



# The pollination deficit

Towards supply chain resilience in the face  
of pollinator decline

## Acknowledgements

This resource is an output of the Cambridge Conservation Initiative (CCI), supported by the Arcadia Fund. We are grateful for the inputs of all the companies, interviewees and workshop attendees who contributed their time and expertise. Particular thanks go to Dr Alexandra-Maria Klein and Dr Virginie Boreux, to Mars, The Jordans & Ryvita Company, Sustainable Agriculture Network and The Body Shop for inputting into this report. Thanks also to Dr Chloe Montes for her work in shaping this project and to Professor Simon Potts and Dr Tom Breeze.

## Project partners



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## Foreword

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The global thematic assessment of pollinators, pollination and food production published last year by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) clearly outlined the vital role played by pollinators in supporting food production, natural ecosystems and human wellbeing. It showed that wild pollinators have declined on regional scales in North West Europe and North America, but that there aren't enough data to make such general statements for the rest of the world. However, there is substantial scientific information about what is causing pollinators to decline – agricultural intensification, habitat loss, agricultural chemicals and climate change, for example. These same drivers are exerting pressure on pollinators globally, so it is likely the long-term declines are far more widespread than we have evidence for. Governments of the world have responded very positively by supporting strategic national and local action to support wild pollinators. This report demonstrates how and why businesses can also take action to support pollinators.



**Simon Potts, Co-chair of the IPBES global pollination assessment and Professor of Biodiversity & Ecosystem Services, University of Reading**

Since 1985 Jordans has paid a premium for grain to support biodiversity on farms. We work in partnership with The Wildlife Trusts to develop bespoke habitats amounting to 10 per cent of each farm's land. This work helps us differentiate our brand. We also work with UK growers and agronomists to increase supply chain efficiency.



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Despite this work we are still exposed to risk. Within my business alone we purchase £11 million worth of ingredients that are pollinator dependent. That is where collaborative partnerships like this are essential. It is very helpful to have a concise, action-focused report that offers a practical roadmap for the private sector, supported by rounded academic observations on the business case for action.

**Paul Murphy, CEO, The Jordans & Ryvita Company**

Pollinator declines are a growing social and ecological issue and one that is not sufficiently recognised. Farm sustainability standards like the Sustainable Agriculture Network Standard have a key role in helping farmers and companies address and reverse these declines by promoting pollinator-friendly strategies and practices. This report has reinforced how important yet underestimated the impact of pollinator decline is likely to be for many companies that source agricultural products, and is driving our thinking as we expand our work beyond certification. We are looking forward to collaborating further with the Cambridge Conservation Initiative partners on the next phase of this work and to strengthen the approach for addressing this within supply chains.



**Andre de Freitas, Executive Director, Sustainable Agriculture Network**

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## Executive summary

As a society we are increasingly dependent on pollinators. The proportion of global agricultural production that depends on pollinators has increased four-fold since 1961. Much of this dependence is linked to wild pollinators. Where data exists, we are seeing evidence of wild pollinator decline. Over 16 per cent of vertebrate pollinators are threatened with global extinction, 9 per cent of wild bee and butterfly species face local extinction and available National Red Lists show up to 50 per cent of bee species assessed are nationally threatened. This could pose an unidentified risk – a pollination deficit – in agricultural supply chains.

This report presents the results of a year-long project aimed at improving the understanding of pollination risk within private sector supply chains.

### Company action within supply chains

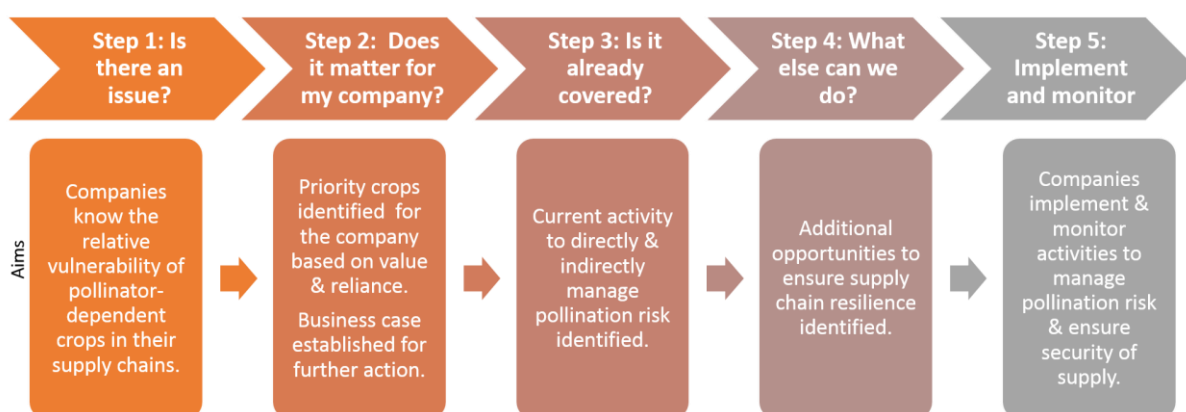
Twenty-seven companies with a potential dependence on pollination were benchmarked for action on pollination, eight were surveyed and seven were interviewed. Public corporate disclosures suggested limited action on pollination within the supply chain. The companies surveyed, however, linked the issue with operational, regulatory and marketing risk, with a number of companies piloting pollinator-friendly farming practices. Action to address the risks of pollinator decline was hampered by a lack of knowledge of which crops and sourcing regions are potentially vulnerable to pollinator decline and by a lack of an effective business case for action.

Less than half the companies sampled know which of the raw materials they source depend on pollinators

### A roadmap towards sustainable pollinator management

A five-step roadmap is outlined below (Figure 1) to enable sustainable pollinator management within supply chains. It asks the questions: Is there an issue? Does it matter? Is it already covered? What else can we do? Are our actions effective?

Figure 1. Roadmap towards sustainable pollinator management in the private sector.



A key first step on the roadmap is for companies to assess the vulnerability of their supply chains to improve understanding of business risk associated with key crops and sourcing regions. In Steps 3 and 4, there is a clear role for policymakers and certification schemes to provide regulatory controls, incentives or guidance for pollinator-friendly practices.

### Recommendations

Priorities identified for companies to act to improve supply chain resilience included:

- a better business case – the highest priority
- better understanding of crop vulnerability to pollinator decline and its economic implications
- readily accessible national-level information on crop vulnerability to pollinator decline nationally
- better integration of pollinator-friendly practices into certification standards.

A private sector coalition on pollination could drive action in all these areas.

The project team is working to deliver a vulnerability assessment methodology that can assist companies in moving forward on this emerging business risk. Details on this methodology will be presented in a follow-on to this report and in a scientific publication (Dicks et al in prep) in the coming year.



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# 1. Introduction

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This report is aimed at companies with agricultural supply chains who wish to gain a better understanding of the potential risks to their business posed by the decline of wild pollinators and how this translates to a business case for action.

Produced by the University of Cambridge Institute for Sustainability Leadership (CISL), Fauna & Flora International (FFI), UN Environment World Conservation Monitoring Centre (UNEP-WCMC) and the University of East Anglia (UEA), this report:

- sets out current practice on pollinator conservation within company supply chains (Section 2 ‘Setting the scene’ and Section 3 ‘Pollination and the private sector’);
- identifies areas of potential risk to biodiversity and to security of supply (Section 4 ‘Building more sustainable supply chains’);
- outlines best practice and recommendations for a roadmap to strengthen management approaches for conserving wild pollinators (Section 4)
- sets out recommendations for follow-on activities that can lead to sustainable pollinator management (Section 5 ‘Recommendations’).

## Conserving wild pollinators to secure supply chains

The report is a key output from a year-long Cambridge Conservation Initiative-funded project. It aims to catalyse private sector action to support the conservation of wild pollinator populations by:

- improving the understanding within the private sector of pollination risk within supply chains, articulating a business case for companies to act on the issue and identifying the role that they can play in reversing a downward trend in wild pollinators
- increasing private sector access to information on pollination, bringing policy and research into the heart of corporate sustainability decision-making
- promoting good practice with regard to pollinator-friendly management practices to ensure sustainable sourcing of pollinator-dependent crops amongst the private sector
- sharing project outputs with national-level policymakers to create a flow of information from the scientific and agriculture sectors into policymaking.

## Approach

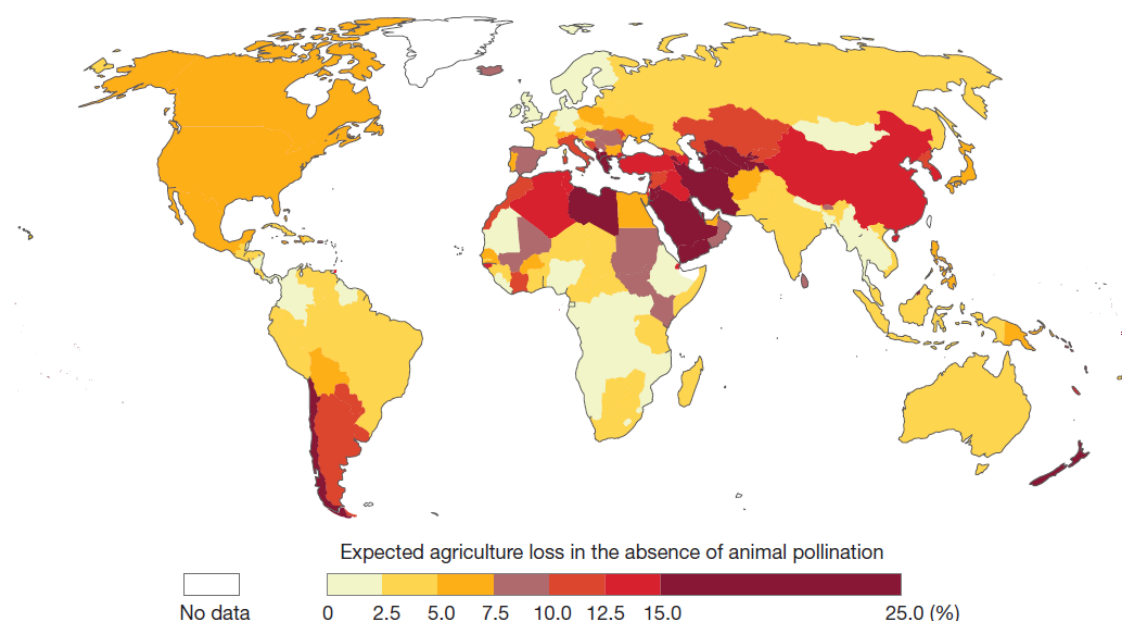
A benchmarking approach was used to identify how 27 companies with agricultural supply chains were addressing the issue of pollination in public disclosures, and form an overall picture of the status of private sector activity on this issue. Eight companies were surveyed and seven companies who identified potential risk from pollinator decline in their supply chains were interviewed to form a view on the perceptions and drivers of action on pollination within the private sector. A workshop with companies, certification schemes, and pollinator experts and/or researchers was used to test initial findings and provide feedback on the proposed roadmap towards sustainable pollinator management.

