BirdLife Europe position paper: reducing direct and indirect impacts of pesticides on birds

Adopted by the EU Agriculture Task Force on 24 April 2015.

Executive summary

Pesticides used in agriculture can have both direct and indirect impacts on bird populations. Birdlife Europe is calling for the following actions to address these problems.

Preventing poisoning related to insecticides and rodenticides

1. Substitute (remove from the market and replace with environmentally safe alternatives) substances contributing to impacts on bird populations; improve mandatory evaluation mechanisms for existing and new products.
2. National legislative mechanisms should include a mandatory review and evaluation process with criteria to adjust labelled/approved uses when evidence shows it is necessary.
3. National governments to promote low pesticide farming systems (organic and Integrated Pest Management) across all agricultural sectors and use appropriate tools including regulation, provision of information and training, and incentives to ensure uptake by growers.
4. Include bird criteria in Rotterdam Convention to reduce risk of imports of products highly toxic to birds.
5. National Governments to identify local risk black spots and work with stakeholders to reduce risk.
6. Ban second generation anticoagulant rodenticide use in open agricultural fields.
7. Use best practice to prevent and manage rodent irruptions minimising use of second generation anticoagulant rodenticides (SGARs)..
8. Prohibit permanent baiting: apply rodenticides only when infestations are present followed by bait and carcass removal.

Tackling indirect impacts

1. Increase support for organic farming and improve organic standards where necessary to maximise the benefits to biodiversity.
2. Fully implement the Sustainable Use of Pesticides Directive in all Member States, in particular the promotion of Integrated Pest Management (IPM).
3. Protect and expand the area of unsprayed biodiversity habitats.
4. Update the EU risk assessment process to take account of the indirect impacts of pesticides on non-target organisms and ecosystems.
5. Increase the research focus given to low-pesticide input methods of food production.
6. Improve monitoring of pesticides in the environment to enable further research into their indirect impacts on biodiversity.

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Notes on scope

The word *pesticides* is used here as a general term to include all chemicals used by farmers to kill undesired organisms in crops, including herbicides, insecticides and fungicides. This paper only considers pesticides used in agriculture, although the use of pesticide in other sectors (for example management of highways and public parks) can also affect biodiversity.

Pesticides can also have effects on human health. These effects must be taken seriously by governments and the European Union and efforts should be undertaken to eliminate these effects. For the purposes of this paper, direct or indirect effects on human health will not be considered further. A separate position on organic farming will be developed.

Part 1: preventing poisoning of birds from pesticides (direct impacts)

Introduction and context

Poisoning is a significant global problem affecting a wide range of species across almost all habitats, with the potential to contribute to population declines of birds as well as having wider associated ecosystem impacts. Birds of prey are one of the most vulnerable groups of species to poisoning due to their position at the top of the food chain and as long-lived, slow reproducing species.

There has been much policy progress in the prevention of poisoning of birds over the last decades. In November 2014, the Convention on Migratory Species adopted Guidelines to Prevent the Risk of Poisoning of Migratory Birds, developed through a CMS Working Group coordinated by BirdLife (RSPB). These address five priority poisoning areas: insecticides, rodenticides, poison-baits, veterinary pharmaceuticals, and lead ammunition and fishing weights. The adoption of these guidelines is an important opportunity to address the issue of poisoning at the level of EU Member States.

A BirdLife position on poison-baits, veterinary pharmaceuticals, and lead ammunition and fishing weights was adopted through the EU Birds and Habitats Directives Task Force (13 May 2014).

This Position of the Agricultural Task Force addresses direct poisoning by:

- insecticides used to protect crops from insect pests, particularly carbamates and organophosphates; and
- rodenticides used to protect crops and grain stores from rodent pests, particularly second generation anticoagulant rodenticides.

Indirect effects of pesticides on birds, such as the reduction of habitat/cover and food abundance, eg, invertebrates, which lead to reduced feeding opportunities and breeding success, are covered in Part 2.

Three quarters of all pesticides used are in agriculture (with the remainder used in veterinary medicine, food storage, building preservation, urban environments, etc.). The pesticide use often associated with modern agriculture can threaten ecosystem viability through a reduction in biodiversity.

