



Basecamp Research

Biodiversity Collaborations Support Biodiversity Conservation

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1. The importance of biodiversity for humanity and the life science industry
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4. A model that supports the CBD and GBF

1 The importance of biodiversity for humanity and the life science industry

How reliant have humans been on mother nature over the past 200,000 years?

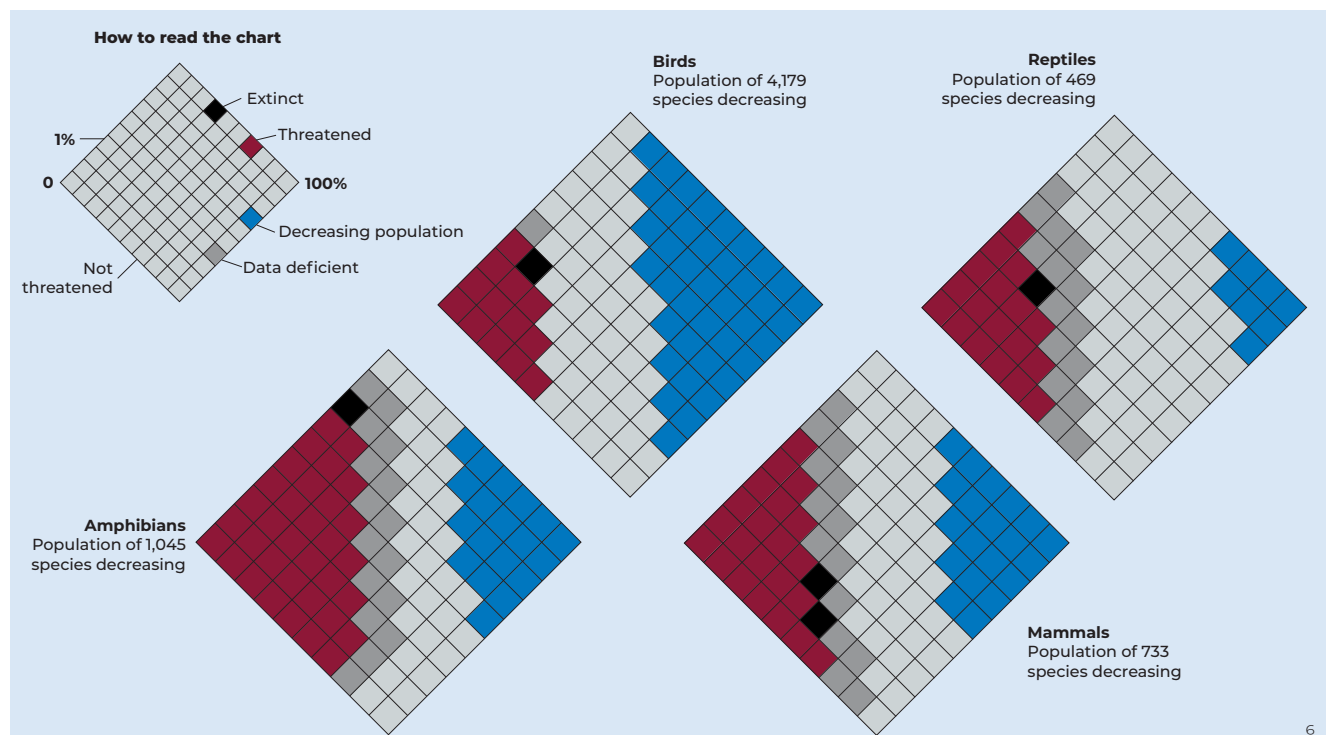
Human reliance on mother nature's biodiversity extends far beyond essential resources such as clean air, water, food and shelter. Biodiversity plays a critical role in essential ecosystem functions and is vital for sustaining life on our planet. At Basecamp Research, we believe that over 4 billion years of evolution and the resulting microbial biodiversity has created sustainable solutions to our planet's greatest challenges.¹ Basecamp Research is using cutting edge DNA and AI based biotechnologies to tap into our planet's oldest science experiment: the huge potential of the natural world.