## 2. Setting the scene

Pollinators provide a crucial service to nature and humans. Pollination directly affects the yield and/or quality of 75 per cent of globally important crops. As a society we are increasingly dependent on pollinators – the fraction of global agricultural production that depends on pollinators has increased fourfold since 1961. The annual contribution of pollinators to the global economy is estimated at US\$ 235–577 billion<sup>1</sup> (Potts et al 2016).

A diverse range of animals provide pollination services, including birds, bats, and other species, but the most important pollinators are insects. Among insect pollinators, bees are the largest and most important group, especially for crop production (Klein et al 2007). Five to eight per cent of global crop production would be lost if pollination services from animals ceased (Potts et al 2016 – Figure 2) and the area of land required to compensate for such a production deficit would be several times higher than the current land used for agricultural purposes (Aizen et al 2009).

Figure 2. Dependence on pollination of agriculture in 2012 at the country level (figure from Potts et al 2016).



Beyond the essential regulating ecosystem service that they provide, pollinators also contribute to the production of fibres (e.g. cotton), timber for construction purposes, biofuels (e.g. oil palm and oil seed rape) (IPBES 2016a). A high diversity of wild pollinators contributes to increased stability in pollination, even when managed bees are present in high numbers (Garibaldi et al 2011). At the global scale, approximately half of the value of pollination services to crops comes from wild bees, as opposed to managed species such as the European honey bee *Apis mellifera* (Kleijn et al 2015).

<sup>1</sup> Inflated to 2015 US\$.



### Many wild pollinators are in decline

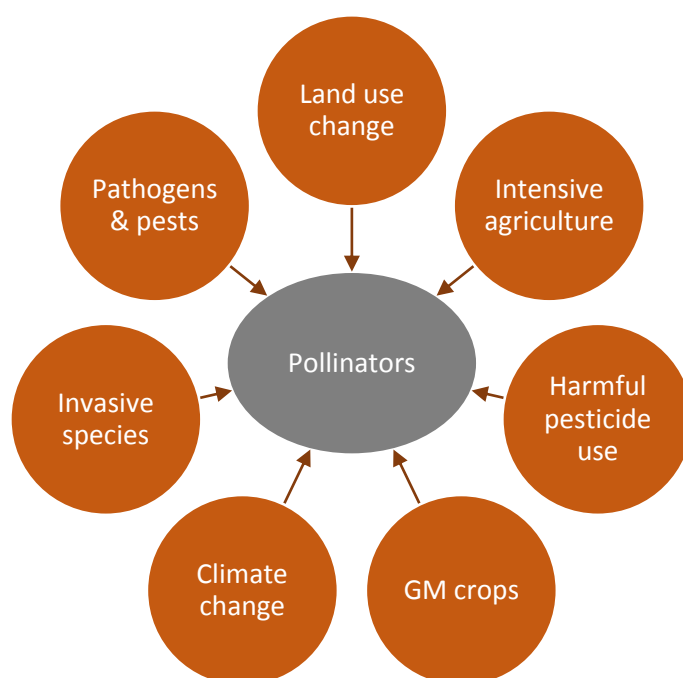
Where there are data on the status of pollinators (mainly from Europe and North America), national or regional assessments show declines in many wild bee and butterfly species, with 9 per cent or more facing local extinction (IPBES 2016a; Potts et al 2016). The International Union for Conservation of Nature (IUCN) Red List assessments indicate that 16.5 per cent of assessed vertebrate pollinators are threatened with global extinction (increasing to 30 per cent for island species). Up to 50 per cent of assessed bee species are listed as threatened in some countries' National Red Lists (Potts et al 2016). A decline in pollinators can lead to loss of yield and inability to source key products.

Approximately half the value of pollination services to crops comes from wild bees

### Multiple threats are driving this decline


Wild bees and other pollinators are facing multiple, often interacting, threats (Figure 3). These threats are not restricted to parts of the world where there is clear evidence for pollinator decline. They are taking place globally. While wild pollinators are declining, the number of managed honey bee colonies has increased globally over the last five decades, although declines have been recorded in some European countries and North America (IPBES 2016a; Potts et al 2016). There is increasing evidence that honey bees are a threat to wild pollinators as a result of the diseases they carry and their intensive resource use.

Figure 3. Threats to pollinators (Potts et al 2016).



### Policy attention on pollination is increasing

Over the past two years, there has been an increasing focus on pollinator conservation in policy. Following a global assessment of the status of pollinators and their contribution to agriculture conducted by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the '[Coalition of the Willing on Pollinators](#)' was created at the Convention on Biological



Diversity's 13<sup>th</sup> Conference of the Parties in Cancun, Mexico. Thirteen countries<sup>2</sup> signed up to the Coalition, which aims to promote implementation of national pollinator strategies, create knowledge-sharing platforms to promote innovation and best practices, and establish new partnerships to safeguard pollinators. Some national strategies already exist, such as England's National Pollinator Strategy<sup>3</sup> (Defra 2014), which sets out the UK Government's plans to improve the state of pollinators in England by 2024.

<sup>2</sup> Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, Peru, Slovenia, Spain, the Netherlands, United Kingdom and Uruguay.

<sup>3</sup> For further information see: [www.gov.uk/government/publications/national-pollinator-strategy-2014-to-2024-implementation-plan](http://www.gov.uk/government/publications/national-pollinator-strategy-2014-to-2024-implementation-plan)



### 3. Pollination and the private sector

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This section sets out the results of a review of private sector activity on pollination. It is based on an analysis of publicly available information, a survey of companies with potential exposure to pollinator risk, and interviews with companies who had identified pollination as a potential risk to supply chain resilience. It provides insight into the perceived risk within companies associated with pollinator decline; where this is felt in business; the current level of action being taken by companies; and the barriers to scaling up action.

#### What are companies saying publicly on pollinators?

Companies within the agri-business and retail sector have a dependency on the quality and quantity of raw materials within their supply chains; without wild pollinators there is a potential risk to security of supply which could result in business disruption and loss of revenue. In 2014 financial group Schroders identified 25 leading companies that had exposure to risk from pollinator decline (Stathers 2014). Only five of them explicitly addressed pollinator decline in public communications.

In this project, a review of publicly available information was conducted for 27 companies (including three standalone brands) with a perceived dependence on pollination (see Appendix 2 for details). Of the companies reviewed, 52 per cent mentioned bees or pollination, but only 26 per cent went on to present it as a potential risk to the company. All companies reviewed referred to sustainable agriculture and mentioned that risks had been filtered to identify the main issues presented within their sustainability reports. This could indicate that pollination is either not incorporated in risk reviews, or that it is not considered a material risk.

Most references made by companies to pollination or bees related to community projects and improving field margins for pollinator forage. Of the 26 per cent where pollination was identified as a risk to supply chains or an opportunity to increase yield, a mix of pilot projects were underway to understand the issue further or to improve pollinator habitat by, for example, creating nesting sites and introducing forage crops to attract pollinators (see Appendix 2). One company, Waitrose, had a seven-point plan for pollinators (see Figure 4).

Seventy per cent of the companies reviewed mentioned pesticide management actions and 41 per cent had pesticide reduction programmes in place for specific crops or as a general policy; notably this included all five retailers reviewed. Certification schemes were referred to by companies in public disclosures as a key tool to manage supply chain risks. Of the 27 companies reviewed, 88 per cent<sup>4</sup> used them to help deliver targets within supply chain strategies and commitments on sustainable agriculture.

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<sup>4</sup> This figure excluded the agro-chemical companies for which certification schemes are inappropriate.

Figure 4. A “Seven Point Plan” developed by Waitrose to address pollinator declines. Source: [www.waitrose.com/bees](http://www.waitrose.com/bees)



### Maintaining yield and supply chain resilience are key drivers for corporate action

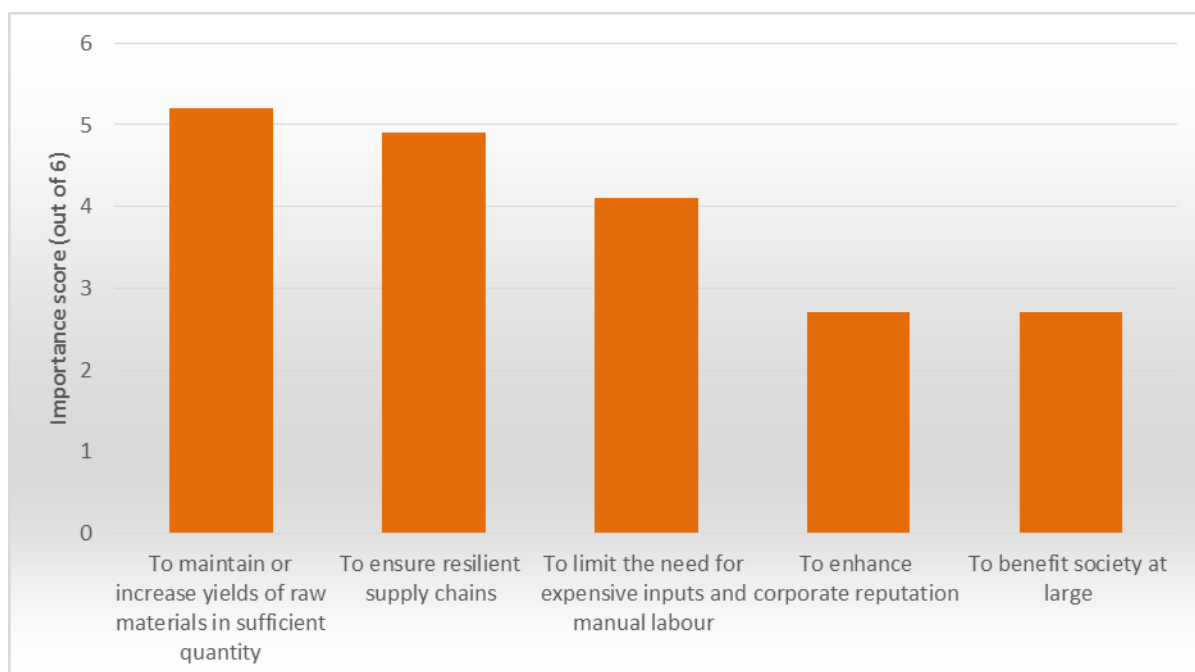
Eight companies from a range of sectors (retailers, food and beverage manufacturers and cosmetics) were surveyed to explore perceptions of pollination risk in more depth. Companies were selected based on the perceived likelihood of their exposure to risk relating to pollinator decline. Follow-up interviews were conducted with seven of these companies. The drivers, risk perceptions and actions of three companies – Mars, The Jordans & Ryvita Company (Jordans) and The Body Shop – were reviewed in more detail to provide case studies of corporate responses to the issue. The information gathered from these case studies is presented as examples throughout this section. It is drawn from interview responses and is not an exhaustive review of the companies concerned. Interviewees’ responses do not necessarily reflect the views of the companies themselves.

