REPORT BIODIVERSITY OASIS

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INTRODUCTION

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BIODIVERSITY AND ECOSYSTEM SERVICES

"*Biological diversity, most commonly used in its contracted form, biodiversity, is the term used to describe the variety of life on earth, including animals, plants and microbial species*"(World Health Organization, 2015, p. 28).

Biodiversity shapes the integrity, balance, and health of **ecosystems** – marine and freshwater, air, soil, microorganisms, and biomedical discoveries – intricately influencing the properties and processes of their constituent elements (World Health Organization, 2015).

Ecosystems provide a multitude of **direct and indirect benefits to human communities** (Boyd et al., 2007). These benefits are commonly translated into products and services consumed and enjoyed by humans, known as **ecosystem services**.

Ecosystem services result from intricate interactions between humans, natural ecosystems, and species and rely on a variety of organisms, including primary producers, herbivores, carnivores, decomposers, pollinators, pathogens, and natural enemies of pests. Specifically, these services stem from intricate physical and chemical interactions between biotic components (living organisms within an ecosystem – plants, animals, and bacteria) and abiotic components (non-living elements – water, soil, and atmosphere), coordinating the regulation of biogeochemical cycles, energy flows, and dynamics within an ecosystem (Boyd et al., 2007; Fisher et al., 2009).

Resilient biodiversity and ecosystem services are a significant part of sustainable development and the promotion of the economic and physical well-being of societies (IUCN, 2022).

According to their functions, the WHO (2015) classified ecosystem services into:

- **Support services**: enablers of other ecosystem services, including soil formation, nutrient cycling, photosynthesis and oxygen production, water recycling, and biomass production.
- **Provisioning services:** products from ecosystems, such as freshwater, food production (on land and in water), timber and fibers, fuel and energy sources, and natural medicines.
- **Regulating services:** aimed at balancing and regulating ecosystem processes in terms of climate, floods, pathogens and diseases, water, soil, and air quality, **pollination**, carbon storage, natural hazards, and support for human immune function.
- **Cultural services:** all non-physical benefits received from ecosystems, such as aesthetic value and inspiration from nature, the spiritual significance of nature, recreational and educational opportunities, the promotion of mental health, and social interaction.

Among **regulating services, pollination** is essential for flora conservation, biodiversity maintenance, and food production. Additionally, pollinators and the pollen they collect can provide **valuable information about environmental health, local flora, and chemical contamination in local areas**.

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The ecosystem service of pollination highlights the importance of **maintaining a balanced ecosystem**, as any imbalances can trigger cascading events related to **climate** and **biodiversity**, impacting human health, food production and the overall survival of species.

Commonly associated with bees, pollination is an ecosystem service performed by a broader category of species that includes **vertebrate and invertebrate pollinators** (Allen-Wardell et al., 1998). Vertebrate pollinators include bats, non-flying mammals, hummingbirds, and other pollinating birds. Invertebrate pollinators include bees, such as honeybees (*Apis mellifera*) and non-*Apis* bees, and others such as moths, flies, wasps, beetles, butterflies, and other invertebrates (Thakur, 2012). **Invertebrate pollinators**, such as bees, are a perfect **bioindicator** of biodiversity because they represent the health status of the environment where they are (Albrecht et al., 2012; Allen-Wardell et al., 2023; Cox, 2023; Kearns et al., 1998; Mitra & Banerjee, 2007; Nicholls & Altieri, 2013; Potts et al., 2010).

Wild pollinators play a fundamental role in **plant pollination** and in **biodiversity conservation** and therefore in the **protection of ecosystems**. The diversity of wild pollinators contributes to the **resilience** of ecosystems, increasing the stability of plant populations and resistance to diseases. Furthermore, they promote the conservation of wild plants, including fragile habitats such as grasslands, wetlands and woodlands. Recent studies by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services show that approximately 308,000 **wild plant** species (about **87.5%** of the total) are at least partly dependent on insect pollinators (including 40,000 bee-dependent) and it has been shown that approximately **70%** of the 115 major **crops** grown in the world benefit from animal pollination (Klein et al., 2006). The increase in global annual economic value due to the **pollination** of agricultural production amounts to approximately **260 billion euros** (Lautenbach et al., 2012).

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BIODIVERSITY LOSS

The **quality and quantity of services provided by an ecosystem depend on its quality, quantity and safety**, **on the level of biodiversity conservation and the presence of environmental stressors** (McKinsey & Company, 2020; World Health Organization Regional Office for Europe, 2021).

Biodiversity loss is calculated based on the **extinction rate**, i.e. the annual number of extinct species per million.

