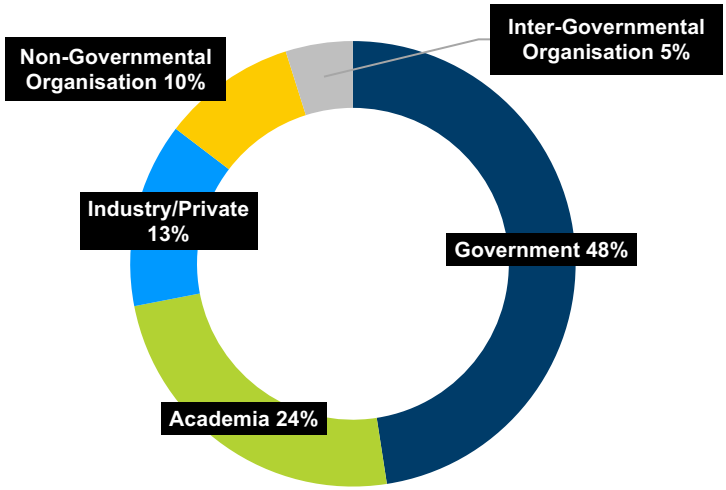
Bill discussed the **role of legislation** in addressing the illegal pesticides trade. Legislation can vary significantly between countries despite agreements at global levels, e.g. the Rotterdam Convention. Many countries have some kind of relevant legislative provisions related to the trade of pesticides, but those **provisions may vary widely, or the rules are not always clear**. He described key first steps to tackling the illegal pesticides trade, which is **understanding what rules are in place in one's country context that could be implicated, what legal tools are available to regulators and enforcement agencies, and if deemed necessary, what room is there for strengthening current legislation**. A strong overall legal framework governing pesticides is important for many reasons, even beyond illegal trade.

Breakdown of Discussion Participant Demographics

Regional Representation

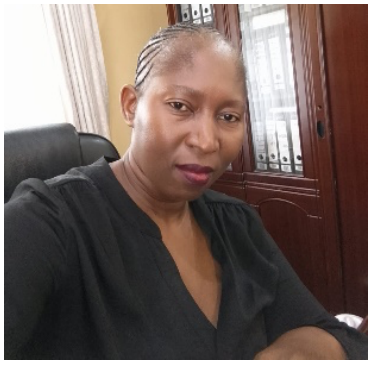


Sectoral Representation



Total = 82 participants live

PRESENTERS



Rorisang Mantutle currently works as a chief crop production officer in the Department of Crops Services, Ministry of Agriculture, Food Security and Nutrition in Lesotho. She has worked in the Ministry of Agriculture since 2001, when she graduated from the National University of Lesotho. Rorisang has 23 years' experience in the field of crop production dealing with crop production and protection. She has worked with national and regional bodies such as the Southern African Pesticide Regulators Forum (SAPReF) to regulate issues of pesticides management in the Southern African Development Community (SADC) region. She has been a member of the FAO/World Health Organization (WHO) Joint Meeting on Pesticide Management (JMPM) since 2023 representing the Africa region.

D'Arcy Quinn is the director of Anti-Counterfeiting at CropLife International, based in Brussels, Belgium. Mr. Quinn began his anti-counterfeiting career with the French food group Danone by eliminating counterfeiting factories in North Africa and Asia. He was Legal Counsel for Merck Sharp & Dohme in the Middle East and Africa, dealing with medicines that were smuggled and counterfeited and coordinated global anti-counterfeiting investigations for the Pharmaceutical Security Institute. For the manufacturer of Marlboro and L&M he reduced the Russian rate of counterfeit cigarettes from 17% to less than one percent and oversaw police raids of twenty-two illegal cigarette factories in the ex-Soviet Union. Currently Mr. Quinn advises multinational agrochemical companies and governments about counterfeit and illegal pesticides, on behalf of CropLife International.

Bill Garthwaite is a consultant supporting the Development Law Service of the Food and Agriculture Organization of the United Nations (FAO). His work for FAO has included supporting a range of projects aiming to strengthen the regulation of pesticides at the country, regional, and global levels.

CONTRIBUTIONS FROM PARTICIPANTS

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The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
A. Give examples of cases of illegal trade in pesticides you have experienced in your country. B. How did you deal with/address the situation?

Guyana

- Illegal pesticides can enter the country due to extended borders and are sold illegally on the market. They can enter the country in containers as undeclared. The regulatory body works on a multi-tier approach, ensuring products needed in the country are registered and economical for farmers

Zambia

- Illegal importation of pesticides. The importer was prosecuted using the Environmental Management Act No. 12 of 2011
- There is limited capacity to handle illegal importation of pesticides. There is a need to synchronise the environmental online and ASYCUDA (Automated System for Customs Data) systems. This may help to combat the illegal importation of pesticides

South Africa

- There have been cases of mislabelling and false advertising.
- A lot of street vendors are selling insecticides for controlling rats, cockroaches, and other pests. Some of the insecticides are not labelled

Tanzania

- Illegal manufacture of pesticides. The starting point is to create awareness of the illegal trade of pesticides and then strengthen the legal framework on pesticide trade

Nigeria

- Majority of the pesticides sold by agro-dealers are counterfeit, and this is what farmers use because it is way cheaper than the original. Farmers are trained on the identification of less toxic pesticides and reading pesticide labels. Contacts are provided for original pesticide suppliers to agro-dealers and pesticide users

Burkina Faso

- In August 2020, the Ministry of Agriculture and Hydro-agricultural Development of Burkina Faso conducted inspections in the Rood Woko and Sankaryaaré markets in Ouagadougou. During these inspections, significant quantities of unapproved pesticides were seized. The inspections aimed to verify the quality of pesticides sold and ensure compliance with regulations governing the sale of phytosanitary products in Burkina Faso

Cameroon

- Despite the existence of a legal and regulatory framework on highly hazardous pesticides (HHPs), there is still a multitude on the market, such as GREFONSEC COMPLEX 210WP, which were identified as being widely used by farmers. An awareness-raising campaign with young farmers in the Manjo agricultural zone and on social networks was undertaken. Unfortunately, financial resources were an obstacle to this action

Gabon

- Some pesticides banned by the government, such as Malathion, are still available on the market and still used. Additionally, several illegally imported pesticides, especially insecticides, can be found in the marketplace

Poll Results

POLL 1: Is there enough capacity in your country to identify these illegal pesticides or to prevent their trade within and between countries?

Yes	4
No	18
Don't Know	0

POLL 2: What challenges is your country facing as a result of illegal trade in pesticides? Include your country in your response

- Nigeria: pesticide poisoning cases where the active ingredient is unknown and delays medical response
- Zambia: contribution to the development of resistance due to indiscriminate use of pesticides especially in agriculture; poisoning
- Ireland: end-users purchasing unregistered products from across borders including online
- Tanzania: similar challenges as those pointed out by the presenter
- South Africa: street pesticides sold at taxi ranks for the control of various household pests are decanted and sold in Coke bottles, and the bait is sold in plastic bags. There is a huge increase in poisonings in South Africa

QUESTION 2
A. What questions do you have about the illegal trade of pesticides? B. How have your country's regulations either supported or posed challenges for your compliance and enforcement efforts related to illegal trade of pesticides?

A.

- What are the best practices to prevent the use of illegal pesticides in developing countries?
- Can countries seek support both regionally and internationally in identifying the composition of illegal pesticides?
- How do we trace the origin of the illegal pesticides?
- How do we reduce risk to lower-income earners who purchase illegal cheap pesticides sold online?
- How can counterfeit products be identified in the absence of testing capacity?
- How can HHPs be recognised on the market, given that the right to information is not respected on the label? In Cameroon, for example, we use a list of government-approved pesticides for our work, which doesn't always guarantee the reliability and credibility of our actions

B.

