UCT PESTICIDE NETWORK DISCUSSION FORUM

Division of Environmental Health | UCT

School of Public Health Departement Openbare Gesondheid Isikolo Sempilo Yoluntu

Sweden Sverige

DISCUSSION DIGEST

Identifying Levers to Enable Less Chemistry-Dependent Agricultural Systems

Issue 12 of 2023
Discussion: 16 Nov 2023

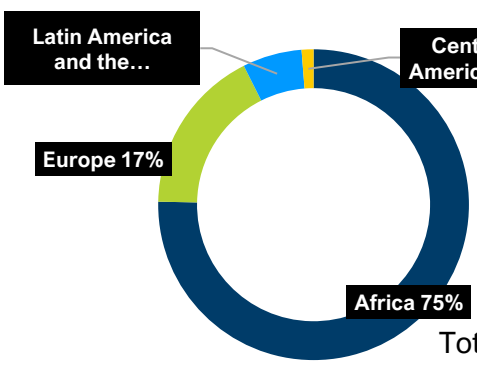
This document summarises the University of Cape Town's Division of Environmental Health's Pesticide Community of Practice discussion held on 16 November 2023, titled: "Identifying Levers to Enable Less Chemistry-Dependent Agricultural Systems". This digest presents the issues and points raised and the information shared by participants in response to three questions prepared by the presenters, who are editors and/or contributors of the Environmental Science & Policy special issue, "Removing pesticides: innovations and alternatives for a changing food system":

- **Eve Fouilleux** (French National Centre for Scientific Research – CNRS & French Agricultural Research Centre for International Development – CIRAD)
- **Alexis Aulagnier** (Sciences Po Bordeaux)
- **Fiona Kinniburgh** (Technical University of Munich – TUM)
- **Tomás Palmisano** (University of Buenos Aires – UBA & Consejo Nacional de Investigaciones Científicas y Técnicas)

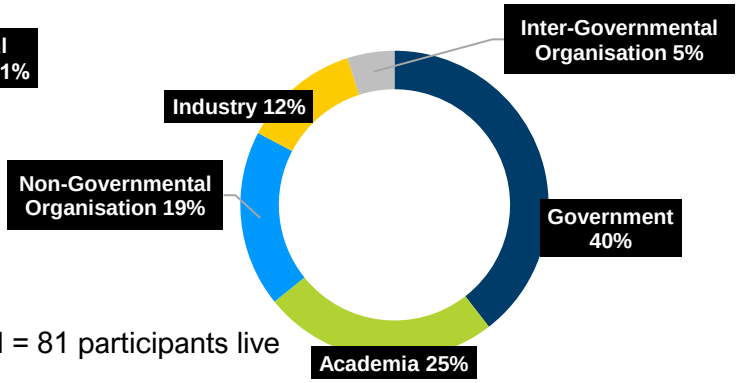
Eve introduced the topic of alternatives to pesticides and the politics around this touching on substitution, for example, using less harmful pesticides or biopesticides, and systemic change, which involves changing farming systems and processes, such as agroecology. Alexis's presentation focussed on technological substitution, discussing the technical and political processes around substitution as a policy option, using the case study of Ecophyto, a pesticide reduction plan in France. Fiona presented on the roles of expertise and the types of expertise needed in finding alternatives, looking at the case of glyphosate in France. She included the limitations and implications of using expert knowledge in policy. Tomás used a case study from Chile and Argentina to discuss the narratives around practices in reducing pesticide use, looking at various drivers and influences in the use of pesticides or alternatives, and understanding the sustainability of alternatives. The discussion recording can be found here, and the presentation slides here.

Breakdown of Discussion Participant Demographics

Total PDF Region Representation



Total PDF Sector Representation



Total = 81 participants live

PRESENTERS

Eve Fouilleux is a senior research director at the French National Centre for Scientific Research, Laboratoire Interdisciplinaire Sciences Innovations Sociétés (LISIS), University of Paris-Est Marne-la-Vallée, and an associated researcher at the French Agricultural Research Centre for International Development, UMR MoISA, Montpellier Interdisciplinary research Centre on Sustainable Afrifood systems. She is a political scientist working on global and multilevel policies and politics in the field of food, agriculture, and natural resources. She works on public policies and policymaking, through a political sociology perspective, with a special focus on the role of ideas in policy changes in a multilevel governance context. She has published extensively on the European common agricultural policy, on food security policies in Africa, on organic agriculture policies and regulations in France and the EU, and on global policies (food security, biodiversity, sustainability voluntary standards, bioeconomy). For some years, her empirical research has focused on organic farming and agroecology policies. She co-coordinates a research action project on institutional innovations for organic agriculture in Tanzania, Uganda, and Morocco.

