

Biodiversity and Biodiversity Credits



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While the entire world is now focusing on dealing with climate change, it has not paid too much attention to another serious environmental threat – biodiversity loss.

Operation Wallacea noted that lagging in biodiversity progress compared to climate change “is partly because identifying progress in climate change can be quantified in terms of carbon credits whereas quantifying biodiversity progress is much more difficult. There is no single taxon that can act as a read across to carbon dioxide, in which increases can be seen as beneficial in all circumstances or even a reflection of the overall biodiversity changes in other taxa.”

In this paper, we bring forward some basic information on Biodiversity and Biodiversity Credits.

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I. What is Biodiversity?

Biodiversity is the variety and variability of life on Earth¹: it refers to all the different kinds of living organisms within a given area, including plants, animals, fungi, and other living things².

Biodiversity is not distributed evenly on Earth – it is a measure of variation at the species, ecosystem, and genetic levels.¹

1. Species Level

A common way to measure biodiversity is to count the total number of species living within a particular area:²

- Tropical regions are areas that are warm year-round, and they have the most biodiversity. Generally, the closer a region is to the Equator, the greater the biodiversity. Tropical forest ecosystems cover less than 10 percent of Earth's surface and contain about 90 percent of the world's species¹. At least 40,000 different plant species live in the Amazon rain forest of South America, one of the most biologically diverse regions on the planet.
- Temperate regions, which have warm summers and cold winters, have less biodiversity.
- Regions with cold or dry conditions, such as mountaintops and deserts, have even less biodiversity. Only about 2,800 different plant species live in Canada's Quebec province.
- The warm waters of the western Pacific and Indian Oceans tend to be the most diverse marine environments. The Bird's Head Seascape in Indonesia is home to more than 1,200 species of fish and 600 species of coral. Many of the corals build coral reefs, which are home to hundreds more species, from tiny seaweeds to large sharks.
- Some places in the world have a large number of endemic species – species that exist only in that place. The Cape Floristic Region in South Africa is home to about 6,200 plant species found nowhere else in the world. Areas with high numbers of endemic species are called biodiversity hotspots. Scientists and communities are making a special effort to preserve biodiversity in these regions.

¹ "Biodiversity," Wikipedia. Retrieved on July 29, 2022, <https://en.wikipedia.org/wiki/Biodiversity>

² "Global Biodiversity," National Geography. Retrieved on July 29, 2022, <https://education.nationalgeographic.org/resource/global-biodiversity>

2. Ecosystem Level

Ecosystems are communities of living things and their environments. They include deserts, grasslands, and rain forests.²

The continent of Africa is home to tropical rain forests, alpine mountains, and dry deserts. It enjoys a high level of biodiversity. Antarctica, covered almost entirely by an ice sheet, has low biodiversity.²

3. Genetic Level

Genes are the basic units of biological information passed on when living things reproduce. Some species have as many as 400,000 genes. Some of these genes are the same for all individuals within a species, but some genes within a species are different.²

Greater genetic diversity in species can make plants and animals more resistant to diseases. Genetic diversity also allows species to better adapt to a changing environment.²

To summarize, nature-human relationship plays a key role in biodiversity.

Since life began on Earth, five major mass extinctions and several minor events have led to large and sudden drops in biodiversity. The period since the emergence of humans – named the Holocene extinction or referred to as the sixth mass extinction – has displayed an ongoing biodiversity reduction and an accompanying loss of genetic diversity.¹

Many species have gone extinct in the past hundred years. Extinction is a natural process: some species naturally die out while new species evolve, but human activity has changed the natural processes of extinction and evolution. Scientists estimate that species are dying out at hundreds of times the natural rate.²

II. Why is Biodiversity Important?

Biodiversity is important because it boosts ecosystem productivity, where every species plays a part, no matter how small³. All species are interconnected – they depend on one another. Forests provide homes for animals. Animals eat plants. The plants need healthy soil to grow. Fungi help decompose organisms to fertilize the soil. Bees and other insects carry pollen from one plant to another, which enables the plants to reproduce. With less biodiversity, these connections weaken and sometimes break, harming all the species in the ecosystem.²

