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Business and nature working together: action by the building sector to protect wild pollinators

Environment

Business and nature working together: **action by the building sector to protect wild pollinators**

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Arcadis Belgium. 2020. Business and nature working together: Action by the building sector to protect wild pollinators. Technical guidance prepared by Arcadis for the European Commission under contract No 07.0202/2018/795538/SER/ENV.D.2 “Technical support related to the implementation of the EU Pollinators Initiative”.

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Date of completion: August 2020

Manuscript completed in August 2020

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Luxembourg: Publications Office of the European Union, 2020

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PDF ISBN 978-92-76-22846-2 doi:10.2779/053343 KH-01-20-586-EN-N

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Business and nature working together:

Action by the building sector to protect wild pollinators

Why this guidance?

This guidance document for businesses is part of the broader implementation of the EU Pollinators Initiative¹. The initiative was adopted by the European Commission (EC) on 1 June 2018, setting the framework for an integrated approach to address the decline of pollinators in Europe through three priorities:

1. Improving knowledge on the decline of pollinators, its causes and consequences;
2. Tackling the causes of such decline;
3. Raising awareness, engaging society and promoting collaboration.

One of the important actions of the initiative is to encourage and enable the business sector to take action for wild pollinators.

This document aims to provide such guidelines to businesses that are involved in the building sector. Actors include real estate developers, architects, urban spatial planners², housing and infrastructure managers and contractors executing works for the private sector.

This document aims to provide such guidelines to the building sector. Its scope includes both local actions (i.e. site-specific) and measures across the value chain that can contribute towards the conservation and restoration of wild pollinator populations. The guidance document also informs businesses on the risks that stem from the decline of wild pollinators, and opportunities that arise from taking action to reverse this negative trend.

Pollinators – such as bees, hoverflies, moths, butterflies and beetles – are declining dramatically around the world, and Europe is no exception. With pollinator populations being essential in underpinning the stability of pollinator services over time, this decline of pollinators puts managed and natural ecosystems functioning at risk.

Why should your business care?

The building sector has plenty of opportunities to minimize its impact on biodiversity and invest in ecosystem restoration and the creation of new habitats. Restoring pollinator populations to healthy levels will help to create a high quality living and working environment, resulting in an increased attraction of buyers, tenants and employees. While preventing economic losses, actions for wild pollinators also

provide other environmental and social benefits through the provisioning of ecosystem services, e.g. reducing local problems such as flooding risks.

As a win-win, building with nature has been shown on many occasions to also increase the estate market value and assists the company in building/maintaining a good rapport with the public and other stakeholders.

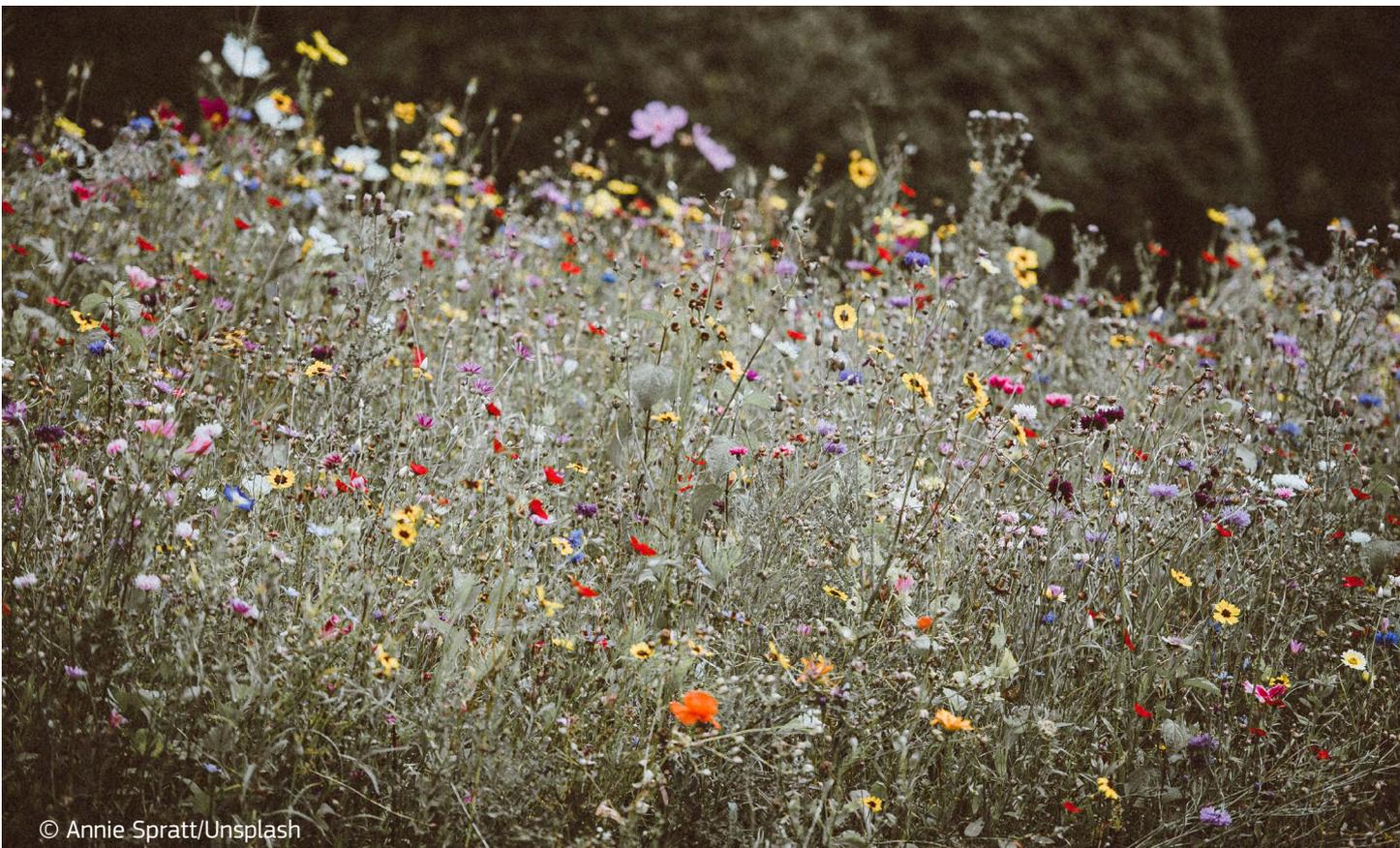
¹ COM(2018), 395 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1528213737113&uri=CELEX:52018DC0395>

² See also A guide for pollinator-friendly cities: How can spatial planners and land-use managers create favourable urban environments for pollinators? by Wil et al. (2019), guidance prepared by ICLEI Europe for the European Commission.

What can your business do?

The sector is well placed to seize opportunities and act positively and effectively for wild pollinator populations. This guidance provides recommendations for action by this business sector to protect wild pollinators illustrated with examples of companies taking the lead in creating opportunities for both the sector and pollinators. The building sector should:

- ▶ integrate green infrastructure into the early stages of the design process of a project, considering:
 - ▶ to recognize existing sources of food and shelter for pollinators on the project site, preserve them, and if necessary, strengthen their natural value to obtain a higher quality;
 - ▶ to identify locations where new habitats can be created to help pollinator populations, including green corridors;
 - ▶ to include green belts and green corridors when planning traffic verges, road side and railway verges, roundabouts, water ways and river banks;
 - ▶ to install biodiverse green roofs and walls, and providing sufficient nesting habitat in the vicinity (e.g. dead wood);
 - ▶ to manage the site after construction in a pollinator-friendly way;
- ▶ mimic nature in its designs instead of traditional landscaping with monoculture lawns;
- ▶ make a well-considered choice of native plant species, considering the importance for pollinators and strictly avoiding invasive alien species;
- ▶ promote actions to ensure healthy pollinator populations within the value chain;
- ▶ raise awareness of the role of pollinators to its stakeholders and encourage them to partake in actions that promote pollinator conservation;
- ▶ monitor and evaluate the impacts of actions on wild pollinators;
- ▶ partner up with NGOs, local nature authorities and/or biodiversity experts when drafting, implementing and evaluating actions for pollinators, whether they focus on company's site or the supply chain.