- **Guyana**'s regulation supports compliance and enforcement of the illegal trade of pesticides. It is very detailed, with well-thought-out regulations which can be amended as needed
- The local pesticide regulator should come up with a task force on the trade of illegal pesticides
- Monitoring needs to be strengthened as the legislation in **South Africa** says that you need to catch them (in the act) breaking the law
- In **Nigeria**, there is no monitoring for pesticides that have been banned, and awareness-raising or access to databases with information on bans is limited. This continues to encourage the use of illegal pesticides. Bribery among authorities at the port of entry is a major problem and

continues to let illegal pesticides enter the country
- **Burkina Faso**'s regulations on pesticides, as outlined in the Law N°026-2017/AN, provide a framework to monitor and control the production, importation, distribution, and use of pesticides to ensure safety, health, and environmental standards. While the law includes requirements for permits, inspections, and penalties for non-compliance, challenges may arise in enforcement due to factors like limited resources, inadequate infrastructure, and illegal trade networks. Addressing these challenges may require additional resources, capacity building, and collaboration with stakeholders for effective enforcement and compliance efforts
- **Zambia** has been supported by legalisation through provisions that address illegal importation, non-compliance, and trade in counterfeit products
- In **Gabon**, there is the Gabonese Food Health Agency which takes care of management, but there is a lack of monitoring and controlling trade
- There is a Border Management Authority (BMA) in **South Africa** that brings all sectors together regarding compliance of imported products and monitoring for counterfeit and illicit products entering the country
- There should be standardisation from the pesticide manufacturers on labelling
- More enforcement at the entry and exit points

Poll Results

POLL 1: What strengths or innovative approaches in your regulations have been effective to enhance compliance or enforcement related to illegal trade of pesticides?

- Multi-stakeholder approach crucially involving the intelligence community
- Stringent penalties, imprisonment, and fines
- Collaboration among stakeholders including police, industry, and end-users
- Zambia regulates importation, exportation, trade, transportation, storage, and manufacturing. The pesticide regulators also work with the customs department
- Comprehensive regulatory frameworks, rigorous registration processes, enhanced border controls, collaboration, and coordination
- Zambia: availability of personnel to enforce the pesticide laws, and collaboration with line ministries and agencies
- Generally, since illegal pesticide sales are primarily conducted online, the most effective approach would be to implement stricter regulations for e-commerce, with a focus on enforcement
- Strengthening control and setting up a customs nomenclature for pesticides
- Approaching the illegal trade of pesticides from a health and environmental perspective. Letting users know that we are all involved
- Namibia: capacity-building in chemical risk management

POLL 2: List changes/improvements to your regulatory framework to better support compliance/enhance enforcement against the illegal trade of pesticides

- Zambia: Formation of the pesticide regulation task force
- Collaboration with other relevant sectors when monitoring and enforcing compliance of illegal trade
- Punitive penalties as a deterrent, specifically covering illegal trade
- People buy illegal pesticides because they are viewed as being cheaper. Perhaps a task force should be created to determine the prices and offer safer pesticides to the public for a lower price
- For Malawi, the following should be considered: review the law to enable enforcement officers to be stationed at the borders, introduce proper monitoring guidelines on sales, and implement restrictions on HHPs
- Regional collaboration
- Fines for non-compliance
- The penalties are far too low and must be increased if this is to be considered a deterrent
- Collaboration with Interpol, immigration, and farmers

- Internal manufacturing of low-cost green pesticides

POLL 3: List specific guidance/information/support useful to strengthen regulations to enhance compliance/enforcement efforts

- KemI guidance documents
- FAO guidance documents
- Aligning pesticide regulations with international best practices and standards ensures that the country stays updated with the latest developments in pesticide safety and regulation
- Strengthening legislation: harmonisation of regulations, stricter penalties, clear definitions and scope, enhancing monitoring and surveillance, advanced tracking systems, and regular inspections
- Guidance on the establishment of monitoring and tracking systems for imports
- Support to train monitoring and enforcement officers, and police/customs officers, on regulations
- National and regional compilation of data on illegal trade (all products not just pesticides), quantification of loss to economies, human health etc.
- Border enforcement increase

Q&A

Several questions were answered live during the session (view the recording here), the rest, included in this digest, were answered through typed responses.

Q: Can you consider prosecuting the trade of illegal pesticides as a measure to deter this illegal activity, thus involving judiciary administration? In most of sub-Saharan Africa, sanctions are needed/important to support enforcement
A (Rorisang): This is an issue of fraud and prosecution in the courts of law. If this can be strengthened, then it would deter most importers from importing illegal pesticides

Q: In Lesotho, is it possible for the local companies to buy legal pesticides and then make their own concoction?
A (Rorisang): From the assessment that was done, we have not established an incidence of personal concoctions, but farmers do mix their own unauthorised pesticides with a view of making it stronger. However, we have established that active ingredients are imported from several countries and mixed illegally

Q: Is there a trend of where the counterfeit pesticides are coming from?
A (Rorisang): It's still a matter of investigation but very difficult to establish because the source is difficult to find. A few have been identified in the Republic of South Africa (RSA), but there seems to be a lot more still out there

Q: What are the best practices to prevent the use of illegal pesticides in developing countries?
A (Rorisang): Strengthen our legislation, implement pesticide conventions, training and awareness-raising, and collaboration between regulators and the industry

Q: Will the online course be made available to other members apart from Interpol?
A (D'Arcy): Interpol will decide, sometime in late September

RESOURCES

1. Development Aid. Illegal pesticide use in developing countries: risks and solutions | Experts' Opinions by Catalina Russu. May 2023. https://www.developmentaid.org/news-stream/post/160678/illegal-pesticide-use-in-developing-countries-eo
2. United States Environmental Protection Agency. Avoid Illegal Household Pesticide Products. December 2023. https://www.epa.gov/safepestcontrol/avoid-illegal-household-pesticide-products
3. UCT Policy Brief. Street Pesticide Use in South Africa - Collective Responsibility in Reducing Health Risks. https://health.uct.ac.za/sites/default/files/media/documents/2019.4.16_street_pesticide_policy_brief.pdf
4. FAO/WHO *Guidance on Pesticide Legislation* (Second edition – 2020) (Especially Sections 4.4 on import and export of pesticides, 4.13 on inspection, and 5.1 & 5.2 on international cooperation and trade)
5. OECD *Best Practice Guidance to Identify Illegal Trade of Pesticides* (2018)
6. TRACIT: Tackling the Sale of Illicit Pesticides on E-Commerce. https://www.tracit.org/tackling-the-sale-of-illicit-pesticides-on-e-commerce-platforms.html
7. TRACIT website: https://www.tracit.org/pesticides.html

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DEH is based in the School of Public Health at the University of Cape Town (UCT). environmentalhealth@uct.ac.za
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Addressing Vector Control Challenges Including DDT Use

Issue 4 of 2024
Discussion: 18 July 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 18th of July 2024, titled 'Addressing Vector Control Challenges Including DDT Use'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to questions prepared by the presenters:

- **Professor Basil Brooke** (National Institute for Communicable Diseases - NICD & South African Malaria Elimination Committee)
- **Chadwick Sikaala** (SADC Malaria Elimination 8 Secretariat)
- **Dr Nosiku Munyinda** (SADC Elimination 8 Technical Working Group & University of Zambia)

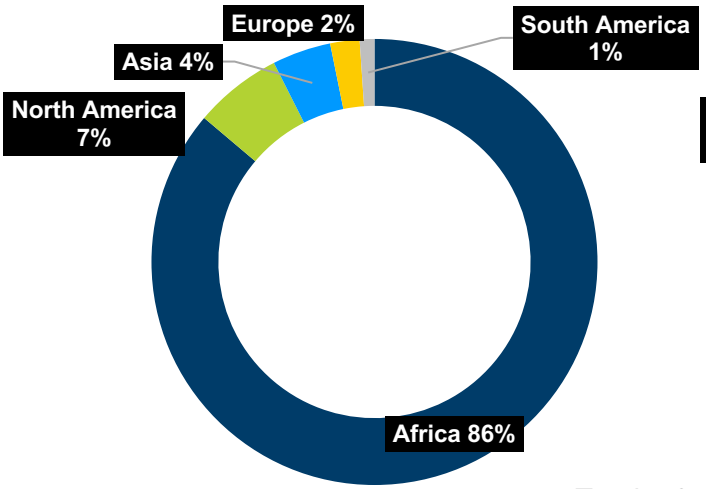
KEY MESSAGES

- A **key challenge to vector control globally is insecticide resistance,** with resistance to almost all 4 classes of insecticides noted across Africa
- *Anopheles funestus* is a major malaria vector of *Plasmodium falciparum* (a parasite that causes a **severe** form of malaria) in Africa. *A. funestus* is **highly resistant to pyrethroids** but **fully susceptible to DDT** (dichlorodiphenyltrichloroethane)
- DDT has been **historically instrumental** in reducing malaria cases, but DDT use is being phased out so **alternatives** such as the organophosphate pirimiphos-methyl are being considered despite being **more costly**
- **Vector control needs to be funded sustainably**, to ensure continuity, necessary to achieve appropriate control
- **Climate change** is impacting the distribution of malaria, where it may threaten previously unexposed areas and may even be reduced in others. It is also impacting the **seasonality** of certain vectors in some places where there is **no longer a seasonal break**
- Integrated vector management (IVM) is an **evidence-based rational decision-making process** to **optimise the use of resources** for vector control. IVM ensures **efficiency, efficacy**, and **ecological soundness** and **stability** of intervention application within available tools and resources. IVM enables the use of resources from other sectors and programmes to be leveraged, relying on **intersectoral collaboration**
- Many countries struggle with **inadequate resources** (e.g. human capacity, laboratory, infrastructure, financial). Other challenges include programmes working in **silos**, regional **misalignment of funding cycles** (affects supply chain etc.), and **differing registration processes** and **legislation** in countries (delaying insecticide procurement and use)
- Addressing challenges includes **promoting innovation**, adopting **new technologies**, **linking programmes and research** so that countries and institutions do not work in isolation, **improving surveillance and human capacity**, and advocating at higher levels to see how countries can work around misaligned planning and budget cycles