**All companies surveyed viewed pollinator decline as a risk, now or in the future**

All companies surveyed viewed pollinator decline as a risk to their supply chains now or in the future. Maintenance or increase in yields of raw materials (Figure 5) were the primary motivation for managing impacts and dependence on pollination. Ensuring supply chain resilience (the ability of the supply chain to return to its original state after a major disruption) was identified as another key driver.



Figure 5. Respondents associated different levels of importance (score ranging from 0 to 6) to the risks resulting from pollinator decline.



Company representatives expressed a desire to ensure their business decisions, particularly within their supply chains, have a beneficial effect on the environment. In addition to managing dependency on pollinators to enable and maintain access to raw materials (e.g. fibres, food stuffs), avoiding adverse impacts of business activities on pollinators was also considered important.

### Box 1: Case studies – priority drivers for pollination management

The table below shows the level of perceived importance of drivers selected by the three case study companies from a list of potential drivers identified by the project team. Drivers at the top of the list are of highest perceived importance.

Increasing perceived importance ↑	Mars	Jordans	The Body Shop
	<ol style="list-style-type: none"> <li>1. To ensure resilient supply chains</li> <li>2. To maintain or increase yields of raw materials</li> <li>3. To benefit society at large</li> <li>4. To limit the need for expensive inputs and manual labour</li> </ol>	<ol style="list-style-type: none"> <li>1. To limit the need for expensive inputs and manual labour</li> <li>2. To maintain or increase yields of raw materials</li> <li>3. To ensure resilient supply chains</li> <li>4. To enhance corporate reputation</li> <li>5. To maintain biodiversity in broader ecosystems</li> <li>6. To benefit society at large</li> </ol>	<ol style="list-style-type: none"> <li>1. To maintain or increase yields of raw materials</li> <li>2. To ensure resilient supply chains</li> <li>3. To limit the need for expensive inputs and manual labour</li> <li>4. To enhance corporate reputation</li> <li>5. To benefit society at large</li> </ol>

## Pollinator decline is emerging as a potential operational and reputational risk

Companies were asked to rank the following different forms of business risk associated with pollinator decline in terms of perceived importance:

- **Legal and regulatory**: potential impacts of increasing legislation to e.g. reduce pesticide use, protected pollinator habitat etc., leading to increased operating costs or a need to change business practice.
- **Operational**: potential impacts of pollinator decline in crop yield or quality leading to narrowing profit margins.
- **Financial**: constraints in securing finance as a result of investor concern regarding declining pollinators.
- **Reputational and marketing**: consumer concern regarding pollinator decline may lead to negative perception of company brand.

Companies linked pollinator decline to potential business risk, in particular operational and reputational/marketing risk (Figure 6). Increasing global demand for raw materials associated with the growth of middle-class upcoming economies could further exacerbate this risk. Demand for cocoa from countries such as China and India, for example, could outpace supply. If supply becomes compromised as a result of decline in pollination services, greater price increases could result.

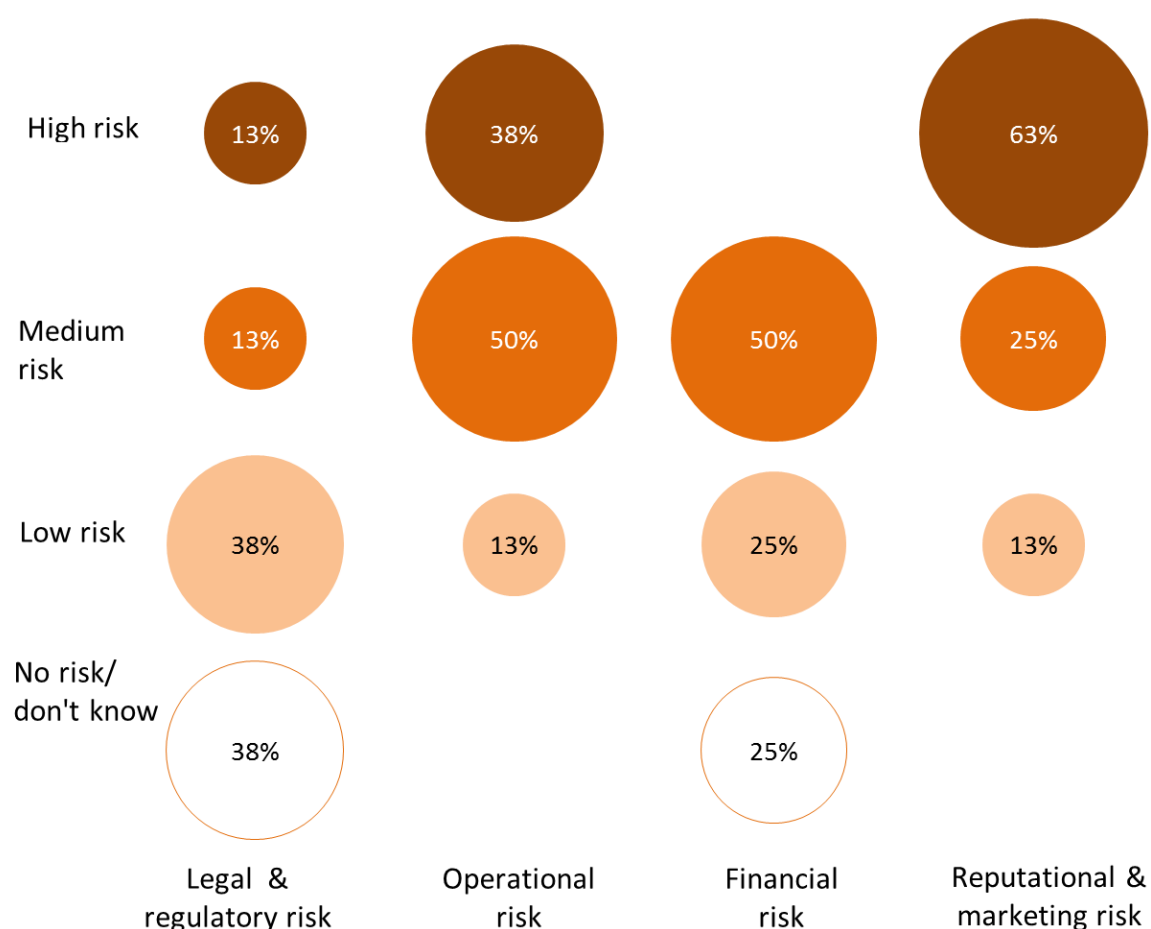
Financial, legal and regulatory risks associated with pollinator decline were perceived as relatively low. The long-term nature of the issue, in comparison to more immediate issues such as water scarcity, makes it challenging for companies to link typical business drivers like profit generation or sales to risks associated with pollinator decline. With longer timeframes associated with this risk, it is difficult to make the case for investing in management actions to address pollinator decline.

One company explained that businesses are not designed to approve an investment case that will provide benefits in 10 years' time; they take a shorter term view to investments to increase profit within a year.

Companies require scientifically robust evidence of pollinator decline and information on how this will directly impact their bottom lines before they can act. This evidence is either lacking or not in a format that is accessible and useable by business. For almost all crops, further research is required to determine the impact of pollinators on crop yields, the status of pollinators and the implications of this for security and cost of supply.

Without evidence of the declines in pollinators and the impact this will have on company bottom lines, companies are unlikely to act

Figure 6. Respondents associated different levels of importance to the potential business risks resulting from pollinator decline.



## Box 2: Case studies – potential business risks from pollinator decline

The range and importance of potential risks identified varied from company to company; however, a common risk cited was operational risk. The table below shows the results from our discussions with Mars, Jordans and The Body Shop.

	Operational risk	Legal & regulatory risk	Financial risk	Reputational & marketing risk
Mars	High risk	Low risk	Unknown	Low risk
Jordans*	High risk	High risk	Medium risk	High risk
The Body Shop	High risk	Low risk	Medium risk	Low risk

\*operational and financial risk relates to international supply chains

Key:  High risk  Medium risk  Low risk  Unknown

### Identifying dependency of raw materials on pollinators is in its infancy

Less than half of the surveyed companies had a clear picture of which of their raw materials were dependent on pollinators. Companies sourcing a limited number of raw materials were more aware of which materials are at potential risk from pollination decline.