1. WHAT YOU AS A BUSINESS MANAGER SHOULD KNOW ABOUT POLLINATORS

Pollinator populations are essential to underpin the stability of pollination³ services in the short- and long-term. Indeed, without pollinators, a large majority of flowering plants will not be able to reproduce and eventually will decline, causing serious cascading effects across ecosystems and business value chains. Many fruits, nuts and vegetables will be lost from our diets, but also other important raw materials and products, such as vegetable oils, cotton and flax, plant-based pharmaceutical and cosmetic products. In essence, pollinators play a crucial role in maintaining terrestrial ecosystems healthy and resilient, which in turn deliver essential services to our businesses and society at large.

Pollinators – such as bees, hoverflies, moths, butterflies and beetles (Figure 1) – are declining dramatically around the world, and Europe is no exception [1, 2]. Many species are threatened with extinction creating a pollination deficit [3]. This puts managed and natural ecosystems functioning at risk, with businesses facing possible serious shortages of raw materials, a decline in crop quality and challenges with the security of the supply chain.



Figure 1. A snapshot of the diversity of wild pollinators

In addition to the impact on farmers' crops, the loss of wild pollinators will also lead to serious problems in terms of the benefits to society that our already fragile ecosystems are delivering. The reduced growth of specific pollinator-dependent vegetation on a mountain slope, for example, could lead to an increased erosion effect or flooding. To maintain our ecosystems and

landscapes healthy, wild pollinators are crucial allies. Indeed, we rely on wild pollinators for very important services in maintaining our ecosystems. There are no alternatives to species rich communities, and both businesses and society should therefore increase their efforts for the protection and restoring of wild pollinator populations.

³ Pollination is the transfer of grains of pollen between flowers which enables the reproduction of flowering plants (both wild and domesticated). Without animal pollinators, many plants cannot set seed and reproduce. When humans benefit directly from this function, pollinators thereby deliver a free pollination service.

Differences between honey bees and wild bees

In addressing this challenge, it is essential to understand the difference between wild bees and honey bees. Honey bees and wild bees are often both included when bee conservation and campaigns are conducted. Obviously, the two have much in common, however, there are key differences. Conversely, there are around 2,000 bee species in Europe and the honey bee (the only species that produces honey) is just one of them.



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- ▶ Although some feral honey bee colonies can be found, most honey bee colonies, which contain thousands of bees, are bred by beekeepers (managed honey bees) for the production of honey and other products. Therefore, honey bee occurrence and density depend on the locations of bee hives; which is determined by beekeepers.
- ▶ Honeybees are generalists, feeding on many different types of flowers available around the beehive.
- ▶ Some wild bees are generalists, whilst others are specialists and exclusively feed from one or a small number of flowering plant species.
- ▶ Wild bees usually occur in lower densities, but due to their species variety have a much more diverse ecological role: they feed and make their nests in many different habitats.
- ▶ Several crops and flowers (such as legumes) can only be pollinated by specific wild bees.
- ▶ Some wild bees such as bumblebees live in small colonies (of ~50-200), but most are solitary animals without a colony.

In general, wild bees are more effective and efficient pollinators than honey bees [5,6] and they provide the service for free. In fact, high honey bee density can negatively impact wild pollinators including pollinator-plant networks [4]. Honey bees have a role to play, but maintaining a species-rich pollinator community is critical for a sustainable pollination service.

Diversity in species ensures that plants will be pollinated even in cases where certain species fail to perform or when populations are too small to effectively pollinate. It enables resilience to the ever-changing environments and acts as a buffer for unforeseen or uncertain future major changes, especially in the context of climate change.

1.1 Building sector and pollinators

The continued development of real estate unfortunately is having a significant contribution to the loss of biodiversity in general and the disappearance of pollinator habitat specifically. At each phase of a building's life cycle, from the extraction of raw materials to the demolition operations, it plays a role of some kind in the five major causes of the erosion of biodiversity identified by the Convention on Biological Diversity (CBD): (1) overexploitation of natural resources; (2) destruction/disturbance of species and natural habitats

and the fragmentation of habitats; (3) pollution; (4) climate change and (5) the introduction and spread of invasive exotic species.

In addition to the direct impacts on biodiversity and pollinators such as the use of space, there are also potential indirect impacts both on the construction site (e.g. soil sealing, impacts on rainwater infiltration) and in the wider environment (i.e. impacts down the supply chain, such as extraction of raw materials, manufactu-

ring of construction materials and equipment, packaging, transportation etc.).

Urban and suburban areas are synonymous with extreme habitat loss and fragmentation; however, they also present major opportunities for preserving and restoring natural habitat. Cities and towns can be a major refuge for many insect pollinators, providing

foraging and nesting sites, larval food plants and nectar that may be less available on surrounding intensively managed, often monoculture, homogenous farmland. Given that a large part of cities and towns consists of built-up areas, the building sector has an important role to play, with ample opportunities for multifunctional space use thereby also catering for biodiversity.



Businesses that are active in the construction and maintenance of real estate can promote the design and management of buildings and surrounding spaces in a way that it provides multiple ecosystem services, while improving quality of life and supporting a green economy. With the inclusion of green infrastructure⁴, the building sector can contribute to the protection of biodiversity and enhance the ability of ecosystems to deliver multiple services such as disaster prevention, water purification, air quality, pollination, provision of

recreation possibilities, climate control and many others. Specifically, for pollinators, building and maintenance design can include the creation of vibrant pollinator habitats to reduce pressures on pollinators and boost pollinator diversity and the benefits they deliver. In addition, the building sector can promote supply chain management that supports pollinators. As a win-win, building with nature has been shown on many occasions to also increase the estate market value.

⁴ Green infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. This network of green (land) and blue (water) spaces can improve environmental conditions and therefore citizens' health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity. (https://ec.europa.eu/environment/nature/ecosystems/index_en.htm)

1.2 Site and value chain impacts

Any business is a value chain as is shown in Figure 1 with environmental and social impacts occurring across the value chain.

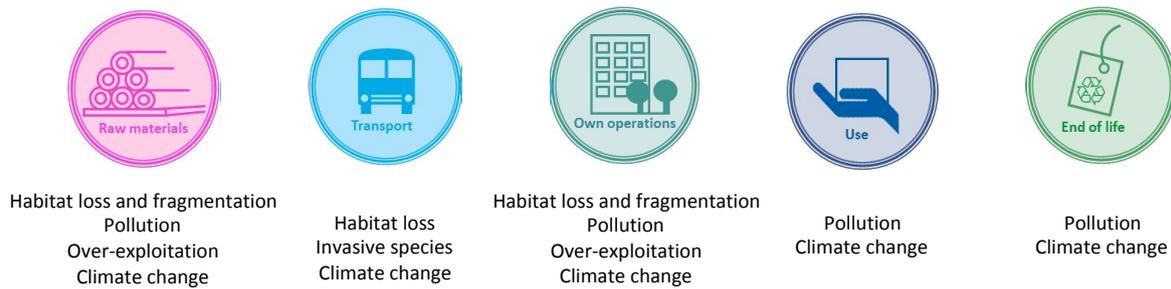


Figure 1. Value chain link with key drivers of biodiversity loss

As companies are being pressed to account for those impacts, they are turning to their supply chain to disclose information in order to monitor and reduce impacts. This includes keeping track of where materials come from, under what conditions they are mined or manufactured, where and how things are made, how products are packaged, transported, used and disposed of. This information is subject to scrutiny by stakeholders, investors and regulators alike [12].

