

Cutting pesticide use and promoting Integrated Pest Management in UK agriculture: a farmer's perspective

Introduction

We are witnessing serious declines in wildlife in the UK and across Europe, with intensified agriculture and pesticide use increasingly implicated as key drivers. The government chief scientist has warned of the environmental impact of current industrial-scale use of pesticides, and called for change. Despite these disturbing trends, frequency of pesticide applications to UK cropland is increasing.

A reduction in pesticide use is clearly needed to deliver cleaner water, healthy soils, healthy food and thriving nature. But farmers will need support to get off the chemical treadmill.

Integrated Pest Management (IPM) is a broad-based approach that integrates sustainable farming practices for the control of pests to below threshold levels of economic injury, and reduces risks to human health and the environment. Under the EU Sustainable Use Directive, and as a commitment in its 25 Year Environment Plan, the UK has committed to adopting IPM as a key feature of agriculture practice, however it has become clear that for the majority of farmers, IPM is nothing more than a tick-box exercise and has a minimal role in the control of pests and disease.

As the UK prepares for Brexit, we have a unique opportunity to change current farming practice and fulfil the Government's stated ambition to reduce the use of pesticide in UK agriculture.

Friends of the Earth is calling for:

- **The Government to take the opportunity of the Agriculture Bill to set out a clear ambition to reduce pesticide use and impacts, and use payments to farmers to support the adoption of alternative pest control methods.**
- **The new National Action Plan on Pesticides, due to be produced in 2019, to put IPM at the heart of UK farming.**
- **Farmers to be adequately supported to adopt alternatives to pesticides through: provision of better agronomic advice; improved knowledge transfer; redirecting the focus & structure of farming research; provision of clear guidelines for farmers on implementation of IPM; and adoption of a new system to measure and monitor pesticide use.**

This briefing is based on a report¹ written for Friends of the Earth by Peter Lundgren, a conventional arable farmer. It identifies from a farmer's perspective, the barriers and drivers to reducing overall pesticide use through adoption of IPM. Following a series of consultation events in person and online, the author drew together a broad consensus of opinion from farmers, agronomists, scientists, and NGOs.

Why we need to reduce pesticide use and promote Integrated Pest Management in the UK

A decades-long focus on yield as a key priority of the farming industry has led to the adoption of a high-input model with high levels of pesticide use to protect vulnerable crop varieties. This model requires high outputs and high prices to be financially viable. Consequently, attitudes to pests and disease are very risk averse with 'insurance' applications of pesticides being the norm, rather than treatment after full consideration of threshold levels, economic implications, and the associated environmental and health risks.

At the same time a growing number of reports^{2,3,4} are indicating serious declines in wildlife in the UK and across Europe, and industrialised agriculture and pesticide use have been repeatedly implicated as potential factors. Government Chief Scientist Ian Boyd has voiced concerns about the industrial-scale use of pesticides, and suggested radical change is needed to the current system of pesticide monitoring and authorisation.⁵ Despite this, the frequency of pesticide applications to cropland continues to rise.⁶

Long-term farming productivity relies on healthy soils and a recovery in the services provided by nature such as pollination and natural pest control. There is a place for pesticides in conventional farming but overuse of pesticides is damaging natural resources, posing a threat to the resilience of future food production.

How do we reduce pesticide use? The tools and knowledge required.

The Agriculture Bill provides a unique opportunity to invest in advice to farmers and a new focus for R&D that will support the necessary transition to low-input farming. It is essential that there is enough funding behind the Government's ambition for farming reform.

