

January 2014

# Farmers need bees, bees need farmers

## Farmers' perspectives on why we need a strong National Pollinator Strategy

### Summary

Defra is set to publish its draft National Pollinator Strategy (NPS) including measures for pollinator-friendly management of farmland. Farms make up 70% of England's land use and intensive farming methods have been identified as a key driver of bee decline.

The NPS must contain ambitious measures for our farmed land. Bees and other pollinating insects are vital to the quality and yields of many crops so helping bees helps farmers and food security.

The briefing, which draws directly on the views of farmers who think it is crucial to protect the pollinators that they rely on, highlights that it is possible for farmers to take action for nature *and* run a profitable farm. These aims are compatible and in fact closely linked.

Key findings:

- Farming without neonicotinoid insecticides will not harm farm businesses
- Dedicated habitat areas on farms are beneficial to pollinators and crops
- Crop diversification can help with pest control and soil fertility and provide food for bees

A strong message from farmers is that Government needs to be more proactive in supporting them to farm in a way that helps pollinators – reducing pesticide use and providing them with the food and shelter that they need to thrive. The briefing contains several recommendations for how the NPS should help farmers to help bees.

There is also a role for food retailers in delivering the aims of the NPS. The Co-operative and Waitrose have already committed to changes in their own supply chains in recognition of the importance of pollinators to their businesses.

## Introduction

“I know from the surveys that I do on mine and other farmers’ farms that wildlife is in trouble. The wildlife that is in real trouble is insects and they are the basis of all life. The insect population has decreased so much that birds, most of which feed their young on insects are unable to find enough insects at some time during the breeding season to rear a brood and so they are declining too.” *Nicholas Watts*<sup>1</sup>

Declines in wild bee populations and honey bee colonies pose a threat to food production and biodiversity. Recent research has suggested that across Europe there is a shortfall in honey bee colonies to pollinate a growing area of insect pollinated crops, increasing our dependence on wild bees<sup>2</sup>. The UK apple industry is particularly dependent on insect pollinators, according to the researchers. Wild pollinators add £37m a year to the value of just two varieties of British apples, Gala and Cox. "Pollinators not only increase the number but improve the quality of the apples you get. They are bigger, firmer and sell for a better price," says Dr Thomas Breeze of University of Reading.

In recognition of the plight of pollinators, and responding to Friends of the Earth's Bee Cause campaign, the Government is drawing up a National Pollinator Strategy (NPS). **The provisions in the NPS that cover our farmed land will be crucial to its success.**

The NPS must promote and facilitate action among farmers to both help pollinators and benefit the yield and quality of insect-pollinated crops.

As Lincolnshire farmer Peter Lundgren told us:

“Coupled to the impact of pesticides on pollinators, changes in modern farming practice, often supported by government policy and the public’s desire for plentiful cheap food, has led to a reduction in suitable habitat for pollinators within the farmed landscape.

“Any response to the plight of pollinators has to address two core issues – bee friendly farm practice and the provision of habitat to support a flourishing pollinator population. And this must be within the context of a financially viable farming system. Many of our farming leaders believe that habitat provision and profitable farming are mutually exclusive. I believe that these two goals can be mutually inclusive”.

This briefing looks at issues about pesticide use, habitat creation, crop diversification and the need for research and development and advice to farmers.

## Reducing Pesticide Use

“The battle between farmers and crop pests goes back to the dawn of time. But since the advent of spray-applied insecticide, and more recently the advent of seed-applied insecticide, the collateral damage from this battle has increasingly impacted on pollinators and other beneficial insects.” *Peter Lundgren*

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<sup>1</sup> Nicholas Watts is a Lincolnshire farmer and was the RSPB Telegraph Nature of Farming Award winner in 2013

<sup>2</sup> <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0082996><sup>2</sup>

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“Insects are declining because everyone is at war with them. We don’t like them in our houses or in our offices and we won’t tolerate those that eat our crops. We have starved those that live on our arable weeds and many of us flail our margins and wild areas where they could have had a home. Insects are the basis of all life, some of our crops are pollinated by insects and if the decline of insects continues there will not be enough insects to pollinate these crops. We will have to find ways of farming that are not so devastating to insects.” *Nicholas Watts*<sup>3</sup>