Understanding the full environmental footprint behind products has become a critical challenge for the private sector and associated players such as manufacturers and retailers. Advances in accounting and reporting methodologies will enable companies to identify suppliers that perform best on reducing resource

dependence, social and environmental impacts. This will allow companies to encourage suppliers to cost-effectively manage risk and opportunity in their own supply chains and product development [4].

Depending on the sector, the ratio of environmental costs due to direct impacts versus their supply chain impacts varies. As shown in Figure 3, the highest supply-chain environmental impacts occur in the food and beverage industry (92%), with retail and real estate following just behind.

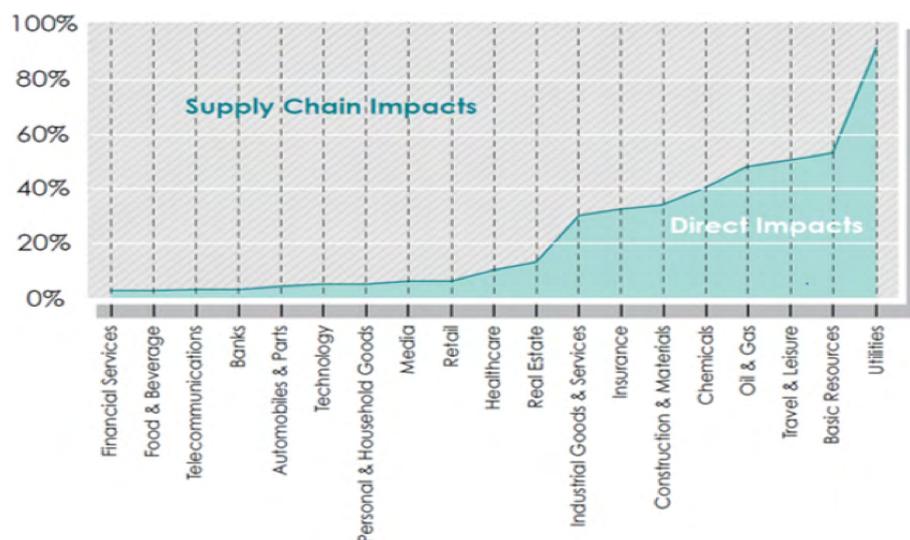


Figure 3. Percentage of site vs. supply chain impacts by sector [4] Reprinted from GreenBiz, by Bernick, L., 2015, Retrieved from <https://www.greenbiz.com/article/5-ways-apply-natural-capital-valuation-your-business> (c) 2015 GreenBiz

The building business sector relies on its value chain, starting with the extraction of building materials; the manufacturing of building materials (incl. packaging); the design and construction of buildings, facility management, maintenance & renovation; and ending with demolition (incl. re-use/recycling/landfill of materials). At each phase, also transportation takes an important role.



2. WHY DO POLLINATORS MATTER TO YOUR BUSINESS?

Declining trends in overall ecosystem health should be of direct concern to businesses not only because many depend on related services, either directly or indirectly, but also because the degradation of ecosystems can present some of the following risks: operational, regulatory and legislation, marketing and reputation, financial and societal. In addition to tackling the risks, opportunities can also emerge. Managing a business at any value chain level and the ecosystem services involved implies evaluating risks and opportunities against these various aspects of running a business. Table 1 shows the risks and opportunities that are relevant for the building sector.

Importantly, the sector is well placed to act positively and effectively for wild pollinator populations and the companies and actors involved in the building sector can reverse pollinator decline into a broad range of opportunities.

Triodos Bank building at Driebergen-Zeist includes green roofs which serve as an insect highway and act as connecting bridges between the surrounding nature on the estate.

Interested in what benefits this has created for the company? See Chapter 4

Covivio, a European investment and development company, launched a Biodiversity Policy in France that formally incorporates in its charters the planting of native plant species in the design and management of green spaces.

Interested in what your business can do? See Chapter 3

In Paris, Viparis is transforming 14,000 square metres of flat roof on top of a cultural complex into the world's largest urban farm and Europe's biggest green roof. The urban rooftop farm Agripolis will open in spring 2020.

Interested in what other front-runners are doing? See Chapter 4



Table 1. Why pollinating insects matters to your business and what to do (risks & opportunities for the horticulture sector that are of key importance and sector-specific are highlighted in green).

	Risks	Opportunities
Operational Regular business activities, expenditures, and processes	<ul style="list-style-type: none"> ▶ Reduced value of land and property where no attention has been given to the multifunctionality of green infrastructure, contributing to the protection of wild pollinators. ▶ The loss of pollinators can lead to impacts throughout the ecosystem, which can lead to other effects such as flooding risks, drought, etc. 	<ul style="list-style-type: none"> ▶ Increased value of real estate. Living and working environments that score high on green infrastructure more easily attract buyers, tenants and employees. Pollinators are a good indicator of a healthy nature/ecosystem, so by paying attention to them, the sector can address the dimension of nature in properties. ▶ Differentiating the business to key customers who demand strong sustainability commitments paying attention to the added value for pollinators, in an increasingly competitive market. ▶ Provision of other ecosystem services and associated benefits, e.g. by linking water and carbon management with pollinator-friendly actions, such as green roofs or water infiltration basins, reducing local problems such as flooding risks.
Legal and regulatory Laws, public policies, and regulations that affect business performance	<ul style="list-style-type: none"> ▶ New pollinator strategies, including legislative elements. ▶ Increased compliance costs. 	<ul style="list-style-type: none"> ▶ Reduce compliance costs and/or other costs by: <ol style="list-style-type: none"> a. being proactive on compensation measures; b. anticipating negative impacts; c. embedding pollinator risk identification within the supply chain management and certification schemes (e.g. ISO14001, BREEAM, DGNB, HQE, LEED...); d. increased acceptance for a project from local communities, authorities and stakeholders. ▶ Government agencies to develop policies and incentives to protect or restore ecosystems upon which a company depends.
Financing Costs of and access to capital including debt and equity	<ul style="list-style-type: none"> ▶ Increased financing costs (higher interest rates or harsher conditions), due to increased interest of the finance sector in how businesses in which they invest are dependent on ecosystems services such as pollination. 	<ul style="list-style-type: none"> ▶ Gain or maintain investor interest and confidence, which can improve access to finance and/or reduce financing costs. ▶ New «green funds» and associated initiatives may become available, e.g. the Verified Conservation Area (VCA) Platform. ▶ New environmental markets might emerge (e.g. carbon offsets, habitat credits etc.).
Reputational and marketing Company trust and relationships with direct business stakeholders	<ul style="list-style-type: none"> ▶ Changing customer values or preferences may lead to reduced market share. ▶ Public campaigns, e.g. negative publicity on large real estate projects that contribute little to the local environment. ▶ Increased staff turnover, which in turn leads to higher recruitment and retention costs. ▶ Reduced interest and loyalty of business stakeholders, e.g. key suppliers or business service providers. 	<ul style="list-style-type: none"> ▶ Maintain a good relationship with direct business stakeholders, such as customers, suppliers and employees. ▶ Improve physical and mental wellbeing of employees. ▶ Improve ability to attract and retain employees. ▶ Emerging environmental markets and products may offer new revenue streams (e.g. carbon offsets, habitat banking etc.). ▶ Growing demand for credibly certified buildings (e.g. BREEAM, eco-labels, etc.).
Societal Relationships with the wider society	<ul style="list-style-type: none"> ▶ Local communities may hold the building sector responsible for the decline of wild pollinators and the loss of benefits they provide to the society. 	<ul style="list-style-type: none"> ▶ Increased sense of community in neighborhoods that are revitalised by joint pollinator conservation actions. ▶ Local communities may benefit from other improved ecosystem services that come along with the implementation of pollinator-friendly measures, e.g. through improved recreational access to green areas, cleaner air and improved regulation of water flows.



3. WHAT CAN YOUR BUSINESS DO?

To avoid the risks and meet the opportunities that are described above (see Chapter 2), it is important for the building sector to take measures to improve the state of pollinators.

