

Sustainable Supply Chains Toolkit

PLANT PROTECTION



Introduction

For farmers and growers to produce wholesome, safe, affordable and plentiful supplies of food and other crops, they need the right tools available to do the job. Pesticides are an essential, but often misunderstood part of current farming practice and food production.

The NFU believes it is absolutely right to have robust risk-based legislation around the availability and use of pesticides to protect the public and the environment, and to support productive and competitive agriculture and horticulture. The best practice in use of pesticides is then re-enforced through the requirements of a world beating food assurance system, which requires and independently audits practices like operator training and equipment checks.

The NFU recognises that in balancing all these interests, it is also right that pesticides are used as the tool of last resort, within a programme of Integrated Pest Management. However, under the current regime of EU pesticide regulation, set to be lifted and shifted into UK law, British farmers and growers find themselves in a position where they are generally losing the pesticide tools they have relied on at a far greater rate than they are being replaced by safer, more effective and lower risk pesticides and alternative technologies.

This creates a gap in the availability of effective crop protection tools, which in turn compromises the ability to produce crops in the EU and UK. The result is that production is simply done elsewhere - more likely than not using the pesticides no longer available to our farmers; more likely than not to lower standards than those met by our farmers – and imported into the EU and UK.

Farmers and growers are proud to produce the wholesome food that sits at the heart of every healthy, balanced diet. The NFU wants British farmers and growers to remain the number one supplier of choice to the UK market. We want all consumers to be able to enjoy sustainable, high quality, affordable British food, irrespective of their income. Having available a toolbox of effective pesticides and alternatives to control weeds, pests and crop diseases is essential to achieving this aim.

Guy Smith
NFU Deputy President

This booklet aims to provide evidence based information to challenge some of the misconceptions about pesticides and support you when producing internal policy, briefing colleagues and dealing with questions from customers.

What are pesticides?

‘Pesticide’ is the commonly used word for plant protection products or crop protection products. Pesticides help protect crops from pests, diseases and weeds. Pesticides work in a variety of different ways:

- **Control or kill** unwanted pests that damage and destroy crops
- Enhance the ability of the crop to **defend** itself against pests
- **Reduce vulnerability** of crops to attack by pests

Herbicides



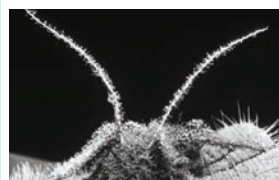
Control weeds

Insecticides



Control pest insects like aphids

Biopesticides



Picture courtesy of University of Warwick

Includes microorganisms like pathogenic fungi, viruses or bacteria mainly used to control insect pests

Molluscicides



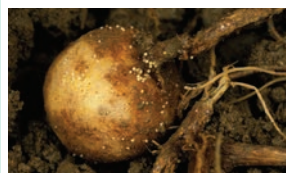
Control slugs and snails

Fungicides



Tackle harmful fungal diseases

Nematicides



Control nematodes

Rodenticides



Control rodents

Pheromones



A pheromone is a chemical released by an animal that affects the behaviour of others of its species. The picture above is of a system used to release a pheromone that disrupts mating to control moth pests in apple and pear orchards

Acaricides



Control mite pests

Plant growth regulators



Used to alter the growth of a plant or plant part, e.g. to help leaves and flowers form, or fruit to ripen

The part of the pesticide that does the job of controlling the pest is called the ‘active substance’ or ‘active ingredient’. These pesticide actives can be naturally occurring or synthetic. Most actives are chemicals or mixes of chemicals, but some are microorganisms like pathogenic fungi, viruses, or bacteria mainly used to control insect pests. Naturally occurring pesticides may be organic (derived from plants, fungi, bacteria etc) or inorganic (sulphur, copper, chemicals found in soils etc).



Are pesticides safe?

The EU ensures pesticides are safe by having the **strictest approval process in the world**. **Pesticides are tightly regulated** to ensure their use does not harm human and animal health and the environment.