Fiona Kinniburgh is a postdoctoral researcher in the Chair of Sociology of Science at TUM. Combining perspectives from political science and science and technology studies, her work broadly examines the roles of science and public policies in enabling deep societal transformations towards sustainability. Her PhD in political science investigated multilevel governance of transitions to sustainable agrifood systems and the role of expertise in policy processes, focusing on efforts to reduce or discontinue pesticide use at the international level and in the European Union. She previously worked on various projects relating to climate change, biodiversity, and agricultural policy at the Institute for Sustainable Development and International Relations (IDDRI) in Paris and at research institutes in the United States of America.

Alexis Aulagnier is a sociologist and a political scientist, currently working as a postdoctoral researcher at Centre Émile Durkheim, Sciences Po Bordeaux . He focuses on environmental and climate policies. His PhD thesis was dedicated to the analysis of pesticide reduction policies in France. He investigated the variety of levers used by government officials to reduce dependency on these chemical substances in the farming sector.

Tomás Palmisano holds a PhD in social science from UBA, Argentina. His research interests span across both critical agrarian studies and social movements in Argentina and Chile. He is an assistant researcher in the Consejo Nacional de Investigaciones Científicas y Técnicas of Argentina and he works in the Instituto de Investigaciones Gino Germani (UBA). His research project focuses on agrarian change and alternative agricultures in rural territories subject to the pressure of agribusiness.

DISCLAIMER: The information below represents the opinions of members, participating from different countries, expressed during the discussion, and shall not necessarily be taken to reflect the official opinion of the Division of Environmental Health, University of Cape Town, or the Swedish Chemical Agency.

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

Question 1: What are the political and social consequences of technological substitution as an alternative to pesticides?

Regulatory and Political

- Governments may need to adapt or create new regulations to govern the use of technological substitutes, which could involve extensive discussions and negotiations among policymakers, scientists, and industry stakeholders
- New regulations need to be adopted which may differ regionally, which is also a challenge
- The distribution of funds supporting research and development may become a subject of political debate
- The pesticide industry is largely funded by the biggest economies in the world with influence on politicians. Industry could pressurise governments to reject policies that are in favour of alternatives
- Government hindrance to switching to alternatives if they make a lot of money from the production of pesticides and personal protective equipment (PPE)

Financial

- Potentially higher costs, especially for low-and-middle-income countries (LMICs), which could lead to unequal access for some smaller-scale farmers
- The higher cost of technological substitutes than traditional pesticides could impact the overall cost of food production, and social acceptance of these substitutes may be difficult
- The cost of orienting users to new technology and phasing out pesticides
- Governments may need to allocate funds for research and development to support the creation and improvement of these technologies
- Higher enforcement costs

Social

- Introduction of technological substitution may reduce job opportunities
- It may involve higher labour input
- Reduction cases of pesticide poisoning
- The introduction of new technologies may clash with traditional farming practices or cultural beliefs
- Ethical considerations may also play a role in shaping societal acceptance
- People who are employed to be pesticide applicators may lose their jobs
- Reduction of yield may affect farmers' means to make a living because of the reduced output

Other

- Resilience is very important, and more diverse systems need to be more productive but also more resilient
- Technological substitution of pesticides is not well understood by experts in LMICs
- Substitution alone will not lead to fundamental change. Farmers will also need to stop preventive spraying, improve monitoring of pests, and implement practices that will prevent them, so that pesticides will only need to be used as a last resort. With the Rainforest Alliance, this is a requirement, and farmers are being supported through it
- Technological substitution is necessary but restrictive and not sufficient

Question 2: What role does expertise play in the development of policy to reduce pesticides or transition to alternatives?