Insecticides

The broad spectrum nature of certain insecticides (organophosphates and carbamates) puts any bird at risk of lethal or sub-lethal effects if they happen to be in the vicinity at the time of application, or shortly thereafter, or if they come into contact with exposed prey. Organophosphates have been implicated in 335 separate mortality events causing deaths of approximately 9,000 birds during 1980-2000 in the US. Insecticide use can also have implications for human health. Bird species that use arable farmland are at risk of exposure to insecticides. Insecticides may also used in forestry to control invertebrate pests; however the current position statement deals only with agricultural use.

Primary poisoning

Granivorous passerines may consume pesticide-treated seeds (primary poisoning). Granular insecticides are particularly attractive to songbirds, either as grit or as food, eg, previously used granular carbofuran (now banned for agricultural purposes in the EU, but is still used in some areas) applied at seeding in canola (oilseed rape) fields resulted in reduced abundance and declining population trends of common agricultural species.

Waterfowl and some gamebirds which feed on agricultural foliage are at potential risk. Extensive kills of waterfowl have occurred in potato and root crops, and in partially flooded corn, winter wheat and rice fields in the US and Canada.

Secondary poisoning

Scavengers and predators are poisoned when they consume contaminated prey (secondary poisoning), eg, secondary poisoning by carbamate and organophosphate insecticides have been attributed as the cause of mortality in barn owls and kestrels.

Birds that feed on agricultural pests, such as grasshoppers, are at risk if feeding on contaminated insects, eg, grasshopper control in Argentina using the organophosphate monocrotophos killed at least 5,000 Swainson's hawks during 1995-1996. European species such as black kites may be particularly vulnerable to poisoning because of their ability to target pest outbreaks in agricultural crops.

Species that regularly feed on earthworms are also more likely to be poisoned as a result of carbamate use. This has been documented in birds of prey, such as buzzards and kites.[1]

Sub-lethal effects

Small amounts of these chemicals can cause sub-lethal effects, such as reduced activity in birds, which spend more time resting or perching than foraging or reproducing.[2] For example, raptors that consume high levels of these substances lose the ability to fly and coordinate muscles.[3] Pesticides can also reduce reproductive success: for example in one study imidacloprid reduced fertilization rate, egg size and eggshell thickness in red-legged partridge.[4] Sub-lethal toxicity associated with exposure to organophosphates and carbamates can also lead to alteration in migratory behaviour, such as a lack of migratory orientation.

Rodenticides

Rodenticides are most commonly used for agricultural purposes, such as the protection of crops and grain storage from rodent pests. Anticoagulant rodenticides (ARs) are the most widely used rodenticide to control rodent pests worldwide. They are also a common component of modern agriculture for the control of rodent populations. Rodenticides are also used in forestry to reduce

[1] Mineau et al., Poisoning of raptors with organophosphorus and carbamate pesticides with emphasis on Canada, US and UK.
[2] Walker, C. H. (2003). Neurotoxic pesticides and behavioural effects upon birds. Ecotoxicology, 12(1), 307-316.
[3] Ostrowski, S., & Shobrak, M. (2001). Poisoning by acetylcholinesterase inhibiting pesticides in free-ranging raptors: a case reported from Saudi Arabia. Falco. The newsletter of the Middle East Falcon Research Group 20:8-9.
[4] Lopez-Antia, A. et al (2013) Experimental exposure of red-legged partridges (Alectoris rufa) to seeds coated with imidacloprid, thiram and difenoconazole. Ecotoxicology, 22, 125-138

rodent damage to saplings and mature trees, with potential impacts on birds. The current position statement however deals only with agricultural use.

Birds that forage in agricultural landscapes can be exposed to anticoagulant rodenticides (ARs). Many raptor species are especially likely to be exposed to rodenticides due to a regular diet of rodents. Scavenging species may be especially at risk because they feed on carcasses that could be contaminated with rodenticides. The red kite, for example, may be particularly susceptible to secondary poisoning because of the high proportion of carrion in its diet, including rat carcasses.