In 2013 the European Commission introduced a partial ban on three insecticides for which there is strong evidence<sup>[1]</sup> of harm to bees. The UK Government and the NFU oppose the ban. The NFU describe neonicotinoids as an “absolutely critical product for many farmers.”<sup>[2]</sup> A report by the Humboldt Forum, which was funded by pesticide companies (including Bayer and Syngenta which sell neonicotinoid products to farmers) claimed that the loss of neonicotinoid seed treatments would cost the UK economy £630million each year<sup>[3]</sup>. The NFU is supporting a legal challenge of the EU restrictions by Bayer and Syngenta saying that the ban will harm NFU members’ ability to farm productively and sustainably<sup>[4]</sup>

Friends of the Earth asked conventional arable farmer Peter Lundgren<sup>[5]</sup> for his perspective on how farmers would be affected by the neonicotinoid ban. Based on analysis of how the ban will affect his own farm, Peter Lundgren thinks that the NFU and pesticide companies have significantly overstated the impacts. At Hope Farm (which has been owned by the RSPB since 1999) where conventional oil seed rape is grown for a commercial market farm manager Ian Dillon thinks the impact of the ban will depend on the crop management choices made by farmers. What is clear is that to benefit bees and farmers a more proactive approach to developing safer alternatives is needed from the Government.

## Farming without neonicotinoids

The pesticides industry claims that without neonicotinoids **winter wheat** production would not be profitable in the UK<sup>4</sup>. However, analysis commissioned by Friends of the Earth shows that, based on price lists available to farmers, crop protection costs for wheat need not be more expensive if alternative but equally effective products or methods are used instead<sup>5</sup>.

To reduce reliance on chemical control, use of threshold pest numbers can be used to assess unacceptable levels of damage to the crops. Costs are reduced further if farmers use more resistant wheat varieties. For example, neonicotinoids do not protect against Orange Blossom Midge but there are readily available varieties of Blossom Midge resistant wheat which are comparable in yield to non-resistant varieties.

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<sup>3</sup> Nicholas Watts is the RSPB Telegraph Nature of Farming Award winner 2013. He farms in Lincolnshire with part of his farm in organic and the rest in conventional production

[1] <http://www.efsa.europa.eu/en/press/news/130116.htm>

[2] [http://www.farminguk.com/news/Neonicotinoid-restrictions-shroud-crop-future-in-uncertainty-NFU-says\\_26902.html](http://www.farminguk.com/news/Neonicotinoid-restrictions-shroud-crop-future-in-uncertainty-NFU-says_26902.html)

[3] <http://www.neonicreport.com/wp-content/uploads/2013/01/HFFA%20Report.pdf>

[4] [http://www.farminguk.com/news/NFU-to-support-Bayer-neonicotinoid-legal-challenge\\_26992.html](http://www.farminguk.com/news/NFU-to-support-Bayer-neonicotinoid-legal-challenge_26992.html)

[5] Peter Lundgren is a conventional arable farmer growing oil seed rape and wheat in Lincolnshire.

<sup>4</sup> <http://www.neonicreport.com/home/project-compass/>

<sup>5</sup> Full details and calculations available from Friends of the Earth

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For **oilseed rape** a small increase in crop protection costs<sup>6</sup> is likely after the withdrawal of neonicotinoid seed treatments. But this is nowhere near the figures that have been suggested by the Humboldt Forum. In fact, moving away from treated seeds could actually give farmers more control over the risk to their crops and the impact of their crop protection regime on pollinators. Risk management for control of crop pests requires farmers to take into account the expected threat and be ready to manage the unexpected threat.

But as Peter Lundgren points out:

“Neonicotinoid seed treatments involve applying a chemical before the threat even arises and so could lead to unnecessary use of insecticides – at a cost to the farmer and the bee”.

The NFU claims that without neonicotinoids farmers will use more pyrethroids,<sup>7</sup> which can cause problems with pest resistance and harm wildlife. But the RSPB’s Hope Farm found that crops grown from treated seeds needed almost as many pyrethroid sprays as the crops grown from untreated seeds<sup>8</sup>. As Ian Dillon of Hope Farm explains:

“The picture is more complex than a choice between neonicotinoids and sprays. Our experience shows how the outcome of the neonics ban could depend greatly on the crop management choices farmers make. It’s interesting that, nationally, use of pyrethroids hasn’t dropped since neonicotinoids came on the scene you can check out the figures yourself at <https://secure.fera.defra.gov.uk/pusstats/>”.