- There are different types of experts, and no single type is necessarily "better" than another. The mobilisation of experts is itself a political process which reflects specific priorities of the actors involved in the mobilisation process

Understanding the Problems

- Expertise is important as environmental experts have a clearer understanding and vision of where the country was, where it currently is, and what the future holds for pesticides through the knowledge gained from scientific studies
- Environmental experts provide a detailed description of problems a country faces with the use of certain pesticides, regarding both health and environmental consequences
- Conduct research and provide a policy brief on findings to policymakers for decision-making
- Expertise would approach this with an understanding of toxicological or ecotoxicological aspects that come with a particular pesticide, and make good recommendations
- Experts in fields such as agronomy, ecology, and toxicology contribute to the scientific assessment of risks associated with pesticide use as this understanding is important for developing policies that prioritise environmental and human health

Finding Solutions

- Expertise play an important role in providing tailor-made solutions for different contexts. An expert will know what works in high-income countries (HICs) may not work in LMICs
- Experts should provide the cheapest and most effective and usable alternatives and substitution practices, and sensitise and communicate their results to the stakeholders
- Expertise play a role in developing and introducing the available alternatives which have comparative advantages over pesticides
- Different experts may have very different views on what is to be done, based on their scientific evidence

Communication and Collaboration

- Experts play a role in communicating evidence on pesticide risks and alternatives
- Experts could facilitate communication and collaboration among various stakeholders, including farmers, industry representatives, environmentalists, and the public. Engaging these diverse groups is crucial for developing policies that are acceptable, feasible, and inclusive. It is also important to ensure that experts avoid conflicts of interest and that all voices are heard in the consultation processes
- Close collaboration between experts and policymakers is needed for sustainable change in pesticide use or selection of alternatives
- Many farmers need to be made aware of pest resistance, which results in making cocktails or increasing pesticide use beyond recommended doses. If pest resistance were better understood, perhaps there would be more willingness to try alternatives
- Provision of education and extension services to farmers
- Ensuring government and policymakers receive informed advice in policies related to pesticide alternatives. Currently, people rely on the knowledge of "I have used this for many years" and fear the use of alternatives they deem are foreign to them. Expertise will ensure facts, efficacy, etc., are conveyed and is at the core of introducing alternatives to the public

Economics

- Economic calculations of alternatives should also take hidden costs on health and environment into account
- These kinds of costs are generally taken on by the government. From a policy perspective, quantifying these costs can potentially help governments to negotiate subsidies for different forms of production that are less dependent on pesticides and have lower costs for the environment and public health (direct and indirect)

Evidence-Based Policymaking

- Experts can help form a reliable evidence base rooted in health surveillance, agricultural production, and expertise from farmer groups
- Scientists and researchers could help policymakers make informed evidence-based decisions
- Given that resistance to the reduction or withdrawal of pesticides is vigorous, experts need to ensure that public policies are more supportive of organic farming
- Experts provide advice based on evidence and wide stakeholder consultations that help to produce well-informed pesticide-related policies

Other

- Capacity to design, pilot, and recommend alternatives is a big challenge in Uganda. Often, there is no capacity to produce and promote alternatives that have been tried and worked in other settings. Capacity across all sectors is very important in ensuring fast and effective transition to alternatives
- It is high time to bring scientific skills to the lower-level practitioners, especially farmers

Question 3: In your country, what techniques and practices do farmers carry out to reduce the use of pesticides and why do they choose these practices?

South Africa

- Low-or no-till agriculture, planting bean varieties close to the ground, biological control, and crop rotation
- Cultural practices such as the use of cow dung as fertilisers
- Biopesticides, even though the use is slower than in developed countries; the shift is due to the demand for pesticide-free food and the global recognition of the health effects of pesticides on the food consumed

Uganda

- Biopesticides are produced by some largescale farmers especially in sugarcane and tea growing
- Integrated Pest Management (IPM) methods are also used but at a very small scale

Malawi

- The use of biopesticides that include bacteria, fungi and botanical based formulation are increasingly being promoted. There are several formulations that have been approved and registered for use in different crops e.g., BT, Trichoderma, azadiractin, and Anacardium
- Farmers also utilise cultural practices such as intercropping, the use of resistant varieties, and sanitation to reduce pest infestation and conventional pesticide usage
- Physically/manually killing the pests is also used in both agricultural and household settings. Pests like fall armyworms, rodents and roaches are commonly controlled using this method. These practices are mostly cheaper and less toxic to farmers

Tanzania

- Use of local materials like ash, soap, chillis, and mechanical means because they are cheaply available
- Large plantations use biopesticides and biological control agents
- Smallholder farmers use crop rotation, resistant varieties, and sanitation of crop residues

Lesotho

- Use of cow dung and manure is a cultural practice that is substituted for pesticide or fertiliser use. This improves the quality of the soil and the plants

Nigeria

- Use of manure
- Use of mosquito nets to cover plants and reduce insect infestation
- Mulching films to reduce weeds
- Scarecrow and voodoo are also methods used