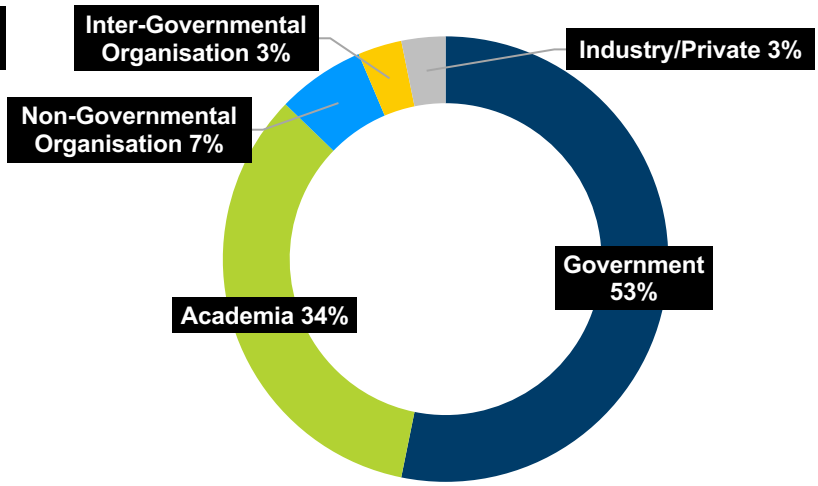
- Vectors do not follow borders, therefore **regional collaboration** (e.g. the Elimination 8)**, information-sharing** and **networks** are beneficial so countries can work together and quickly respond to and learn from each other, to address vector-borne diseases
- **Areas** where one resides drastically impacts their exposure risks to vectors, which is also frequently affected by **socioeconomic and environmental circumstances**
- A **hierarchy of control** is used in IVM, looking at 3 stages: 1. anti-larval stage, including larval source management, 2. anti-adult, looking at ways to eliminate adult vectors, e.g. indoor residual spraying (IRS), and 3. anti-bite, preventing exposure e.g. through nets and repellents
- Vector control is often left to the Ministry of Health, but **broadening collaboration within and beyond the health** sector is important in IVM. **Local government and communities** are also key role players
- Local communities can play a role e.g. in "**plugging holes**" where residual vector-borne diseases exist (areas being close to elimination, but resistance or vector behaviour change leads to persistence)
- **Community engagement** is key, where community-driven solutions aid vector control, especially where the community itself is involved in priority-setting. Activities such as training community leaders on vector identification and larval source management, environmental sanitation, e.g. cleaning gutters, collection of larval breeding sources like tyres and plastic containers for recycling, and simple/low-cost house improvements, and nature-based solutions.

Breakdown of Discussion Participant Demographics

Regional Representation



Sectoral Representation



Total = 95 participants live

PRESENTERS

Basil Brooke. Associate Professor Basil Brooke is the head of the NICD's Vector Control Reference Laboratory, Centre for Emerging Zoonotic & Parasitic Diseases, and is a member of the Wits Research Institute for Malaria (WRIM), University of the Witwatersrand. His collaborative research work over the past 20 years has primarily focused on identifying the entomological drivers of malaria transmission, especially insecticide resistance, and vector species assemblages and their corresponding behavioural/physiological traits. This work applies directly to the development of strategies designed to maintain effective malaria vector control in South Africa and the greater southern African region. He is also involved in the assessment of enhanced vector surveillance techniques, operational procedures for malaria outbreak response, new vector control products and alternative methods of control. Prof Brooke regularly consults with the World Health Organization (WHO) and United Nations Environment Program

(UNEP) on technical issues relating to malaria vector control policy and practice and serves on national and regional committees as part of the drive toward malaria elimination in southern Africa.

Chadwick H. Sikaala. Chadwick has regional experience in the fields of vector control and entomological surveillance. He was instrumental in scaling up vector control and community-based entomological surveillance programs in Zambia, before his engagement with the Elimination Eight Secretariat (E8S) as a Regional Entomologist/Vector Control Specialist, involved in regional capacity-building across eight countries (Angola, Botswana, Eswatini, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe). He is currently the head of Technical Support and Research.

Nosiku Munyinda. Dr Nosiku Sipilanyambe Munyinda is a lecturer and researcher at the Department of Environmental Health – School of Public Health at the University of Zambia. She is also an honorary senior lecturer at the Division of Environmental Health – School of Public Health at the University of Cape Town. She holds a BSc in environmental and natural resources management, an MSc in environmental engineering and sustainable infrastructure and a PhD in environmental health. Her research interests include environmental pollution and health effects, and climate change science, mitigation and adaptation. Dr Munyinda has a robust interface with policymakers, seeing her represent the University of Zambia on various national and international technical and project steering committees. She is a member of the Stockholm Convention Persistent Organic Pollutant Review Committee (POP-RC) and the Joint Meeting on Pesticide Management (JMPM).

CONTRIBUTIONS FROM PARTICIPANTS

Disclaimer: The information in this digest represents the opinions of members participating from different stakeholder groups expressed during the discussion. The views expressed in this document do not necessarily represent the opinion or the stated policy of the Swedish Chemicals Agency (KemI) or the Division of Environmental Health UCT, nor does citing trade names or commercial processes constitute an endorsement

The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
What are some examples of vector control challenges in your country, region, or globally?

South Africa
- Inadequate funding for vector control programmes
- Lack of sanitation and waste management in informal areas
- Lack of funding
- Lack of capacity-building
- Differences between the provinces regarding follow-up, e.g. 24 hours in KwaZulu-Natal versus 72 hours in Limpopo

Antigua and Barbuda
- Limited resources
- Issues with follow-ups and facilitation of education and training

Uganda
- Limited funding
- Limited research
- Lack of appreciation for some interventions
- Fears of the consequences for chemical approaches

Tanzania
- The use of pesticides for malaria control without research to assess human health impact
- Use of treated bed nets sometimes triggers allergic reactions which are not followed up
- Insecticide spraying is usually done by untrained spray service providers leading to poor control of the vectors
- Many pesticides used for vector control are unregistered and sold illegally

Zimbabwe
- Urban malaria cases increasing
- Insect resistance to pyrethroids
- Overall increase in favourable environment for mosquito breeding due to wastewater

Malawi

- Increasing resistance to insecticides e.g. in Malawi, most pyrethroids and carbamates have developed resistance towards Anopheles mosquitoes threatening the efficacy of long-lasting insecticidal nets (LLINs) and IRS
- High cost of alternative chemicals to combat the vectors
- Limited funding
- Operational and technical concerns e.g. reduced number of sprayed districts, procurement of low-quality insecticides and pumps by government

Iran

- The incidence of malaria has decreased in the past few years in Iran, and there were no indigenous cases in 2018 and 2019, the disease has been under control in the south of Iran in the last decade. However, this disease suddenly broke out in 2022

Guyana

- A vector control unit works closely with local partners to execute its duties
- Need for Improved data management and utilisation for vector control
- Lack of national framework for entomological monitoring and surveillance
- Need to improve community mobilisation
- Lack of human resource capacity within the vector control unit

General

- There is continuous application of different pesticides with the same mode of action which has led to resistance
- The inability of regions to utilise effective biopesticides such as Beauveria bassiana (fungal pathogens to control adult mosquitoes)
- Rapid urbanisation creates breeding grounds for vectors in poorly planned or maintained urban areas, leading to increased vector-borne diseases such as dengue and malaria

Poll Results

Poll 1. Do you think DDT should be retained for public health use and why?