Widespread exposure in birds to rodenticides has been detected through wildlife monitoring programmes in Europe and North America. For example, high detection rates of ARs have been reported in birds of prey collected through wildlife monitoring programmes in USA (86% of 161 birds between 2006-2010), France (73% of 30 raptors, 2003), Ireland (85% of barn owls, 2006-2011), and Western Canada (70% of 164 owls and 60% of red-tailed hawks (Buteo jamaicensis), 1988-2003).

In the UK, secondary exposure to ARs has been found in populations of barn owl, tawny owl, kestrel, buzzard, and red kite. In 2010, over 90 per cent of barn owls and red kites were exposed to second generation anticoagulant rodenticides according to the Predatory Bird Monitoring Scheme in the United Kingdom. Exposure is also prevalent in the wider food chain, not just limited to small mammal specialists, with 46 per cent Sparrowhawks and 35 per cent of peregrines exposed to ARs in a recent study.

In Norway, ARs (brodifacoum, bromadiolone, difenacoum and flocoumafen) were present in five species of raptors found dead during 2009-2011, including 70 per cent of golden eagles and 50 per cent of eagle owls, with 30 per cent of the livers of the samples of these two species containing lethal levels.

In Spain, the presence in livers of AR residues has been detected in a large number of non-target wildlife species. During 2005-2010,[5] 40.9 per cent of animals analysed in Spain were poisoned and 21.1% of these were due to AR. Nocturnal raptors (62%) and carnivorous mammals (38%) were amongst the secondary consumers with highest prevalence of AR exposure, especially to second generation AR (SGARs). On the other hand, granivorous birds showed the highest prevalence of AR exposure (51%), especially to chlorophacinone in a region treated against a vole population peak in 2007.

[5] Sánchez-Barbudo IS, et al, Primary and secondary poisoning by anticoagulant rodenticides of non-target animals in Spain, Sci Total Environ (2012), doi:10.1016/j.scitotenv.2012.01.028

Sub-lethal exposure to second generation ARs (which are more commonly used and more toxic to birds than first generation ARs) may hinder the recovery of birds from non-fatal collisions or accidents. They may also impair hunting ability through behavioural changes, such as lethargy, thus increasing the probability of starvation. However, there is limited evidence of these effects occurring in the field and further research is needed to understand the potential implications on populations.

Policy Asks (solutions required)

Current EU policies are not sufficient to effectively prevent the poisoning of birds (see Annex 1). The introduction of new legislative measures and non-legislative measures is therefore needed to prevent the poisoning of birds. BirdLife Europe is seeking the introduction of the following legislative and non-legislative measures.

Actions required to prevent poisoning related to insecticides

Creating habitats and refuges from pesticides within the farmed landscape may in some cases reduce poisoning risk, and can also mitigate the indirect impacts of pesticide use on birds and the wider environment (see Part 2). Mechanisms to achieve this include organic farming, agri-environment schemes and Ecological Focus Areas.

1. ***Substitute (remove from the market and replace with environmentally safe alternatives) substances contributing to impacts on bird populations; improve mandatory evaluation mechanisms for existing and new products***: Substances resulting in lethal or sub-lethal effects contributing to bird population declines, should be immediately removed from the market and replaced with environmentally safe products. Legislative provisions should include immediate suspension of products where evidence shows they likely to result in risks to birds when applied in agricultural fields. Legislation should incorporate the precautionary principle so that if substances have the potential to contribute to bird population declines, the lack of certainty of the evidence should not prevent their removal from agricultural use (see Box 2).

2. ***National legislative mechanisms should include a mandatory review and evaluation process with criteria to adjust labelled/approved uses when evidence shows it is necessary***, while applying the precautionary principle. To ensure a re-evaluation process is triggered when risks to birds may occur, a monitoring system needs to be put in place. Monitoring of insecticide use and recording of effects on birds should be part of the required mitigation plan at the stage of the original approval of the product's use.