Eswatini

- The level of transition from pesticide use to environmentally friendly strategies is very slow mainly because there is still a lack of risk communication strategies
- Crop rotation
- Mulching
- Less cultivation
- Cultural practices and crop rotation
- Some farmers use soapy water, especially in horticulture

Zambia

- Farmers use traditional methods to reduce the use of chemicals, including physical methods and use of plant-based pesticides

Madagascar

- Biopesticides in order to reduce pest infestation
- Crop rotation
- Use of natural preparations of low concern for small-scale farmers, and use of mechanical means combined with animal traction for weeding to avoid chemical weeding

Ethiopia

- Natural manure or compost for small farmers
- Crop rotation

Benin & Ethiopia

- Organic cotton farmers are successfully using a food spray technique to attract natural enemies and then neem or other locally produced biopesticides. https://www.pan-uk.org/food-spray/

POLL RESULTS

Is technological substitution an option favoured to reduce pesticide use in your country?

- Yes = 10 (53%)
- No = 5 (26%)
- Don't Know = 4 (21%)

What are the challenges for substitution to be a policy option in your country? Name your country in your response

- Technological capacity
- In Uganda, policymaking is often easy and fast but often very difficult to enforce
- The challenge is that my country doesn't manufacture pesticides, almost 94% of the total pesticide in the country are imported from other countries
- Zambia: cost
- Convincing users and politicians that alternatives work and do not reduce agricultural production
- Guyana: generally, the substitution tends to be replacing one pesticide with another rather than improving technology
- South Africa: might get a lot of opposition from political spheres, considering that it may affect job security
- Adopting new technology in a developing country such as South Africa would be challenging as it would involve substantial upfront costs for farmers leading to reduced access for farmers
- Nigeria: corruption, the policymakers tend to favour already existing pesticide producers instead of the interest of pesticide users
- Lesotho: funds and properly developed agricultural policies
- Togo: the introduction of new technologies may clash with traditional farming practices or cultural beliefs. Ethical considerations may also play a role in shaping societal acceptance
- Ethiopia: weak adaptation and training of new technology by end users, less political commitment

- South Africa: resistance or reluctance by chemical manufacturers and sometimes users to make use of available alternatives
- Ethiopia: willingness and accepting or clearly understanding their effectiveness
- South Africa: job creation is at the core of political rallies which may challenge any proposal that will threaten the promises made to the public
- Eswatini: lack of knowledge and understanding of technological substitution processes and there is limited availability of alternatives. Agricultural technologies to substitute pesticides takes time to implement
- Limited access to technology and information may exist among different farming communities. There would also be resistance to change as traditional farming practices are deeply rooted in culture
- Ghana: Change of government and political interference, and party politics activities
- Uganda: obtaining locally suited and economically viable substitutes may require a lot of investment in research
- Ghana: Need farmers inputs in sustainable agriculture development for new approaches. Farmers participation and involvement in the policies will be the gamechanger

What policy levers exist or need to be changed/created in your country to reduce pesticide use? Name your country in your response

- South Africa: data on the extent of poisonings, health effects, and environmental contamination
- Zambia: there is need to amend the law and encourage the use of alternatives
- South Africa: Agricultural Remedies Act and the Pesticides Management Policy
- Uganda: incentivising use of alternative pest control measures
- Ethiopia: pesticide registration and regulation
- Kenya: regulations and guidelines for public health and environmental safeguards need to be changed or created
- Ethiopia: support the farmers in finance and technology
- Ethiopia: the use of biopesticides is not emphasised at policy level
- Nigeria: financial profit and loss shouldn't be a major factor in policy development. This should change. Focus should be more on health
- Guyana: the country's agriculture strategy 2022 to 2028 include key indicators to reduce highly hazardous Pesticides (HHPs) and increase registration of biopesticides
- South Africa: IPM is promoted as a sustainable approach to pest control. There is also the Pesticide Act 36 of 197 which aims to ensure efficacy standards are met

Is the assessment of alternatives to pesticides part of the registration or other policy processes in your country?

- Yes = 9 (41%)
- No = 5 (23%)
- Don't know = 8 (36%)

What kinds of resources are farmers and other actors (e.g., farm advisors) using for identifying alternatives for pesticides and who provides these?

