

# Lessons learned in Africa

Michael Norton, from the European Academies Science Advisory Council, and Baldwyn Torto, from the International Centre of Insect Physiology and Ecology, talk with *Nature Sustainability* about recent efforts to address neonicotinoid insecticide risks in Africa.

## ■ What are neonicotinoids, or 'neonics', and why are they controversial?

**BT:** They are a class of insecticides based on nicotine that interfere with the nervous systems of insects. Although aimed at killing pest species, they do not differentiate between target and beneficial insects. Increasing evidence over the last two decades suggests that collateral damage affects beneficial insects and birds and so undermines ecosystem services in agriculture and beyond.

## ■ How does Africa compare with other world regions for neonics use and agricultural context?

**BT:** Although the effects of neonics across different regions may be similar, what makes the difference in Africa is a wide diversity of agro-ecological and socio-cultural systems and practices. Enterprises range from small-holder farmers with poor literacy to large industrial farms. Agricultural environments range from extreme deserts to rainforests. Africa is also home to a rich diversity of pollinators and edible insects at risk of harm from neonics.

## ■ What issue motivated this collaboration, and how did it start and evolve?

**MN:** In 2015, the European Academies Science Advisory Council (EASAC) reviewed neonics' effects on agriculture and ecosystem services. The review suggested neonics, besides suppressing insect pests, were harming pollinators and natural enemies given their lack of selectivity, sub-lethal effects, and ability to spread given their water solubility. The evidence convinced European Union (EU) countries to ban the outdoor use of the three main neonics varieties in 2018. After the EU ban, the umbrella group of which EASAC is a member, the InterAcademy Partnership, wanted to leverage this momentum. They decided to focus first on Africa given growing pressures on agriculture and threats to food security there, reflected in Sustainable Development Goals (SDGs) 2 (hunger), 14 (water) and 15 (land). EASAC then worked with the Academy of Science of South Africa (ASSAf) and the Network of African Science Academies



Michael Norton.



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(NASAC). In order to develop broad policy recommendations, they convened experts from across Africa to survey studies covering most of the continent.

## ■ What are the backgrounds of those involved?

**BT:** A group of 30 experts was selected from 17 countries covering the main 4 geographical areas of Africa (North, West, East and South). Experts were nominated from government departments, research organizations and universities, and brought expertise including toxicology, bee research, agricultural-pest management, indigenous knowledge, farmer awareness, and education.

## ■ What is unique about this effort?

**BT:** Africa's agro-ecological diversity and wealth is not mirrored by its scientific resources. Research efforts and infrastructure are limited and dispersed across large distances and different languages and cultures. This effort was unique in bringing these dispersed resources

together to build on the extensive work already carried out in Europe and North America. It also directly addressed the policy issues and recommended reforms based on a literature review of credible scientific evidence.

## ■ The collaboration resulted in the 18 November 2019 report 'Neonicotinoid Insecticides: Use and Effects in African Agriculture. A Review and Recommendations to Policy Makers.' What are the key takeaways?

**MN:** Africa is the world's fastest-growing market for insecticides, and all African countries seem to be using neonics at this point. Populations of honeybees, edible insects and insectivorous birds are declining, consistent with similar trends in Europe. In using neonics to control mirid bugs in cocoa trees, side effects include the proliferation of secondary pests given destruction of their natural enemies, a pattern seen elsewhere in Africa. Pollination of cocoa flowers by the natural pollinator, a midge, has also been affected, and expensive manual alternatives

had to be introduced. Pesticide resistance has been reported in vegetable-growing areas, and levels of neonics in African honey are similar to levels found in Europe before restrictions. Regulation, education and funding still lag. Regulations specific to neonics were applied in only a few African countries. There is also a lack of adequate capacity for extension services, which are critical for encouraging judicious pesticide use by educating farmers, particularly small-holders, about beneficial insect services and principles of integrated pest management (IPM). Africa needs more regional centres of expertise to provide associated research, advice and training. Finally, aid agencies should better promote sustainable agriculture as part of economic development.

■ **Who is the target audience, and what do you hope to achieve with the report?**

**BT:** The main targets are African policymakers and institutions, including the African Union, the Regional Economic Communities and national authorities. International aid agencies are another key audience. We also hope manufacturers of neonics and recent analogues will accept that their products should be used more

selectively — practices such as using neonics as seed dressing and to drench soil ensures most of the active ingredient misses pest targets — and not be driven solely by increasing sales. We hope it will add momentum to the calls for a pesticide-registration system that does not approve non-selective and mobile pesticides, which history suggests ensure wider damage. Ultimately, we hope sustainability will be increasingly seen as the foundation for food security.

■ **What were the main challenges?**

**MN:** We expected more difficulties than we encountered with such a diverse group, but local organizers (especially ASSAf) and the International Centre of Insect Physiology and Ecology helped generate a real sense of partnership. The fact that individuals had been nominated by their academy gave everyone a sense of shared responsibility, both among African countries but also with scientists providing input about Europe's experience. Workshop discussions were lively, but we had no difficulty reaching a consensus to adopt IPM strategies — such as monitoring and targeted, ecologically informed efforts to suppress pest populations without overusing

pesticides — to manage pests and to promote ecosystem services.

■ **How could the tension between agricultural intensification and biodiversity and ecosystem services conservation be addressed in Africa?**

**BT:** There is an imbalance in resources and drivers. Economic reasons drive agricultural intensification with little or no consideration for long-term impacts and implications. Meanwhile, authorities lack resources, knowledge and the power to influence. One potential driver of change would be for pesticide companies to see their role more broadly and as oriented toward sustainable agriculture. In this context, at least one neonics manufacturer, Syngenta, has shifted its corporate objective to supporting 'responsible and sustainable agriculture'. We hope this shift is sincere and that it encourages others. As the ongoing pandemic is teaching us, we have a common stake in sustainability issues.

Interviewed by William R. Burnside

Published online: 10 August 2020

<https://doi.org/10.1038/s41893-020-0571-0>