That neonicotinoids do not remove the need for pyrethroid sprays has also been noted by Professor Dave Goulson of Sussex University. His surveys of pesticide use in East Sussex revealed multiple spraying with three pyrethroids on crops grown from treated seeds<sup>9</sup>.

The RSPB believes that the risks to bees from neonicotinoids are greater than those from sprays such as pyrethroids. But as Ian Dillon points out, it is better to aim towards less overall pesticide use:

“The priority is to help farmers to use sprays wisely, as part of an Integrated Pest Management strategy – an approach we continue to develop at Hope Farm”.

Major food retailers had already committed to restricting use of the 3 most toxic neonicotinoids ahead of the ban. This makes sense given the importance of wild bees to the production of good quality fruit and vegetables. As David Croft of Waitrose explained:

“The role of pollinating insects such as bees is crucial in sustaining agriculture in the long term, as part of a thriving ecosystem that will support food security, healthy diets and the wider agricultural economy”.

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<sup>6</sup> Full details and calculations available from Friends of the Earth

<sup>7</sup> <http://www.theguardian.com/environment/2013/nov/27/wildlife-risk-ban-pesticide-bee-death-neonicotinoids>

<sup>8</sup> <http://www.rspb.org.uk/community/ourwork/farming/b/farming-blog/archive/2013/10/28/getting-ready-for-the-neonics-ban-at-hope-farm-and-lessons-so-far.aspx>

<sup>9</sup> <http://splash.sussex.ac.uk/blog/for/dg229/2014/01/15/does-anyone-remember-rachel-carson-more-on-pesticides-and-bees>

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### Alternatives to pesticides

“Increasing resistance amongst crop pests to insecticides, coupled to the impact of insecticides against pollinators and beneficial insects, require a novel response, novel strategies and an increased level of management awareness and ability at farm level.” *Peter Lundgren*

As explained above alternative insecticide products are available to farmers but are not environmentally benign<sup>10</sup> and so do not represent a long term solution – they are at best at stop gap for conventional farmers until safer products and solutions are made available. It is not clear whether an *increase* in pyrethroid use would result since these chemicals are used on neonicotinoid treated crops anyway but solutions are needed that move away from pyrethroid use.

The intense debate over the impacts of the neonicotinoid ban on farmers highlights the slow progress made in making effective safe crop protection tools available to all farmers. The NPS must be used to step up research and development of these alternative approaches and making sure they are available to all. There are a number of ways in which farmers could reduce reliance on pesticides:

- For direct attack on crops by insects better assessment of threshold levels could allow for reduction in insecticide use.
- Insect-borne diseases are becoming harder to deal with - some of these diseases are not evident until the damage is done so insurance treatments are applied. However resistant crop varieties, if developed, could be a cost effective way of avoiding disease damage.
- Companion planting<sup>11</sup> and trap cropping<sup>12</sup> have both demonstrated success in reducing pesticide use and maintaining or increasing yields of oil seed rape.

Organic farmers are already experienced in growing food without the need for neonicotinoids or other sprays. This experience should be drawn on in the NPS.

“Bees are incredibly important to my business growing organic vegetables for my vegetable box scheme as well as for the major retailers. With good crop management that limits the incidence of pest damage I can consistently produce the quality needed and meet supermarket specifications without the use of insecticides or practices that kill bees and beneficial insects.” *Andrew Dennis*,

### Providing on-farm bee habitat

“We have been growing wildflowers in many of our field margins on our farms for a number of years and have funded research to help us identify what mixes to plant to best support bees and other pollinators on our land.” *David Watson, Operations Manager at The Co-operative Farms*

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<sup>10</sup> Conventional alternatives to neonicotinoids currently available to farmers include pyrethroids which could also be harmful to bees and aquatic organisms.