In recent years, biodiversity loss has become a prominent **challenge**, **significantly compromising the planet's resilience**. We are currently experiencing the **sixth mass extinction**, with an extinction rate approximately 1,000 times higher than the natural level before human influence (McKinsey & Company, 2020). Among the 28% of all species assessed, ecosystems account for 83% of wild mammals and half of extinct plants, with over 44,000 species of flora and fauna threatened with extinction (IUCN, n.d.). Biodiversity loss is one of the most pressing environmental challenges of our time and is hampering the achievement of the Sustainable Development Goals (Secretariat of the Convention on Biological Diversity, 2020). Furthermore, biodiversity loss is also making it increasingly difficult for pollinators to find the resources they need to survive.

The current increase in extinction rates is mainly attributed to **human activities**, such as changes in land and sea use, habitat degradation and overexploitation of resources, pollution, invasive alien species, climate change and global population growth (World Health Organization, 2015; World Health Organization Regional Office for Europe, 2021). In particular, new agricultural practices and the spread of monocultures have drastically reduced the presence of wild pollinating insects, thus increasing dependence on the honeybee as the main pollinator. In some cases, this has led to honey production being overshadowed in favor of pollination.

Biodiversity loss is classified as **one of nine "planetary boundaries"** that represent a safe operating space for humanity identified by Rockström and other scientists in 2009. If crossed, these boundaries can lead to extreme and catastrophic climate events (Rockström et al., 2009; Richardson et al., 2023). The nine planetary boundaries are closely interconnected. Historically, the intricate connection between deforestation, rainfall patterns, soil erosion, drying of springs and the emergence of streams caused by human action has been observed (Gómez-Baggethun et al., 2010). The planetary boundary of biodiversity loss was considered to have been crossed already in 2009, mainly due to human production and consumption patterns.

In this context, it becomes crucial to take immediate action to protect the world's ecosystems and the biodiversity they support.

3Bee's scientific approach and **Element-E protocol** allow us to **monitor terrestrial biodiversity** and **implement specific actions for its regeneration and conservation**.

INTRODUCTION

GOALS AND REGULATORY FRAMEWORK

The main objective of the following document is to **assess the impacts of business operations on biodiversity**, following the guidelines established by the Corporate Sustainability Reporting Directive (CSRD).

The **Corporate Sustainability Reporting Directive (CSRD)** is a European Union directive that entered into force on 5 January 2023, which expands the reporting and disclosure requirements of the previous Non-Financial Reporting Directive (NFRD) on **sustainability issues**, in line with global trends that incorporate ESG considerations into business practices and in reference to the **ESRS** (Environmental and Social Responsibility Standards) developed by **EFRAG** (European Financial Reporting Advisory Group) and **GRI** (Global Reporting Initiative) (European Commission, 2023).

The CSRD introduces several key requirements:

- The **extension of the obligation to provide non-financial reporting** to all large companies and those with securities listed on regulated markets in the European Union.
- The **expansion of ESG information** that must be included in non-financial reporting.
- The **uniformity of reporting standards** for all European companies, in order to define common guidelines to ensure consistency and comparability of the information disclosed (EFRAG).

The deadlines for compliance with the CSRD are divided into the following phases:

2024 *Reporting required for companies that exceed at least 2 of the following 3 requirements: +250 employees, +50M€ turnover, +25M€ profit.*

2025 *Mandatory compliance for organizations already subject to the NFRD.*

2026 *Obligation extended to all other large listed companies.*

2027 *Listed SMEs will have to comply with the requirements.*

2029 *Obligation applicable to third country companies with a net turnover exceeding 150 million euros in the EU.*

YOUR ACTIVE CSR PROJECT

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ACTIVE CSR PROJECT DESCRIPTION

Starting from **2023**, L**A CISA TRASPORTI INDUSTRIALI** has been involved in biodiversity regeneration projects with 3Bee, planting 50 nectar-rich plants in Italy.

The plants, cared for by expert growers, support local pollinators.

GEOGRAPHICAL, ENVIRONMENTAL AND SOCIAL IMPACT

Geographical Impact

Environmental Impact

- **50** Nectar-producing plants adopted
- **38.4** Kg of nectar produced
- **3.84** K of pollinators nourished

Social Impact

- **1** Supported grower

YOUR ACTIVE CSR PROJECT

THE CSR PROJECT FOR BIODIVERSITY REGENERATION - ARBORETUM

Thanks to the "Adopt a Nectar Arboretum" project – part of the Biodiversity Oasis initiative – it is possible to support the growth of high nectar-yielding plants

The European Commission has recognized forests as a valuable ally in the fight against climate change and biodiversity loss, as well as in the development of rural areas and the bioeconomy. This recognition has led to the creation of the **3 Billion Trees Initiative**, in which the EU commits to defending and restoring all forests in the territory of the EU, planting 3 billion trees by 2030.

