THE FUTURE OF RISK ASSESSMENT IS NOT RISK ASSESSMENT:

*Could improved farmland **biodiversity** mitigate marginal risk assessments for pesticides?*

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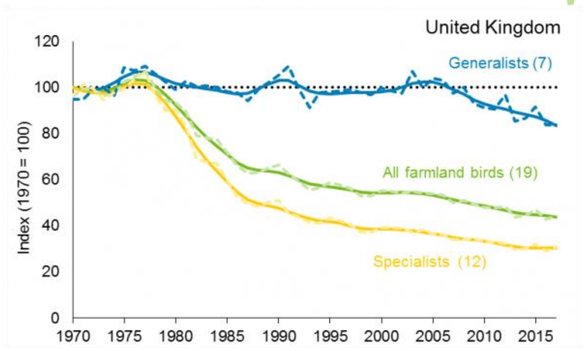
Biodiversity is under pressure, risk assessments for pesticides are becoming tougher, public concern surrounding environmental issues is increasing… what could it all mean for the regulation of pesticides and continued food production in the EU? *Are biodiversity and productive agriculture really at odds?*

Current situation…

Biodiversity is under pressure: UK breeding farmland bird index **1**



Source: BTO https://www.bto.org/science/monitoring/developing-bird-indicators

Public awareness of environmental issues is increasing: sensational headlines in media! **2**

The methods used by [1] have been criticised [2] and related reports have shortcomings [3] but there is evidence for a general decline in insect numbers…

Source: Guardian https://www.theguardian.com/environment/2019/feb/10/plummeting-insect-numbers-threaten-collapse-of-nature

Risk assessments are getting tougher **3**

Regulator concern over e.g. multiple stressors

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Reduced acceptability of **transient** and **marginal** effects in e.g. field studies

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Understandable response to protect an impoverished agricultural biodiversity!

We respond by investing in risk assessments – but we are still losing molecules at renewal due to **minor effects in field studies!** **4**

…which could impact food availability, or export of production to non-EU countries…

But there is Hope!

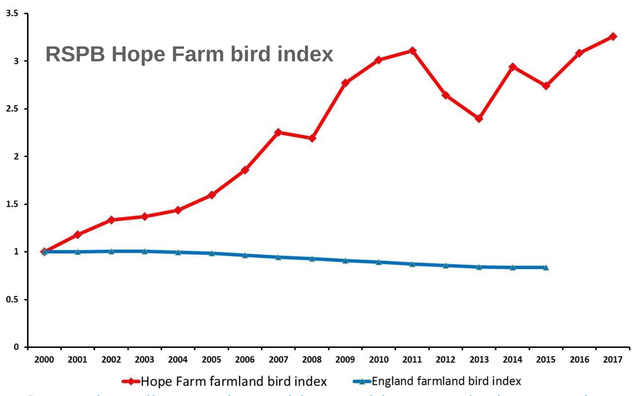
Farming is often blamed for biodiversity losses in industrialised landscapes, due to factors such as

- Habitat loss
- Use of pesticides
- Increased efficiency
- Winter cropping
- …

Newsflash!

…but there is strong evidence that **biodiversity *can*** flourish alongside conventional agriculture through intelligent crop selection and field margin management…

In the UK, the birds charity RSPB has managed Hope Farm since 2000 with great success…



Source: https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/hope-farm/bird-numbers/

More **biodiverse** and better connected ecosystems are **better able to buffer stressors…** such as **transitory effects** on few taxa in aquatic and terrestrial field studies…

What can we do?

Maintain status quo: Try to demonstrate safe use via risk assessment; potential to lose valuable molecules; do not enhance biodiversity further

Continued decline in biodiversity → No capacity in system to buffer minimal effects seen in field studies → Continue to lose molecules at EU level → **Fewer tools for food production, no gain in biodiversity**

Do more! Use **multifunctional field margins (MFFM)** and other measures to enhance on-farm biodiversity; buffer minor effects of pesticides; overall enhance health of system; retain crop production tools.

Invest in biodiversity via e.g. multi functional field margins → Improved capacity to buffer minimal effects seen in field studies → Retain some molecules with marginal risk assessments at EU level → **Agroecosystem is enhanced, retain tools for farmers**

To be clear – we still need risk assessment! And we still need to protect non-target organisms. But with enhanced biodiversity at the landscape scale, we should have confidence that minor effects of pesticides in off-field areas can be withstood by the more resilient agroecosystem. This is not intended as carte blanche for writing off all effects! ☺

The tools to do this already exist – see SETAC MAgPIE [4], our report to ECPA [5] on multifunctional field margins. Where pesticide risk assessments require a no-spray or run-off buffer, these margins could be managed for biodiversity – some already are – could such management become a label requirement?

Key challenges & next steps

- We need a discussion about how we can balance enhanced biodiversity and acceptability of minor and transient effects observed in ecotoxicology field studies. This must include regulators, policy makers, industry and scientists.
- Industry already have various related programmes in place, these are great, but more could be done to give greater coverage.
- Landscape modelling could explore some scenarios.
- Don't forget this could be a PR win for industry!
- What do you think? Let me know!

References:
1 Sánchez-Bayo, F., & Wyckhuys, K. A. G. 2019. Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27.
2 Simmons et al., 2019. Worldwide insect declines: An important message, but interpret with caution. *Ecology & Evolution*, 9, 3678-3680.
3 Hallmann et al. 2017. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoS ONE 12(10): e0185809.
4 Mitigating the Risks of Plant Protection Products in the Environment (MAgPIE). Anne Alix, Colin Brown, Ettore Capri, Gerhard Goerlitz, Burkhard Golla, Katja Knauer, Volker Laabs, Neil Mackay, Alexandru Marchis, Elena Alonso Prados, Wolfgang Reinert, Martin Streloke, Véronique Poulsen, Eds. 2017. Society of Environmental Toxicology and Chemistry. ISBN: 978-1-880611-99-9.
5 Hackett, M. & Lawrence, A. 2014. Multifunctional Role of Field Margins in Arable Farming. Report for European Crop Protection Association by Cambridge Environmental Assessments – ADAS UK Ltd. CEA report number CEA.1118.