

**BEES FOR ESG IMPACT:**

**How organizations  
can support the UN's  
Sustainable Development  
Goals with data-yielding,  
scientifically-managed  
honeybee hives**

The Best Bees Company  
[bestbees.com](https://bestbees.com)



# Sustainability Goals

Today, organizations of all sizes are challenged—no, expected—to contribute to sustainability. Investors, customers, and other stakeholders are holding companies accountable for affecting positive change locally and globally. “Climatization” is playing out in every corner of society.

“The course of climatization—the process by which climate change will transform society—will play out in the coming years in every corner of society.” - Justin Worland, Time Magazine .

The 17 Sustainable Development Goals (SDGs) established by the United Nations in 2015 are helpful reference points for organizations setting and measuring Environmental, Social, and Governance (ESG) targets. Leaders seeking to create a comprehensive plan for their company’s sustainability and societal impact often refer to the SDGs for guidance.

And yet, within this framework, “green teams” maintain a lot of latitude in how to interpret and apply the goals in a way that matches the organization’s culture and resources. The need for effective and efficient ways to achieve SDGs has opened up a creative explosion of ecological services, and we are here for it.



## The Plight of Pollinators

Environmentally-conscious citizens are mostly aware of the plight of pollinators and want to do something about it. Bees specifically are responsible for the fertilization of many flowering plants, including 75% of food crops. As biologists know from the last 15 years of scrutiny, bees are dying at an unprecedented rate due to disease, pesticides, loss of habitat, and climate change.

As a result, more and more organizations are embracing the idea of bringing honeybee hives to their properties as part of a broader sustainability program. (Bees prove to generate a lot of buzz among stakeholders.) But it’s important to tie such an effort to strategic objectives to ensure it adds empirical value.

# The Risk of Greenwashing

While a standalone beehive will pollinate its immediate surroundings and is compelling in its own right, its overall impact is relatively confined. To be effective, a sustainability team must avoid “greenwashing” or exaggerating the environmental benefit of a given effort, which can lead to an eco-friendly reputation being undermined.

Fortunately, there is one surprisingly efficient way to make an outsized impact on bee health and the environment at large.



## A Network of Data-Yielding Beehives

Professional beekeepers using scientific methods to control for variables ensure that data on hive health can be collected at scale and normalized for analysis. Big data from a nationwide network of beehives managed in this standardized way creates the opportunity to study many open questions. Data harvested from beehives can inform us about our environment, the security of our food system, disaster recovery strategies, biodiversity, pollinator resiliency, and more.

Beekeeping done right will enrich the local ecology for miles around the hive, and a network of scientifically managed beehives lets us see the whole world through a new lens.

Incidentally, such a networked beekeeping approach directly supports 10 of the 17 SDGs put forth by the UN.





# How a Data-Yielding Beehive Network Supports the SDGs

Bees make non-linear impacts on a complex, interconnected system. To borrow a term from sister pollinators, it's the butterfly effect on full display.

Honeybees managed with research in mind are surprisingly efficient cross-target investments with synergistic outcomes across multiple SDGs:

	#2. Zero hunger
	#3. Good health and well-being
	#6. Clean water and sanitation
	#9. Industry innovation and infrastructure
	#11. Sustainable cities and communities
	#12. Responsible consumption and production
	#13. Climate actions
	#14. Life below water
	#15. Life on land
	#17. Partnership for the goals

Let's take a bees-eye view through the SDGs. We'll start with the most obvious and work toward the more subtle effects of a data-yielding beehive network. →



**First, pollination.** Bees spread pollen as they forage, naturally fertilizing flowering plants and trees.

Goal #15 Life on Land, specifically targets 15.1, 15.5, and 15.9. Through pollination, honeybees directly support the conservation of terrestrial ecosystems, reforestation efforts, and increased biodiversity.<sup>2 3 4</sup>

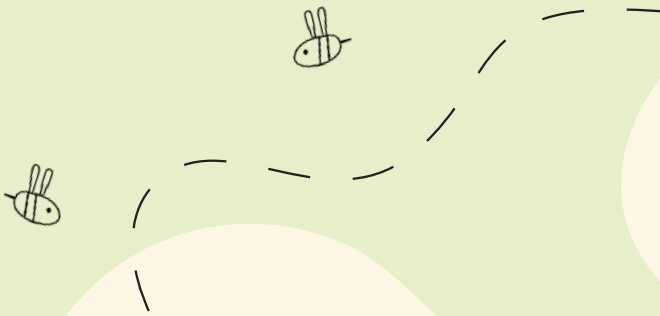
**As more flowering plants flourish, species that feed on plants thrive as well.** For example, fish...