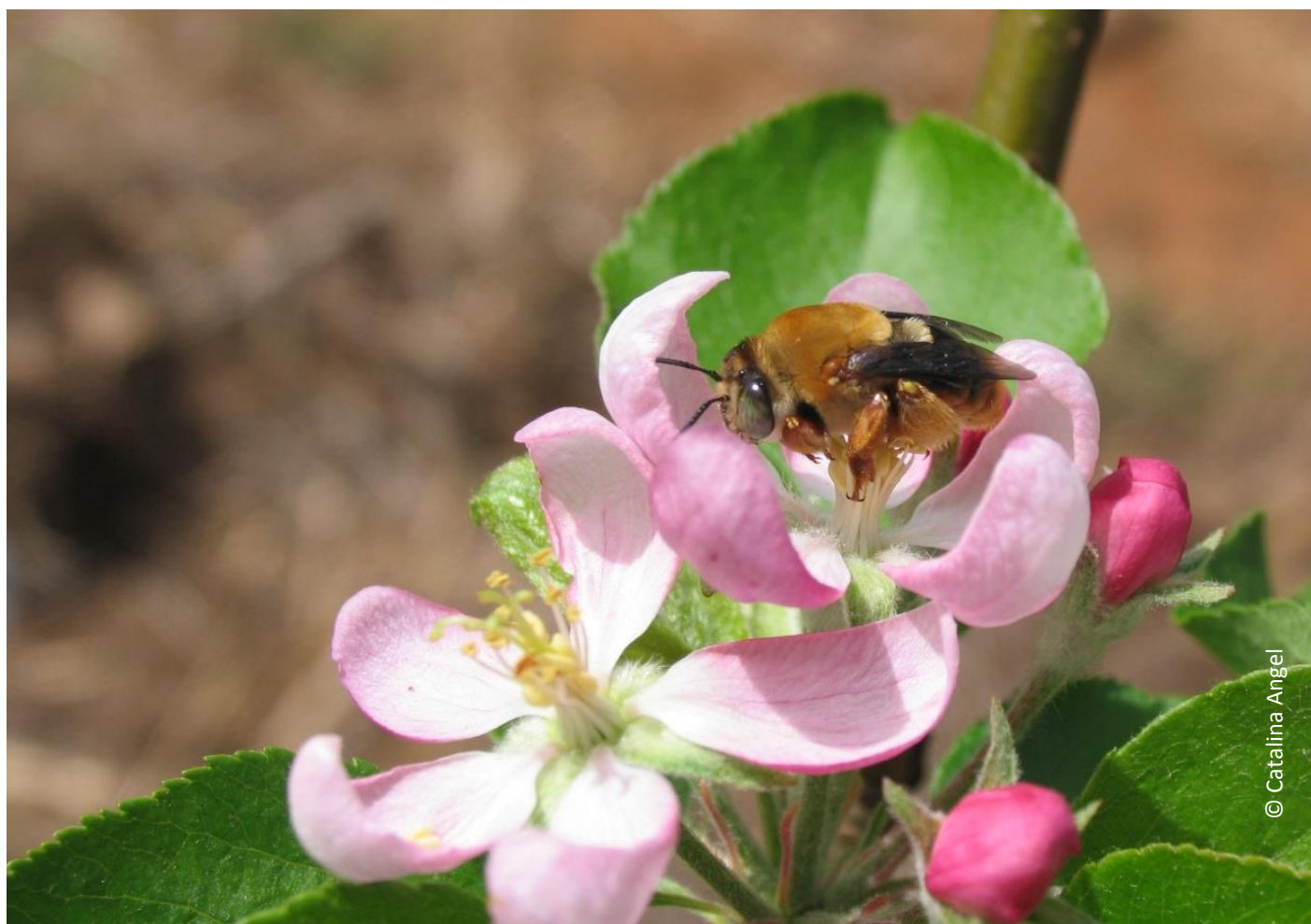
Typical crops that were identified include cocoa beans, apples and other orchard fruits, sunflower and rapeseed, almonds, blueberries, and honey and beeswax (Figure 7). Unsurprisingly, companies with complex supply chains struggled to identify priority raw materials that are at potential risk.

Many of the companies noted a gap and a need for information that illustrates which commodities depend on pollinators. They were keen to understand where pollinators are in decline or at risk in relation to their supply chains in order to help inform sourcing decisions and investments. Such information is not available for all commodities.

Less than half the companies sampled know which of the raw materials they source depend on pollinators

### Not all companies with perceived risk exposure were managing that risk

Only half of the survey respondents reported that their company has taken steps to reduce corporate risks from pollinator decline. Actions included site-level action on pollinator decline (25 per cent), engagement programmes with suppliers on pollinator decline (38 per cent), and integration of steps to avoid and manage impacts and dependence on pollinators into environmental management systems or sustainable agriculture systems (13 per cent).



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### Box 3: Case studies – identifying potential risks and opportunities in supply chains

Supply chain vulnerability to pollinator decline is a function of the location of commodities sourced, the extent to which they are dependent on pollinators and the potential for the pollinators to be replaced. Priority commodities for assessing risk associated with pollinator decline are those bought by companies in largest volume and/or those that are irreplaceable in products. The three case study companies identified the following priority commodities potentially exposed to risk:

- **Almonds:** Jordans (sourced from California), The Body Shop (sourced from Spain)
- **Brazil nuts:** Jordans (from Bolivia) and The Body Shop (from Peru)
- **Blueberries:** Jordans (from Canada and the USA)
- **Cocoa:** Mars (from across South America, Africa and South East Asia)
- **Rapeseed:** Jordans (from Europe)
- **Virgin coconut oil:** The Body Shop (from Samoa)

This did not represent an exhaustive supply chain review, but gives insights into potential priorities.

*Figure 7. Priority commodities identified by Mars, Jordans and The Body Shop.*



For Jordans, almonds are a key product and an ingredient used in their branding. This increases the company's risk relating to pollinator decline. Jordans growers typically invest in managed hives to provide pollination services, which is already factored into product price. Jordans indicated that supporting natural rather than managed pollinators might be a valuable contribution to risk management. The Body Shop sources almonds from a co-operative near Alicante. They are produced organically with low-intensive farming methods, drip-feed irrigation and are assisted by naturally occurring as well as informal pollination, through small-holder honey producers.






Figure 8. Summary of typical responses from the eight companies surveyed when asked about pollinator decline and how that relates to their business.

**“At present there is not enough known about the link between pollinator decline and supply chain risk to assume a strong business case**

**“I need to know what the return on investment is for managing pollinator decline**

**“There isn’t enough scientific evidence of the dependence on pollinators and how yield is impacted**

**“I don’t know where to find which commodities depend on pollinators, and where the pollinators are in decline or at risk**

**“This isn’t an immediate priority for me as I’m not seeing any impacts in my supply chain**

**“There is a contract between companies who have close relationships with the raw material suppliers and those that either buy in bulk or are far removed by being downstream, so how do I take action?**

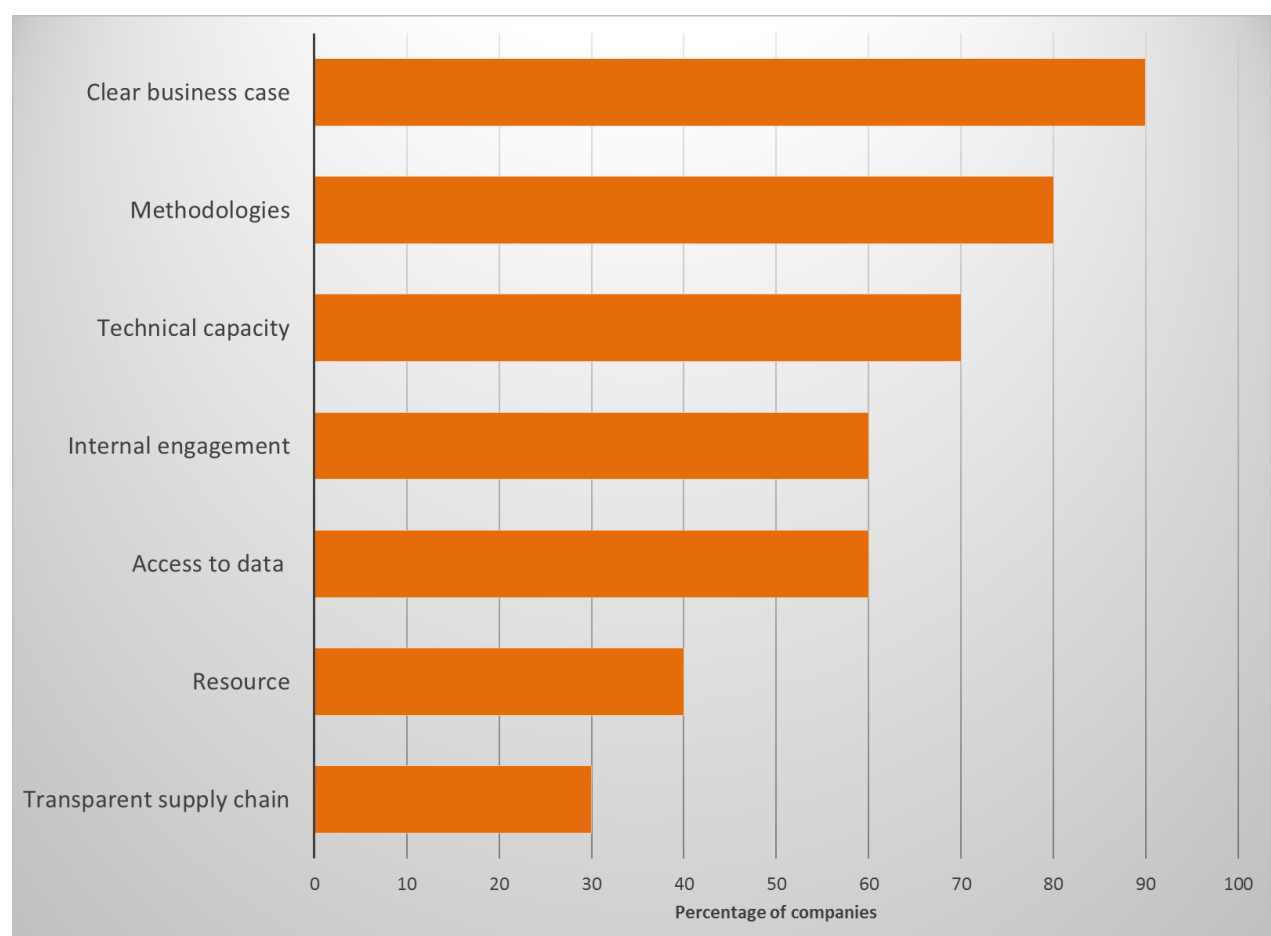


### A simple business case is needed that resonates with business decision-makers

The lack of response and action from companies can be attributed to a number of factors. The first is a need for more scientific evidence on how yield is dependent on pollinators, and where pollinators are under threat. The second is that there is little evidence of a return on investment from undertaking activities to reverse trends of declining pollinators. The third is that pollination is not currently seen as an immediate issue, so the business case is hard to make.