The life science industry is deeply connected to biodiversity;

it is fundamentally dependent on learning from the diversity of ecosystems, species, and genetic resources that have evolved over the last ~4 billion years. Biodiversity serves as a rich source of genetic diversity which forms the basis of most of our biological and chemical processes: from food to drugs, to plastics and cosmetics. At least 50% of all approved medicines have been derived from nature; the remainder have been designed by learning biological design principles from nature.² In industrial applications, natural enzymes can be used for baking, brewing, detergents, fermented products, pharmaceuticals, textiles, and leather processing, of which 60% are produced from fungi, 24% from bacteria, 4% from yeast, and the rest are from plant and animal sources.³ However, it is widely estimated that far, far less than 1% of microbial biodiversity has been discovered to date.⁴ Basecamp

Research is combining exploration and cutting edge DNA and AI-based biotechnologies to unlock the hidden microbial biodiversity which can be used to design a greener, healthier and more sustainable future for all.

This reliance on nature is at a critical juncture; the planet is currently facing a global crisis regarding biodiversity and climate change. Since the industrial revolution began, there has been tremendous progress in improving human lives. However, this progress has come at a huge cost, resulting in the loss of species and environmental degradation. In addition to the extinct and endangered species, it is clear that many more species are threatened and have declining populations. For example, nearly 50% of bird species that are considered not threatened are facing population declines. The graphic below highlights this trend.⁵



As we strive to develop new life-saving medicines from biodiversity, we are in a race against time as our natural resources are lost at an increasing rate.

2 The CBD and digital sequence information (DSI)

In recognition of this threat to biodiversity, in December 2022, the 15th Conference of the Parties (COP15) for the Convention on Biological Diversity (CBD) established a landmark agreement for a Global Biodiversity Framework (GBF) that included a target (Target 19) to secure \$200 billion per year by 2030 to fund the conservation of biodiversity. It remains unclear where the necessary funds will come from and who will be responsible for providing them. The only known information at the moment is that the sources will likely be a mix of domestic, international, public, and private funds. One crucial source of funding being discussed is from the private sector contribution arising from the use of Digital Sequence Information (DSI), which is sequenced genetic material in a digital format. Life science companies worldwide use DSI to develop various products and applications.

Before the 1992 Earth Summit, companies were not obligated to share benefits with the sources of the raw materials that led to the development of their products. Such examples include Taq PCR with Yellowstone National Park and Cyclosporin A with Hardangervidda National Park in Norway. As a result, these companies generated an enormous amount of wealth for themselves and their governments through taxation.

Some progress was made in 1992 through the Earth Summit with the development of the United Nations Convention on Biological Diversity (CBD) that included the objectives of 1) the conservation of biological diversity; 2) the sustainable use of the components of biological diversity; and 3) the fair and

equitable sharing of the benefits arising out of the utilisation of genetic resources.⁷

Over time, this led to the development of Access and Benefit Sharing agreements between life science companies and biodiversity (genetic resource) providers to facilitate the sharing of benefits derived from biodiscovery (also referred to as bioprospecting). However, it is hard to argue that this was successful - very few successful ABS partnerships have been recorded, with the notable exception of those built by the US-based company, Diversa. Diversa built successful, long-standing ABS partnerships on all 7 continents, often going far above and beyond what they were required by law. Diversa's aim was to show that proactive engagement with biodiversity hotspots and ABS requirements led to faster and more cost effective development of biotechnology products.

The Nagoya Protocol entered into force in 2014 in an attempt to address the lack of ABS partnerships worldwide, as part of the CBD.⁸ However, the Nagoya Protocol only addressed 'physical genetic

samples', not DSI. By 2014, most life science companies had moved towards using DSI exclusively, thanks to the progress of technologies such as DNA sequencing, DNA synthesis and synthetic biology. Therefore, in practice, the Nagoya Protocol had little effect on the number of ABS partnerships and acted to push companies away from physical exploration of the natural world towards the use of free, online public databases of DSI, mostly populated by Western-based academics under the guise of 'open data access'.