³ “Why is Biodiversity Important?” Nicole Barrantes, World Animal Protection, July 9, 2021. Retrieved on July 29, 2022, <https://www.worldanimalprotection.us/node/39276>

1. Biodiversity Provides a Variety of Benefits

(1) Essential for Supporting Human Survival:

Biodiversity is important to people in many ways. Plants help humans by giving off oxygen. They also provide food, shade, construction material, medicines, and fiber for clothing and paper. The root system of plants helps prevent flooding. Plants, fungi, and animals such as worms keep soil fertile and water clean.²

(2) Preventing Disease:

It has been shown that higher rates of biodiversity have been linked to an increase in human health benefits. For example, 25 percent of drugs used for modern medicine are derived from rainforest plants. On the contrary, losses in biodiversity have resulted in increased infectious diseases (three out of every four new or emerging infectious diseases in people come from animals).³

(3) Fighting Climate Change:³

When building resilience in a system, biodiversity is the key player. According to the insurance hypothesis, “biodiversity insures ecosystems against declines in their functioning because many species provide greater guarantees that some will maintain functioning even if others fail.”

When we conserve habitats, ecosystems continue their normal functioning of offsetting carbon. When we reduce biodiversity (through farming, logging, development, etc.), we reduce nature’s ability to store carbon, thus exacerbating climate change.

(4) Providing Livelihoods:

Hundreds of industries rely on plant biodiversity. Agriculture, construction, medical and pharmaceutical, fashion, tourism, and hospitality all depend on plants for their success. When the biodiversity of an ecosystem is interrupted or destroyed, the economic impact on the local community could be enormous.²

One-fifth of the world’s population – 1.3 billion people – depends on forests for employment. Three out of four jobs worldwide are water-dependent. Jobs that restore natural landscapes, as part of the “restoration economy,” provide more jobs in the U.S., for example, than mining, logging, and steel production. These can include organic farming, sustainable fishing, ecotourism, the sustainable management of forests, and much more.³

2. Negative Impacts as a result of Decreasing Biodiversity²

In the past hundred years, biodiversity around the world has decreased dramatically, which negatively impacts the world.

A major reason for the loss of biodiversity is that natural habitats are being destroyed. The fields, forests, and wetlands where wild plants and animals live are disappearing. Land is cleared to plant crops or build houses and factories. Forests are cut for lumber and firewood.

As habitats shrink, fewer individuals can live there. The creatures that survive have fewer breeding partners, so genetic diversity declines. Pollution, overfishing, and overhunting have also caused a drop in biodiversity.

Global climate change – the latest rise in the average temperature around the globe, linked to human activity – is also a factor. Warmer ocean temperatures damage fragile ecosystems such as coral reefs. A single coral reef can shelter 3,000 species of fish and other sea creatures such as clams and sea stars.

Biodiversity can also be harmed by introduced species. When people introduce species from one part of the world to another, they often have no natural predators. These non-native species thrive in their new habitat, often destroying native species in the process.

III. Biodiversity Protection Gaining Global Traction

A Biodiversity Action Plan (BAP) is an internationally recognized program addressing threatened species and habitats and is designed to protect and restore biological systems. The original impetus for these plans derives from the 1992 Convention on Biological Diversity (CBD)⁴. In 2010, all the countries in the world except Somalia and the United States ratified the CBD.