Companies expressed a need for such a business case for taking action to reduce pollinator risk to their supply chains. Access to data, methodologies to minimise impacts and technical understanding of vulnerability of supply chains were also identified as areas where further details would provide companies with the evidence and support they need to address pollinator decline (Figure 8).

*Figure 8. Companies need different kinds of support and tools to help them address the risks of pollinator declines.*



## 4. Building more sustainable supply chains

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This section sets out a roadmap that companies can follow to enable more sustainable pollinator management, exploring the actions emerging from policy-level discussions on pollinators and their implications for corporate management of potential pollinator risk.

### A roadmap towards sustainable pollinator management

A roadmap towards sustainable pollinator management is given below (Figure 9). This sets out a five-step process to guide companies through the process of identifying vulnerability in their supply chains and designing an appropriate response to mitigate risk and increase security of supply:

- **Step 1 ‘Is there an issue?’** assesses the presence of pollinator-dependent crops in the company supply chain and determines their potential vulnerability to pollinator decline.
- **Step 2 ‘Does it matter?’** places this assessment within the context of the company supply chain, identifying the extent of reliance on vulnerable crops, whether crops can be substituted or suppliers switched, and establishes the business case for acting to address pollinator decline.
- **Step 3 ‘Is it already covered?’** reviews existing action to manage pollinator risk against a set of recommended management interventions from policy and science.
- **Step 4 ‘What else can we do?’** is in effect a gap analysis to identify further actions required to manage risk.
- **Step 5 ‘Implement and monitor’** implements the actions identified in Step 3 and monitors them.

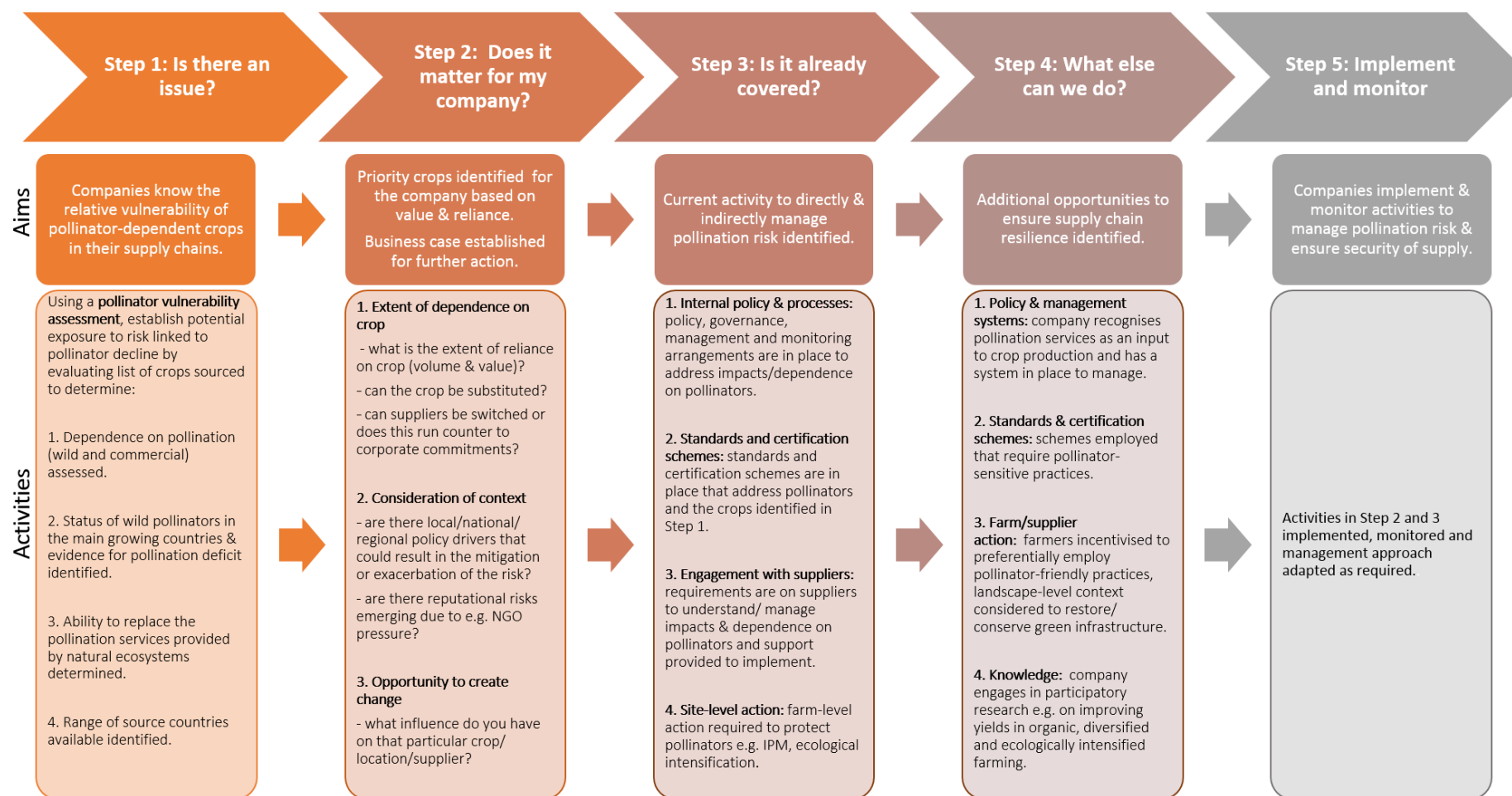
This roadmap was discussed with representatives from industry, standard-setting bodies and pollination experts in a one-day workshop. These discussions highlighted the following areas of priority action to enable companies to address pollinator decline:

- a better understanding of potential vulnerability of supply chains to pollinator decline (Step 1)
- based on this, a clearer articulation of the business case for action (Step 2)
- insight into management actions that can deliver sustainable pollinator management (Step 4).

Given the limited scope of this initial scoping project, the remainder of this section focuses on the latter two action areas. The vulnerability assessment (Step 1) is the subject of a second publication in this series and forms the focus of a scientific publication (Dicks et al in prep.).



Figure 9. Roadmap towards sustainable pollinator management in the private sector.



## Articulating the business case for action (Step 2)

Discussions with industry suggest that the range of potential business risks that pollinator decline gives rise to are not yet clearly or convincingly articulated. Figure 10 below summarises the key emerging risks identified by those companies and experts consulted throughout this project as a first step in providing this clarity.

Figure 10: Business case for action.



The links between crop yield, quality and type of pollinator (wild versus managed pollinator) are becoming clear. However, securing evidence of direct links between wild pollinators and economic returns is challenging (Breeze et al 2016). Although some studies exist, they are difficult to apply to a single crop.

The business case for action on pollinator decline will vary from company to company, and from crop to crop. It will depend on the value of the crop to the company, the company's ability to replace it through switching suppliers or ingredient substitution, and the regulatory and legal context in which the company is operating. More work is required to make this case convincing.

## Ensuring supply chain resilience to pollinator decline (Step 4)

A number of recommendations (see Table 1) for actions to address pollinator decline are emerging from policy discussions such as the IPBES assessment, the National Pollinator Strategy: for bees and

other pollinators in England<sup>5</sup>, and from the academic community (Dicks et al 2016 and Potts et al 2016).

*Table 1. An overview of potential responses to pollinator decline drawn from academic literature (Dicks et al 2016 and Potts et al 2016), the IPBES assessment and the National Pollinator Strategy.*

Activity	Relevance
<b>1. Better control of pesticides (regulation/application)</b>	Raise pesticide regulatory standards to incentivise best practice use of pesticides and reduced exposure of pollinators
<b>2. Integrated Pest Management (IPM)</b>	Reduce overall use of pesticides, through integrated pest management
<b>3. More comprehensive risk assessment of GM crops</b>	Raise standards of risk assessment of genetically modified crops worldwide
<b>4. Improve control and management of pollinators</b>	Regulate movement of managed pollinators and promote good husbandry, especially disease management and monitoring
<b>5. Supplier and farmer incentives for pollinator-friendly practices</b>	Develop incentives, such as insurance schemes, for farmers to adopt pollinator-friendly practices and secure benefits from ecosystem services
<b>6. Recognise pollinators as an agricultural input</b>	Recognise pollination as an agricultural input in extension services
<b>7. Diversified and ecologically intensified farming systems</b>	Strengthen diversified farming systems, maximise the use of ecological processes and promote sustainable agricultural practices e.g. organic farming, crop rotation including flowering crops, intercropping, control of invasive species and agroforestry
<b>8. Green infrastructure and land management for pollinators</b>	Work with large-scale landowners, advisors, contractors and facility managers to conserve and restore natural habitats or 'green infrastructure' (a network of habitats, with food and nesting resources for pollinators)
<b>9. Monitoring of pollinators and pollination</b>	Develop long-term monitoring of pollinators and pollination to better understand pollinator status, the causes of any declines and where actions will have most effect
<b>10. Research</b>	Fund research on pollinators e.g. exploration of the links between wild pollinators and yield improvement in organic, diversified and ecologically intensified farming, the value and benefits of pollinators, and resilience of agricultural systems to changes in pollinator populations
<b>11. Stakeholder engagement and partnership</b>	Seek collaboration with a broad spectrum of stakeholders – countries as well as companies, NGOs, farmers and local communities – and encourage public action on pollinators
<b>12. Raising awareness and capacity building</b>	Improve sharing of knowledge and evidence between scientists, conservation practitioners, companies and non-government organisations (NGOs) to ensure that actions taken to support pollinators are based on up-to-date evidence

<sup>5</sup> The National Pollinator Strategy: for bees and other pollinators in England.  
[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/409431/pb14221-national-pollinators-strategy.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/409431/pb14221-national-pollinators-strategy.pdf)

These recommendations are highly relevant for business. Some companies are already exploring some of these actions or integrating them into their management practices (Box 4 and Appendix 2). Table 2 provides insight into key means to safeguard pollinator-dependent supply chains, demonstrating the direction of travel of the regulatory environment.