3. ***National governments to promote low pesticide farming systems across all agricultural sectors and use appropriate tools including regulation, provision of information and training, and incentives to ensure uptake by growers***: Governments must support farmers to adopt a more sustainable approach to crop production and protection that minimises the use of all pesticides, thereby limiting the risk of poisoning of non-target species, including birds. In the EU, the Sustainable Use of Pesticides Directive (DIRECTIVE 2009/128/EC) requires that "Member States shall take all necessary measures to promote low pesticide-input pest management, giving wherever possible priority to non-chemical methods". This Directive must be implemented in full by all EU Member States. Tools are needed to encourage current users of substances of risk to birds, particularly in agricultural crops (food and non-food crops), to move to more sustainable approaches.

   a. Organic farming: pesticide use in organic farming is highly restricted, reducing risks of poisoning of non-target species. Organic farming systems also have proven benefits for biodiversity and wider sustainability. In recognition of these benefits, Governments should support and promote organic farming, including by providing payments for conversion to, and continuation of, organic farming and providing training and information in organic techniques. In the EU, organic farming is clearly defined and regulated in law, and organically labelled foodstuffs are widely recognised by citizens. Properly-regulated third-party labelling can encourage a move towards environmentally-friendly consumption patterns and also induce governments to increase environmental standards for products through current regulatory systems[6].

   b. Integrated Pest Management (IPM): IPM, when implemented well (see Box 1), is a more sustainable approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimise the use of pesticides. However, the fact that Member States lack willingness to engage with IPM, or any way to benchmark good practice, means that in some countries a wide range of farming systems are being defined as IPM and are receiving publicly-funded government support, or benefiting in other ways such as through membership of certification schemes. Some of these farming systems are not meeting what Birdlife would consider to be basic good practice. Member State government need to define what IPM is (or at least what it is not), setting out clear IPM standards required of growers and making these the baseline for receiving any public support. Strong action must be taken to eradicate false claims and misleading labelling for products not compliant with stringent IPM principles. Birdlife accepts that government support may play an important role in encouraging the adoption of IPM strategies through provision of enabling systems and

[6] Birdlife Agriculture Task Force will separately prepare a detailed position statement on organic farming.

advice, including but not limited to training and information on IPM application. However, subsidies for static application of IPM measures are not supported by the BirdLife partnership. The IPM baseline need to be dynamic and updated over time. Member States should also make full use of support for organic food and farming in order to support good implementation of the Sustainable Use of Pesticides Directive.

4. ***Include bird criteria in Rotterdam Convention to reduce risk of imports of products highly toxic to birds***: mandatory consideration of effects of pesticides on birds could achieve better informed decision-making, particularly when national governments are deciding whether to allow import of pesticides, and when the Convention is deciding whether to regulate additional pesticides.

5. ***National Governments to identify local risk black spots and work with local stakeholders to reduce risk***: poisoning black spots within breeding, wintering and stopover sites need to be identified and addressed by working with local stakeholders. Risk models exist to identify pesticide uses that present a high risk of acute intoxication and these should be applied more broadly. Better identification of likely risk from insecticides to birds and black spots risk areas could be achieved by conducting studies in which habitat (initially focusing on the habitat of threatened species and areas of high bird concentration) and areas of pesticide use are overlaid.

Actions required to prevent poisoning related to rodenticides

6. ***Ban second generation anticoagulant rodenticide use in open agricultural fields***: the likelihood of exposure to SGARs used in open-field agriculture is high for birds. In many non-temperate areas, i.e. where rodents have not yet developed resistance to ARs, the less toxic and persistent first-generation anticoagulant rodenticides can still be effective.

7. ***Use best practice to prevent and manage rodent irruptions minimising use of second generation anticoagulant rodenticides (SGARs)***: SGARs should not be used for rodent outbreaks, deploying instead preventative rodent damage measures, e.g. synchronous planting of crops and good field sanitation to limit resource availability/length of planting season.

8. ***Prohibit permanent baiting: apply rodenticides only when infestations are present followed by bait and carcass removal.*** Permanent baiting, rather than only using rodenticides when infestations are present, is a likely cause of non-target wildlife exposure to rodenticides, particularly to SGARs, which are widely applied in this way. Many professional pest controllers use permanent baiting with anticoagulant rodenticides as standard procedure. Best practice guidelines on rodenticide use should be adopted.