Twelve years after the ratification, in April 2022, more than US\$5 billion has been pledged by 29 countries for the Global Environment Facility (GEF), providing a major boost to international efforts to protect biodiversity and curb threats from climate change, plastics, and toxic chemicals through collaboration actions. The GEF is the primary source of financing for biodiversity protection globally.⁵

Biodiversity protection represents the biggest share of the GEF's eighth programing period (GEF-8), which runs from July 2022 to June 2026.⁵

⁴ "Biodiversity Action Plan," Wikipedia. Retrieved on July 30, 2022, https://en.wikipedia.org/wiki/Biodiversity_action_plan

⁵ "Biodiversity Receives Boost as 29 Countries Pledge over \$5 Billion to the GEF," GEF, April 12, 2022. Retrieved on July 30, 2022, <https://www.thegef.org/newsroom/news/biodiversity-receives-boost-29-countries-pledge-over-5-billion-gef>

In the first part of the UN Biodiversity Conference held in Kunming, China, in October 2021, the Parties to the Convention on Biological Diversity adopted the Kunming Declaration and reaffirmed their commitment to achieving the 2050 Vision of “Living in Harmony with Nature”⁶. At the second part of the Conference, to be held again in Kunming, in October 2022, it is expected that GEF-8’s biodiversity agenda – which includes implementation of the new post-2020 global biodiversity framework – to be agreed by the Parties to the Convention⁵.

In October 2021, Chinese President Xi Jinping launched a RMB 1.5 billion (US\$235.4 million) fund for the protection of biodiversity in developing countries. In the 2022 Government Work Report, China pledged to protect biodiversity and advance the development of the national park-based nature-reserve system. In addition, Chinese Premier Li Keqiang vowed to promote high-quality cooperation in this area under the Belt and Road Initiative.⁶

IV. Biodiversity Credits and Offsets

1. Biodiversity Credits⁷

Biodiversity credits are a mechanism that allows individuals and companies to invest in environmental projects that contribute to a richer biodiversity. A credit itself is a legal document (analog or digital) describing where the environmental action has taken place, who has developed it, according to what kind of methodologies, and that it has been certified according to a certain system. Biodiversity credits may be transacted after issuance.

There is a strong economic justification for incentives that encourage private land-owners towards nature-focused management of their land, including payments for ecosystem services as well as confirmation of benefits of ecological restoration. The rationale behind market-driven instruments for biodiversity conservation is that positive and negative impacts on biodiversity can be measured and represented as credits and debts, and as such can be integrated in economic-decision making.

A business may have to pay for regulatory mitigation of its biodiversity impact, or may wish to contribute to a voluntary net-positive impact on ecosystems thus improving its image and reputation towards its customers. Likewise, if a landowner may gain a profit from protecting or restoring a habitat, they may provide more habitat protection than they would have done without compensation.

⁶ “Biodiversity Protection Efforts Offer Lessons for All,” Erik Solheim, China Daily, April 18, 2022. Retrieved on July 30, 2022, <https://global.chinadaily.com.cn/a/202204/18/WS625cbab0a310fd2b29e577bb.html>

⁷ Bio Diversity Credits. Retrieved on July 30, 2022, <https://www.biodiversitycredits.se>

Biodiversity credits are not a legal requirement and can therefore be used to describe a positive biodiversity impact resulting from a targeted action towards that purpose.

2. Biodiversity Offsets

Biodiversity offsets are increasingly promoted and adopted by governments and companies worldwide as policy instruments to compensate for biodiversity losses from infrastructure-development projects. In 2018, policies for offsetting biodiversity losses were used in at least 33 countries around the world, cumulatively restoring and protecting 8.3 million hectares of land⁸. The goal for using biodiversity offsets is to create a no net loss, or even a net gain of biodiversity⁷.

In biodiversity-offset voluntary markets, relatively few third-party standards have emerged. For species and habitat-driven projects, the Business and Biodiversity Offsets Programme (BBOP) Standard on Biodiversity Offsets, established in 2004, is probably the best-known voluntary project standard. The BBOP Standard, released in 2012, set out principles, criteria, and indicators for project design and offers guidance on best practice in applying the mitigation hierarchy and offset design.⁹

In 2016, over 200 individuals from conservation organisations, governments, companies, and financial institutions joined in a “Call to Action” for greater efforts to secure “Biodiversity Net Gain” in the context of development. The call to action was issued during Natural Capital Week, where BBOP launched a new set of roadmaps and guidance for business and government to craft economic development strategies that result in an overall gain of biodiversity, rather than loss.¹⁰