1. Independent agronomy advice

The relationship between the farmer and the agronomist is seen as the primary barrier to pesticide reduction; and the primary potential driver in moving towards adoption of IPM

¹ <https://friendsoftheearth.uk/nature/cutting-pesticide-use-uk-agriculture-farmers-perspective>

² <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0185809>

³ UK Biodiversity Indicators (2018), JNCC <http://jncc.defra.gov.uk/page-4235>

⁴ The State of the UK's Butterflies 2015, Butterfly Conservation

⁵ Milner, AM, & Boyd, IL, (2017) Science Vol 357 (6357), 1232-1234

⁶ Fera Pesticide Usage Surveys. <https://secure.fera.defra.gov.uk/pusstats/index.cfm>

as a primary method of control. Agronomists play a crucial role, advising farmers on the use of agricultural inputs such as pesticides and fertilisers, and increasingly relied upon as the chemical toolbox becomes more complicated. Whilst the majority of agronomists put the interest of customers first, around 50% of agronomists are employed by agrochemical merchants and manufacturers, and inevitably experience pressure to increase sales and bonuses. Thus 50% of farmers don't pay directly for agronomy services. If farmers recognised and were invoiced the true cost, de-linked from chemical sales, a more professional relationship would develop where alternative options were more thoroughly assessed, with more farmers engaging in decision-making and involving the agronomist in the whole growing process of rotation, cultivation, variety choice, habitat creation etc.

Recommendation: agronomy services should be independent of merchants and manufacturers and the sale and distribution of agrochemicals.

All agronomists must be BASIS⁷ qualified, however the BASIS syllabus and training programmes for agronomists are heavily focused on a chemical approach to pest and disease management and do not adequately prioritise or promote IPM or the whole-farm approach to mitigate the impact of pests and disease. The application of pesticide should be viewed as a secondary response.

Recommendation: review the BASIS syllabus and further training for agronomists, with an emphasis on promoting IPM and alternative non-pesticide solutions as the primary response to the threat of pest and disease.

2. Knowledge transfer for farmers

If farming attitudes are to change, and new practices such as IPM be adopted, farmers need to be better-trained, and knowledge better-shared. This would complement a more progressive approach to IPM by agronomists.

Recommendation: farmers and land managers need to be better-trained through a programme of continuing professional development (CPD).

This should include: a simplified BASIS course for farmers with a focus on IPM; benchmarking of farms (a powerful tool in adapting farmer's behaviour); use of social media; and consideration should be given to paying farmers a day rate to leave the farm for targeted training and CPD.

Farmers learn better from other farmers. The preferred training delivery would be via peer to peer exchange, This needs to be supported by a national advisory service independent of agribusiness and made up of small regional teams with the right spread of expertise to conduct an assessment of the individual farm and wider landscape, consider regional and local factors such as climate, soil and pests, diffuse pollution, and advise on a bespoke package of improvements.

⁷ BASIS is an independent standards setting and auditing organisation for the pesticide, fertiliser and allied industries. www.basis-reg.co.uk

There is no need to invent a new knowledge transfer organisation. A number of suitable organisations already exist, such as the Farming Advice Service which already has a statutory responsibility for promoting IPM.

3. Research and development

Since the green revolution, the focus of research and development has been on driving up yields and maintaining profitability, including through increasing the use of pesticides and fertiliser. However the last decade has seen a plateau in yields and significant increase in the costs of inputs, which has eroded profits. Greater emphasis must be placed on the following areas of research:

Conventional plant breeding combined with genome sequencing and marker-assisted breeding has accelerated the development of many beneficial traits. Where GM technology promised but failed, conventional plant breeding has delivered pest and disease tolerance; nutritional enhancement; drought, flood and saline tolerance; and the potential for significant yield increase, eg. NIAB's⁸ 'superwheat' which has reintroduced genetic diversity by wheat hybridisation with wild goatgrass.

Cultural alternatives, including rotation; variety choice; companion cropping; push-pull cropping technology; and cover cropping.

Robotics has the potential to deliver a targeted response to weeds, pests and disease whilst retaining beneficial plants and beneficial insects. However robotics should not be seen as a panacea for tackling pesticide use, but as additional to the adoption of IPM

Variety choice. Currently the AHDB variety list is focused on yield. The published varietal comparison table is between treated and untreated yields. Varieties with beneficial traits such as significantly improved tolerance to disease and pests fail to be included because of lower yield. Listing varieties suitable for lower-input systems will offer farmer and agronomist an opportunity to make a more informed decision on variety choice to deliver the best gross margin.

Recommendation: the AHDB varietal trials be expanded to include assessment of varietal performance in low-input systems and well as the existing assessment in high-input and untreated systems.