Chapter 3.1 describes the strategic actions that a business can take to integrate biodiversity into its daily operations. In Chapter 3.2 focus is on the actions that can be taken on project sites, in order to develop buildings and spaces to the benefit of pollinators and biodiversity more generally. In addition to the benefits for biodiversity, this may also lead to the provision of other ecosystem services and associated business benefits (for example by linking water management with water-related ecosystem services by implementation of green roofs). Of course, businesses should also consider including pollinator-friendly measures on their own company's premises. Such measures not only provide biodiversity benefit, but also improve the physical and mental wellbeing of employees through the creation of a green space. In Chapter 3.3 focus is on actions that can be taken in the context of the value chain.

3.1 Strategic actions

A high-level significant step for the landscape sector is to integrate biodiversity into the companies' core business strategies. The sector may therefore capitalize on the associated opportunities while setting and working towards commitments to minimize its impact on wild pollinator populations and wider biodiversity. This commitment will help companies to maximise opportunities to make a positive contribution to the protection of biodiversity and ecosystem services in which pollinators and their habitat play an important role. This is fundamental to the long-term health of the business and the wider society in which it operates.

For buildings and urban developments, several frameworks for environmental and sustainability performance are being used throughout Europe, often including rating tools and independent certification schemes. Well known are BREEAM⁵, DGNB⁶, HQE⁷, LEED⁸, ... These standards provide guidance and a framework for comparing and evaluating whether a building project can be regarded as sustainable and green. In all of these methodologies, the integration of green infrastructure into a project is rewarded in the scoring, through different requirements or methods. In some cases, these methodologies can be differentiated according to the scale on which they apply (building scale, larger project development scale).

By considering green infrastructure in building projects, areas become more attractive to residents, employees and visitors. Upfront costs to meet standards often are high. However, rental rates and market value of certified green buildings are typically higher, thereby offsetting the initial investment costs. Indeed, developers who invest in the environment, through quality of buildings, and the surrounding hard and soft landscaping, can secure for example much higher rents, up to 20 percent higher⁹ relative to similar local competitor locations.



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⁵ www.breeam.org

⁶ www.dgnb.de

⁷ www.assohqe.org

⁸ <https://www.usgbc.org/leed>

⁹ http://www.merseyforest.org.uk/BE_group_green_infrastructure.pdf

3.2 Developing pollinator-friendly buildings

To be most effective, green infrastructure and pollinator-friendly actions need to be integrated into the design or development of the project from the early stages. Indeed, if green infrastructure and the impact on wild pollinator populations is considered early in the design process, then it can provide multiple benefits for the site, as well as make construction easier and more cost effective.

Spatial and land use planners and architects can play a vital role in the conservation of wild pollinator species, including the protection and enhancement of pollinator populations and habitats. They can stimulate the conservation and enlargement of pollinator habitats by identifying the options for green corridors and new pollinator habitats in an early phase of the design, as well as making provisions for connecting up small pockets of well-planned urban green space or parks into butterfly-ways that cross the city and peri-urban areas. A major shift here is to safeguard nature values present and incorporate or save them in the design instead of applying tabula rasa.

The most important actions to be considered in the design phase are listed in this chapter:

Preserve, enhance and create pollinator-friendly habitat.

After feeding on nectar and collecting pollen, bees return to their hives and nests for shelter, to raise their young, and to overwinter. While it is noted that 75% of bees typically forage within 0.6 miles (1 km) of their nests, smaller species like the mason bee (*Osmia* spp.) can only travel a few hundred yards—benefiting greatly from integrating

nesting sites. Unlike the large, comb-filled hives of the European honey bee and other social bees, about 70% of native bees are solitary and nest in the ground. The remaining 30% nest in wood cavities and hollow stems. In an undisturbed or unkept landscape, these spaces and resources are often abundantly available, only to be cleared out to “improve” or develop a site. While some level of disturbance is inevitable, be sure to **recognize existing sources of food and shelter for pollinators on the project site, preserve them, and if necessary, strengthen their natural value to obtain a higher quality.** It is a good practice to involve local authorities, nature organisations and/or experts when securing habitats for wild pollinators.

In addition to preserving the existing habitats of natural value, locations should be identified where new habitats can be created to help pollinator populations. **When creating new habitats, one should consider letting nature regenerate on its own to the benefit of wild pollinators.** This can be complemented by additional planting of native flowers seed mixes, when needed.

A good planting palette should always aim for full season color and blooms. While this should provide the minimum pollen and nectar resources for your local pollinators, ideal pollinator habitat should provide significant native floral diversity, optimized for your site’s conditions, having abundant blooms and resources early in spring season. In general, the more biologically diverse a site is, the more species of pollinators it can support.



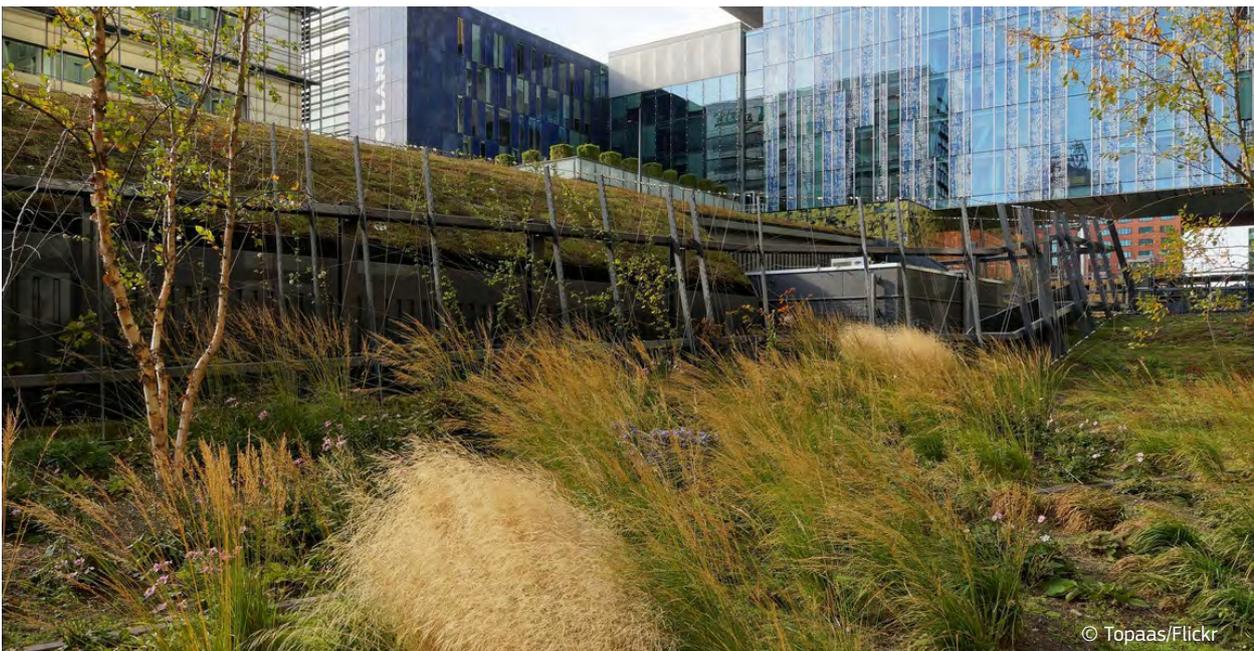
Elements of high-quality pollinator habitats

Pollinators need foraging sites (for food) and nesting habitats (used as shelter during hibernation time or while settling colonies). Most urban spaces provide one or the other, sometimes even both at the same time, which would be ideal. If separate, they can work well if they are well connected to each other, allowing pollinators to easily move between them. Elements that high-quality pollinator habitats should include are:

- ▶ Heterogeneous landscapes (a patchwork of fine-leaved grassland, wildflower-rich grassland, heathland and open bare areas);
- ▶ Diverse surface and soil conditions (substrate, topography, water availability);
- ▶ Ideally, some areas of bare ground to allow for nesting possibilities;
- ▶ Vegetation of varying heights to benefit sedentary stages such as cocoons by providing a substrate;
- ▶ A diverse plant community with no more than 10% of a single plant species, both flowering and nonflowering (as larval host plants);
- ▶ High abundance and diversity of flowering plants, with flowers of different size, colour and shape suitable both for generalists and specialists; many of them growing in clusters;
- ▶ A mix of early and late flowering species of plants;
- ▶ Use of native species;
- ▶ Limited management, ideally remaining as unmanaged as possible;
- ▶ Absence of environmental pollutants (including pesticides, heavy metals and light pollution);
- ▶ A variety of nesting habitats, including loose soils such as sand and loams, shrubs, herbaceous plants of different heights, dead wood, dried leaves, twigs and stems, stones and logs.