Under EU legislation, active substances go through re-authorisation at least every 15 years, but often more frequently as the science and our understanding of the actives develops. Authorisation of the pesticide product containing the active is done in the UK by the Chemicals Regulation Division of the Health and Safety Executive. After Brexit, the EU regulation will become UK law, which needs to be fit for purpose in order to protect the environment and the public, along with effectively supporting productive and competitive agriculture and horticulture.

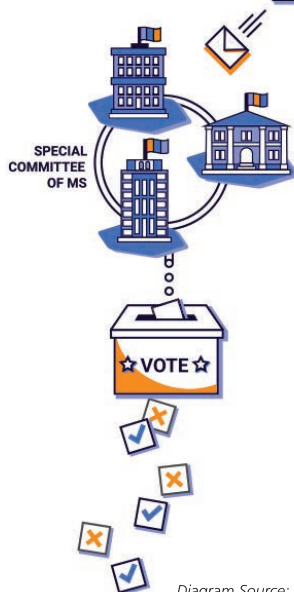


Diagram Source: European Commission

There are many detailed steps in the current approval process that ensure safety. There is a **rigorous and lengthy science-based assessment** that takes more than three years to complete. It starts with a complete dossier of studies on the active substance that addresses the comprehensive data requirements set by EU regulations. The company that developed the active substance submits the dossier and application for approval to a Member State authority tasked by the Commission to undertake the initial assessment. This assessment is then sent to the European Food Safety Authority (EFSA), which reviews the assessment in consultation with all other EU countries. EFSA then sends its conclusions to the European Commission, which makes a proposal on whether or not to approve the active. A regulatory committee composed of representatives of all EU countries then votes on the Commission proposal.

This is just the first step in the approval process, which assesses the safety of the active substance at an EU level. The assessment and authorisation of every pesticide product, containing the active substance, is then undertaken by Member States.

The EU regulatory process for pesticides ensures that they are safe to use. However, we believe the shift in focus of the current EU regulation – from being risk-based to being hazard-based – means it has become overly precautionary, increasing requirements beyond the necessary safety

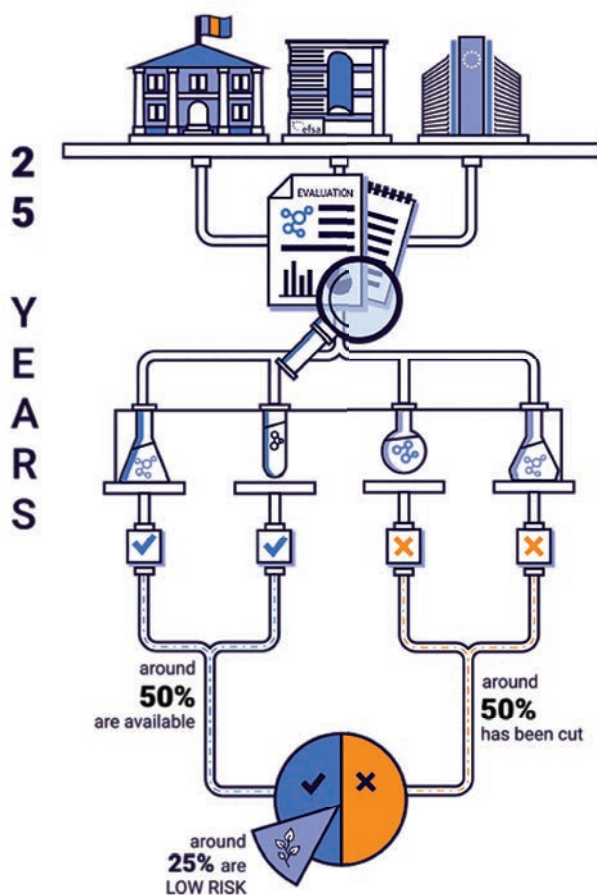


Diagram Source: European Commission

limits. At the same time, the regulatory process pays little regard to its aims to safeguard agricultural competitiveness and agricultural production. Over the last 25 years the EU review process has reduced the number of actives by over 50% to around 400. In the UK even fewer actives are available. In the last seven years only eight new active substances have been brought to the market. Not having the right tools available undermines the farmer's ability to control pests.