- No x 6
- The neurotoxic and endocrine disrupting effects probably impact more people than malaria does
- DDT should not be retained. There are other safer methods to control mosquitoes
- We have efficacious alternatives to DDT in Zambia
- Unless for emergencies, DDT should not be used for public health. There are other methods of vector management that can be integrated instead of DDT use
- There are too many health risks and there are safer alternatives

Poll 2. Do you think vector control programmes in places affected by malaria/vector-borne diseases should receive donor funding or be domestically financed?

- We need donors funding because vector control programmes are very expensive
- This should be on a case-by-case basis
- Programmes should be funded domestically
- The product is expensive and will require donor funding
- Donor funding is necessary because treatment is expensive and finding or creating alternatives also needs funds
- Zambia: domestic funding ensures sustainability of vector control. Donor funding supplements government effort

QUESTION 2
What measures have been applied in your country or region for vector management?

Zambia

- The core interventions are IRS, and insecticide-treated nets (ITNs), supplemented by larval source management
- There is integrated vector management, but the environmental management aspect is not well-supported
- There is a National Malaria Elimination Centre with a National Malaria Elimination Strategy currently 2022-2026 in place

Tanzania

- ITN and IRS promoted by government
- Individuals spray whatever insecticide is available on the market

Nigeria

- Door-to-door distribution of ITN
- Monthly sanitisation of the environment happens in different communities and movement is restricted so that people take the time to clean gutters around their homes
- Insecticides have been made widely available for different price ranges but this is also a challenge as there have been many cases of misuse and overuse

Antigua and Barbuda

- Fogging (spraying of insecticides) is scheduled and controlled by the Ministry of Health

Guyana

- A vector control unit works closely with the Ministry of Health and central and local government

Mexico

- There is a regulation for IVM for malaria, dengue, and other products
- Mexico stopped using DDT years ago, but the current problem is dengue
- 15 highly hazardous pesticides (HHPs) are approved and used as larvicide, adulticide, and in ITNs
- For Mexico's experience in avoiding DDT for malaria control see https://www.sciencedirect.com/science/article/abs/pii/S1438463904702357

Malawi

- IRS with pyrethroids and organophosphates
- Use of larvicides and chemical repellents
- Environmental management: habitat management, waste management

South Africa

- IRS as routine vector control method, with DDT frequently being used
- Ongoing resistance management and surveillance through systems like Notifiable Medical Conditions Surveillance System managed by the NICD
- National Vector Control Strategy (2023-2027) highlights 5 strategic objectives aimed at protecting populations at risk of vector-borne diseases, monitoring the occurrence of disease vectors, developing capacity for outbreak response, increasing national knowledge and practices, and providing effective management and coordination for vector control implementation. Additionally, the strategy mentions vector control interventions such as IRS, long-lasting insecticidal nets, larval source management, and personal protection measures

Iran

- Use of insecticides targeting mosquitos of the Anopheles genus

Poll Results

Poll 1. Give examples of where and how integrated vector management approaches have been used. Include your country in your response

- In Zambia: IVM for malaria
- In the malaria control program - Zambia (National Malaria Strategic Plan)
- In Tanzania, IVM is used for training health officers who are supposed to implement it on the ground. However, pesticides take precedence

QUESTION 3
Do you think a systems approach is a viable solution to the vector management challenges raised during this discussion? Why/why not?

Yes

- A systems approach is a viable solution. Involvement and collaboration within sectors gives an alignment in the solutions provided and every sector will be up to date
- It allows a holistic approach to be taken with the integration of various interventions, enhanced coordination (multi-sectoral collaboration), sustainability, research and resource optimisation
- It takes the coordination of the community into account to maximise resources and results

- It aims to improve the efficacy, cost-effectiveness, ecological soundness, and sustainability of disease-vector control
- It is certainly the right direction to go in for vector control. IVM makes vector control more sustainable and cost-effective
- By looking at the entire ecosystem (interaction between the vector and the environment and the host), effective and more sustainable vector management strategies can be developed
- A systems approach can effectively address vector management challenges by considering various interconnected factors for more sustainable solutions
- It provides a joint solution towards similar problems
- It can be used to consider the key drivers to both exposure and transmission, for resistance management, and for the collaboration between health and other departments and organisations

Possibly

- South Africa has a unique issue in that malaria is becoming a mostly imported disease, with many outbreaks in areas where it is not endemic or expected

Poll Results

Poll 1. What alternatives to highly hazardous chemicals are currently being used, or are you aware of, in your country or region? Include your country

- India has taken the first step to eliminate dependency on DDT by promoting locally appropriate, cost-effective, and sustainable alternatives, including LLINS
- Zambia: Clothianidin based (such Sumishield, Fludora Fusion) and Actellic 300 CS insecticides are used
- BTI is used for larvicide
- In Antigua and Barbuda, alternatives include monitoring of pesticides and community toxic chemicals

Q&A

Several questions were answered live during the session (view the recording here), the rest, included in this digest, were answered through typed responses by Basil Brooke.

Question	Answer
There is a biopesticide for malaria control (Beauveria bassiana). Why has this not been considered?	Fungal control methods have good efficacy but are not easy to deploy on a wide scale and have very limited persistence. But research into this method continues
Why another organophosphate?	The only active ingredient under consideration currently is pirimiphos-methyl
Have there been cases of mosquito resistance to DDT in South Africa? How much protection can the net give when it isn't treated with DDT?	Bed nets are not treated with DDT. Most are treated with pyrethroid insecticides. There is some evidence of resistance to DDT in another vector in South Africa called Anopheles arabiensis, but it is very low-level and currently weak in effect
Is there any latest literature on the migration of malaria-causing mosquitos to non-endemic areas, e.g. from northern KwaZulu-Natal to Durban/Johannesburg, also given what was highlighted regarding climate change?	Mosquitoes can travel long distance by inadvertently getting caught in buses, cars, taxis, aeroplanes, trains etc. But malaria vector mosquitoes tend not to proliferate in high altitude areas with cold winters
What about the efficacy of Spinosad?	This is one of the potential innovations currently in an experimental phase for vector control

RESOURCES

1. Brooke B et. al. Malaria vector control in South Africa. *South African Medical Journal*. 103 (10) p. 784-788. August 2013. DOI: 10.7196/SAMJ.744 . Accessible here
2. Brooke B. Mosquitoes and Malaria Control – a Complex Problem for Entomologists to Unravel. *Outlooks on Pest Management*. 30 (5) pp213-216. October 2019. DOI: https://doi.org/10.1564/v30_oct_07. Accessible here.
3. WHO. Frequently asked questions on DDT use for disease vector control. 2004. https://iris.who.int/bitstream/10665/68616/1/WHO_HTM_RBM_2004.54.pdf
4. WHO. Global Technical Strategy for Malaria 2016-2030. 2021 update. https://iris.who.int/bitstream/handle/10665/342995/9789240031357-eng.pdf
5. WHO. Handbook for Integrated Vector Management. 2012. https://www.who.int/publications/i/item/9789241502801
6. WHO. Global Vector Control Response 2017-2030. https://iris.who.int/bitstream/handle/10665/259205/9789241512978-eng.pdf

If you are not already a member, we invite you to join UCT's Pesticide Network to receive discussion updates and newsletters: http://eepurl.com/ijR8DX

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.