Design and connect green spaces

As cities grow, habitat can be lost or fragmented into small patches, making it difficult for some species to access the resources they need to survive. By re-connecting green spaces, a continuous corridor of habitat can be created that allows pollinators to move freely from area to area and take advantage of the resources each patch has to offer. On a city-wide scale, parks, ravines, green roofs, and infrastructure corridors present the greatest opportunity for the conservation of pollinators. On a smaller scale, individual pollinator plantings such as urban gardens, parkettes, laneways, and planter boxes, can be linked to create a neighbourhood-scale pollinator corridor¹⁰.



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¹⁰ <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/reports-plans-policies-research/draft-pollinator-strategy/>

Real estate companies and project developers can rely on local nature experts to identify in the building project the urban areas of high potential for creating and reconnecting pollinator habitats (such as brownfields¹¹ and unused urban areas, green corridors, green roofs, sustainable drainage systems, road, railway and waterway verges) and take them into account when in the design phase.

This section provides some practical advice on how to improve the quality of pollinator habitats through pollinator-friendly design and management.

An important step forward for the landscape sector is to choose to mimic nature in its design instead of traditional landscaping with monoculture lawns and planting of non-native species. Mimicking nature includes the selection of native plants and seeds that have not been treated with systemic pesticides and that create natural native diversity adapted to the local environmental conditions, but also simply **allowing nature to regenerate on its own to the benefit of wild pollinators (limiting management efforts)**.

Simple changes to management of grasslands will give wildflowers a chance to grow. This is one of the most cost-effective ways to provide food for pollinators and other insects, and will not just benefit pollinators; well-managed grasslands can produce magnificent and colourful displays in summer. It will also help reduce pollution, improve soil structure and reduce flood risk. It is recommended for businesses to partner with local NGOs, authorities and/or recognized experts to integrate biodiversity and ecosystem services thinking in the design process of the project site.

Green corridors with abundant vegetation play an important role in creating healthy, ecological cities. They make urban areas more pleasant, provide appealing habitats for fauna and flora, and provide social benefits such as recreation. Several cities have green infrastructure and open space strategies in place that lay the groundwork for pollinator preservation and habitat expansion efforts.

Through anticipatory land use planning, the building sector can identify options for green corridors and new pollinator habitats into its project designs, strategically linking existing spots of green infrastructure across the city.

By ensuring habitat connectivity this benefits pollinators and allows for the movement and mixing of species. Also, the sector should consider multi-functionality (combining different functions to enhance the utility of the planned/developed green infrastructure) for multiple co-benefits and leveraging wider funding for pollinator conservation.

By complementing green belts and green corridors when planning traffic verges, road side and railway verges, roundabouts, water ways and river banks, the building sector can connect ecologically important elements and provide pollinator refuges in densely populated urban areas. A good guidance to develop pollinator-friendly transport corridors is developed by the All-Ireland Pollinator Plan (2019).

Green roofs can aid conservation efforts by mitigating the effects of habitat loss associated with urban development. Pollinator species do not necessarily require green physical connections. Stepping stones of suitable habitat over spatial scales can be sufficient to connect habitat patches¹².

¹¹ Brownfields are abandoned areas or pieces of land on which previous developments or industrial activities once existed. Often, such sites suffer from soil contamination but some of them also have a high biodiversity value and support various forms of insects.

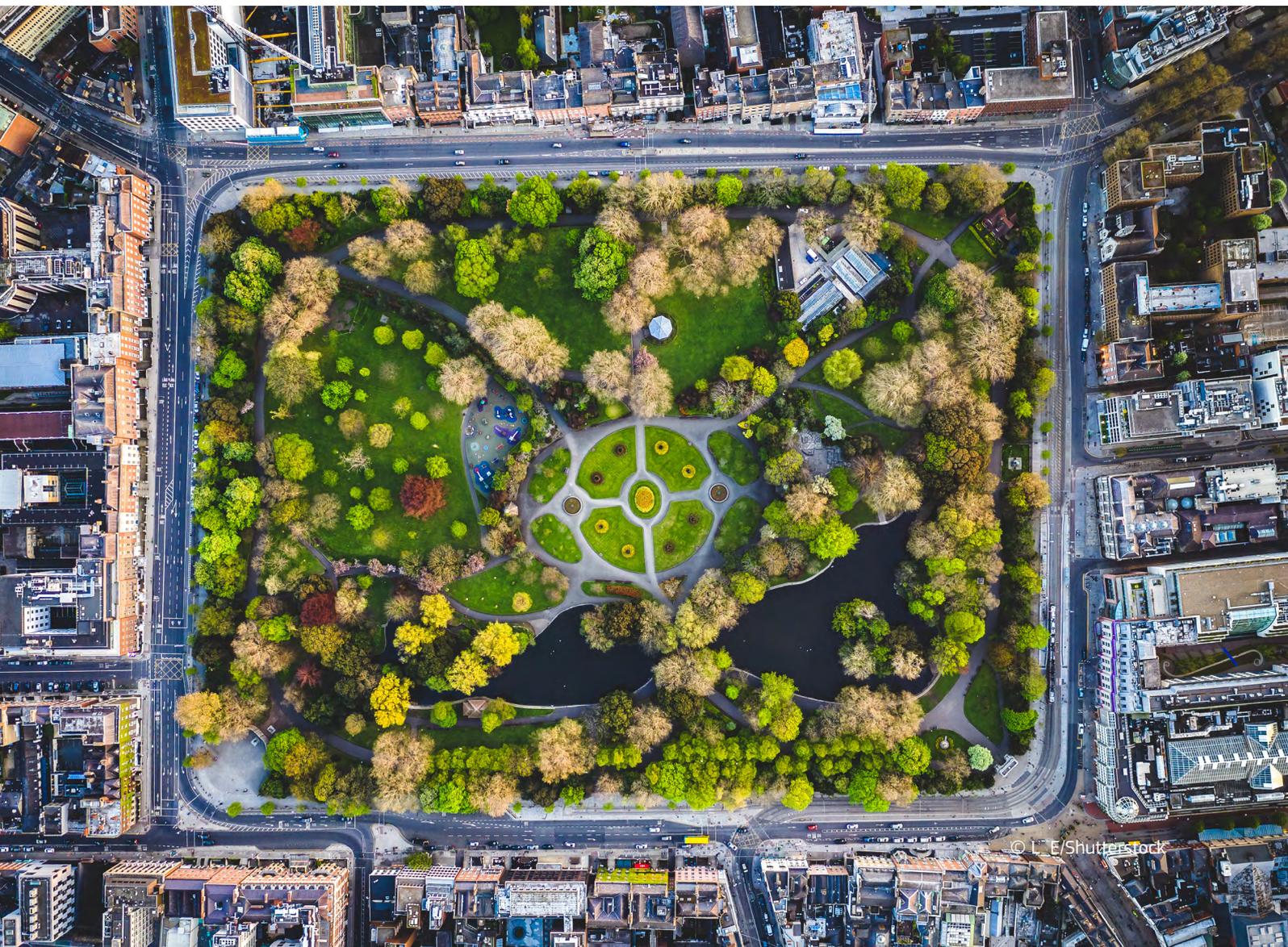
¹² Gedge, D., Grant, G., Kadas, G., & Dinham, C. (2012). Creating Green Roofs for Invertebrates. A Best Practice Guide. Peterborough. Retrieved from <https://cbc.iclei.org/project/bsap-guidelines/>

Biodiverse green roofs can fulfil this function as they often provide food sources for pollinators, whilst delivering a variety of co-benefits such as water retention and delayed water run-off to drainage systems, reducing energy consumption through insulation, and reducing the urban heat island effect when applied on a larger scale (i.e. multiple roofs in a neighborhood).