It is worth noting that this is not aiming to place blame on life science companies; while it is reasonable to expect life science companies to pay their fair share for biodiversity conservation, it is equally essential to hold accountable other industries responsible for environmental degradation and species loss. Life science companies are ultimately all working towards the development of better medicines, food security, sustainable industries and other areas that hold promise for humanity. However, for the sake of brevity, this article will only focus on the role of life science companies as it pertains to the CBD.



3 Basecamp Research's biodiversity partnerships model is increasing bioliteracy and sustainable revenue streams for biodiversity hotspots around the world

In the world of industrial life sciences, Basecamp Research is a new company that has made

strides in bridging the gap between biodiversity and biotechnology. Their business model for ethical biodiscovery (also referred to as bioprospecting), offers both monetary and non-monetary benefits that support biodiversity research and conservation.

In the long term, Basecamp

Research hopes that, by increasing bioliteracy, their model can empower those biodiversity stewards to develop the skills and capacity to make use of their own resources - thus moving towards a world that doesn't rely on transfer of knowledge between the Global South and Global North - more that

the countries that have done the most to protect their biodiversity have the greatest opportunities to develop the revolutionary life science technologies of the future.

After securing required permits and authorisations, Basecamp Research's biodiscovery model offers both monetary and non-monetary benefits to their provider country through its Biodiversity Collaboration partners thereby utilising technology to enable collaboration between biodiversity and biotechnology. Basecamp Research is currently operating and building access and benefit sharing (ABS) collaborations with biodiversity conservation organisations around the world, striving to build a value chain that simultaneously supports biodiversity conservation and provides building blocks (products and applications) for a cleaner, healthier, and more sustainable future for all. Our Biodiversity Collaboration partnerships help increase bioliteracy; providing local teams with the skills, technologies and platform required to discover, understand, and generate income from their natural world.

The monetary benefits can include funding for related research activities and a royalty associated with any net revenue generated from commercialization derived from environmental samples. The royalties are paid to both the provider of the sample collected, which includes the land owner/management authority, or/and the provider country and the Biodiversity Collaboration partner who collected and processed the sample.

The nonmonetary benefits can include technology transfer by providing the Biodiversity Collaboration partner with laboratory equipment (including a mobile DNA lab), training, data sharing (things like the chemical composition of each sample as well, the associated taxonomic data, or further data packages that support research goals), development of joint publications, and support for commercial R&D for the Biodiversity Collaboration partner if in alignment with BCR's technology. As Basecamp



Pictures: Basecamp Research (2)

“Basecamp Research is combining exploration and cutting edge DNA and AI-based biotechnologies to unlock the hidden microbial biodiversity which can be used to design a greener, healthier and more sustainable future for all”

Research grows, we expect to be able to offer more and more within these partnerships, towards our goal of transferring these capabilities to our partners over time.

As of September 2023, Basecamp Research has dedicated a significant proportion of its overall budget to developing these Biodiversity Collaborations around the world and it has led to more than 90 sample collecting expeditions, in 23 countries covering approximately 50% of global biomes. Not only has this led to significant direct funding to support organisations involved in biodiversity research and conservation, it also leads to significant opportunities associated with funding to these same

organisations from the royalties that will flow from the commercial R&D conducted by Basecamp Research and its commercial partners. These royalties are paid on naturally occurring DSI as well as proteins designed by Basecamp Research's AI technology that learns from the naturally occurring DSI to develop and design proteins and other biological systems. As far as the Basecamp Research team is aware, this is the first time that benefit sharing from AI-designed genes or proteins has been discussed in earnest, let alone implemented in practice. By doing this, we hope to set a benchmark and prevent a repeat of what happened with the Nagoya Protocol (when companies

moved from physical genetic resources towards DSI). If companies move towards AI-based sequences in favour of natural DSI to avoid obligations from the GBF, the CBD will find itself back at square one.