Longer-term outcomes. R&D funding is too short-term and relatively inflexible. Research on farming systems needs to run for at least one full crop rotation and preferably longer, at least 4-5 years. Research applications currently require very detailed information yet research is dynamic and requirements can change. Funders need to acknowledge this and allow greater flexibility.

Recommendation: significant upscaling of funding for research into farming systems that aid pesticide reduction and the adoption of IPM: conventional plant breeding and development of crop varieties tolerant to pest and disease; alternative cultural and

⁸ National Institute of Agricultural Botany. http://www.niab.com/news_and_events/article/304

mechanical measures to control pest and disease; and the development of novel chemical solutions with a significantly reduced toxicity load.

4. The structure of farming research and its link to farming

The failure to research many of the low-tech, low-input techniques has arisen as we have lost much of our research capability to look at holistic approaches through the closure of research stations that had farms attached to them. Such institutions could push the boundaries more with new systems than a commercial farmer would ever attempt. Their loss has been mirrored by a loss of capable expertise (entomologists, weed scientists, pathologists, etc).

We have lost to a large extent the link between research, advisory services, and what farmers need. Previously organisations such as ADAS had a team of farm advisors who provided free on-farm advice across the country, facilitating a two-way dialogue between farmers' needs and latest research. To some extent this has been replaced by private agronomy companies but these lack the resources to run expensive studies of whole farming systems.

We have lost most funding routes for research into low-tech, low-input systems. Defra channel their research funding through research councils, which is generally only available to universities, and other institutes are ineligible to apply. Universities have been forced to focus more on academic prowess and publishing in high-impact journals to attract research funding, at the expense of research into basic low-tech solutions that make a genuine difference to farmers. In addition, Research Council committees making the decisions on grant applications are dominated by academics, but incorporation of end users in this process is essential if the research is to genuinely benefit farmers and deliver public goods.

AHDB are the key funding route for this type of research into IPM but haven't invested in this sufficiently. There have been numerous reviews, but very little new research into IPM and reducing pesticide use in the last 20 years.

Recommendation: long-term research into farming systems should be conducted by organisations that have strong links to the end users, working closely with innovative farmers and having the means to promote the findings and train farmers. This will require multidisciplinary teams, making use of the latest technologies but also appreciating what is achievable by farmers. The funding needs to be flexible, and with compensation for farmers if done on commercial farms, with a recognition that it can take decades to achieve a truly sustainable farming system.

How do we reward pesticide reduction, and measure pesticide use?

The focus in the Agriculture Bill on public goods outcomes is welcome. It is important that farmers are rewarded not just for measures around the edges of the farm but also for sustainable practices on the cropped area such as the adoption of IPM.

1. Transition and outcome based payments to promote the adoption of IPM

There is potential for farmers to be rewarded for cutting pesticide use through the new Environmental Land Management Scheme, either for adopting particular systems or for delivery of specified outcomes.

Defra will need to be clear about what constitutes an IPM approach and how it will be monitoring to ensure that this brings about genuine changes in practice rather than being a tick box exercise.

It's also important that those farmers who have already made the change and adopted alternative cultural and mechanical alternatives to pesticides, have the opportunity to apply from the outset for an outcomes-based payment

Recommendation: initially transition payments to be focused on promoting the adoption of the practices and systems that promote IPM and a reduction in the use of pesticides. When those practices are widely employed it is envisioned that the focus of incentives would shift towards the delivery of agreed outcomes and public goods through a similar vehicle to the DEFRA Payment by Result scheme.

2. The Voluntary Initiative

"For far too long IPM has simply been viewed as good practice for farmers to do voluntarily"⁹

The Voluntary Initiative (VI) was set up as an industry response to EU Sustainable Use Directive. The IPM Plan¹⁰ developed by the NFU for the VI is a basic 'tick box' exercise that solely meets the needs of crop assurance schemes. It is accepted that the VI has imposed a system of sprayer operator licensing and an annual test for application machinery, but it has singularly failed to address the increasing use and increased frequency of use of pesticides.