In addition to the nutrient-rich green roofs, it remains important to provide sufficient nesting habitat near to the roofs (e.g. provide dead wood).

There is also the opportunity to combine green roofs with photovoltaic panels, thereby providing habitat to pollinators [5], contributing to sustainable building development and reduction of greenhouse gas emissions. When combined, the cooling and shading effects of plants have a positive impact on the production of energy and the effectiveness of the solar panels [6-8] compared to solar panels on a gravel or bituminous roof.

Clearly, green roofs are a nice example of the multifunctionality of green infrastructure, and it is this multifunctionality that sets green infrastructure apart from most of its 'grey' counterparts. Grey infrastructure tends to be designed to perform one function, such as drainage, without contributing to the broader environmental, social and economic context. As such, green infrastructure has the potential to offer win-win, or 'no regrets' solutions by tackling several problems and unlocking the greatest number of benefits, within a financially viable framework.





It is important for all players in the building sector to take into account green roofs in an early stage of the design phase, because extensive green roofs – that value most for biodiversity and pollinators – require sufficient load-bearing capacity and the integration of elevators and stairways in the building design to access the roof¹³.

A best practice guide for creating green roofs for invertebrates¹⁴ – including design considerations, substrate choice and management – was produced by Buglife. Biodiverse green roofs are based on extensive green roof systems with shallow, low-nutrient substrates that require little or no maintenance and irrigation. At best, biodiverse green roofs replicate open mosaic habitats¹⁵.

Extensive green roofs can also be transformed **into urban vegetable gardens**. These rooftop gardens have been identified as particularly good spots for pollinators because they provide a combination of fruit and vegetable flowers, as well as corners full of weeds and native plants.



Other sustainable drainage components that can be designed and managed to help pollinators are the integration of **green (living) walls and rain gardens**. Living walls and rain gardens not only provide a more beautiful view but can also serve as important pollinator habitats.

¹³ <https://architazer.com/blog/product-guides/product-guide/green-roofs/>

¹⁴ https://cdn.buglife.org.uk/2019/07/Creating-Green-Roofs-for-Invertebrates_Best-practice-guidance.pdf

¹⁵ www.thenatureofcities.com/2018/01/09/landscaping-erases-local-ecological-diversity/

Pollinator-friendly management of spaces

In addition to efforts into the planning of pollinator habitat, from early on it also should be considered and planned for how to manage the site after construction. The full potential of pollinator-friendly management is achieved by good pre-arranged maintenance contracts (for example, in terms of mowing protocols and planting etc.). Pollinator habitats normally need less management in the long term than classic urban habitats, with some actions leading to financial savings.

Businesses should draw up a long-term action and management plan that identifies and protects the areas that are already providing food (e.g. patches of wildflowers, weeds or flowering hedgerows) and shelter (e.g. bare soil, long grass and dry-stone walls) for wild pollinators. In order to ensure pollinator-friendly management, businesses should aim to protect the elements of high-quality pollinator habitats as described in Box 2, for example by banning the use of pesticides and reducing the mowing frequency to create species-rich grasslands. More site level actions are described in Chapter 3.4.

Evaluate the undertaken actions

To assess that the undertaken actions lead to results, it is recommended for businesses to systematically monitor wild pollinator populations in the area of actions. Monitoring can be a management tool that enables project managers to track activities for the implementation of a value chain development strategy and see whether development targets are achieved. The company could, for example, monitor the occurrence and diversity of local pollinator populations at the project site or its own company's premises though local partnerships and/or by engaging in local citizen science programmes¹⁶.

While not every project can afford to consult with an ecologist or botanist, there may be opportunities to collaborate with local NGOs, universities, or botanical gardens to gather baseline data during a projects' site analysis phase. Many of these same organizations may also be able to assist during design, construction, and post-occupancy evaluations as well, presenting opportunities for consultation and research.

3.3 Value chain actions

The building sector can play a big role in guiding its suppliers of materials into circular building practices and increasing the awareness of the stakeholders (e.g. clients, financiers, regulators) that are relevant for the value chain. As such, the sector can set the scene on how project sites are developed and which building practices are rewarded.

Identify business risks and opportunities across the entire value chain

A first step for the company is to get good insight into the stakeholders that are part of the supply chain of its building materials.

It must be acknowledged that it may take some effort for the company to know exactly where its materials are coming from and how natural resources are used at every step of the production process (from mining to manufacturing, including transportation)

Furthermore, harvesting this information from its suppliers could potentially increase purchasing costs. However, in the end, knowing this will reduce several of the risks that were highlighted in Table 1. Taking actions to improve pollinators can be employed as a marketing strategy in which building with biodiversity-friendly materials is being a way of differentiating the business from its competitors.

¹⁶ See also 'Citizens for pollinator conservation: a practical guidance', guidance prepared by the Institute for European Environmental Policy (2020) for the European Commission.

Encourage the entire value chain to act

In order to make a value chain environmental friendly, it is necessary to consider all activities in the value chain such as design, supply, production, assembly, packaging, logistics, distribution, marketing, after-sales and appropriate product disposal.

Improving the value chain performance with environmental friendly solutions includes the reduction of energy consumption, environmental accidents, air emission, waste etc.

Companies should ensure that its products and operations cause the least damage to the environment during the whole product life cycle via green purchasing, green design, internal environmental management, green production, environmentally friendly packaging and transportation. For example, the removal or addition of soil and the prevention of introducing invasive alien species to new ecosystems, has multiple effects on biodiversity and pollinators.

To reinforce efforts like these, companies should monitor suppliers' sustainability performance and hold them accountable for it. Once companies know where their supply-chain issues are, they can set goals for lessening the resulting impact. Ultimately, consumer-based companies can only achieve ambitious sustainability goals if they set high standards for their suppliers' performance and stop doing business with suppliers that fall short.

Subsequently, companies in the building sector can audit its suppliers to determine if they are taking appropriate measures for maintaining or restoring wild pollinator populations and assist them with managing their impacts. They can reward its suppliers for good practices (e.g. achieving Biodiversity Net Gain at a mining site¹⁷), for example by offering suppliers long-term contracts tied to commitments related to delivering rich biodiversity on their land and providing diverse habitats for pollinators. Long-term contracts thereby enable the suppliers to invest in long-term measures which is crucial to reverse the negative trends of pollinator populations.

Identify opportunities for research and collaboration

Investing in pollinator protection initiatives that create pollinator habitat will inspire and motivate people and other businesses to act. It is vital to pollinator protection that building companies, architects and urban planners continue to build relationships, consult, and engage with stakeholders.

In addition to collaborating with local NGOs or nature experts, there is also the opportunity to take part in green building networks and initiatives, such as the World Green Building Council¹⁸ (WorldGBC), and support and encourage their actions. The sector could also support university and college-led research and monitoring projects or citizen science initiatives that support the goals of this strategy.

3.4 Site/local level actions

While the previous chapter focused on sector-specific actions, this last chapter gives an overview of measures that can be applied to all business sectors, since they target individual business locations (for example, the premises of a business' headquarters or an industrial facility), as well as the company's properties that have not yet been developed for business purposes.

¹⁷ See also Arcadis Belgium. 2020. Business and nature working together: Action by the mining sector to protect wild pollinators. Technical guidance prepared by Arcadis for the European Commission under contract No 07.0202/2018/795538/SER/ENV.D.2 "Technical support related to the implementation of the EU Pollinators Initiative".