DEH is based in the School of Public Health at the University of Cape Town (UCT). environmentalhealth@uct.ac.za
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UCT PESTICIDE NETWORK DISCUSSION FORUM

Division of Environmental Health | UCT

School of Public Health Department Openbare Gesondheid Isikolo Sempilo Yoluntu

Sweden Sverige

DISCUSSION DIGEST

Understanding & Implementing the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide

Issue 5 of 2024
Discussion: 12 Sep 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 12th of September 2024, titled 'Understanding & Implementing the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to questions prepared by the presenters:

- **Dr Piumee Bandara** (World Health Organization)
- **Dr Cindy Stephen** (Poisons Information Centre, Red Cross Children's Hospital)
- **Debbie Muir** (Department of Forestry, Fisheries and the Environment, South Africa)

KEY MESSAGES

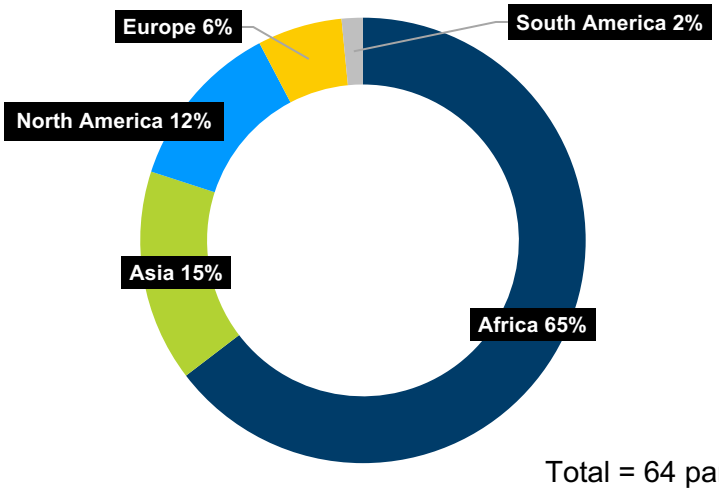
- **Pesticides are among the most common suicide means globally**
- People with suicidal thoughts are often seeking relief from acute distress, many act **impulsively with low suicidal intent**. For example, they may drink a pesticide, which may be regretted, as the person may die a few days later despite actually wanting to live
- **Significant reductions can be made to suicide rates if access to lethal methods is limited,** therefore, **restricting access to acutely toxic pesticides** is recognised by the World Health Organization (WHO) as an evidence-based intervention to prevent suicides
- **Guidance documents** have hence been produced in this regard, such as the WHO/FAO (Food & Agricultural Organization) International Code of Conduct on Pesticide Management, and the WHO brochure, Preventing suicide by phasing out highly hazardous pesticides, which provides a step-by-step guide to phase out highly hazardous pesticides (HHPs)
- Between 2019 and 2024, 3451 pesticide self-poisoning cases were reported in South Africa. Three quarters of these have been symptomatic, 5.8% life-threatening, and 0.4% lethal. One fifth of cases are teenagers. Anticoagulants, carbamates, and organophosphates are the pesticides most commonly reported
- **Monitoring and evaluation** of pesticide suicides is important in advocating for restriction of pesticides used in self-harm, but this is not always available or possible, especially with resource constraints
- **Multisectoral collaboration** is essential to tackle the issue of pesticide suicides
- **Restricting and reformulating pesticides** is effective in some situations, such as reduction in case fatality, but **phasing out shows a more dramatic reduction** in suicide deaths
- **Promotion of alternative approaches** to crop protection are encouraged, such as **agroecology**, to reduce or substitute the use of HHPs, reducing their availability in communities. This can meaningfully impact health with environmental co-benefits
- In South Africa, the Department of Forestry, Fisheries and the Environment (DFFE) amended the Pesticide Policy using the **precautionary principle and hierarchy of control** to replace hazardous pesticides, such as paraquat, Warfarin, and aluminium phosphide, with safer alternatives. Chemical companies assisted with research and design for some safer alternatives

- DFFE also implements awareness campaigns, and "toolbox talks" which are conducted with teams in the field every morning, usually around personal protective equipment use and safety,

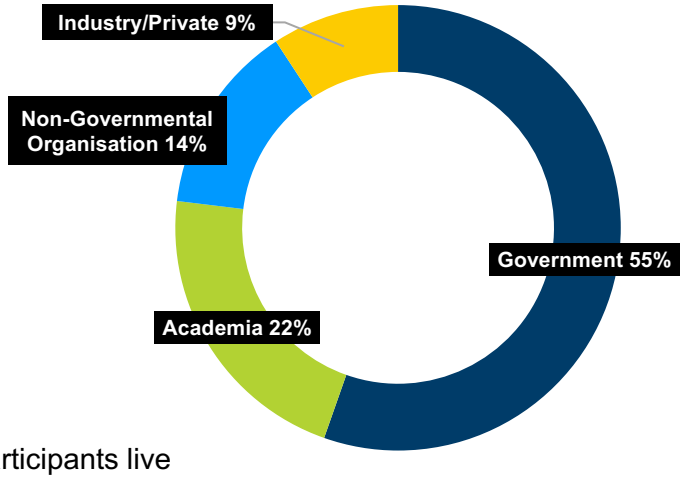
but also on suicide, such as the risks of pesticide suicides, with mental health practitioners. Awareness campaigns include discussions around pesticide container management and safe disposal

Breakdown of Discussion Participant Demographics

Regional Representation



Sectoral Representation



Total = 64 participants live

PRESENTERS

Dr Piumee Bandara is a consultant in suicide prevention at the Department of Mental Health and Substance Use, WHO. Her work primarily involves supporting national governments in low- and middle-income countries (LMICs) implement suicide prevention activities, including limiting access to HHPs. She has contributed to global policy and United Nations (UN) publications to reduce suicides, including the 2023 WHO/ FAO Guidance on the use of pesticide regulation to prevent suicide. In addition to her role at the WHO, Piumee is an epidemiologist in mental health at the University of Bristol, United Kingdom (UK), where she holds an honorary fellowship. Her research primarily focuses on the epidemiology and aetiology of suicide and self-harm in LMICs. Piumee holds a Master in International Public Health (University of Sydney) and a PhD in Epidemiology (Western Sydney University). She is a member of the UK Office for National Statistics Mental Health Expert Group on 'Standards for official statistics on climate and health' and member of the scientific committee for the International Association for Suicide Prevention World Congress.

Dr Cindy Stephen is the director of the Poisons Information Centre (PIC) at Red Cross War Memorial Children's Hospital in Cape Town, South Africa. After completing her MBChB at UCT, she worked in KwaZulu-Natal for many years in the disciplines of paediatrics and child health, with a focus on improving quality of care. In 2015, Cindy joined the PIC in Cape Town and has been involved in the further development of AfriTox, the electronic poisons information database used widely to treat poisoned patients throughout South Africa. She has also been instrumental in launching the Poisons Information Helpline service, which receives poisoning calls from throughout South Africa and is a collaboration between the PICs at Red Cross War Memorial Children's Hospital and Tygerberg Hospital. Her interests include paediatric and environmental poisonings, particularly pesticide poisoning reduction.

Debbie Muir is the pesticide risk manager/biodiversity officer Control Grade B for DFFE and holds a Master of Science in Botany, a Postgraduate Diploma in Pesticide Risk Management (UCT), and 3 international diplomas from the UN. She has international accreditations from the UN for environmental law and conventions for multinational environmental agreements, UN Statistical Institute for Climate Change, WHO/FAO for HHPs, and University of Stockholm for the assessment and management of chemicals. She is currently completing an International Diploma in Biological Diversity. She is the focal point for South Africa for FAO's Forestry Invasive Species Network Africa. She is part of the International Forestry Stewardship Council (FSC) Technical Working Group who published the International Generic Indicators for use in conjunction with the published FSC Pesticide Policy and is currently working on updating the FSC list of HHPs. She developed the Pesticide Policy for DFFE and is currently working on the biomonitoring protocols in line with WHO guidelines.

CONTRIBUTIONS FROM PARTICIPANTS

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The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
To what extent is pesticide suicide a problem in your country/region? List your country/region in your response

South Africa

- This is a major concern for adolescents, particularly for those with access to illegal street pesticides containing HHPs
- It is a concern for farmworkers with easy access to agricultural pesticides
- 5 CMRs (carcinogenic, mutagenic, reproductive, and development toxicants) anticoagulant rodenticides have been banned and 4 derogated, i.e. they can still sell it with some limitations but only for a limited period (1 year)
- Issues regarding CMRs are still unclear, as there are no clear and detailed cut-off values or limits specific to SA. The list issued by the Department of Agriculture, Land Reform and Rural Development (DALRRD) could not be used as reference for CMRs because the data was submitted by CropLife to DALRRD as per individual company Globally Harmonised System (GHS) classification. Most companies were using the European Chemicals Agency as reference and not following the UN GHS global cut-off values

Barbados

- Pesticide suicides are not of serious concern on the island. It is rarely used

Guyana

- Pesticide suicide is a major issue in Guyana. While some numbers are decreasing, it is still one of the main tools used to commit suicide

Uganda

- Pesticides are often used to commit suicide. Police and hospital records show that 71.7% of pesticide poisoning cases are suicides

Lesotho

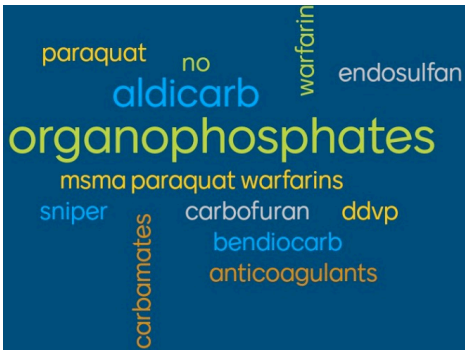
- There is a very high number of suicides caused by use of poisons in Lesotho, but there is not enough data reporting the kind of chemicals used

Malawi

- Pesticide suicide is a serious problem, although official data is not available. Reports from both online and print media show many cases of pesticide suicide, especially aluminium phosphide

Poll Results

Poll 1. What pesticide active ingredients are commonly used for self-harm in your country?