Part 2: reducing indirect impacts of pesticides on birds

Introduction and context

This section sets out Birdlife Europe's position on reducing the indirect impacts of pesticides on birds. By *indirect impacts* we mean the impacts on bird populations resulting from disruption to food webs and habitats caused by pesticides. The direct impacts of pesticides on wildlife (i.e. toxic effects) are covered in Part 1.

Agriculture has changed significantly in many parts of Europe since the 1940s - 1950s. The nature and pace of change has varied in different countries, but dominant trends include a move from mixed to specialised farms; removal of hedgerows and other landscape features; draining of wet soils; shorter crop rotations and a shift to autumn-sown crops.

Use of pesticides (along with synthetic fertilisers) is inextricably linked with this intensification of farming. It is difficult to prove or quantify the impacts of pesticides on given bird species, because there are nearly always impacts from other aspects of agricultural intensification happening at the same time.

It is known, however, that indirect impacts of pesticides do occur. Bird populations can be negatively impacted by factors including removal of insect and seed food sources, and habitat loss or decline in habitat quality for breeding and foraging. Pesticides themselves can cause these factors (e.g. insecticides removing insect food), and additionally can enable farming practices that lead to these factors (e.g. fungicides allowing growth of denser wheat crops that impede nesting of ground-nesting birds).

Pesticides have been a key factor enabling the increase in crop production per hectare. However use and mis-use of pesticides brings a range of problems. If a particular pesticide is used repeatedly year after year, over time pest species can develop resistance to that chemical, meaning that greater amounts must be applied or more toxic alternatives used. Pesticides may kill beneficial organisms such as pollinators or soil biota. If a pesticide kills the natural enemies or competitors of a pest, the pest population may rebound to even higher levels than before treatment. Pesticide use can disrupt the agro-ecosystem such that minor 'secondary pests' increase to levels where they begin to cause significant economic damage.

In organic farming, synthetic pesticide use is prohibited, with the focus on the overall farming system - building fertile soils through the use of farmyard and green manures and rotating and mixing crops to support healthy plants that can withstand and prevent the build-up of pests, while maximising natural pest control. Integrated Pest Management (IPM) is an approach where pesticides should be used only as a last resort, the intention being to design the farming system such that pest populations are kept under control through mechanisms including crop rotation and encouraging natural enemies of pests (see Box 1). IPM makes use of all tools available, such as resistant crop varieties and detailed monitoring of pest populations, to effectively manage pests with minimal use of pesticides. Some of these tools are also widely used by organic farmers.

Evidence for indirect impacts of pesticides on birds

For some species, research has been carried out to establish the impacts of pesticides at individual or population level. Insecticide and herbicide use were demonstrated to reduce chick survival in grey partridge in the UK at levels predicted to cause population declines. Individual level effects have also been found for yellowhammer and corn bunting.[7]

Some studies have explored pesticide impacts on populations at the landscape scale. A study in the Netherlands found that local bird population trends were significantly more negative in areas with higher surface-water concentrations of imidacloprid (a neonicotinoid insecticide). The authors suggest that this is due to the depletion of insect food resources.[8]

Out of 13 studied components of agricultural intensification across Europe, use of pesticides had the most consistent negative effects on the species diversity ground-nesting farmland birds.[9]

An evidence review produced on behalf of the German Federal Environment Agency in 2014 concluded that in order to persist, populations of wild farmland birds need certain amounts of natural or semi-natural (unsprayed) habitats scattered within arable landscapes. The authors believe it is highly probable that a completely sprayed arable landscape could not hold any breeding birds.[10]

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[7] Bright, J.A., Morris, A.J. and Winspear, R. (2008) A review of Indirect Effects of Pesticides on Birds and mitigating land-management practices. A report for the Pesticide Safety Directorate by the Royal Society for the Protection of Birds

[8] Hallman, C.A. *et al* (2013). Declines in insectivorous birds are associated with high neonicotinoid concentrations. Nature 511, 341–343

[9] Geiger, F. et al. (2010) Persistent negative effects of pesticides on biodiversity and biological control potential on European farmland. Basic and Applied Ecology 11: 97–105

[10] Jahn, T. et al (2014) Protection of biodiversity of free living birds and mammals in respect of the effects of pesticides. Produced on behalf of the Federal Environment Agency (Germany).