3. What is Biodiversity Net Gain?¹¹

Biodiversity net gain is an environmental policy enforced at the government level. It outlines an approach to development and land management that aims to leave the natural environment not only unharmed, but in a considerably better state than it was before use. In essence:

⁸ “How Much of a Market is Involved in a Biodiversity Offset? A Typology of Biodiversity Offset Policies,” Niak Sian Koh, Thomas Hahn and Wiebren J. Boonstra, *Journal of Environmental Management* Volume 232, February 15, 2019, Pages 679-691, Science Direct. Retrieved on July 30, 2022, <https://www.sciencedirect.com/science/article/pii/S0301479718313458>

⁹ “Biodiversity Market: Overview,” Ecosystem Marketplace. Retrieved on July 30, 2022, <https://www.ecosystemmarketplace.com/marketwatch/biodiversity>

¹⁰ “A Call to Action for Biodiversity “Net Gain,” Tropical Forest Alliance, November 26, 2018. Retrieved on July 30, 2022, <https://www.tropicalforestalliance.org/en/news-and-events/news/call-action-biodiversity-net-gain>

¹¹ “The What, Why And How Of Biodiversity Net Gain Credits,” Engain.com. Retrieved on July 30, 2022, <https://www.engain.com/the-what-why-and-how-of-biodiversity-net-gain-credits>

- Local plans should promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species.
- Development should contribute to and enhance the natural and local environment by minimizing impacts on and providing net gains for biodiversity. This can help to establish coherent ecological networks that are more resilient to the current and future pressure the environment faces.

4. The Biodiversity Crediting Process – Land

“Biodiversity Credits in Boreal Forest Landscapes: Rationale, Methods and Process Description,” a part of the “Mechanisms and Opportunities for Financing of Forest Biodiversity” project¹², illustrated the biodiversity-crediting process (Figure-1).

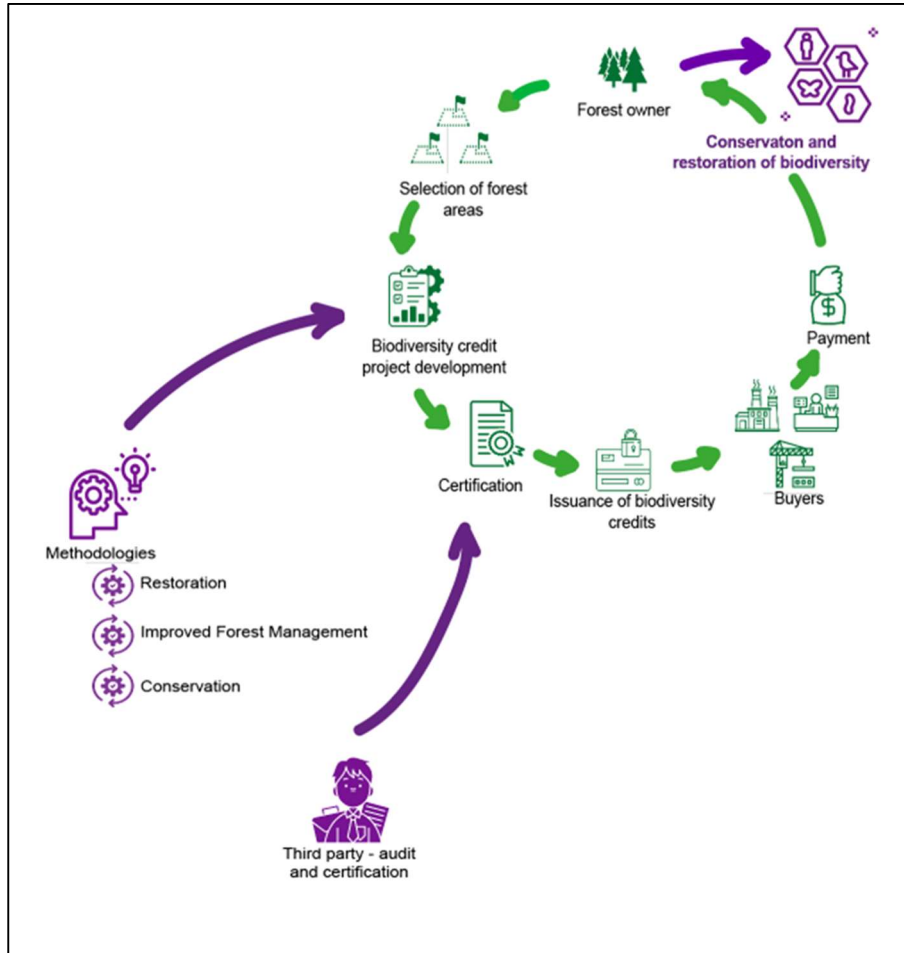
The process, as noted, “is inspired by existing voluntary carbon-crediting process for forestry-related projects. Similarly, the biodiversity-crediting process starts with choosing appropriate land areas and methodologies and continues with a verification process resulting in issuance of credits ready for transaction.”