Recommendation: the Voluntary Initiative be wound-up and replaced with a properly resourced government strategy that is charged with delivering a reduction in the use of pesticides, a reduction in the toxicity of the pesticide load, and the widespread adoption of IPM.

3. Defra to clarify through the National Action Plan a definition of, and clear guidelines for, practical implementation of IPM

The European Commission in its progress report on implementation of Directive 2009/128/EC has highlighted key shortcomings in member states' National Action Plans: *the plans do not specify how the application of IPM by farmers can be measured, do not set targets or indicate how implementation will be ensured. IPM is a cornerstone of the Directive, and implementation of IPM is the intended means to reduce the dependency on pesticide use in sustainable agriculture, and thus the lack of clear steps that can be*

⁹ A green future: our 25 year plan to improve the environment. DEFRA 2018

¹⁰ <https://ecommerce.nfuonline.com/home/ipm-plan/>

*assessed, measured and enforced is a significant area for improvement in the ongoing review of national action plans by Member States.*¹¹

Recommendation: that DEFRA develop a definition of IPM that defines the practical application of the various elements, to create a system that can be readily understood and practised by farmers and promoted by DEFRA and its agencies.

4. Adopting a new metric for pesticide measurement

The Agriculture Bill must include a requirement to deliver on environmental targets and goals including pesticide reduction. This will require a robust metric to be adopted.

Total weight of pesticides used is frequently cited as the key indicator of pesticide use, and is used to justify claims that pesticide use has halved between 2000 and 2016. However, use of a metric such as weight or economic value of pesticide applied is meaningless, because neither method addresses the frequency of use nor differing toxicity of pesticides. Nor does it consider indirect impacts, such as removal of food sources for wildlife due to use of broad spectrum herbicides.

The focus on weight masks significant growth trends: the number of pesticide applications to UK crops has increased 24% over the same period, from 12.8 per hectare in 2000, to 15.9/ha in 2016¹² (NB: several active ingredients may be applied at the same time). Consideration of overall pesticide use is important: when used in combination there can be a multiplier effect in terms of both toxicity and indirect impacts.

Many farmers are concerned about their environmental impact, and being able to differentiate between more and less toxic options would be an important step in awareness-raising, driving cultural change, and facilitating and encouraging more sustainable practice.

There are strong calls for a more rigorous authorisation and monitoring process for pesticides, but this must be matched by adoption of a new metric which more accurately illustrates the negative impacts of individual pesticides. The Danish Pesticide Load Indicator has proven effectiveness but would need to be adapted for UK use.

Recommendation: that a Pesticide Load Indicator metric be designed for the UK, taking into account the toxicity of the pesticide to humans, the toxicity to non-target species, and the persistence of the pesticide and its metabolites in the environment. Such a load indicator, alongside frequency of use, should be incorporated into a pesticides reduction target for the UK.

¹¹ Report from the Commission to the European Parliament and the Council. On Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides, 10.10.2017

¹² Fera Pesticide Usage Surveys. <https://secure.fera.defra.gov.uk/pusstats/index.cfm>

The Agriculture Bill, and forthcoming Pesticides National Action Plan offer unique opportunities to cut UK pesticide use

Brexit offers many challenges and opportunities to farming. The survey of stakeholder opinions contributing to the source report - farmers, agronomists and researchers - makes it clear that there is a desire in all sectors of UK farming to achieve a reduction in the use of pesticides and their impact on the environment and human health.

This briefing collates the views of consultation respondents and sets out a template of practical, achievable and complementary steps which will deliver a meaningful reduction in pesticide use. From the starting point of identifying the barriers to pesticide reduction; to identifying the research and practical tools farmers will need to change farm practice; to funding that change and monitoring the outcomes.

The Agriculture Bill, the introduction of a new Environmental Land Management Scheme and the re-writing of the National Action Plan on Pesticides offer unique opportunities to ensure the more sustainable use of pesticides and help farmers get off the chemical treadmill.

Contact

Sandra Bell: sandra.bell@foe.co.uk 07941 176 957

Nick Rau: nick.rau@foe.co.uk 07583 049 411