Policy asks (solutions required)

1. ***Increase support for organic farming and improve organic standards where necessary to maximise the benefits to biodiversity***[11]. See 3a in Part 1 of this paper. Some organic production, despite adhering to the rules that restrict use of synthetic inputs as well as other requirements set out in organic standards e.g. organic fertilisation, lower stocking rates, diverse rotations, can in some cases be highly intensive and may not actively support habitat management for biodiversity. Organic standards should therefore be encouraged to go beyond the legal requirements, for example for retaining/ restoring semi-natural habitat within the farmed landscape. In this respect the role of the organic regulation should be to better support biodiversity outcomes through additional guidance on conservation and habitat management. Furthermore in addition to organic farming payments, organic farmers should also be able to access payments under CAP that support enhanced biodiversity such as agri-environment-climate and Natura 2000 going beyond the scope of the organic regulation.

2. ***Fully implement the Sustainable Use of Pesticides Directive***[12] ***in all Member States, in particular the promotion of Integrated Pest Management (IPM)***. See 3b in Part 1 of this paper.

3. ***Properly implement and enforce Article 9 in the Sustainable Use Directive, which requires that "Member States shall ensure that aerial spraying is prohibited."*** As set out in the Directive, aerial spraying should only be allowed in exceptional circumstances and only where evidence shows it is safer and more effective than alternatives.

4. ***Protect and expand the area of unsprayed biodiversity habitats***. The Sustainable Use of Pesticides Directive requires Member States to ensure that use of pesticides is minimised or prohibited in certain areas, which include public parks, sports and recreation grounds, areas near schools and healthcare facilities, and Natura 2000 sites and other areas protected for biodiversity. This is necessary to protect human health and the environment, and can form part of an IPM strategy by providing refuges for beneficial organisms.

   Member States should prohibit use of pesticides in Ecological Focus Areas. Habitat created through agri-environment schemes should not receive pesticide applications, including protecting them from spray drift. Designated wildlife areas such as Natura 2000 sites must

[11] Birdlife Agriculture Task Force will separately prepare a detailed position statement on organic farming.

be protected from adverse effects of pesticide use. The actions needed to achieve this will vary according to the specific situation, but must include preventing harm from pesticide use outside the borders of the site (for example upstream in a water catchment).

5. ***Update the EU risk assessment process to take account of the indirect impacts of pesticides on non-target organisms and ecosystems.*** Legislation must be based on hazard on not on risk (see box 2).

6. ***Increase the research focus given to low-pesticide input methods of food production.***

7. ***Improve monitoring of pesticides in the environment to enable further research into their indirect impacts on biodiversity.*** At present, a lack of data on pesticides in the environment makes it difficult to draw conclusions about their indirect impacts on biodiversity (exceptions, such as the Netherlands study on imidacloprid described above, show what can be done when the data is available). For example, the quality and scope of monitoring of pesticides in water is very variable between Member States. There is a need for improved standardised monitoring of pesticide contamination of water and soils across the EU.

Box 1: Integrated Pest Management

EU Directive 2009/128/EC on the Sustainable Use of Pesticides sets out the 'general principles of IPM'. These principles form a useful starting point but do not in themselves provide a complete list of IPM tools nor a measurable baseline for what can be considered IPM, with the result that different governments and other groups may interpret IPM differently. For purposes of clarity, we set out here Birdlife EU's understanding of IPM. This draws on a briefing prepared by Pesticide Action Network EU in December 2010.

IPM is a package of practices covering the whole farming system. The key elements of an IPM approach are:

- Appropriate design of the farming system and good practices that minimise the chance of pest outbreaks. This includes but is not limited to appropriate crop rotation/ diversity, choice of crop varieties, and protection of beneficial organisms.
- Close monitoring of pest populations and only intervening when predetermined thresholds are exceeded.
- Using sustainable non-chemical control (e.g. biological) methods in the first instance.
- If a pesticide is needed, applying best practice in the choice and use of chemical, and taking measures to avoid resistance.
- Recording pest management decisions and outcomes and using past results to inform future decisions.