<sup>11</sup> <http://www.agrovista.co.uk/news/news.aspx?pname=Companion-planting-boost-rape-yields&newsid=667>

<sup>12</sup> [www.onlinelibrary.wiley.com/doi/10.1111/j.1365-2338.2008.01192.x/pdf](http://www.onlinelibrary.wiley.com/doi/10.1111/j.1365-2338.2008.01192.x/pdf)

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“From a farmer’s perspective, one of the strongest arguments in favour of habitat provision for pollinators and a pollinator friendly environment within the cropped area is that it also provides habitat for a wide range of beneficial insects.” *Peter Lundgren*,

Beneficial insects provide a range of ‘services’ to farmers. In addition to the pollination of crops provided by bees and other pollinators insect predators and parasitoids can help to control pests naturally and detritivores<sup>13</sup> can help to maintain soil fertility<sup>14</sup>.

Beneficial insects need shelter, food in the form of wildflowers and diverse flowering crops, as well as lower use of pesticides in order to thrive. This suggests that habitat provision and diversity of cropping should be standard practice. But in reality there is a continuing trend towards monocultures and a paucity of dedicated habitat areas.

## Payment for bee-friendly farming

Some existing agri-environment schemes (rewarding farmers for environmental practice) promote bee-friendly practices on the margins of the cropped area. However the take up of these has been slow. Recent attempts by the Campaign for the Farmed Environment to increase the numbers of landowners signing up to agri-environment schemes has met with limited success, especially for encouraging greater take-up of those measures that would most benefit pollinators<sup>15</sup>.

The situation is unlikely to improve under the new Common Agricultural Policy (CAP). Defra has estimated that only 35-40% of farmed land will be covered by the new agri-environment scheme (NELMS)<sup>16</sup>. This puts more importance on the “greening” measures to be attached to standard CAP payments (Pillar 1) made to the majority of farmers. As Tim Field of Daysford Farms<sup>17</sup> in Gloucestershire explains:

“Support for ecological farming techniques must not be restricted to voluntary schemes or existing biodiversity hotspots. For ‘Greening’ to be a success, it needs to steer farms towards economically and environmentally beneficial management systems. Starting from now, it needs to be the stepping stone to lower-input farming. Greening needs to find a robust way of incentivize legume cultivation into rotations, and value the management of habitat features to benefit farming and its environment.” *Tim Field*

New ‘greening’ rules will require farmers to provide some habitat - “Ecological Focus Areas” (EFAs) - to qualify for CAP payments. Final details on EFAs have yet to be announced but proposals in the CAP consultation suggest that the requirements will be too weak to achieve the quantity or quality of habitat for pollinators that are required, and may allow the inclusion of cropped areas.

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<sup>13</sup> An organism that feeds on and breaks down dead plant or animal matter, returning essential nutrients to the ecosystem

<sup>14</sup> See <http://www.hgca.com/publications/documents/croprosearch/Beneficials.pdf> and [http://www.hgca.com/publications/documents/croprosearch/356\\_Final\\_Project\\_Report\\_-\\_Part\\_1\\_\(Pgs\\_1-80\).pdf](http://www.hgca.com/publications/documents/croprosearch/356_Final_Project_Report_-_Part_1_(Pgs_1-80).pdf) Summarised by GM Freeze [http://www.gmfreeze.org/site\\_media/uploads/publications/non\\_gm\\_aphid\\_control\\_final.pdf](http://www.gmfreeze.org/site_media/uploads/publications/non_gm_aphid_control_final.pdf)

<sup>15</sup> Page 17 <http://www.foe.co.uk/sites/default/files/downloads/beesreport.pdf>

<sup>16</sup> New Environmental Land Management Scheme <http://www.naturalengland.org.uk/ourwork/farming/funding/nelms.aspx>

<sup>17</sup> <http://daylesford.com/>

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Yet farmers have told Friends of the Earth that providing dedicated areas of habitat for beneficial insects can bring benefits to the cropped area. Tim Field of Daylesford believes that marginal habitat features should be considered as a necessity in the farming system – including hedgerows, grassy tracks, ditch and field margins.

“The 7% of habitat targeted for greening need not be seen as a hindrance to farming. For instance, hedgerows are important for livestock shelter while permanent field margins can harbour beneficial insects if managed appropriately. These refugia and forage habitats are essential for pollinators and beneficial predators.

We see this habitat as critical to linking biodiversity hotspots, but also linking the various ecological service requirements around our farm. We want the pollinators to serve our vegetables and fruit, and the beneficial predators for IPM, but for the rest of the year they need other resources to survive. Legumes in rotation and herb-rich swards are critical in this cycle; whereas badly managed grass-choked margins across deserts of different cereals are of negligible value to feeding pollinators”.