Why do we need pesticides?

Pesticides are used as a tool of last resort to keep crop plants healthy enough to produce a nutritious, plentiful and affordable supply of food.

As the world's population grows to an estimated 9.5 billion by 2050, we need to find ways to **produce food more efficiently and sustainably** from the same amount of land, while meeting the challenges of increasing water scarcity, climate change and changing food preferences.

The use of pesticides helps **maximise yields** and **minimise losses and food waste** by **reducing damage and crop rejection**. This also **reduces the labour and energy costs** associated with growing, harvesting, grading and processing crops. The key is to strike a balance between using as little pesticide as necessary to keep the crop healthy while delivering the required food quality and affordability.

The Food and Agriculture Organization of the United Nations (FAO) estimates that on **average 26% to 40% of crop yield is lost every year to weeds, pests and disease**. If crop protection practices were removed, these losses could double. Catastrophic losses of entire harvests would increase. Less than 200 years ago, a single fungal disease – late blight – destroyed Ireland's potato crop and resulted in the potato famine and the death or emigration of millions of people. Late blight is still a major disease of potatoes. Resistant varieties and crop hygiene practices help control the disease, but fungicides are vital to avoid crop devastation.

Pesticides are also required to help control mycotoxins that can be dangerous to human health



Residues

After use, pesticides break down over time. However, when crops are harvested minute amounts, known as pesticide residues, may remain on or in food. Maximum Residue Levels (MRLs) are the legal limits set on how much residue can remain in food. These are set on the basis of pesticides being used properly – in accordance with good agricultural practice. **MRLs are set well below any safety levels.**

In the UK, the government monitors home-produced and imported food to check for any pesticide residues. It does this to check that no unexpected residues are occurring in crops; that residues do not exceed the MRL, and that consumers' dietary intake of residues in foods are within acceptable levels.

The Health and Safety Executive carries out the monitoring, with results reviewed by the Expert Committee on Pesticide Residues in Food (PRiF). **Not all food contains residues.** Recently published PRiF reports show that for food from the UK around 60% of samples contain no residues at all (compared to about 47% for imported food). In the majority of cases where residues are found, they are within the trading limits of the MRL. In around just 1-2% of samples, residues were found above the MRL (compared to over 4% for imported food). On further investigation none of the UK cases were expected to have an effect on human health.





Under assurance schemes, like Red Tractor, pesticides can only be applied following a recommendation from a BASIS qualified agronomist.

Under Sustainable Use Directive and assurance scheme requirements

**ALL SPRAYING
EQUIPMENT IS
REGULARLY TESTED.**



Under assurance schemes, like Red Tractor, users of pesticides are required to continue training through the National Register of spray operators (NRoSO).



Pesticides have to be applied by qualified operators.



Farmers are legally required to keep spray records, which are audited as part of farm assurance audits and available to the Health and Safety Executive.

70,000

different pest species damage agricultural crops.

Pesticides play a role in reducing soil erosion, soil compaction and greenhouse gas emissions. Without the herbicide glyphosate the additional ploughing required would mean the equivalent of an extra

**12 MILLION
TONNES**

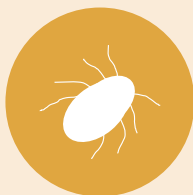
of CO₂ would be added to the atmosphere each year – the equivalent of the emissions from

**2.5 MILLION
NEW CARS.**

**A REDUCED NUMBER
OF EFFECTIVE
PESTICIDES ARE
AVAILABLE.**



Without pesticides, there would potentially be little or no production of some 'iconic' British foods such as frozen peas, apples and fresh carrots.



Integrated Pest Management plans are carried out by farmers to take a holistic approach to crop protection.

Without pesticides there could be job losses of between

35,000
and
40,000

in the associated workforce.