¹⁸ The WorldGBC is a network of national green building councils in more than one hundred countries, making it the world's largest international organisation influencing the green building marketplace. (<http://www.worldgbc.org/>)

Action within companies' grounds

Businesses can draw up a long-term action plan, alongside a management plan, that identifies and protects the areas on the company's premises that are already providing food (for example, patches of wildflowers, weeds or flowering hedgerows) and shelter (like bare soil, long grass and dry-stone walls) for wild pollinators. In order to ensure pollinator-friendly management, the following actions are key:

- ▶ Reduce mowing frequency to create species-rich grasslands. Natural habitats can be further supplemented by artificial ones (for instance, bee hotels).
- ▶ When planting for pollinators, use native species (like seed mixes, clovers, bulbs, trees and shrubs). Ensure that wild pollinators have foraging resources during the whole vegetation season.
- ▶ Ensure connectivity with surrounding areas of green infrastructure and nature importance by creating grasslands and other types of vegetation that support rich biodiversity.
- ▶ Avoid and control the spread of invasive alien species¹⁹, both plants and animals.
- ▶ Consider the construction of green roofs and walls²⁰, as they can provide considerable feeding ground for wild pollinators.
- ▶ Reduce light pollution, as artificial light can negatively affect insect populations.
- ▶ Adopt a pollinator-friendly management protocol and do not use pesticides (insecticides, fungicides and herbicides), as these can be harmful to wild pollinators.
- ▶ Ensure contractors that manage the company's land are aware of the company's intentions to enhance wild pollinators and how this should be realised.



It is recommended that businesses partner with local NGOs/authorities or experts to include biodiversity and ecosystem services at the design stage of the company's site. They can also help with development of key performance indicators (KPIs) and, as it was already mentioned, with monitoring, reporting and evaluation of outcomes. The company could, for example, monitor the presence and diversity of local pollinator species at the company's site and the wider environment either through local partnerships or by engaging in local citizen science programmes²¹.

These actions within the companies' grounds can benefit wild pollinators and overall biodiversity most when they are applied early in the design stage of the company's site when the landscaping and infrastructure features are still open for creativity. **When securing habitats for wild pollinators, the main guiding principle is to let nature regenerate on its own.** This can be complemented by additional planting of native flowers seed mixes, if/when needed.

¹⁹ See also 'Managing invasive alien species to protect wild pollinators', technical guidance prepared by IUCN (2019) for the European Commission.

²⁰ See also 'A guide for pollinator-friendly cities: How can spatial planners and land-use managers create favourable urban environments for pollinators?' by Wil et al. (2019), guidance prepared by ICLEI Europe for the European Commission.

²¹ See also 'Citizens for pollinator conservation: a practical guidance', guidance prepared by the Institute for European Environmental Policy (2020) for the European Commission.

Generic actions which do not require any land holding

It is recommended for businesses to embed pollinator-friendly actions into the company's strategy and daily operations:

- ▶ Integrate pollinator-sensitive practices into the company's environmental management system and/or other certification schemes or standards.
- ▶ Introduce internal biodiversity policy commitments that include measures to improve pollination. For example, by implementing a biodiversity- or pollinator-friendly purchasing policy, the business can direct its suppliers to reduce the negative impacts on pollinators.
- ▶ Link the business' strategy to national and international biodiversity policy (including the EU Pollinators Initiative) and to the SDGs²² (namely SDG 15 "Life on Land", SDG 2 "Zero hunger" and SDG 12 "Responsible consumption and production").



In addition, the company can invest in projects to restore, create and connect pollinator habitats to reduce the environmental footprint of their buildings and operations and obtain general environmental benefits (reduced solid waste and wastewater, less pollution, energy efficiency etc.) and implement green procurement. Overall, these improvements will benefit nature and wild pollinators alike.

Also, the company can take efforts to **raise awareness** of:

- ▶ **the local community:** sponsor creation/restoration of pollinator habitats or arrange an expert to give a training/lecture on the conservation of wild pollinators;
- ▶ **the business' workplace:**
 - ▶ organise pollinator awareness training sessions or workshops for employees (for example, on how to ensure their own gardens are pollinator-friendly, or how to observe and record wild pollinators in order to help monitoring efforts);
 - ▶ include environmental considerations at each stage of the procurement process of goods, services and works (i.e. green procurement);
- ▶ **the business sector:** share your experiences regarding the implementation of pollinator-friendly measures with the EU Business @ Biodiversity Platform²³ at relevant conferences or seminars, and/or through social media using the #EUPollinators.



**Business @
Biodiversity**

²² <https://sdgs.un.org/goals>

²³ <https://ec.europa.eu/environment/biodiversity/business/>



4. WHAT ARE FRONT-RUNNERS ALREADY DOING?

This section presents a limited, non-exhaustive set of examples of businesses taking action for pollinators, to illustrate the diversity of potential actions that could be uptaken by the horticulture sector. The list has been generated by consulting the members of the EU Business and Biodiversity Platform²⁴, and through literature review.

Covivio

Company: Covivio, formerly Foncière des Régions, is a European investment and development company with business activities encompassing office real estate (46%), hotels (26%) and residential accommodation (26%).

Action:

In 2010, Covivio launched a Biodiversity Policy in France that formally incorporates, in its charters for the design and management of green spaces, the following issues at each stage of a building's life cycle:

- ▶ eco-design of developments and renovations thereby considering biodiversity through eco-friendly corridors, including stakeholders' expectations and the selection of environmental-friendly materials;
- ▶ creation of green terraces in urban environments that contribute to mitigating the urban heat island effect;
- ▶ environmentally-responsible management of green spaces;
- ▶ planting of native plant species to limit the need for watering and preserve local species;
- ▶ promoting circular economy (choice of materials, reuse and recycling at the end of an item's useful life, best practices for extracting and manufacturing raw materials);
- ▶ enhancing the functions of green spaces for building users;
- ▶ adapting the upkeep of green spaces to meet eco-responsible criteria (modifying lawn maintenance schedules, limiting the use of plant protection products);
- ▶ participating in research and innovation.

To implement this policy in the most suitable way, Covivio has commissioned a Europe-wide study into its potential impacts on biodiversity:

- ▶ In 2015, Covivio took part in developing the Sustainable Building Plan, which led to the publication of the "Building and Biodiversity" report²⁵.
- ▶ At the end of 2017, Covivio carried out a mapping exercise for its building construction and operation activities in order to measure its indirect impacts on biodiversity such as: use of space, destruction and fragmentation of natural habitats, "artificialisation" of environments, soil sealing, and impacts on rainwater infiltration; but also the indirect effect of the extraction of raw materials and the manufacture and use of construction materials on biodiversity.

In 2015, the group became involved in the development of real estate projects that are precursors in taking biodiversity into account, such as the Carré Suffren building. The Carré Suffren building is the first site in France to have its green space renovated with the BiodiverCity© label. This label aims to promote more ecological constructions that consider living systems and improve the living environment without increasing operating costs.

Resulting from the classic pattern of lawns and yew hedges, the "Carré Suffren" project favoured indigenous plants requiring little water and favouring the life of a more varied fauna (bird and insect nesting boxes, etc.): natural meadows (favourable to wild pollinators), shrubs (elderberry, etc.), fruit trees accessible to the occupants (redcurrant, blackcurrant, hazelnut, etc.), creation of a green wall.

Carré Suffren is also a pilot site for testing the HQE Performance Biodiversity 2015 indicator: Biodi(V)strict.

Impact of action:

By tending towards maintenance without phytosanitary products, by using less water, by doing away with the lawnmower in favour of the occasional use of sheep, by considerably reducing waste production and by ensuring that a minimum of 30% of gardeners' journeys are made by metro, which reduces CO2 emissions, the «Living

²⁴ https://ec.europa.eu/environment/biodiversity/business/index_en.htm

²⁵ <http://www.planbatimentdurable.fr/publication-durapport-batiment-et-biodiversite-a943.html>

Gardens» project is proving to be environmentally beneficial in several respects. Undertaking these actions enlarge the provision of nesting and foraging habitat and contributes to the conservation of wild pollinator populations. The extra care it requires is financially compensated by the elimination of the dozen or so annual lawn mowing.