Goal #14 Life Below Water, specifically targets 14.4. Bees improve the production of plant-based sources of compounds commonly found in fish which sustainably restore fish stocks and reverse the effects of overfishing.<sup>5</sup>



**... and people. Crops pollinated by bees produce more food with higher nutritional value.**

Goal #2 Zero Hunger, targets 2.2 and 2.3. Bee pollination increases crop yield and enhances the nutritional value of fruits, vegetables, and seeds.<sup>6 7 8 9</sup>



**Food from healthier crops has shelf appeal, too. Call us shallow, but if food looks good, consumers are less likely to waste it.**

Goal #12 Responsible Consumption and Production target 12.3. Visual aesthetics (shape, size, and color) of food directly impacts its shelf-life and commercial value, and how much is wasted.<sup>10</sup>



**Now let's move beyond food.**



**Because in reality, honeybees pollinate over 400 different plant species, most of which are not fruit and vegetable crops.<sup>11</sup> Bee-pollinated plant life, including many species of trees, greatly influence air quality...**

Goal #3 Good Health and Well-Being, target 3.9. Cleaner air reduces death and illness from air, water, and soil contamination. Plants and trees remove toxins from the air and lead to better health for humans and all living beings.

**... support clean water...**

Goal #6. Clean Water and Sanitation, target 6.6 Bees support resilience and biodiversity within aquatic ecosystems including forests and mountains which greatly impact waterways.<sup>12 13</sup> Cleaner water sources require fewer resources to filter for human consumption and avoid contaminating downstream areas.



**... and make cities more sustainable.**

Goal #11 Sustainable Cities and Communities. The pollination of urban flora improves urban air quality.<sup>14</sup> Bees also help make urban gardens and public open spaces self-sustaining and less costly to maintain.<sup>15 16</sup>

By the way, bees tend to do better in urban areas because they have access to more varied diets (more biodiversity).<sup>17</sup> Overly-manicured suburban landscapes and areas near industrial farms (mono-crop agriculture) actually offer poor foraging habitats for pollinators.



**We'll take a conceptual turn now on our journey through the impact of honeybees on modern society.**



*Did you know? The U.S. Green Building Council awards up to 7 LEED points for adding a pollinator habitat to a commercial building? Learn more at [bestbees.com/LEED](https://www.usgbc.org/bestbees.com/LEED)*



## People have always been fascinated by bees. Observing them often inspires innovation.

Goal #9 Industry Innovation, target 9b. Bees have long influenced designers and engineers in industrial manufacturing, architecture, transportation, communications, health care, computer science, and other domains.<sup>18 19 20</sup>

Urban beekeeping is a high-impact way for students to practice concepts in STEAM (science, technology, engineering, art, and math) education.<sup>21</sup>

Biophilic design is an approach to designing buildings in a way that increases connectivity to the natural environment to promote human health and well-being. Many space designers strategically place beehives in workplaces and public areas where they can be readily observed and enjoyed.



*The SDGs don't explicitly call for capturing carbon. Instead, Goal #7 seeks to improve access to affordable, reliable, sustainable energy. So as we work hard to reduce our dependency on fossil fuels, bees help counteract the negative effects of their emissions. As bees pollinate and support more plant life, and more plants are able to capture more carbon through photosynthesis, more carbon is therefore removed from the atmosphere.<sup>25</sup>*



## Zooming out another level, a large-scale network of honeybee hives helps us see the environment in new ways. And ultimately helps us fight global warming.

Goal #13 Climate Actions, target 13.3 seeks to improve awareness of climate change mitigation, adaptation, and early warning systems. The use of bees in environmental monitoring improves our understanding of the climate's impacts on our world, detects environmental toxins, and more.<sup>22 23 24</sup> Analysis of the genomics of pollen found in honey (i.e. HoneyDNA) reveals the diversity of plant species available to nourish domestic and native pollinators.

## Honeybee insights are shared to enhance research on food systems and climate change, and economically empower individuals.

Goal #17: Partnerships to Achieve the Goals. Target 17.6 enhances access to science, technology and innovation, and knowledge sharing. Projects such as combining large sets of bee health data with NASA-grade satellite data<sup>26</sup> seek to understand the impact of environmental changes on the security of food systems. Partnerships with non-profit associations such as the Urban Beekeeping Lab are designed to analyze apiculture trends and spread best practices. Such collaborations aim to empower anyone in the world to learn how to sustainably pollinate local crops, harvest honey, strengthen local environments, or earn a living through beekeeping.