Keep an eye out for these announcements in 2024 from Basecamp Research to learn more about how the life science industry can provide even more direct financial support consistent with the Global Biodiversity Framework as proposed through the COP15 of the Convention on Biological Diversity.

We are building a world that truly values Earth's biological assets,

however they are used, and motivate future generations to protect the future of biodiversity on our planet. This has not only entailed substantial direct funding for organisations engaged in biodiversity research and conservation but also paved the

way for considerable opportunities linked to funding for these same organisations through the royalties derived from the commercial R&D endeavours conducted by Basecamp Research and its commercial partners.



4 A model that supports the CBD and GBF

In the spirit of the CBD, as outlined above, Basecamp Research is focused on addressing the ABS challenges of the GBF through its business model based on collaborations with biodiversity partners worldwide to create case studies that demonstrate that effective, proactive and mutually beneficial partnerships can be built between biotechnology companies and biodiversity providers.

Amongst a suite of other technical advancements, Basecamp Research has invested in a purpose-built platform to track and trace the DSI used in both developing their products and in using AI to design new biological systems, allowing them to share monetary benefits with their Biodiversity Collaboration partners and the provider nations. The Biodiversity Collaboration program includes local communities (IPLCs⁹) in its sampling and processing workforce demonstrating that commercialization of DSI has enabled broader stakeholder

engagement and collaboration.

It is important to note that the CBD Secretariat has emphasised the need to build research capabilities that make the appropriate links between ABS and the discourse around digital sequence information (DSI), and measure and report on progress towards the monetary and non-monetary benefit-sharing of genetic resources. The GBF may enhance cooperation and the mainstreaming of ABS. With more than 30 years of combined experience in building effective ABS partnerships around the world, Basecamp Research aims to set the benchmark for effective delivery of research capabilities to our biodiversity partners around the world.

Basecamp Research believes that the ABS indicators are adaptable to national financial circumstances and biodiversity priorities. This biodiversity program aims to strengthen the technical capacity of national and regional partners, education institutions, and local governments. Basecamp Research's experience in implementing ABS

partnerships within the spirit of the 1992 CBD, including the Nagoya Protocol and engagement with various National ABS committees has led to the development of a standard procedure for implementing and complying with national legislations and multilateral GBF guidelines.

We look forward to improved legal clarity from the GBF multilateral system, particularly around expectations for standardised procedures for access, compliance, and facilitation towards benefit-sharing, resulting in more effective Biodiversity Collaboration partnerships between the Users and Providers of DSI.

Ultimately, at Basecamp Research, we are partnering with biodiversity providers and biotechnology researchers across the globe to build a world that values biodiversity as the foundation of a cleaner, healthier and more sustainable future for all. ●

To collaborate with Basecamp Research, please contact [**biodiversity@basecamp-research**](mailto:biodiversity@basecamp-research).

Footnotes

1. <https://www.science.org/content/article/life-may-have-originated-earth-4-billion-years-ago-study-controversial-fossils-suggests>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3560124/#:~:text=Up%20to%2050%25%20the%20approved,or%20directly%20derived%20there%20from.>
3. <https://www.sciencedirect.com/science/article/abs/pii/S0958166920301890>
4. <https://www.nytimes.com/2016/05/24/science/one-trillion-microbes-on-earth.html>
5. <https://www.reuters.com/graphics/GLOBAL-ENVIRONMENT/EXTINCT/lbvvggdgevd/>
6. <https://www.reuters.com/graphics/GLOBAL-ENVIRONMENT/EXTINCT/lbvvggdgevd/>
7. <https://www.un.org/ldcportal/content/convention-biological-diversity-and-its-protocols#:~:text=The%20Convention%20on%20Biological%20Diversity,the%20utilization%20of%20genetic%20resources.>
8. <https://www.cbd.int/abs/>
9. Indigenous Peoples and Local Communities