IPM is a complete package, which is being updated over time. A programme that only considers some of the above elements – for example a scheme to promote best practice in pesticide spraying – is not in itself IPM.

Certain practices are in contradiction of IPM, and the use of these practices will generally mean that a farming system should not be considered as IPM. These include large-scale monocultures that require routine applications of pesticides; use of soil fumigation; use of broad-spectrum pesticides which harm non-target organisms; and 'calendar' or pre-emptive pesticide treatments without assessment of need.

Box 2: Hazard and Risk

There is a debate over whether EU legislation on pesticides (and other potentially harmful substances) should be based on hazard or risk.

Hazard in this case is the toxicity of a substance. Under hazard-based legislation, a chemical with high toxicity to non-target organisms would not be authorised for use as a pesticide.

Risk combines the hazard with an estimate of probability that the sensitive organisms will be exposed to the chemical. Under risk-based legislation, a chemical with high toxicity to non-target organisms could be authorised if it was considered that these organisms were at low risk of being exposed.

Clearly it is important to consider and address the probability of exposure as part of responsible use of pesticides. Measures to reduce exposure – for example high-precision spraying equipment, or label requirements to avoid spraying at certain times of day or year – play an important role in reducing the impacts on wildlife from pesticide use.

Nevertheless, Birdlife believes that EU legislation on pesticides must be essentially hazard-based. A risk-based approach fails to protect wildlife because it is not possible to predict all possible exposure routes from use, misuse or abuse of the pesticide. An example of the failure of this approach is provided by neonicotinoid insecticides. These chemicals are known to have extremely high toxicity to bees. However, it was believed that by applying neonicotinoids as seed dressings, exposure of bees (and therefore 'risk') would be minimal. It is now understood that bees and other wildlife can be exposed to neonicotinoids through a variety of unforeseen routes, including in pollen and nectar of crops and in water bodies next to treated fields. The European Commission has placed temporary restrictions on the use of neonicotinoids to try to protect bees. A hazard-based approach to pesticide authorisation would presumably have prevented this situation from arising in the first place.

Annex 1:
Direct Impacts - comparison of recommendations with status quo

	Recommendation	Status quo in European Union	Change necessary
Crop protection using insecticides			
1	Substitute (remove from the market and replace with environmentally safe alternatives) substances of high risk to birds	Continued evaluation of existing products' risks birds is necessary, but the focus should be on preventing risky new products from entering the market, if they are to be used in a way that will affect bird populations; Commission Regulation (EU) No 283/2013 concerning the placing of plant protection products on the market needs improvement	Regulatory
2	Improve mandatory evaluation mechanisms for existing and new products		
3	National governments to promote low pesticide farming systems, including organic farming, across all agricultural sectors and use appropriate tools including regulation, provision of information and training, and incentives to ensure uptake by growers	EU Directive 2009/128/EC on sustainable use of pesticides needs implementation. Organic farming regulation is currently under review in the EU. Several governments promote organic farming either by setting targets or by using rural development money to get more farmers to convert.	Regulatory and non- regulatory
4	Include bird criteria in Rotterdam Convention to reduce risk of imports of products highly toxic to birds	Needs adoption by the Rotterdam Convention and then transposition into national regulatory systems	Regulatory
5	Identify local risk black spots and work with local stakeholders to reduce risk	Limited knowledge of these areas. Pesticide risk models exist, but need to be overlaid with habitat/species use to identify black spots.	Non-regulatory
Crop protection using rodenticides			
6	Ban second generation anticoagulant rodenticide use in open agricultural fields and areas where rodents are not resistant to first generation ARs.	Second generation anticoagulants are used in open field agriculture in some countries, such as France.	Regulatory
7	Use best practice to prevent and manage (when occurring) rodent irruptions. Do not use second generation anticoagulant rodenticides.	Second generation anticoagulant rodenticides are used for treatment of rodent irruptions in some countries putting wildlife at risk.	Regulatory
8	Prohibit permanent baiting: apply rodenticides only when infestations are present followed by bait and carcass removal	Permanent baiting is frequently used, increasing risk of bird exposure	Regulatory