The 3Bee CSR project, "*Adopt an Arboretum*", by registering the planted trees, is part of this initiative, ensuring the transparency of the project.

Moreover, the sites being regenerated are carefully selected as they are located within an ecosystem classified by the **IUCN** as **intensive land-use systems**. These systems, such as agricultural areas, grazing lands, plantations, and urbanized areas, are heavily influenced by human activity, making their restoration crucial to reestablish ecological balance.

The regeneration interventions within the Oasis aim to create a welcoming environment for pollinators, improve the availability of food resources, provide suitable habitats for nesting, and offer significant **ecosystem services**. This dynamic promotes plant diversity through pollination, which is essential for the reproduction and dissemination of plants. Furthermore, by supporting a healthy ecosystem for pollinators, these plants also foster animal diversity. Another important aspect is the contribution to CO2 absorption, crucial for mitigating climate change.

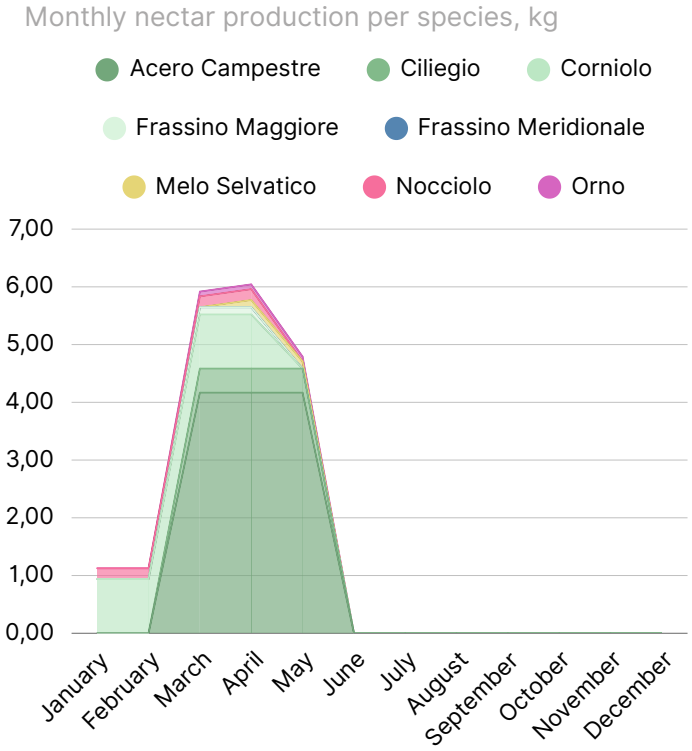
The **selection of species** is based on their suitability to the local climate and their ability to provide essential nutritional resources and habitats for other local pollinators, while also considering aesthetic and landscape aspects. The plants are chosen according to precise criteria: they must be native to the area to promote local adaptation and ecological resilience; they must offer staggered flowering to ensure a constant food source for pollinators; and they must represent at least three different species to support and promote plant biodiversity.

YOUR ACTIVE CSR PROJECT

NATURAL REGENERATION

- Location: **Lombardia**
- Arboretum Name: **Gaminara's Wood**
- Number of nectariferous plants: **50**
- Species and number: **5 Acero Campestre, 5 Ciliegio, 5 Corniolo, 5 Frassino Maggiore, 5 Frassino Meridionale, 5 Melo Selvatico, 15 Nocciolo, 5 Orno**

Nectar Production

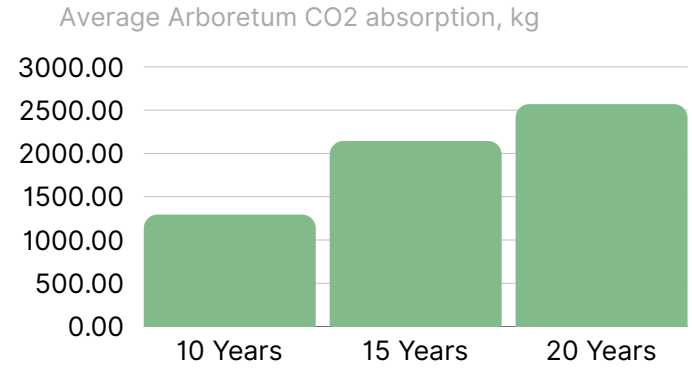


The nectar potential of an arboretum is calculated by summing the **contribution of each individual plant**. Data from scientific literature are used to indicate the nectar yield of each species and their flowering schedules.