In 2018, Covivio was awarded the Grand Prix award for «Best Extra-Financial Reporting on Environmental Matters» at the «Entreprises et Environnement 2018» award ceremony which took place during the Pollutec exhibition in Lyon. In this way, Covivio confirms its position as benchmark real estate operator in terms of CSR policy.

More info:

<https://www.covivio.eu/app/uploads/2019/05/Biodiversity.pdf>

<https://www.covivio.eu/app/uploads/2018/05/2015-Document-de-r%C3%A9f%C3%A9rence.pdf>

Canopy

Company: Canopy is a Belgian company that is active in the construction of green roofs and green walls.

Action:

Canopy provided the carport of a private villa in Sint-Martens-Latem with a natural roof with bees & butterflies vegetation blankets. These vegetation blankets were specifically developed by Sempergreen and the Dutch Butterfly Foundation to contribute in the fight against global bee and butterfly decline, using only native plant species on the rooftop.

In 2015 Sempergreen, in collaboration with the Butterfly Foundation, conducted research into biodiversity on green roofs. Results from this research show that the tested vegetation blankets (Sedum-mix mat, Sedum herb mat, Bees & Butterflies mat) and various roof garden substrates can make a functional contribution to biodiversity. In intensively used urban and agricultural areas, a green roof with herbal and flowery vegetation for butterflies, bees and hoverflies at least provides food and/or possibly good reproductive possibilities that are not available in the vicinity.

The Bees & Butterflies vegetation mat is planted with 4 varieties of Sedum, 5 to 7 types of grasses and a mix of over 40 perennials and herbs, which makes the green roof a true paradise for native butterflies, bumblebees and (solitary) bees. A large variety of value and nectar plants has been selected with various flowering periods from early spring to late autumn. The nectar plants provide indispensable food for bees and butterflies. The host plants form an essential link as caterpillar food for the development from egg to butterfly. In addition, the Bees & Butterflies mat is produced entirely free of pesticides and therefore makes a positive contribution to the survival of bees and butterflies.

Benefits for its customers, according to Canopy:

- ▶ Natural green roofs provide its customers the reputational benefit that they are taking care of the environment and that they care to think ahead;
- ▶ Architects who integrate green roofs in their design, get the reputation of being committed to sustainability (not only in terms of nature and the environment, but also in general), and often notice that it differentiates their businesses in an increasingly competitive market, to people with a certain financial capacity;
- ▶ These kind of projects improve the physical and mental wellbeing of employees and owners;
- ▶ Architect customers who ordered green roofs experience a return-on-investment, where they are satisfied and come back to Canopy because they have been able to market their project relatively expensive thanks to the inclusion of a green roof.

More info:

<https://www.canopy-greenroofs.be/blogPost/natuurdak-lhms-sint-martens-latem>

<https://www.sempergreen.com/nl/oplossingen/groene-daken/products/bees-en-butterfliesmat>



Viparis

Company: The originally Dutch company Cosun Beet Company (formerly Suiker Unie) is one of the top five European beet sugar producers.

Action:

- ▶ In Paris, Viparis is transforming 14,000 square metres of flat roof above a cultural complex into the world's largest urban farm and Europe's biggest green roof. The urban rooftop farm Agripolis opened in spring 2020.
- ▶ The greens will be grown entirely organically in an aeroponic manner, meaning they will be arranged vertically above ground in crop columns and fed by a rain of water and biological nutrients.

Benefits for the company:

- ▶ Viparis teamed up with two companies specialising in urban agriculture, Agripolis and Cultures en Ville, to bring the rooftop farm to life. Agripolis will operate the farm, while Cultures en Ville will handle services and events. They hope that the farm will bring communities together and provide low-carbon food to homes and restaurants in southern Paris.
- ▶ The new farm will directly feed the local community through subscription food boxes and will feed the kitchens of the rooftop restaurant. The site will grow more than 30 different species, be tended by 20 gardeners and it is hoped it will produce 1,000 kg of fruit and vegetables every day in high season.
- ▶ The urban farm is a part of the decade-long renovation project to make the exhibition center a model for sustainable development.
- ▶ The Agripolis will provide ideas for having pollinator and biodiversity positive measures in population-growing cities.

More info:

<https://www.forbes.com/sites/alexledsom/2019/08/29/worlds-largest-urban-farm-to-open-a-paris-rooftop/>



5. FURTHER READING

EU Pollinators Initiative:

- <https://ec.europa.eu/environment/nature/conservation/species/pollinators>
- EU Pollinator Information Hive: [https:// wikis.ec.europa.eu/display/EUPKH/EU+Pollinator+Information+Hive](https://wikis.ec.europa.eu/display/EUPKH/EU+Pollinator+Information+Hive)
- https://ec.europa.eu/environment/biodiversity/business/news-and-events/news/news-84_en.htm

IPBES reports:

- <https://ipbes.net/global-assessment-report-biodiversity-ecosystem-services>
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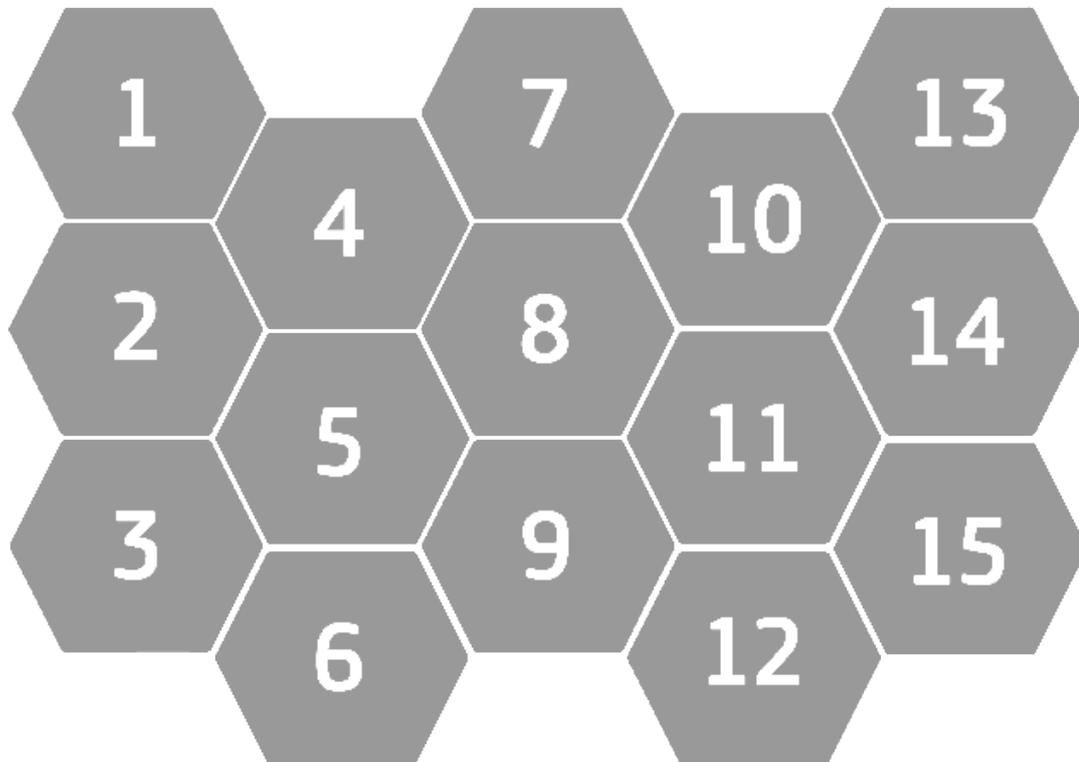
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Annex I



Credits

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