### The right kind of habitat

**Simply leaving an uncropped buffer strip will not be as effective for boosting pollinators as a well-managed wildflower margin with the right plants.** Buffer strips quickly become grass-dominated in the absence of management (cutting, grazing), reducing flower production to levels that cannot support foraging bumblebees.

Margins planted or managed specifically to maximise flower production support significantly greater densities of foraging bees.<sup>12</sup> There is growing evidence that bees are finding it difficult to find food sources at certain times of the year – known as the ‘hungry gap’ – so planting needs to ensure a supply of food at these lean times.<sup>18</sup>

The importance of management and of getting the right mix of wildflowers in margins has been confirmed by the research and experience of the successful Co-operative Farms:

“To maximise the impact of wildflowers in field margins, a variety of types of flowers are needed to ensure pollen and nectar is available throughout the foraging season and to support different species of bee. In our research for example, Crimson Clover was most visited by a long tongue bee species the common carder bumblebee (*Bombus pascuorum*) as the flower has a long corolla that require a long tongue to be able to reach the nectar inside”. *David Watson, Operations Manager at The Co-operative Farms*

Marks & Spencer also recognises the value of quality pollinator habitats and works with its farmers and growers to enhance them:

“M&S continues to work closely with its farmers and growers to increase the provision of high quality farmed habitats that are effective within their farming enterprises. We recognise the importance of pollinators for the vital service they provide to high crop quality & yields, the maintenance and development of habitats that support these services is a critical factor for M&S.” *Johnathan Sutton, Technical Manager – Produce, Flowers & Plants, Marks & Spencer*

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<sup>18</sup> <http://www.fwi.co.uk/articles/19/07/2013/140010/irregular-food-supply-could-be-the-cause-of-bee-decline.htm>.

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Changing management of margins and hedges to benefit nature could actually save farmers money too. This would include avoiding the flailing off of field margins which removes the grasses and other plants that provide overwinter habitat for beneficial insects, and the annual maintenance of hedgerows which removes the flowering stems and potential food source for pollinators and beneficial insects.

“There is an element of ‘vanity farming’ often promoted by peer pressure that has land managers undertaking costly and unnecessary work to field margins.” *Peter Lundgren,*

Peter Lundgren believes that farmers would benefit from independent advice on how best to manage their farms for bees (see below)

## Diversifying crop rotation

“Crop rotation is good practice and good business, but the financial viability of individual crops within the rotation is forcing growers towards a tighter rotation based on wheat and oilseed rape.” *Peter Lundgren*

To provide maximum benefit to pollinators, changes are needed not just in how margins and hedges are managed, but also on the cropped land itself. By diversifying the crops grown – to include more open flowering plants in crop rotations farmers can help to increase food sources when wildflower margins are less likely to be flowering.

“Field-scale legumes in rotation are not a substitute for a diverse mix of flowering plants across the farm landscape; however they do provide an essential boost of resource (nectar, pollen or physical habitat) to certain pollinators at critical periods of the year.” *Tim Field*

In arable farming an increase in the planting of pulses (peas, beans and lupins) would also help to control diseases, pests and pernicious weeds such as blackgrass – and deliver a free source of soil nitrogen<sup>19</sup>.

In dairy and beef production the inclusion of clover in the grass sward delivers protein in the diet and between 150 -250 kg of free nitrogen per hectare, equivalent to a value between £40/ha and £67/ha and providing a valuable food source to pollinators, according to the British Grassland Society.<sup>20</sup>

And as Tim Field explains, growing legumes to feed to livestock has wider benefits to farmers and the environment:

“Home-grown feeds reduce the embedded environmental costs of importing from abroad, which are also often associated with ethically poor and environmentally damaging techniques. When growing it ourselves, we are arguably more resilient to erratic global prices.

“White and red clover, field beans, sainfoin, peas and lupins have all been grown recently. Different sowings give flexibility to suit prevailing field-environment and

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<sup>19</sup> <http://www.hgca.com/publications/documents/cropresearch/Rotation.pdf>

<sup>20</sup> <https://www.cotswoldseeds.com/seed-info/where-have-all-bumble-bees-gone>

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farming situation. As well as home-grown forage, they provide organic matter, fertility, resources for pollinators and Integrated Pest Management (IPM) services.