# The 10 SDGs Supported by Best Bees' Network of Data-Yielding Beehives



## Get Ahead of the Curve

Adding data-yielding beehives to a scientifically managed network supports SDGs in a way that's both ancient and modern. It's a low-hanging fruit solution that supports a grander ESG vision for forward-looking organizations.

SDGs may not be mandated through regulations in all countries yet, but the trend is clear: companies that wait to meet these standards will soon be playing catch-up with competitors.

With a networked beehive program, organizations can support a keystone species, advance pollinator

health worldwide, and visibly demonstrate priorities to stakeholders. Data on both network-wide colonies and individual apiaries can be incorporated into sustainability reports. Honey harvested from on-premise beehives makes for a unique amenity, offering local flavor and sparking rich conversations about all kinds of environmental causes.

Compared to most ESG efforts, beehives are extremely simple to implement and manage through a turnkey service provider such as The Bees Bees Company.



# Make an Impact With The Best Bees Company



Best Bees offers professional beekeeping services that allow clients to make an impact. Individual citizens, multinational corporations, and anyone in between can contribute to the UN's SDGs in ways they may not even realize.

Our scientific beekeeping service deploys state-of-the-art hive management techniques and pools standardized data across a wide network of colonies for broader research objectives. Our standard beekeeping practices have been uniquely developed to control variables in our dataset. This ensures that what we record is reliable for research partners.

With the world's first and largest beehive management system, a proprietary system dubbed Bzzz, we ensure the health of each beehive in our network is recorded and ready for research. Bzzz tracks population, queen health, honey sums, diseases, and mite levels back a full decade,

and data-yielding hives from Boston to LA continue to build on the dataset with each hive maintenance visit. Our data has been used in collaborations with NASA DEVELOP, Google Earth, MIT, and other partners.

HoneyDNA® is another first-of-its-kind innovation from the Best Bees team, developed to quantify the biodiversity of a local environment through the genomic analysis of pollen found in a beehive's honey. HoneyDNA analyses are included among other key metrics in Bee & Biodiversity reports commissioned by corporate clients.

## Interested in adding data-yielding beehives to your ESG program?

Contact us to book an assessment:  
[info@bestbees.com](mailto:info@bestbees.com) or (617) 445-2322



Learn more at [bestbees.com](https://bestbees.com)  
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## SOURCES