Poll 2. Is there a poison information centre in your country that collects pesticide poisoning data?

Yes, and it is functioning well	0
Yes, but it is not functioning well and lacks resources	3
No, and there are no plans for setting one up	4
No, but we plan to set one up in the future	4
No, but we are currently setting one up	0

Poll 3. Is mortuary data used in your country for regulating pesticides linked to fatalities?

Yes	3
No	6
Don't Know	3

QUESTION 2
What questions do you have about the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide document?

- How does the guidance compare the effectiveness of different regulatory approaches (e.g. bans, restrictions, safe storage) in preventing suicides?
- Considering the WHO/FAO Guidance and the need for accurate recording of pesticide-related data, can modelling techniques be used to improve regulation even with limited suicide by pesticide data?
- Is there a synergy between the chemical conventions and this document so that 1. we are not duplicating efforts to properly manage HHPs/other dangerous chemicals and 2. would there be support (projects/funding) given to countries who lack the resources to implement these important measures to save lives? Yes, they do link to the chemical conventions - Stockholm and Rotterdam, and Kyoto protocol
- What is the quality of data and evidence used in developing these guidelines and how context-specific is it? For example, the pesticide suicide situations in Asia are fairly different from those in Africa
- Have "engineering interventions" reduced pesticide suicides?
- Is the guideline friendly to implement in LMICs?
- How can the suppliers be forced to take empty pesticide containers back? This would reduce the problem of reusing containers

Poll Results

Poll 1. Which of the following should you NOT use when communicating pesticide suicides? Tick all that apply

Do Use	Don't Use
Took their own life; suicide death	Committed suicide; commit suicides
Suicide attempt; non-fatal attempt	Failed suicide
Died by suicide	Successful suicide; unsuccessful suicide

Poll 2. Would you say that most of the pesticides used in your country for suicide attempts are highly hazardous pesticides (HHPs)?

Yes	12
No	2
Don't Know	3

QUESTION 3
What is needed to be able to implement the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide document in your country or organisation?

General

- Multisectoral collaboration, e.g. regulators, health, agriculture, labour, and academia
- Proper container management system is an important strategy
- Greater buy-in from all relevant stakeholders
- The Centre for Pesticide Suicide Prevention, UK, is available to support national authorities in implementing recommendations of the guideline https://centrepsp.org/
- Capacity-building

Guyana

- The regulatory body managing chemicals needs both technical and financial support to implement this guidance
- Since Guyana is a small developing country in the Caribbean, a regional project would be useful to understand what already exists and how this document can be used to build on each country's capacity to manage these chemicals used in suicides

Zambia

- There is a need to amend the laws

Poll Results

Poll 1. Have you read/heard of the WHO/FAO Guidance on Use of Pesticide Regulation to Prevent Suicide document prior to this discussion?

Yes, heard of it and read it	4
Yes, only heard of it	6
No	4

Poll 2. Which of the following is the most effective method for preventing pesticide suicide in your country?

Banning highly hazardous pesticides	7
Improve public mental health facilities	2
Increase awareness raising of public on pesticide risks	3
Increase awareness raising of decision-makers on pesticide suicide	4
Reformulating pesticides that are used for suicide attempts	2
Improving storage of pesticides	2
Not a problem in my country	0

RESOURCES

1. World Health Organization (WHO)/Food & Agriculture Organization of the United Nations (FAO). July 2023. International code of conduct on pesticide management: guidance on use of pesticide regulation to prevent suicide. https://www.who.int/publications/i/item/9789240066700
2. WHO. August 2024. Preventing suicide by phasing out highly hazardous pesticides. https://www.who.int/publications/m/item/preventing-suicide-by-phasing-out-highly-hazardous-pesticides
3. The Centre for Pesticide Suicide Prevention. https://centrepsp.org/

If you are not already a member, we invite you to join UCT's Pesticide Network to receive discussion updates and newsletters: http://eepurl.com/ijR8DX

The **Division of Environmental Health** (DEH) Pesticide Discussion Forum is an online seminar for pesticide regulators and relevant/interested stakeholders, as well as students in the postgraduate Professional master's in chemical risk management and diploma in pesticide risk management. Our aim is to provide support for managing pesticide risks and implementing risk reduction strategies.

DEH is based in the School of Public Health at the University of Cape Town (UCT). environmentalhealth@uct.ac.za

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UCT PESTICIDE NETWORK DISCUSSION FORUM

Division of Environmental Health | UCT

School of Public Health Department Openbare Gesondheid Isikolo Sempilo Yoluntu

Sweden Sverige

DISCUSSION DIGEST

Options for Reducing Risks When Phasing-Out Pesticides

Issue 6 of 2024
Discussion: 24 Oct 2024

This document summarises the University of Cape Town's (UCT) Division of Environmental Health's (DEH) Pesticide Community of Practice discussion held on the 24th of October, titled 'Options for Reducing Risks When Phasing-Out Pesticides'. View the discussion recording here, presentation slides here, and newsletter here. This digest presents the issues and points raised and the information shared by participants in response to questions prepared by the presenters:

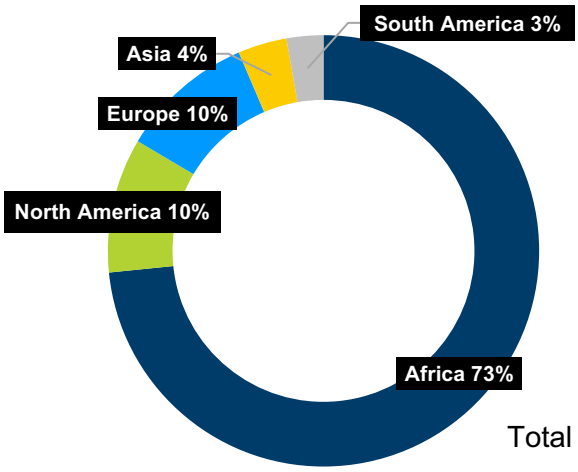
- **Andrea Rother** (Division of Environmental Health, University of Cape Town)
- **David Kapindula** (Independent Consultant, Senior Advisor for Africa Region MEAs, and Former Pesticides Registrar (ZEMA) Zambia)
- **Helena Casabona** (Swedish Chemicals Agency)