5. No Marine-Biodiversity Credit Explored Yet

While carbon credit is high up on the climate agenda in most countries, blue-carbon credits have only just entered their radar screen. It is therefore not surprising to see that at this early stage of biodiversity-credit development, marine-biodiversity credit is not yet explored.

¹² “Biodiversity Credits in Boreal Forest Landscapes: Rationale, Methods and Process Description,” Aleksandra Holmlund and Martin Pilstjarna, Litentiate Research Project on “Mechanisms and Opportunities for Financing of Forest Biodiversity,” May 2022. Retrieved on July 30, 2022, www.biodiversitycredits.se/wp-content/uploads/2022/06/Biodiversity-crediting-process-description-.pdf

Figure-1: Biodiversity Crediting Process



Source: www.biodiversitycredits.se/wp-content/uploads/2022/06/Biodiversity-crediting-process-description-.pdf

V. The World has Just Started to Explore Biodiversity Credits

As indicated in the “Biodiversity Credits in Boreal Forest Landscape” paper, “There are currently no instruments or products, specifically targeting biodiversity restoration and conservation on the market. The instrument most companies are using today for their environmental action are carbon credits, which even with an extra biodiversity certification add-on, do not address biodiversity issues strongly and accurately enough.”¹²

The market for biodiversity credits is still in its infancy. The United Kingdom, for example, is an early explorer in biodiversity credits, and Australia is moving in that direction as well.

1. United Kingdom

A 2019 Bill introduced in the U.K. made it mandatory for housing and development, subject to some narrow exemptions, to achieve at least a 10 percent net gain in value for biodiversity – a requirement that habitats for wildlife must be left in a measurably better state than before the development.¹³

Natural England is an executive non-departmental public body sponsored by the Department for Environment, Food & Rural Affairs. It started a pilot program in mid-2020 supporting the design of the Biodiversity Credits Scheme by developing a biodiversity-credit investment pipeline and payment structures to fund habitat provision¹⁴.

Operation Wallacea (Opwall) is a biodiversity and climate research organization based in the U.K. that is funded by tuition fees paid by students. Opwall has formed a 50-strong Biodiversity Credit Working Group comprising corporates (e.g., Glaxo Smith Kline, Sainsbury's, Croda Plc., etc.), financial institutions (e.g., World Bank, IMF, Finance for Biodiversity, Task Force for Nature-related Financial Disclosures, TNFD), experts in different taxa and biostatisticians, to develop an international biodiversity-credit standard that could be traded in the same way as a carbon credit. Credits would be issued by a third-party independent-certification body – Plan Vivo, one of the longest established carbon-certification schemes.¹⁵

2. Australia

The NSW Biodiversity Offsets Scheme (BOS) was established under the Biodiversity Conservation Act 2016 (BC Act). Under BOS, some developers may be required to offset their project's impact on biodiversity: they have a range of available options to meet their offset obligations. These options include purchasing their own offset sites (and retiring the credits generated by those sites), purchasing credits from the biodiversity credit market (generated by land owned by third parties) or payment of an amount into the Biodiversity Conservation Fund (BCF) in accordance with the offsets payment calculator¹⁶. Figure-2 indicated how the BOS works.