#### **Box 4: Case studies – company approaches to managing risk**

- Mars:** Mars' Sustainable in a Generation Plan provides a compass for building truly sustainable and resilient futures for the farmers, fishermen and workers, which the business suppliers they collaborate with rely on. They engage in a number of environmental and biodiversity initiatives (e.g. Sustainable Agriculture Initiative and CISE's Natural Capital Impact Group) and have developed policies (e.g. deforestation) and position statements for each of the five sustainability impact areas – human rights, income, land, climate and water. Pollination is understood to play a vital role in the resilience of some of their supply chains, but it is not explicitly targeted as an issue. However, Mars uses both UTZ and Rainforest Alliance certification as a stepping stone to ensure sustainable sourcing of several key commodities, with a target of achieving 100 per cent certified cocoa by 2020 – both these certification schemes contain commitments relevant to pollinators. In addition they have set up the Sustainable Cocoa Initiative and are investing in research on cocoa breeding, agroforestry systems, biodiversity-rich environments, land rehabilitation and protection from pests and disease for cocoa.
- The Body Shop:** The Body Shop sources over 2,000 natural ingredients that come mainly from plants, many with potential dependence on pollination services. The Body Shop is committed to an Enrich not Exploit commitment across its raw material supply chains and, as part of this consider it crucial to secure pollination services. They have a Community Trade Sourcing Programme, which works closely on building capacity of 29 suppliers, and a Sustainable Sourcing Charter that includes commitments to sustainable agricultural practice and environmental enrichment. Some of the plant ingredient supply chains do not involve the use of pesticides and ingredients are certified to organic standards, including Soil Association and EU Organic. In Peru the company is working with their supplier and research institutions to investigate the reason for the shortage of supply of Brazil nuts and with the University of East Anglia to examine their almond supply chain in Spain. Effective communication of the problems pollinators are facing is an important element of their approach. Commitment to beeswax and honey supply chains is considered an effective future channel to communicate to customers. Honey bee hives at their head office have helped raise awareness of the issue with staff.
- Jordans:** Jordans is committed to sustainable, nature-friendly farming and engages in a number of initiatives to drive better environmental stewardship, including its flagship Farm Partnership scheme in collaboration with LEAF (Linking Environment And Farming), The Wildlife Trusts and The Prince's Countryside Fund. The Farm Partnership scheme engages suppliers directly on pollinator decline. The company highlighted the importance of linking pollinator services and consumers, especially for products that depend on pollinators.

The actions above were discussed within the one-day workshop with companies, certification bodies and pollinator experts. Priority actions identified were:

1. the need to create a convincing 'business case' for action



2. the development of incentives for more sustainable practices, both for farmers and for suppliers
3. a need for more information on the economic value of pollinator services at a company level
4. a need to recognise pollinators as an agricultural input.

The economic link in particular was highlighted as crucial to get support at the board level.

### *The role of certification standards in addressing pollinator risk*

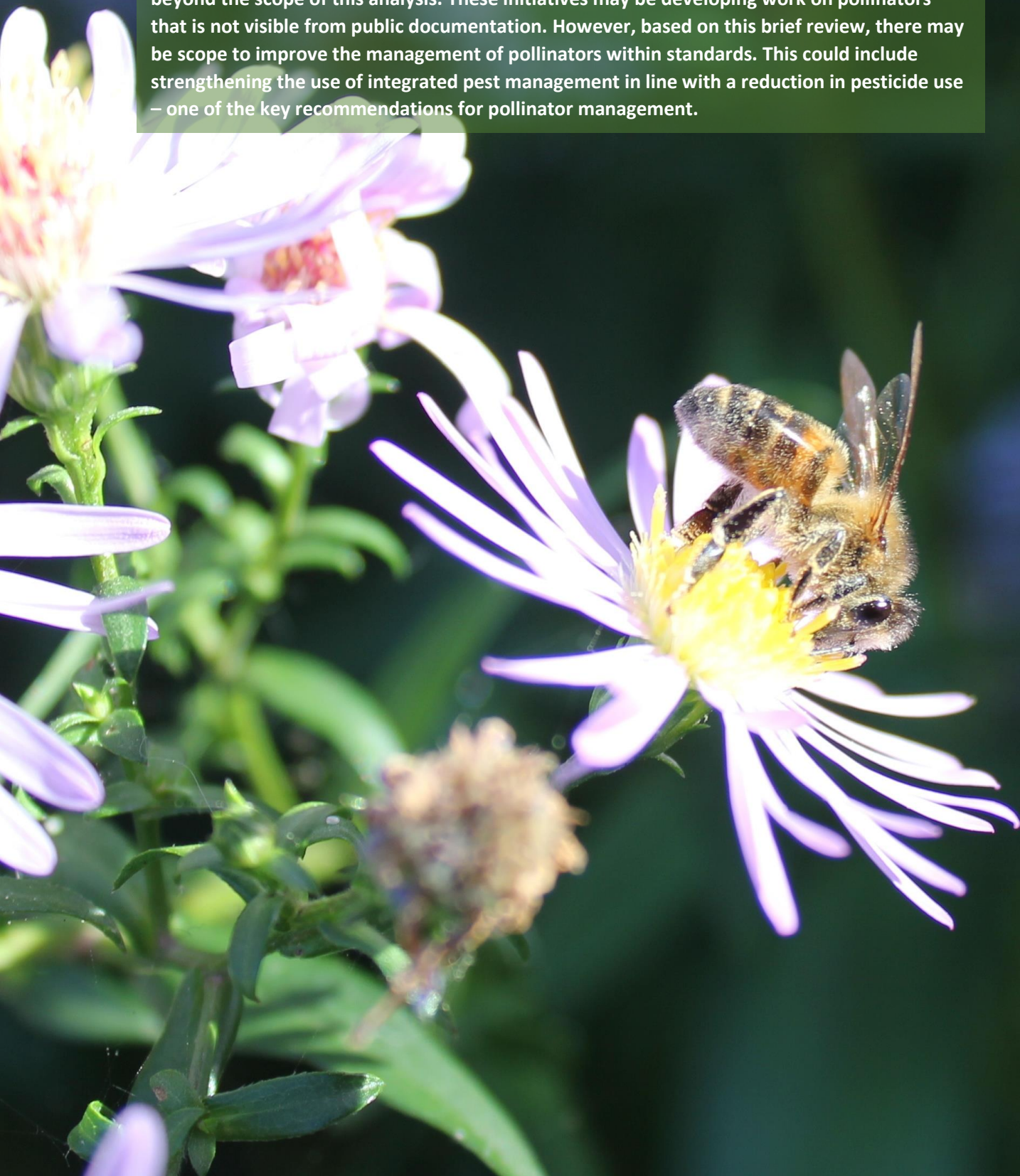
One mechanism frequently used by companies for sustainable sourcing that is absent from science and policy recommendations for action on pollinators is the adoption of certification schemes. Nearly all of the companies reviewed used certification schemes as a means of improving sustainability of important supply chains. A brief review of nine certification standards under this project showed that all had requirements around pesticide management (see Table 2). The development and use of integrated pest management plans was referred to in all standards, with variations in how it is implemented; compulsory within four of the schemes, with phased approaches and inclusion within different policy documents in the others.

*Table 2. Current activity relating to pollinators among certification bodies.*

Organisation	Standard requirements relevant to pollinators
<b>The Global Coffee Platform (4C Coffee)</b>	No direct reference in public disclosures. Strong compulsory criteria on pesticide use. Clear guidance for implementing IPM (4C Association 2015,).
<b>Better Cotton Initiative</b>	No direct reference in public disclosures. Strong compulsory criteria and guidance on pesticide use and for developing and implementing IPM plans. There is a focus on maintaining natural vegetation and biodiversity (Better Cotton Initiative 2013a & b).
<b>Fairtrade/ FLO-CERT</b>	Pushing for more sustainable and pollinator-friendly practices. Strong compulsory criteria for agrochemical use. Developing and implementing IPM plan and protecting and enhancing biodiversity are development criteria (FLO-CERT 2016 & 2017).
<b>International Federation of Organic Agriculture Movements</b>	Campaigning to reduce pesticide use and negative impacts of pollinators; advocating for environmentally friendly practices. Compulsory guidance on best practice for bee keeping and management including the wider foraging landscape (IFOAM 2014).
<b>Linking Environment And Farming</b>	Previously conducted a pollinator survey on a farm and produced guidance on enhancing biodiversity at the farm level. Bees and pollinators are included as key species in the Landscape and Nature Conservation and Enhancement Plan – a compulsory requirement for certification (LEAF 2016).
<b>Round Table on Responsible Soy</b>	No direct reference in public disclosures. Strong compulsory criteria and guidance for implementing IPM and pesticide use. Clear guidance on monitoring native vegetation and wildlife, and restoring vegetation if needed (RTRS 2014 & 2017).
<b>Roundtable on Sustainable Palm Oil</b>	No direct reference in public disclosures. Strong compulsory criteria and guidance on pesticide use, implementing IPM plan and biodiversity protection (RSPO 2013).
<b>Sustainable Agriculture Network</b>	Promoting pollination-friendly practices through their new standard. Strong compulsory criteria and guidance on pesticide use and for implementing an IPM plan Sustainable Agriculture Network (2009, 2012, 2017 a & b).
<b>UTZ</b>	UTZ Standard recommends bee-friendly practices. Strong compulsory criteria and guidance on pesticide use and for implementing IPM (UTZ 2015).

Of the nine standards, three have explicit criteria that deal with pollinators: one on bee keeping, the second by stipulating that bees and pollinators are included as key species in a Landscape and Nature Conservation and Enhancement Plan, and the third by restricting the use of pesticides that are known to be harmful to pollinators. A number of the other certification bodies are addressing pollination services through their standards by encouraging adoption of pollinator-friendly habitat management such as creation of ecological corridors and maintenance of natural habitat around field margins but without necessarily mentioning pollinators.

An exhaustive review of all certification schemes and their treatment of pollination was beyond the scope of this analysis. These initiatives may be developing work on pollinators that is not visible from public documentation. However, based on this brief review, there may be scope to improve the management of pollinators within standards. This could include strengthening the use of integrated pest management in line with a reduction in pesticide use – one of the key recommendations for pollinator management.



## 5. Recommendations

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A number of priorities exist for companies to be able to understand and act to address pollinator decline. Although this initiative focused on food- and cosmetics-related agricultural supply chains, many of the identified risks – and recommendations – are relevant to other companies with agricultural supply chains such as biofuels and apparel sectors.