KEY MESSAGES

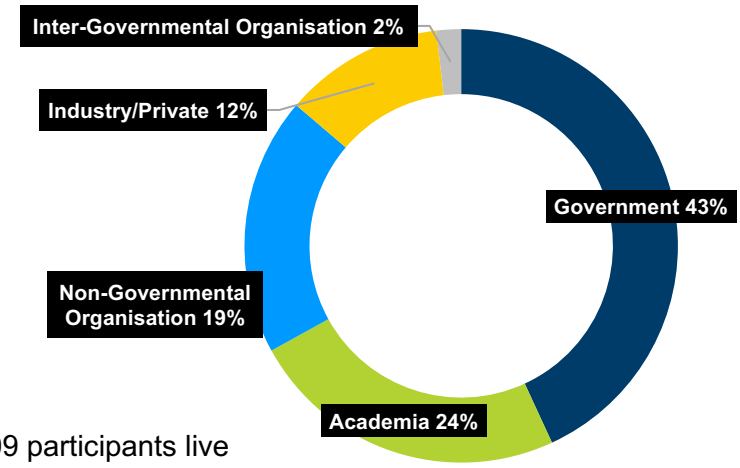
- When a decision is made to remove a pesticide from the market (due to **severe adverse health and/or environmental impact**), the pesticide can either be **immediately removed** (resulting in stockpiles) or **phased-out** within a specified time period (resulting in continued human and environmental exposures)
- Due to a **lack of guidance on mitigating risks**, particularly for low- and middle-income countries (LMICs), the World Health Organization/Food and Agriculture Organization (WHO/FAO) Joint Meeting on Pesticide Management (JMPM) is releasing a **guidance document** titled, '*Guidance on Options for Reducing Risk when Phasing-Out Pesticides*'
- **The trade-off between stockpiles and continued pesticide exposure** must be considered. To prevent ethical issues, **there must be a process to mitigate risks**
- The guidance document includes a table which provides **information for considerations when deciding to apply immediate or phased-out withdrawal**, with varying periods of time for ceasing import/sale/distribution, storage, and total phase-out, depending on the risk posed by the pesticide and the decision taken. It highlights areas of special attention such as ensuring capacity to implement and enforce restrictions, risk mitigation measures, risk communication, and stockpiles
- **Developing a risk reduction phase-out plan** is outlined in the document, and includes development on a phase-out strategy, legal aspects, risk reduction activities such as promotion of integrated pest/vector management and industry stewardship, risk communication, and financing of activities
- **Risk communication** is important as those potentially exposed need to have accurate and accessible information about pesticide hazards, appropriate to language and literacy levels. The guidance document includes steps for developing a risk communication plan, including leadership, goals, target audience identification, planning and designing messages, channels for communication, and resources to finance risk communication
- Part of the environmental management principles in Zambia include the **precautionary principle** (action taken with suspected harm before proof), the **polluter pays principle**, and **citizen access to environmental information**
- In Zambia, the process followed when deciding to regulate a pesticide includes investigation into the substance and its effects, stakeholder engagement (including industry, users, government, etc.), recommendations to the minister, communications to industry, and publication of a list of banned substances to inform the public

Breakdown of Discussion Participant Demographics

Regional Representation



Sectoral Representation



Total = 109 participants live

PRESENTERS

Prof Hanna-Andrea Rother is a professor and head of the Division of Environmental Health in the School of Public Health at the University of Cape Town and an honorary professor in the Department of Public Health, Environments and Society, Faculty of Public Health and Policy, at the London School of Hygiene and Tropical Medicine. She has over 30 years of experience in research, teaching and building capacity, particularly in Africa, on pesticides, risk communication and risk management. She has published widely on the topic and served for twelve years as a WHO expert panel advisor on the FAO/WHO JMPM. She is also currently an international board member of the European Partnership for the Assessment of Chemicals.

David Kapindula has nearly 30 years of working experience in the sound management of chemicals and waste at both national and international levels. He worked for the Government of Zambia for many years in various capacities and was a focal point for Chemicals and Waste Conventions. He served as Vice President of the Bureau of the 5th International Conference on Chemicals Management (ICCM5) for the Strategic Approach to International Chemicals Management (SAICM) from 2015 to 2023, representing the Africa Region. He served as the President of the 3rd Conference of the Parties to the Minamata Convention, Vice President of the Stockholm and Rotterdam Convention Bureaus representing the African region, Vice Chair for the Southern Africa Pesticides Regulator's Forum, member of the FAO/WHO Panel of Experts on Pesticide Management (JMPM) for 10 years, and chair of the Steering Committee on the Global Alliance for the Development and Deployment of Alternatives to DDT for Disease Vector Control under the Stockholm Convention and Africa Region Focal Point for Strategic Approach to International Chemicals Management (SAICM). David has also served as co-chair in various meetings of conference of parties for the chemicals and waste conventions and was one of the key negotiators during the development of the Minamata Convention on Mercury. He is currently serving as a senior advisor to the Africa region on chemicals and waste Multilateral Environmental Agreements (MEAs).

Helena Casabona has worked for the Swedish Chemicals Agency (KemI) since 1996. She is a biologist and toxicologist by training and has held different positions at the Agency over the years, both as a technical expert and manager. Her focus has been pesticide related tasks with an emphasis on human health hazard and risk assessment. She is now working as a strategic adviser and is involved in different development cooperation projects, including KemI's International Training Programme in chemicals management.

CONTRIBUTIONS FROM PARTICIPANTS

Disclaimer: The information in this digest represents the opinions of members participating from different stakeholder groups expressed during the discussion. The views expressed in this document do not necessarily represent the opinion or the stated policy of the Swedish Chemicals Agency (KemI) or DEH UCT, nor does citing trade names or commercial processes constitute an endorsement

The key discussion points raised by participants are presented under each question. Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of the participants' views.

QUESTION 1
Why should it be considered "good practice" to allow a phase-out period of pesticides to be banned to prevent obsolete stockpiles at the cost of continued human exposure?

- Prevents stockpiles of obsolete pesticides which can be costly to safely dispose of, and prevents sudden disposal of large quantities of pesticides, both of which can cause environmental contamination and damage. However, there should be restrictions as to who should have access to these pesticides and have sales and purchase records
- Allows time for farmers and businesses to adjust practices and find alternatives
- Promotes research into safer alternatives and allows industry and government to identify and mainstream substitutes/alternatives
- Prevents economic instability from sudden bans, e.g. loss of stocks, food supply impacts
- Provides time for transitioning to sustainable/safer alternatives, e.g. with training/education and stakeholder consultation
- Allows time for compliance and enforcement
- Farmers will not always want to give up their old stocks, they prefer trade-offs, or better still, reuse and even overuse, since profit margin is always the goal

Poll Results

Poll 1. In your opinion, is it a human rights violation to include a phase-out period when banning or withdrawing a pesticide from the market?

Yes	7
No	22

- It is also vital to consider the hidden costs linked to the continued use of a banned product, especially linked to farmers' health and the medical costs linked to long-term health effects. Many pesticides identified for banning are because of the severe health effects linked to the active ingredient/product
- I don't think the phaseout is a violation but rather, the introduction into the market without any knowledge of the risks (environmental and health).
- The time it takes to phase a pesticide may lead to more human health and environmental harm. There may be rush sales and overuse of pesticides, putting the environment at risk.
- It's not a human rights violation because one is considering both sides. The health and

safety of all humans as well as the consideration of those who would have financially legally imported products until the phase-out point.
- I think it is a human rights violation to allow pesticides in the market that cannot be used without harm to health and environment. If the phase-out period done with an effort to reduce the risks and exposure, it is a way to address the human rights violation. It is an obligation of states to make sure they do not allow chemicals that harm health and lives of their citizens. It is a responsibility of the industry to make sure they do not manufacture chemicals that harm health and lives

Poll 2. In which situations do you feel there should be NO phase-out period?

- High acute toxicity
- High risk to human health and/or the environment
- Acute health risks, with severe, immediate harm to human health, including risks such as acute toxicity, cancer, neurological damage, or birth defects
- HHPs
- When the phase-out exists so that manufacturers are not going to lose money
- When there is sufficient evidence to prove that the product is causing irreversible harm to human health
- When the health of people is at most risk
- When there is an unacceptable high risk from the use of that pesticide
- Where there are available alternatives and measures of dealing with stockpiling
- When there are suitable and safer alternative products in the market
- High acute toxicity, long half-life, bioaccumulates, very volatile
- When deaths are so high that the country in question cannot manage the continued use

QUESTION 2
Please give examples of the legal provisions in your country, or the country you work in, for when a decision is made to "ban" a pesticide (including phaseout period or not)? (Include the country in your response)

South Africa
- DDT operators are employed on a temporary basis, especially when there is an outbreak during hot and rainy seasons
- The Pesticide Management Policy of 2010 refers to types of pesticides that should be banned. The policy focuses on highly hazardous pesticides, such as endocrine-disrupting chemicals, immunotoxins, and those harmful to the environment. It includes provisions for restrictions, phasing out, and complete bans to address these pesticides
- The Registrar of Act No. 36 of 1947 had decided to phase out active ingredients and formulations meeting the criteria of carcinogenicity, mutagenicity, and reproductive toxicity (CMR) categories 1A or 1B for the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The objective was that products meeting these criteria will not have their registrations renewed from June 2024
- The phase-out period is included. For example, methyl bromide is only in use under Critical Use Exemption on ISPM 15, Quarantine and pre-shipment, structural building

Nigeria
- A phase-out period is usually included during the ban of pesticides
- The most recent ban of Dichlorvos (sniper 100ml only) had a 6-month phase-out period

Zimbabwe
- DDT was banned for use in agriculture. Exemption made for malaria control with a phase-out period being implemented

Malawi
- There are legal provisions in the Pesticides Act (CAP. 35: 03) to ban a pesticide (i) for example Section 2 of the Act stipulates the ban on the use of a pesticide and (ii) Section 11 (f) of the Pesticides Act and section 29 of the Pesticides regulations, 2023 stipulates a temporal ban on the importation or manufacturing of a particular pesticide to control stockpiling. However, in both provisions, there are no phase-out periods

Comoros
- DDT has been banned for over 7 years now
- Chlorpyriphos is in the process of being banned with restrictions and importations

Zambia

- The minister may, on the advice of the Environmental Agency, ban, severely restrict, or restrict the use or production of a pesticide or toxic substance where the minister determines that the unregulated use or production of the pesticide or toxic substance is or is likely to be harmful to human health, animal or plant life or the environment

Uganda

- The Agriculture Chemicals Control Act of 2006 defines the chemicals that should be banned, but it is rather vague and lacks a clear line of action

Other/General

- Sometimes the decision to renew is without much notice
- Penalty fees are so small - the industry just goes ahead to pay
- Risk communication is an area that is not often fully utilised to ensure public awareness and participation during phase-out

Poll Results

Poll 1. What role should the industry play to reduce risks when a pesticide is banned?