- Local resources like plant pheromones
- South Africa: I am not sure this is being done; not sure farmers are being engaged with for identifying alternatives
- Local plants - extension officers
- Neem oil
- Ethiopia: indigenous knowledge is widely used to identify locally available materials sourced by themselves
- Farmers together with farm advisors would play a key role in identifying alternatives
- Lesotho: I am not sure there are any assessments being made for use of alternative pesticides
- Expertise from researchers and agricultural experts
- Resources - agro dealers provide these resources as a form of marketing

- Ethiopia: space for testing
- Biopesticide practices e.g., neem applications and various local species depending on location and type of farming
- For farmers, a main source are extension officers. They get their knowledge from buyers, NGOs, and certification standards
- Government and agricultural agencies such as the Department of Agriculture, Forestry and Fisheries (DAFF) provide information on sustainable farming practices and alternatives to pesticides. IPM centres also provide resources and guidelines for farmers
- Cultural practices in gardening techniques, use local pesticides species like weeds, sunflower leaves, crop rotation , ladybugs control aphids, native flora and leaves, reduce pests, habitats
- Tanzania: biopesticides from Mabwepande, local practitioners, innovative farmers trained to mix local species to make pesticides, IRTECO trained farmers, utupa (Tephrosia)

What alternatives to pesticide use are used by small-scale and commercial farmers in your country? Name your country in your response

- Crop rotation
- Resistant varieties
- Uganda: biopesticides, organic farming and other IPM measures on a small scale
- South Africa: ash, BT, hand weeding, ducks for weeding
- Use of animal waste is common in most parts of Kenya
- Mostly in my country Togo, traditional agriculture uses plant extracts (biopesticide), usually neem extract, to avoid conventional pesticides
- Uganda: local concoctions, use of resistant crop varieties, early planting, mixed cropping, push-pull technology, phytosanitary measures such as pruning
- South Africa: plant extracts, bacteria, algae, fungi (biologicals)
- South Africa: biological control, crop rotation and diversification, polyculture, neem-based products and organic farming practices
- Crop rotation
- Tanzania: local materials like ash, chillis for small scale, biopesticides for commercial farmers
- Malawi: botanical pesticides e.g., neem-based; physical methods: killing/crushing the pest; cultural control e.g., sanitation, tillage
- Lesotho: manure, soapy water, and cow dung
- Eswatini: in sugarcane production they practice green harvesting. Small-scale farmers do practice intercropping, mulching, crop rotation, etc.
- Tanzania: commercial farmers use biopesticides and biological control agents while small-scale farmers use resistant varieties and crop rotation to reduce infestation of pests in their farms
- Azolla pinnata, farmers use it as a fertiliser in Madagascar, some of them use neem
- Zambia: they use traditional methods that are physical, biological or plant-based pesticides. These include physical weeding, use of plants such as a paste of Lantana camara leaves as a pesticide
- Togo: farmers find the use of biopesticides difficult and inefficient. Some also find them expensive and complex

What practices/elements/narratives influence the sustainability of the alternatives mentioned in the previous poll?

- That agricultural production increases or stays the same with alternatives
- Environmental friendliness of the alternatives
- Associated cost of the alternatives
- Capacity, especially for large scale farmers
- Cost of synthetic pesticides
- The narrative that the alternatives are less effective
- Quantity needed for desired effect
- Ethiopia: health benefit, quality, and market value
- Affordability and ease of accessibility of these alternatives

- The methods are difficult to implement due to cost and the time it takes to prepare the alternative pesticide. Some methods are not as effective as chemical pesticides
- Capacity-building, advocacy, and demonstrations of best practices to influence farmers to transition to alternatives and sustain their adoption
- Eswatini: deployment of Agricultural Extensions Officers to continuously probe and educate farmers on good agricultural practices
- South Africa: people being used to a particular pesticide and/or the knowledge about the alternative pesticide. It's about behaviour change or the belief that a particular alternative can do the same job
- Togo: farmers find it inefficient and time-consuming to use biopesticides. This is a problem from the known organic agriculture of the country
- Biodiversity conservation, soil health management, resilient crop varieties, community engagement and education, policy support, and climate-resistant practices
- Effectiveness of the alternative – ineffective alternatives will fall out naturally
- Local market does not care whether a farmer used chemical pesticides or alternatives
- Effectiveness of alternatives
- The farmers and landowners regard biological control as a slow process; they need immediate results

RESOURCES

1. Environmental Science & Policy special issue: Removing pesticides: innovations and alternatives for a changing food system. Edited by: Frédéric Goulet, Eve Fouilleux & Alexis Aulagnier. https://www.sciencedirect.com/journal/environmental-science-and-policy/special-issue/10862JMK1LB
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6. ISEAL Alliance App for pesticide alternatives: https://apps.apple.com/in/app/pesticides-alternatives/id1461460997
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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

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