### A private sector coalition on pollination to drive further action

The potential importance of this issue has not been communicated effectively to business leaders; there is an opportunity to create a forum for leaders to discuss the potential risk of pollinator decline to their companies and agree collective action to address it. To enable swifter action, pollination needs to be embedded into existing agendas, such as wider environmental policies on deforestation or water. A private sector coalition would greatly aid this process.

There is real desire from the private sector to develop a community of practice or a platform where experts can share knowledge and case studies on pollinator risk identification and management. Such a community of practice could bring together private sector representatives, certification bodies, local experts and academics, and civil society to ‘unlock’ the wealth of information currently held in national databases and scientific literature, and promote action for pollinators – and where information does not exist, come together with pollination experts to fund research to fill those knowledge gaps. Such a coalition – a partnership for pollinators – could work together in a precompetitive space to address the issues below.

### Develop a clear and convincing business case for action

Building on the information above, there is a real need to set out and communicate a convincing business case for targeting pollination more explicitly in sustainable agriculture/supply chain initiatives. A generic business case exists, but needs to be communicated more effectively to companies. However, a company-specific business case needs to be developed in accordance with Step 2 of our proposed roadmap, to drive action internally for company-specific commodities and regions. A fundamental first step for this is to evaluate the scientific evidence for wild pollinator decline and its implications for yield quality and quantity through crop-specific vulnerability assessments.

### Increase understanding of crop vulnerability to pollinator decline

A robust, country-specific analysis of the vulnerability of crops to pollinator decline is needed. This would need to be supported by a robust, peer-reviewed framework for assessing the vulnerability of crops to pollinator decline. This framework should allow for inclusion on national-level data to provide a country-specific crop vulnerability score wherever possible. Since data collection is costly and time-consuming, to make this process faster and easier to develop, an initial focus should be on a small number of pilot crops, or crop systems, for which data are sufficient and of high enough quality to allow informed decision-making. This should be undertaken through working closely with specific companies and supply chains to apply the vulnerability assessment approach to countries and crop varieties that are actually sourced, and identify the knowledge gaps. This would result in better information on company risks associated with pollination decline, and in turn support appropriate actions to ensure a resilient supply chain.



### Improved understanding of the economic implications of pollinator decline

Companies could collaborate to work with economists to evaluate potential price changes in response to changes in supply expected from pollinator decline for crops identified to be of medium or high vulnerability. Such analysis should consider both wild and managed pollinators and the interaction between the two.

### Improve access to information on crop vulnerability to pollinator decline

Development of a tool or interactive platform as part of a private sector coalition on pollination would allow company users to more readily assess the potential vulnerability of their supply chains to pollinator declines. There was a demand from companies for such a visual means of assessing supply chain risk and the hope is that this will enable companies to more effectively build a business case for action on pollinators, whilst increasing the resilience of their supply chains.

### Access national data on pollinators and pollinator-dependent crops for decisions

Understanding the extent to which crops depend on pollinators within a specific country, which pollinators those crops depend on, and the status of those pollinators would allow companies to anticipate where supply might be unreliable and enable them to adjust their sourcing practices accordingly. For some this may mean switching suppliers, for others investment in pollinator-friendly practices in the supply chain. Having access to national-level data will help identify priority landscapes or even farms for action. National Red List assessments could assist in providing this data. However, detailed information may not be publicly available or even exist yet. A good first step would be to identify local experts and develop a roster of contacts at the country level. Companies operating within the same landscapes could collaborate to identify priority sourcing regions and information gaps, and work with researchers and environmental institutions to fill them, under the coalition outlined above.

### Better integration of pollination into certification standards

Existing certification schemes should be reviewed and best practice guidance for pollinators should be incorporated within such schemes where possible. A short guide for companies on the extent to which different certification schemes address the issue of pollination would also be valuable.

### Engagement of consumer interest

High-profile brands could come together to build consumer awareness of the issues around wild pollinator decline and the actions that individuals and companies can take to address them. Clear communication of the issue – perhaps through the use of ecolabels or standards – and of the choices consumers can make to address them, could help catalyse public action on this issue.



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## 6. Next steps

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The issue of pollinator decline is one that resonates with many people – in business, government, and civil society. The IPBES assessment showed clearly that pollinator decline poses a significant risk to society and the private sector. However, more needs to be done to articulate a strong business case to incentivise private sector action on this issue.

This report was the result of a small scoping study intended to explore how private sector action to address wild pollinator decline could be scaled up in the wake of the global assessment of the status of pollinators. A vulnerability assessment framework is under development and early outputs have shown some significant potential supply chain risks linked to pollinator decline. However, the approach needs refinement. In a follow-up to this report, we will refine and complete the vulnerability assessment, publishing the methodology in an open-access peer-reviewed journal.

We will also engage with and work with industry, certification bodies, trade associations and pollination experts to create a ‘Partnership for pollinators’ – a leadership group of companies and standard-setting bodies committed to safeguarding pollinators, closely linked to the Coalition of the Willing on Pollinators. Through working in partnership we hope to refine, test and embed pollinator risk identification and management within company supply chain management and certification systems. It is only by doing this that we will be able to understand the extent of potential risk posed by pollinator decline to our vital agricultural supply chains and catalyse action to halt wild pollinator decline.



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## Appendix 1. Categories of crops and their reliance on pollinators

Adapted from Klein et al (2007). Importance of pollinators in changing landscapes for world crops. All species listed are possible pollinators. For each crop the difference between pollinators (in bold) and flower visitors is shown.

Crop product	Impact of animal pollination on production	Pollinator
Atemoya, cherimoya	Essential	<b>Beetles</b>
Brazil nut	Essential	Bees
Cocoa	Essential	Bees, <b>flies</b>
Kiwi	Essential	<b>Bees</b>
Macadamia	Essential	<b>Bees</b> , wasps, butterflies
Melon	Essential	<b>Bees</b>
Passion fruit	Essential	<b>Bees</b> , birds
Pawpaw	Essential	Flies
Pumpkin, squash, zucchini	Essential	<b>Bees</b>
Rowanberry	Essential	Bees, flies
Sapodilla	Essential	<b>Thrips</b>
Vanilla	Essential	Bees, birds
Watermelon	Essential	<b>Bees</b>
Almond	Great	<b>Bees</b> , flies
Apple	Great	<b>Bees</b> , <b>flies</b>
Apricot	Great	<b>Bees</b> , flies
Avocado	Great	Bees
Blueberry	Great	<b>Bees</b>
Buckwheat	Great	Bees
Canola	Great	<b>Bees</b> , <b>flies</b>
Cardamom	Great	Bees
Cashew nut	Great	<b>Bees</b> , butterflies, flies, birds
Coffee (robusta only)	Great	<b>Bees</b>
Cola nut	Great	Flies
Coriander	Great	Bees
Cranberry	Great	<b>Bees</b>
Cucumber	Great	<b>Bees</b>
Cumin	Great	Unknown
Durian	Great	Bees, bats, birds
Feijoa	Great	<b>Birds</b> , bees
Fennel seed	Great	<b>Bees</b>
Japanese plum & medlar	Great	<b>Bees</b>
Mango	Great	<b>Bees</b> , flies, ants, wasps
Naranjillo	Great	Bees
Peach, nectarine	Great	<b>Bees</b> , flies

Crop product	Impact of animal pollination on production	Pollinator
Pear	Great	Bees, flies
Plums, sloes	Great	Bees, flies
Raspberry	Great	Bees, flies
Blackberry etc.	Great	Bees, flies
Rose hips	Great	Bees, flies
Sour cherry	Great	Bees, flies
Starfruit	Great	Bees
Sweet cherry	Great	Bees, flies
Turnip rape ( <i>Brassica rapa</i> )	Great	Bees, flies
Nutmeg	Great	Beetles
Allspice	Great	Bees
Okra, Gumbo	Modest	Bees
<i>Canavalia</i> (Jack bean, Horse bean, Sword bean)	Modest	Bees
<i>Dolichos</i> (Hyacinth bean)	Modest	Bees
Eggplant (Aubergine)	Modest	Bees
Coffee (Arabica only)	Modest	Bees
Strawberry tree ( <i>Arbutus</i> )	Modest	Bees
Fig	Modest	Wasps
Strawberry	Modest	Bees, flies
Mammee	Modest	Bees
Prickly pear	Modest	Bees
Guava	Modest	Bees
Pomegranate	Modest	Bees, beetles
Blackcurrant & redcurrant	Modest	Bees
Elderberry	Modest	Bees, flies, beetles
Service apple	Modest	Bees, flies
Jujube	Modest	Bees, flies, wasps, beetles
Chestnut	Modest	Bees
Mustard seeds	Modest	Bees
Rapeseed ( <i>Brassica napus</i> )	Modest	Bees, flies
Coconut	Modest	Bees
Soybean	Modest	Bees
Seed cotton	Modest	Bees, wasps
Sunflower	Modest	Bees
Sesame	Modest	Bees, wasps, flies
Broad bean ( <i>Vicia faba</i> )	Modest	Bees
Karite & shea nuts	Modest	Bees
Caraway	Modest	Bees, flies

Crops in the category ‘little’ dependence on pollination (i.e. <10 per cent of yield lost without pollinators) are not included in this list. If your crop of interest is not in the list, search the Klein et al (2007) paper Appendix for the crop name, and you will see how it was characterised.

## Appendix 2. List of pollination initiatives – private sector

The table below outlines the results of desk-based research to investigate activities underway within the private sector to manage impacts and dependence on pollinators. It is based on publicly available information only and has not been checked by the companies concerned. It therefore may not capture all activities underway.