- Industry should comply with the ban, seize production of the banned chemical, and focus on alternatives
- Invest in creating safer alternatives
- Provide/seek out/research alternative safer, effective alternatives
- Compliance with bans and regulations: the industry must promptly comply with the ban, halting the production, sale, and distribution of the banned pesticide. This ensures that no additional exposure occurs
- Proper disposal and remediation: manufacturers and distributors should ensure the proper collection, disposal, or remediation of banned pesticides that may remain in circulation or on farms
- Mitigating risks, ensuring a smooth transition, and protecting both public health and the environment
- Industry should play a crucial role in informing consumers/society
- Raise awareness and provide training to make people aware of the available alternatives and to avoid buying banned pesticides from the black market
- Stop the manufacturing and importation of such a banned product
- Where possible, the industry should actively engage in the disposal of the banned pesticides
- Industries should comply and provide mitigation measures to avoid use of the pesticide
- They should provide provision for repossession of obsolete products, assisting farmers with collection and safe disposal of banned products
- Ensures that a banned pesticide is withdrawn from the market and production is immediately ceased

Poll 2. What experiences can you share with members when removing a pesticide from the market?

- Important to plan for adequate time for complete withdrawal of the product as different stakeholders will respond differently depending on when they received information on the ban
- The product will still be available after the withdrawal period if it is still allowed in the neighbouring countries
- Users still have resistance to accept withdrawal of the product
- Awareness-raising is needed for users to understand the effect of the banned product on human health and the environment, as well as for them to understand their role in the ban
- The process is consultative, and from the Zambian scenario, it's important to have a legal framework in place that clearly outlines the process
- Adequate education to farmers/users on why it has been removed, the timeline and implementation, as well as alternative options or approaches for control

- Use replacement substances that probably are of higher long-term toxicity. Also, when one single substance is substituted by several others, it's more difficult to track them and have a risk overview
- The challenge we are having in South Africa is the issue of Aldicarb which was banned in 2015, but we still find it at street vendors, resulting in many cases of poisoning
- Zambia: wide stakeholder engagement and user education on the effects
- Pesticides in a restriction category take 2 years to register and carry a higher registration fee, minimising the appeal to continuing registering it
- Setting up a phase-out period of at least 24 months to avoid stockpiles
- Removing a product faces some resistance from agriculture dealers as well as the end-users. If the product is still being used in another country, it can be smuggled in
- Providing alternative pest control methods

QUESTION 3
What risk mitigation and risk communication measures are currently in place in your country to protect human health and the environment during a phase-out period? (Include your country in your response)

Malawi
- Awareness campaigns on the phase-out plan and risks associated with the product:
  - Promoting effective alternative methods e.g. biological and cultural methods
  - Encouraging use of PPE during product use and handling
  - Conducting trainings on safe disposal, Integrated Pest Management
  - Restriction of the product to specific uses which are only deemed necessary
- Risk communication measures
  - Posters, leaflets, television, and stakeholder meetings
  - Notices in newspapers
  - Organisation websites
  - Radio interviews

Nigeria
- One of the mitigation strategies I have noticed is creating awareness that this pesticide has been banned. There are usually news articles, radio announcements, etc.

Zimbabwe
- Training of environmental health staff and sprayers
- Licensing restricted to Ministry of Health DDT usage reported to the WHO

Comoros
- Communications in all agricultural workshops are currently being implemented on the risk of pesticide misuse in the Comoros

Zambia
- The Environmental Management Agency has an Environmental Communication Strategy
- Under projects for the management of chemicals and waste, there are communication strategies that are specific to a project and the chemical of concern

South Africa
- Prohibition of registrations for pesticides identified as highly hazardous or harmful to the environment
- Evaluation of risk assessments and applications for derogations for temporary extensions of registrations
- Integrated pest management and legislation are some of the risk mitigation measures in place in South Africa
- Material Safety Data Sheet is one of the risk communication measures used
- Risk communication needs more efforts

Other/General
- Risk communication is particularly difficult when pesticide industry public relations is strong
- Risk communication to policymakers is paramount
- Radios, workshops, but people living with disabilities are not well catered for in all these attempts at communicating risks
- Through farmer field schools

Poll Results

Poll 1. What is your opinion about the phase out table presented, and would you consider putting this in your legislation?

- It is very practical and would consider putting it in policy
- Yes, also provides information on the decisions to phase-out
- The table takes a very structured approach. It would be useful if all countries could put this into their legislation so that phase-out periods are handled equally
- Yes. They seem flexible enough to be contextualised in different countries

Poll 3. Give examples of risk communication measures used in your country/the country you work in. How have the risks been communicated to the public and farmworkers?

- Yes, regulatory texts should take these issues into account
- Mandatory 3-year education for farmers, where risk mitigation (for pesticides) is taught
- No adequate communication in South Africa, requires more readily available or accessible information on risks to farmers
- Farmer field schools
- Risk communications in South Africa are very formal and do not take farmworkers or the public into account when it comes to delivering this information. Different languages/education levels etc.
- Regulatory texts
- Notices in newspapers
- Organisation websites
- Radio interviews
- Through training, use of flyers, publications, create awareness in the communities, conducting workshops
- In Switzerland, there were two initiatives a few months ago to completely ban all synthetic pesticides. We had to vote on it, which lead to an active discussion in the society
- Farm workers - through trainings, posters
- Medical surveillance: if the pesticide related health issues are discovered/ addressed early it would assist in mitigation measures

Questions & Answers

Several questions were answered live during the session (view the recording here), the rest, included in this digest, were answered through typed responses by Andrea Rother.

During the phase out, are street markets or illegal markets also considered?	This is a good point. One of the reasons for banning a pesticide in some countries is linked to their use as a street pesticide.
With regards to DDT: I think a phase-out period allows development of alternatives compared to a complete ban. Most LMICs are still using it, although it was banned. So was the complete ban effective?	There are many alternatives to DDT for malaria control which many countries have implemented since they banned the use. However, some countries see the alternatives as more expensive. Some must be applied more frequently as they do not last as long as DDT or not easily applied to the inside of homes/walls.
In the phase-out process, is the efficacy of the present pesticide considered? For instance, pesticides that are no longer effective in killing or controlling pest populations due to pest resistance?	This could be a reason why the pesticide is being banned. However, the phase-out period is purely for using up stocks and not about efficacy.
To ask about human rights may be oversimplifying the issue. I would focus on risk vs benefit of each decision. Stockpiling	In the risk benefit analysis, one needs to consider the health effects of the individuals who will continue to be exposed to a pesticide with

may cause bigger challenges especially in LMICs which usually do not have capacity for destruction of stockpiles	severe health hazards/toxicity so that governments are not faced with the cost of destroying the stocks. One must ask, how each of us would feel as a farmer to use a product daily, often with no personal protective equipment, not knowing that it will be banned in say two years' time because it is, perhaps, carcinogenic, mutagenic or has reproductive toxicity.

RESOURCES

1. Zimbabwe Environmental Management Agency https://www.zema.org.zm/publications/
2. Withdrawal of pesticide product authorisations and permits. United Kingdom Health and Safety Executive. https://www.hse.gov.uk/pesticides/applicant-guide/withdrawal-of-authorisations-and-permits.htm
3. Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC https://eur-lex.europa.eu/eli/reg/2009/1107/oj

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