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- 1 “Climate Is Everything” Justin Worland, *Time Magazine*: April 15, 2021
- 2 Minja, G.S., and T.J. Nkumilwa. 2016. The role of beekeeping on forest conservation and poverty alleviation in Moshi Rural District, Tanzania. *European Scientific Journal*, ESJ 12: 366.
- 3 Mudzengi, C., C.S. Kapembeza, E. Dahwa, L. Taderera, S. Moyana, and M. Zimondi. 2019. Ecological benefits of apiculture on savanna rangelands. *Bee World* 97: 1–10.
- 4 Klein, A.M., V. Boreux, F. Fornoff, A.C. Mupepele, and G. Pufal. 2018. Relevance of wild and managed bees for human well-being. *Current Opinion in Insect Science* 26: 82–88.
- 5 Amjad Khan, W., H. Chun-Mei, N. Khan, A. Iqbal, S.-W. Lyu, and F. Shah. 2017. Bioengineered plants can be a useful source of omega-3 fatty acids. *BioMed Research International* 2017: 7348919–7348919.
- 6 Kleijn, D., R. Winfree, I. Bartomeus, L.G. Carvalheiro, M. Henry, R. Isaacs, A.-M. Klein, C. Kremen, et al. 2015. Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. *Nature Communications* 6: 7414.
- 7 Klein, A.M., B.E. Vaissière, J.H. Cane, I. Steffan-Dewenter, S.A. Cunningham, C. Kremen, and T. Tscharntke. 2007. Importance of pollinators in changing landscapes for world crops. *Proceedings of the Royal Society B* 274: 303–313.
- 8 Klein, A.M., V. Boreux, F. Fornoff, A.C. Mupepele, and G. Pufal. 2018. Relevance of wild and managed bees for human well-being. *Current Opinion in Insect Science* 26: 82–88.
- 9 Stein, K., D. Coulibaly, K. Stenchly, D. Goetze, S. Porembski, A. Lindner, S. Konaté, and E.K. Linsenmair. 2017. Bee pollination increases yield quantity and quality of cash crops in Burkina Faso, West Africa. *Scientific Reports* 7: 17691.
- 10 Klatt, B.K., A. Holzschuh, C. Westphal, Y. Clough, I. Smit, E. Pawelzik, and T. Tscharntke. 2014. Bee pollination improves crop quality, shelf life and commercial value. *Proceedings of the Royal Society B* 281: 20132440.
- 11 Original data, Noah Wilson-Rich. 2018. How you can help save the bees, one hive at a time: TEDx Provincetown.
- 12 Brockhoff, E.G., L. Barbaro, B. Castagnyrol, D.I. Forrester, B. Gardiner, J.R. González-Olabarria, P.O.B. Lyver, N. Meurisse, et al. 2017. Forest biodiversity, ecosystem functioning and the provision of ecosystem services. *Biodiversity and Conservation* 26: 3005–3035.
- 13 Creed, I.F., and M. van Noordwijk (eds.). 2018. *Forest and water on a changing planet: Vulnerability, adaptation and governance opportunities. A global assessment report.* Vienna: International Union of Forestry Research Organizations.
- 14 Van Der Steen, J.J., J. De Kraker, and J. Grotenhuis. 2015. Assessment of the potential of honeybees (*Apis mellifera* L.) in biomonitoring of air pollution by cadmium, lead and vanadium. *Journal of Environmental Protection* 6: 96–102.
- 15 Lowenstein, D.M., K.C. Matteson, and E.S. Minor. 2015. Diversity of wild bees supports pollination services in an urbanized landscape. *Oecologia* 179: 811–821.
- 16 Stange, E., D.N. Barton, and G.M. Rusch. 2018. A closer look at Norway’s natural capital—how enhancing urban pollination promotes cultural ecosystem services in Oslo. In *Reconnecting natural and cultural capital*, ed. M.L. Paracchini, P.C. Zingari, and C. Blasi, 235–243. Brussels: European Commission.
- 17 Original data, Noah Wilson-Rich. 2018. How you can help save the bees, one hive at a time: TEDx Provincetown.
- 18 Xing, B., and W.J. Gao. 2014. Bee inspired algorithms. In *Innovative computational intelligence: A rough guide to 134 clever algorithms*, ed. B. Xing and W.-J. Gao. Cham: Springer.
- 19 Zhang, Q., X. Yang, P. Li, G. Huang, S. Feng, C. Shen, B. Han, X. Zhang, et al. 2015. Bioinspired engineering of honeycomb structure—Using nature to inspire human innovation. *Progress in Materials Science* 74: 332–400.
- 20 Sahlabadi, M., and P. Hutapea. 2018. Novel design of honeybee-inspired needles for percutaneous procedure. *Bioinspiration & Biomimetics* 13: 036013.
- 21 T. Schmitt, K. Demary, and N. Wilson-Rich. 2021. “Urban Beekeeping as a Tool for STEAM Education.” Chapter 10: Teaching and Learning in Urban Agricultural Community Contexts. I. DeCoito et al. (eds.). Springer Nature Switzerland AG.
- 22 Hernandez, J.L., G.W. Frankie, and R.W. Thorp. 2009. Ecology of urban bees: a review of current knowledge and directions for future study. *Cities and the Environment (CATE)* 2: 3.
- 23 Van Der Steen, J.J., J. De Kraker, and J. Grotenhuis. 2015. Assessment of the potential of honeybees (*Apis mellifera* L.) in biomonitoring of air pollution by cadmium, lead and vanadium. *Journal of Environmental Protection* 6: 96–102.
- 24 Smith, K.E., D. Weis, M. Amini, A.E. Shiel, V.W.M. Lai, and K. Gordon. 2019. Honey as a biomonitor for a changing world. *Nature Sustainability* 2: 223–232.
- 25 Plants sequester carbon from the atmosphere through photosynthesis, transforming CO<sub>2</sub> into sugars which store energy and provide the building blocks of plant matter. As plant leaves fall and as roots decay, plants contribute that carbon to the soil. Therefore bee pollination, as any action promoting plant life, boosts progress toward net-zero carbon emissions. The exact amount of additional carbon captured by a beehive is an open scientific inquiry.
- 26 The Best Bees Company, the Bee Informed Partnership, and researchers at NASA DEVELOP designed a model to better understanding how bee health relates to our world and food system. Webinar: 2020. Big Data, Little Bees.