Organisation	Examples of initiatives underway on pollination
<b>Archer Daniels Midland</b>	None apparent from public disclosures.
<b>Asda</b>	Working with LEAF Certifiers to promote pollinator-friendly practices and conservation on farmland. See <a href="#">here</a> .
<b>Barry Callebaut</b>	Research with Ghent University addressing threats to cocoa pollinators. Through their Sustainable Nut programme provide training and support to farmers on bee health and pest management. See <a href="#">here</a> for statements on biodiversity conservation in cocoa plantations.
<b>Bayer</b>	Bee Care Programme. Three projects testing to optimise bee safety through improving the application technology. See <a href="#">here</a> for further information.
<b>Ben &amp; Jerry's (Unilever)</b>	None apparent from public disclosures. Supply chain management and activity under Unilever.
<b>Café Direct</b>	Bee keeping projects supported in Kenya to diversify income and livelihoods for tea farmers.
<b>Cargill</b>	Example projects to improve field margin habitat for pollinators around eight crops globally. Cargill's Women's Club in Zambia promotes bee keeping to boost pollination and diversify income.
<b>Coca-Cola</b>	One-off project encouraging Spanish consumers to 'adopt' a bee hive linked to a product launch. Bees used as an indicator for environmental monitoring at a regional office in France.
<b>Innocents (Coca-Cola)</b>	Working with mango farmers in India to improve pollination services in response to climate change risk. Innocents Foundation provided apiary equipment to 40 National Trust sites in the UK.
<b>International Procurement and Logistics (Asda)</b>	Bee Stewardship Guide and a residue reduction programme.
<b>Jordans (Associated British Foods)</b>	"Managing an area of land equal to 10% of [their] farmed land for wild pollinators and farm wildlife."
<b>L'Oréal</b>	None apparent from public disclosures.

Organisation	Examples of initiatives underway on pollination
<b>Marks &amp; Spencer (M&amp;S)</b>	Working in partnership with the RSPB and Butterfly Conservation on a number of the farms that supply them to better understand habitat and maintenance requirements for wild birds and pollinators including bees and other species. See <a href="#">link 1</a> , <a href="#">link 2</a> , and <a href="#">link 3</a> for further information.
<b>Mars</b>	None apparent from public disclosures, however the company is exploring the issue – see case studies above.
<b>McDonald's</b>	None apparent from public disclosures.
<b>Mondelēz</b>	Harmony Wheat programme – reducing pesticide use and improving field margins with European wheat farmers. Using bees and butterflies as indicator species for this programme.
<b>Monsanto</b>	Honey Bee Health Coalition – technical input and funding for the coalition of 40 organisations in the USA including NGOs, academia and unions. Support for the Monarch Butterfly Conservation Fund. Honey Bee Advisory Council – independent advisory group to guide internal policies and practice. Thirty-one sites certified by the Wildlife Habitat Council under its Conservation Certification programme with a focus on establishing new pollinator habitat sites.
<b>Naked (PepsiCo)</b>	None apparent from public disclosures.
<b>Olam</b>	Introduced bees to improve quality and quantity of coffee yield in global supply chains. Engaged with expert stakeholders to support research in hive health and management in Australia for almond production. Pollination best practice guidelines in place for US and Australia almond harvest.
<b>PepsiCo</b>	Recognising risk from pollinator declines especially due to pesticide use and starting to think about potential solutions. See <a href="#">here</a> for further information.
<b>Starbucks</b>	None apparent from public disclosures.
<b>Syngenta</b>	Operation Pollinator – provides seeds and knowledge to farm managers and golf courses on how to create pollinator habitats. Good Growth Plan – aims to enhance biodiversity on five million hectares of farm land, being done, in part, by putting in wild flower margins for pollinators. Further information can be found <a href="#">here</a> .
<b>Tesco</b>	Specific mention of pollinators in their commitment to improve farmland biodiversity. Community grants to support Black Bee conservation in the UK. See <a href="#">here</a> for further information.
<b>The Body Shop</b>	Community Trade programmes in Cameroon for sustainable beeswax and in Ethiopia for community honey production.
<b>The Co-operative Group</b>	Reducing risk of pesticide use to pollinators. See the <a href="#">Co-op Way Report 2016</a> for further information.
<b>Unilever</b>	Unilever's Sustainable Agriculture Code promotes creation of pollinator-friendly habitat. Research with John Innes and Hutchinsons to improve mustard seed yields in relation to pollinator management. Knorr herb farmers in Germany planted flower strips and installed insect 'hotels'. Supplier orchards in Poland installed nesting sites for mason bees to increase yield.



Organisation	Examples of initiatives underway on pollination
	Tomato suppliers in California planted buckwheat to attract bees in to increase yields. See the Sustainable Agriculture Code <a href="#">here</a> .
<b>Waitrose</b>	Organising the Great British Bee Count. Developed a seven-point plan for pollinators introduced in 2013, including phasing out use of neonicotinoids, research with Sussex University, offering more organic product lines, and purchasing from LEAF certified farms. See <a href="#">here</a> for further information.

## Appendix 3. List of pollination initiatives – academia and non-governmental organisations

The table below outlines the results of desk-based research to investigate activities underway to manage impacts and dependence on pollinators. It is based on publicly available information only and has not been checked by the organisations concerned. It therefore may not capture all activities underway.<sup>6</sup>

Organisation	Initiative	Further information
<b>BirdLife International</b>	Pollination education toolkit and ongoing work in West Africa on pollination and agricultural practices.	See the Education Toolkit <a href="#">here</a> and ongoing work <a href="#">here</a> .
<b>Buglife</b>	B-Lines project, guidelines on Managing Woodland for Pollinators.	See B-Lines project <a href="#">here</a> and see woodland management guidelines <a href="#">here</a> .
<b>Business for Social Responsibility</b>	None apparent from public disclosures.	
<b>Cambridge Institute for Sustainability Leadership</b>	Work conducted as part of Natural Capital Impact Group.	See <a href="#">here</a> for further information.
<b>Centre for Ecology and Hydrology</b>	Wealth of research on pollinators and drivers of their declines.	See <a href="#">link 1</a> and <a href="#">link 2</a> for further information.
<b>Consumer Goods Forum</b>	None apparent from public disclosures.	
<b>EU Business and Biodiversity Platform</b>	None apparent from public disclosures.	
<b>European Cocoa Association</b>	None apparent from public disclosures.	
<b>Fauna &amp; Flora International</b>	Previous project work with communities to conserve bee species whilst benefitting local communities.	See <a href="#">here</a> for further details on previous work.
<b>Food and Agriculture Organization</b>	Several publications and recognition of pollinators as crucial for agriculture.	See <a href="#">link 1</a> , <a href="#">link 2</a> , and <a href="#">link 3</a> .

<sup>6</sup> Where the table states “None apparent from public disclosures” this is due to no activity being identified using the following search terms: ‘pollinator’, ‘pollinators’, ‘pollination’, ‘ecosystem services’, ‘ecosystem’, ‘biodiversity’, ‘nature’, and ‘agriculture’.

Organisation	Initiative	Further information
<b>Food Ethics Council</b>	One publication from 2012 on sustainable intensification that identifies management to enhance pollination as an option.	See publication <a href="#">here</a> .
<b>Ghent University</b>	Dr Wouter Vanhove's research on cocoa and pollinators.	See <a href="#">here</a> .
<b>Global Nature Fund</b>	None apparent from public disclosures.	
<b>High Conservation Value (HCV) Resource Network</b>	None apparent from public disclosures.	
<b>HRH International Sustainability Unit</b>	A review of supply chain and food resilience, which also examined risks associated with pollinator declines.	See <a href="#">here</a> for the supply chain review; further information on cocoa sustainability <a href="#">here</a> .
<b>International Institute for Environment and Development (IIED)</b>	Previous work on "identifying and evaluating the impacts of pollinator-friendly practices on livelihoods, incomes and health".	See <a href="#">here</a> for further information.
<b>Natural Resources Institute, University of Greenwich</b>	Professor Phil Stevenson's research on pollinators.	See <a href="#">here</a> .
<b>Rainforest Alliance</b>	Awareness-raising and education on pollinators and their role for agriculture (e.g. cocoa production).	See <a href="#">link 1</a> and <a href="#">link 2</a> .
<b>Royal Botanic Gardens, Kew</b>	Awareness-raising, teaching and public engagement; Professor Phil Stevenson's work on pollinators.	See awareness-raising work <a href="#">here</a> and <a href="#">here</a> .
<b>Royal Society for the Protection of Birds (RSPB)</b>	Awareness-raising and public engagement.	See <a href="#">here</a> for awareness-raising work and <a href="#">here</a> for related work on sustainability of farming practices in the United Kingdom.
<b>Sustain</b>	Previous work includes awareness-raising and training members of the public to keep bees.	See <a href="#">here</a> for further information.
<b>Sustainable Agriculture Initiative (SAI) Platform</b>	None apparent from public disclosures.	
<b>Sustainability Consortium</b>	None apparent from public disclosures.	
<b>Trinity College Dublin</b>	Several projects relating to pollinators and pollination.	See <a href="#">here</a> for further information.

Organisation	Initiative	Further information
<b>UNEP-WCMC</b>	Current Cambridge Conservation Initiative-funded pollination project in collaboration with FFI, University of Cambridge Institute for Sustainability Leadership, and University of East Anglia.	See <a href="#">here</a> for project page.
<b>World Bee Project</b>	“Safeguarding Pollinators, People & the Planet”.	See <a href="#">here</a> for further information.
<b>World Business Council for Sustainable Development (WBCSD)</b>	None apparent from public disclosures.	
<b>World Economic Forum</b>	Raising awareness by publishing information on pollinators (e.g. IPBES report).	See <a href="#">link 1</a> , <a href="#">link 2</a> , and <a href="#">link 3</a> for further information.
<b>WWF</b>	None apparent from public disclosures.	
<b>University of East Anglia</b>	Dr Lynn Dicks’ work on assessing vulnerability of crops to declines in pollinator populations.	See <a href="#">here</a> .
<b>University of Freiburg</b>	Research.	
<b>University of Reading</b>	Professor Simon Potts’ research within the Centre for Agri-Environmental Research.	See <a href="#">here</a> .



## About the Cambridge Conservation Initiative

The Cambridge Conservation Initiative (CCI) is a collaboration between nine leading biodiversity conservation organisations based in and around the city of Cambridge, and the University of Cambridge. By catalysing strategic partnerships between leaders in research, education, policy and practice CCI aims to transform the global understanding and conservation of biodiversity and, through this, secure a sustainable future for biodiversity and society.

## Citation

Cambridge Institute for Sustainability Leadership, Fauna & Flora International, University of East Anglia, & UNEP-WCMC (2017) The pollination deficit: Towards supply chain resilience in the face of pollinator decline. UNEP-WCMC, Cambridge, UK, 42 pp.

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