“Continuous cropping in ecological deserts (enabled wholly by artificial inputs) is an unsustainable technological arms race for innovation in biocides and micronutrient replenishment.”

## Research and Advice

“To achieve the desired increased management ability at farm level we need from research stations novel chemical and cultural bee-friendly responses that are environmentally sustainable, financially viable and supported by the marketplace and wider public.” *Peter Lundgren, arable farmer, Lincolnshire*

Peter Lundgren suggests that research into the following areas is needed to help farmers:

- farming practices that provide increased in-crop habitat for bees and pollinators whilst maintaining financial viability including crop diversification (grass/clover swards and legume crops)
- crop varieties that mitigate the need for insecticides including disease and insect resistant varieties of wheat and oil seed rape
- the potential for push-pull technology or companion planting, successful in Africa against crop pests, to be adapted for UK farming conditions
- research into the ‘hungry gap’ and how farmers and landmanagers can maximise food sources for pollinators through practical changes in farm management.

Tim Field also suggested that IPM be a key focus for research and development. Such research could be funded as part of the ‘UK Strategy for Agricultural Technologies’. But research is of little use if it sits on a shelf in a Government office or academic institution. It needs to be passed on to farmers in a practical and accessible way by trusted sources.

“Research and development and case studies need to be translated into knowledge sharing, training and education. Agricultural academic institutions have a role to play to make research outcomes palatable and practical for current and next generations of farmers.” Tim Field

Peter Lundgren also points towards a worrying trend – that an increasing number of land managers are looking to recoup crop losses from their advisors. The threat of blame is putting pressure of agronomists to ensure that their agronomy recommendations do not leave them open to blame. In practice, this has led to a situation where agronomists are loath to risk waiting for evidence of crop pests causing damage before using an insecticide or recommending products that are bee-friendly, but less efficacious against the target pest, preferring to adopt a prophylactic insecticide regime.

“This also brings into question the value of the government’s investment in research if the benefits of this research and knowledge is not made available to growers. With the demise of a nationwide DEFRA funded advice organization there is no obvious existing vehicle for the dissemination of this knowledge from research that can be trusted by the grower to offer unbiased advice. Therefore it falls to government to establish such a vehicle”. *Peter Lundgren, arable farmer, Lincolnshire*

## **Recommendations for the National Pollinator Strategy**

“Organic production standards probably offer the ‘gold standard’ for bee-friendly farming practice. But given that more than 90% of farmers practice conventional farming techniques and use pesticides it’s important that any attempt to define a National Pollinator Strategy offers a practical and financially viable response for conventional farmers.” *Peter Lundgren, arable farmer, Lincolnshire*

The need to restore a pollinator friendly environment in the countryside is backed by the farmers who contributed to this briefing. The NPS needs to contain new and ambitious action for farmed land.

### **Role of Government**

#### **Research and Development**

- crops that are more tolerant or resistant to insect pests and insect borne diseases and viruses (e.g. BYDV tolerant wheat and Turnip Yellow Virus tolerant Oilseed rape)
- financially viable varieties of legume crops which reduce pest attack by being incorporated into crop rotations and which provide food for pollinators
- novel non-chemical crop protection products

#### **Reducing Pesticide Use**

- Development and promotion of IPM protocols – prioritising bee pollinated crops such as OSR – and with a clear aim of minimising pesticide use.

#### **Habitat creation**

- New pollinator habitat options to be included in the new agri environment scheme (NELMS) with a focus on quality habitat and management and a clear plan for encouraging better take-up by farmers.
- Through greening measures – EFAs to incentivize properly managed wildflower margins, and encourage diverse rotations

#### **Independent accessible advice to farmers**

- ensure agronomists and other trusted sources of advice are giving independent advice – not from pesticide companies – based on latest knowledge.
- spreading of good practice - adoption of tried and tested methods of farming and growing with low or no use of chemical inputs

#### **Role of retailers**

- Introduce specific pollinator measures into supply chain, ensure farmers adequately rewarded for environmentally responsible farming, and raise awareness of consumers about the need for bee-friendly farming.

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