¹³ "September 2021: Nature and Conservation Covenants (parts 6 and 7)," GOV.UK, Updated April 1, 2022. Retrieved on July 30, 2022, <https://www.gov.uk/government/publications/environment-bill-2020/10-march-2020-nature-and-conservation-covenants-parts-6-and-7>

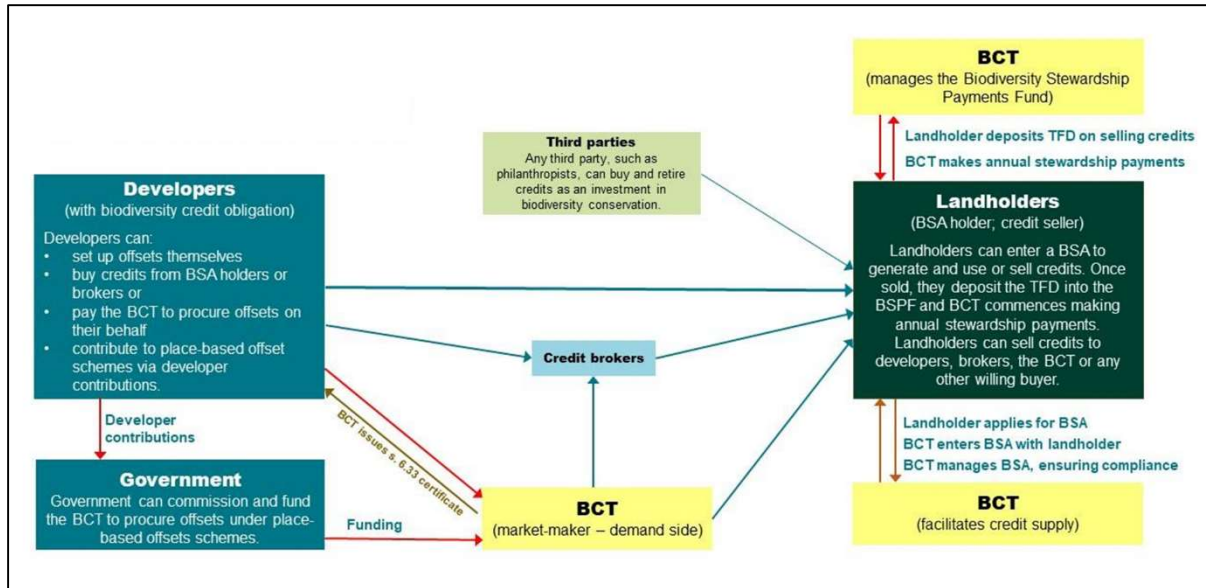
¹⁴ "Introducing the Biodiversity Credits Scheme Pilot Call for Projects," Natural England, July 1, 2020. Retrieved on July 30, 2022, https://cieem.net/wp-content/uploads/2020/07/Introducing-the-Biodiversity-Credits-Scheme-Call-for-Projects_01.07.20.pdf

¹⁵ "Biodiversity Credits," Opwall. Retrieved on July 30, 2022, <https://www.opwall.com/biodiversity-credits>

¹⁶ "Stimulating Biodiversity Credit Creation in NSW," Johnson Winter & Slattery, September 8, 2021, LEXOLOGY. Retrieved on July 30, 2022, <https://www.lexology.com/library/detail.aspx?g=d0893187-ef87-4ed6-afa9-00c5ada86d9c>

Figure-2: Biodiversity Offsets Transactions

(Before BSA application processes were handed over from BCT to CST on July 27, 2022)



Source: <https://www.bct.nsw.gov.au/biodiversity-offsets-program>

“Stimulating Biodiversity Credit Creation in NSW,” an article released on September 8, 2021, described the then current biodiversity credit market as “being relatively immature and of a very small scale.” In recognition of such market limitations, the Biodiversity Conservation Trust (BCT) started to consult with interested stakeholders and landholders on the development of a new developer charges model for developers who choose to pay into BCF¹⁶. On July 27, 2022, management of the Biodiversity Stewardship Agreement (BSA) application processes were handed over from BCT to the Credit Supply Taskforce (CST) at the Department of Planning and Environment¹⁷.