Global population could be

**9.5
BILLION**

by 2050.

Up to

**40%
OF GLOBAL
CROP YIELDS**

are lost to pests and diseases every year. These losses could double without pesticides.

Only

12%

of UK respondents to a YouGov survey in 2016 correctly identified that 40% of global crop yields are lost to pest and disease every year.

Most people underestimate pest damage.



Farmers have planted the equivalent of

**10,000
FOOTBALL
PITCHES
WORTH OF
WILDFLOWER
HABITAT**

to provide homes and a source of food for bees.

Integrated Pest Management plans are completed by around

**17,000
FARMERS AND
GROWERS**

managing about 4.4 million hectares of land.

The environment

It is essential that a safe, affordable food supply goes hand-in-hand with good environmental protection. To be sustainable, crop production methods also have to protect the environment, preserve natural resources and support the livelihoods of farmers and producers.

Pesticides have to go through a **stringent approval process** before they are authorised for use. One of the criteria they have to meet is that they present no unacceptable risk to the environment. In the UK, pesticides are applied in a highly controlled, highly regulated way and in the minimum quantities needed to ensure they are effective. The vast majority of what is sprayed on crops is actually water.

Pesticides can actually be beneficial to the environment.

- They can help **reduce soil erosion, soil compaction and greenhouse gas emissions**. For example, **without the herbicide glyphosate the equivalent of an extra 12 million tonnes of CO₂ would be added to the atmosphere each year** – the equivalent of the emissions from 2.5 million new cars – through additional use of machinery and bringing more land back into agricultural production to enable current yields to be maintained.
- **Pesticides can reduce the need for ploughing**, the traditional way of controlling weeds, by enabling minimum tillage cultivation, which helps earthworms to thrive and ensure habitats where birds' nests are not destroyed.



Bees

The importance of bees and other pollinating insects is well recognised by farmers and growers who rely on the ecosystem service they provide to help pollinate many crops. The economic value of this pollination service to UK agriculture is estimated to be up to £690 million per year.

Farmers do a huge amount of work for beneficial insects via agri-environmental schemes which promote the use of less productive field margins to grow nectar rich flowers, provide beetle banks, sow overwinter seed mixes and provide small areas of winter stubble. Farmers have planted the equivalent of 10,000 football pitches worth of wildflower habitat to provide homes and a source of food for bees. These activities encourage pollinators on their land for crop pollination, and also help maintain a healthy soil structure and attract parasites and insect predators that can control pest species.

There is evidence that the dramatic decline in pollinator diversity happened in Britain and other EU countries between the 1950s and 1980s (incidentally, neonicotinoid insecticides were not introduced until the late 1990s), and that the rate of decline in pollinator diversity has significantly reduced during the last 25 years, with some groups showing improvements.

A new online tool – Bee Connected – has been created to provide a more efficient and effective way for farmers to provide information to local bee keepers about when they are planning to spray insecticides. This notification is required by the Code of Practice for using Plant Protection Products.



What farmers are doing?

Pesticides are an essential, but often misunderstood part of current farming practice and food production.

People who apply pesticides have to undergo **training and achieve specific qualifications** in pesticide application before they are allowed to do so. The National Register of Sprayer Operators (NRoSO) provides ongoing training through **Continuous Professional Development** (CPD), while the National Sprayer Testing Scheme (NSTS) tests spraying equipment regularly to ensure it is safe and reliable. The NFU and other stakeholders have worked together to produce the Good Neighbour Initiative to help ensure people living near areas where pesticides are used are kept informed and any concerns they have are addressed.

Integrated Pest Management

Most farmers use integrated pest management (IPM), which combines traditional farming practices (like rotating the crops they grow in fields) and modern farming practices (like planting seed varieties that have been developed to be naturally more resistant to certain pests) with measures which protect the environment. IPM includes the use of pesticides where necessary. IPM activity is recorded in IPM plans introduced by the Voluntary Initiative (VI) – an organisation that promotes best practice and responsible use of pesticides. Currently, nearly 17,000 farmers, managing about 4.4 million hectares of land use the VI IPM plan.