These insights allow us to determine **how many pollinators an arboretum can support**. The actual nectar consumption can vary based on several factors, including pollinator species, age, behavior, and environmental conditions.

Assuming a consumption rate of 317 kg of nectar per year (at 50% sugar content) for a hive of 50,000 bees, we can estimate that each bee consumes around 6 grams of nectar per year. Therefore, **each kilogram of nectar supports approximately 200 bees per year**.

CO2 Absorption



The amount of CO2 absorbed by each plant is calculated using scientific data on **CO2 absorption by each species**. This calculation excludes the component stored underground.

The graph shows a projection of the **average CO2 absorption** over three different time scales (10, 15, and 20 years), corresponding to different maturity phases of the arboretum.

Your project is part of the Gaminara's Wood oasis, which, thanks to 3Bee, has recorded the improvement shown below, as the oasis area is dedicated to projects involving multiple companies.

YOUR ACTIVE CSR PROJECT

REMOTE ASSESSMENT OF BIODIVERSITY

Site maps with Pollinator Abundance (PA) and Mean Species Abundance Land Use (MSALU).

Relative Pollinator Abundance (PA)

This index measures the relative abundance of wild pollinators in a given area, providing an indication of the environment's capacity to host and support them in terms of both food resources and nesting opportunities. If the index value exceeds 32 points, the area is in excellent condition; below 8, intervention is urgently needed.

Baseline

Regeneration

*Improvement of **12.5 %***

Very High	32+
High	24 - 31.99
Medium High	16 - 23.99
Medium Low	8 - 15.99
Low	0-7.99

Mean Species Abundance (MSALU)

It is an index that quantifies the abundance of living species in a given area, relative to the number of species that would exist in a natural and pristine habitat. A value of 100 represents a perfectly natural area, while a value of 0 indicates an area with no remaining biodiversity.

Baseline

Very High	80+
High	65 - 79.99
Medium High	50 - 64.99
Medium Low	30 - 49.99
Low	0-29.99

Regeneration

*Improvement of **98.5 %***

YOUR ACTIVE CSR PROJECT

SUMMARY OF RESULTS

The **Gaminara's Wood Oasis (Lombardy)** is a protected area constantly monitored through technology with the aim of restoring and preserving local biodiversity. The improvement of the area under analysis is measured through several key indicators, demonstrating the success of the initiatives undertaken.

Below are the main KPIs highlighting the progress made in the Lombardy Oasis:

- **50 native plants** with high nectar potential
- **8 different tree** and shrub species
- **2569.43 kg of CO2** absorbed on average over 20 years
- **12.5% increase in the PA** (Pollinator Abundance) parameter, rising from 20.8 to 23.4 (out of a total of 40). This value is average and lower than the one recorded in the control area.
- **98.5% increase in the MSALU** (Mean Species Abundance for Land Use) parameter, rising from 33.6 to 67.3 (out of a total of 100). The value is high but lower than the control area.

YOUR ACTIVE CSR PROJECT

SUSTAINABLE DEVELOPMENT GOALS

2. Zero Hunger: The project supports biodiversity, which is essential for the resilience of agricultural ecosystems and for ensuring food security. By fostering natural pollination, it promotes more sustainable food production.

6. Clean Water and Sanitation: By enhancing water retention and the natural purification of soil, the project supports the sustainable management of local water resources and improves water quality.

8. Decent Work and Economic Growth: The initiative promotes the development of economic activities linked to environmental protection and biodiversity conservation, creating sustainable job opportunities and fostering environmentally respectful growth models.

11. Sustainable Cities and Communities: By supporting biodiversity even in urban settings, the project helps make cities greener and more livable, integrating technological solutions to monitor and protect urban ecosystems.

13. Climate Action: The project helps mitigate the effects of climate change through environmental monitoring, direct CO2 absorption, and biodiversity conservation, promoting healthy ecosystems that are essential for environmental stability.

15. Life on Land: The project promotes ecosystem regeneration through the introduction of native species, contributing to biodiversity and supporting the presence of pollinators and local wildlife. Additionally, it fosters the protection of natural habitats to prevent species loss.

17. Partnerships for the Goals: The initiative fosters strategic collaborations between businesses, scientific institutions, and local communities, bringing together expertise and resources to promote biodiversity and environmental sustainability.

YOUR ACTIVE CSR PROJECT

MEDIA UPDATES FROM THE OASIS

CONTACTS

www.element-e-biodiversity.com

element-e@3bee.com

3BEE S.R.L. VIA PASTRENGO 14
20159 MILANO (MI)