A day after the BSA application-process handover, Environment Minister Tanya Plibersek indicated a new biodiversity-credit scheme that would pay Australians to repair and nurture the habitat on their properties; noting that it would work similar to the carbon-credit scheme. Minister Plibersek has since promised a fundamental overhaul of federal environment laws, with new ones to be put to parliament next year.¹⁸

¹⁷ “Biodiversity Offsets Program,” Biodiversity Conservation Trust, NSW. Retrieved on July 30, 2022, <https://www.bct.nsw.gov.au/biodiversity-offsets-program>

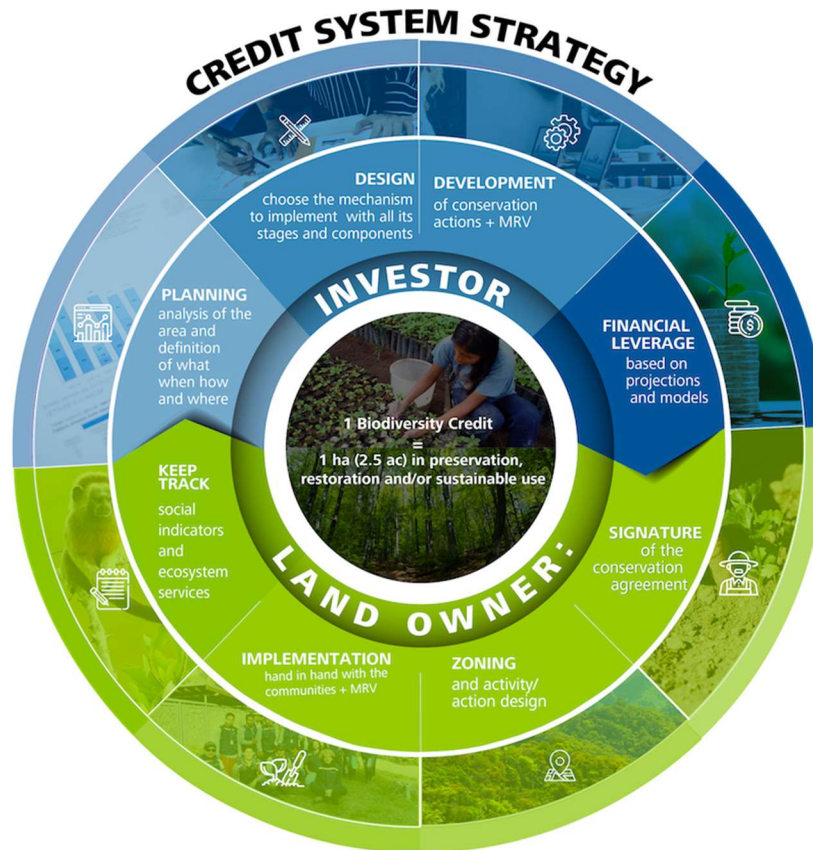
¹⁸ “Minister Flags Biodiversity Credits Scheme,” Tracey Ferrier, The New Daily, July 28, 2022. Retrieved on July 30, 2022, <https://thenewdaily.com.au/news/national/2022/07/28/minister-flags-biodiversity-credits-scheme>

VI. Some Basis to Work With

South Pole, a Swiss carbon-finance consultancy founded in 2006, offered a Biodiversity-Credit-System Strategy (Figure-3), which can serve as a good stimulant to our thought process in biodiversity credit.

As the market starts to develop, we should expect more discussions to surface, and more knowledge that will be built in biodiversity credits.

Figure-3: Biodiversity Credit System Strategy



Source: <https://www.southpole.com/sustainability-solutions/investments-in-biodiversity>