By adopting a **holistic approach** and using appropriate measures to discourage the development of weed, pest and disease populations, **farmers keep the use of plant protection products to a minimum.**

IPM principles include:

1. The prevention and/or suppression of harmful organisms should be achieved or supported by (among other options):
 - Crop rotation,
 - Use of adequate cultivation techniques (e.g. seedbed techniques, sowing dates and densities, under-sowing),
 - Use, where appropriate, of resistant/ tolerant cultivators and standard/ certified seed and planting material,
 - Use of balanced fertilisation, liming and irrigation/ drainage practices,
 - Preventing the spreading of harmful organisms by hygiene measures,
 - Protection and enhancement of important beneficial organisms.
2. Harmful organisms must be monitored by adequate methods and tools.
3. Monitoring leads the decisions about whether, and when to apply pesticides.
4. Sustainable biological, physical and non-chemical methods must be preferred to chemical methods if they provide satisfactory results.
5. Pesticides applied shall be as specific as possible for the target and shall have the least side effects on human health, non-target organisms and the environment.
6. The use of pesticides and other forms of intervention should be kept to levels that are necessary.
7. Where there is a known risk of resistance against a plant protection measure and the level of harmful organism requires repeated application, anti-resistance strategies should be applied to maintain the effectiveness of the product.
8. The success of the product used should be checked based on the application records.

The Future

The science and technology of active ingredients, products and application methods are reviewed regularly. Innovative crop management technologies are being developed now and are starting to be used on-farm.

These include:

- Improved use of technology for managing records and using data.
- Use of biological pesticides and low risk alternatives.
- Precision farming – including the targeted application of pesticides through the use of cameras in sprayers so that herbicides can be applied just to the weeds and not the crop.
- Autonomous vehicles for optimised routes and reduced soil erosion.
- Use of robots – which can be used for tending to crops, weeding and fertiliser application.
- Use of new plant breeding techniques to produce more resistant and resilient crop plants.



Farmers are keen to use proven new technologies and alternative plant protection methods. While some solutions are available, many of the future options will not be available for some years. The concern is how farmers and growers continue to effectively control pests in the meantime if they continue to lose classical chemical pesticide solutions at an increasing rate.



Why are pesticides important to the supply chain?

Modern consumers enjoy a reliable supply of a wide range of quality food all year round. It would not currently be possible to maintain this at affordable prices if farmers did not have pesticides as a vital tool to help protect plants from weeds, pests and diseases if needed.

Without pesticides crop yields could fall by 50 - 80%. Some crops, such as frozen peas, apples and carrots, would be extremely challenging to grow in the UK, as they are vulnerable to pest and fungal attack.

Without pesticides:

- **More land** would be needed to grow the same amount of food that is currently produced.
- A 2010 economic report concluded that the nation's **food bill would increase** by around 40% or £70 billion.
- There could be a **fall in gross value added (GVA) of UK agriculture** of about £1.6 billion / 20% on 5-year averages (2009–2013).
- Potential **loss of 35,000-40,000 jobs** in the wider agri-food sector.
- Potentially, we would need to **import more food** from other countries where the regulation governing pesticide availability and use is not as precautionary, environmental standards aren't as high, and products withdrawn from use in the EU are still available to use.
- Food waste would increase as crops become unviable due to pests, disease and weeds, and more produce is left to rot.



What can the retailers do?

With such robust regulatory and assurance processes, farmers and growers should be able to use existing pesticides carefully where necessary.



Promote evidence based policy decisions. Understand implications of introducing private lists that further restrict the available pesticide options.



Encourage investment in innovation and development of plant protection technology.



Provide consumers with factual information when asked questions about pesticide use.



Educate colleagues about the importance of pesticides and the importance of science and evidence based decision making.



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Published by
NFU, Agriculture House
Stoneleigh Park, Stoneleigh, Warwickshire CV8 2TZ

September 2018

