Introducing DEEP (Decentralised Ecological Economics Protocol):

A Pathway to Flipping the Economics of Ecology

Sovereign Nature
INITIATIVE

Overview

At the Sovereign Nature Initiative, our goal is to reconfigure the economics of ecology by finding ways to fund and expand projects that sustain life on our planet. Currently, most ecological stewarding projects are severely underfunded. Biodiversity restoration primarily relies on donations, and funding from philanthropists, public institutions, and other donors. Private voluntary contributions toward nature-positive efforts, also known as "private investments in nature", play a key role in addressing this funding gap.

The lack of sustainable financial streams is estimated at approximately $700 billion per year according to the Convention on Biological Diversity Secretariat.

We developed the Decentralised Ecological Economics Protocol (DEEP) together with the Registry for Ecological Asset Linking (REAL) to ensure that private commitments are valuable, and eventually become a key mode for contributing to the restoration of biodiversity worldwide. Our protocol and interface allow us to effectively integrate data about ecological impact with the digital realm. This approach generates new funding streams while imbuing digital assets with tangible and real-life significance. Critically, our approach allows ecological stewards to market their work without impeding their on-site efforts, ensuring a harmonious balance between financial viability and biodiversity restoration.

Our work is guided by the following key propositions:

- **breaking with the paradigm of one-sided donation: we integrate the value of biodiversity into digital products increasing their value in the digital economy by imbuing them with meaning in the age of digital overproduction;**

- **verifying impact through data: we provide access to the most relevant ecological field data used by organisations to monitor their progress and evaluate impact, with a digestible explanation of how the data is used to inform nature-positive strategies and actions;**

- **selecting trustworthy partners: we invest in projects of ecological stewards with a successful track record that operate on the ground and are guided by a holistic vision of sustaining life on earth for all species;**

- **reducing the distance: we develop meaningful and long-term connections between contributors and biodiversity practitioners to lay the foundation for a large scale socio-economic transformation.**

What is DEEP?

DEEP is our Decentralised Ecological Economics Protocol that brings eco-data to digital creatives. We collaborate with biodiversity stewards, such as conservation organisations and rewilding projects, who generate eco-data as part of their daily work. Eco-data spans species-specific insights obtained through direct observations, evidence of species' presence (e.g., droppings, tracks), and GPS-tracking devices, as well as broader habitat or ecosystem data collected via top-down remote sensing technologies such as satellites or ground collection of soil and plant samples. We process this data and make it accessible to digital creatives through our protocol; cleaning, standardising, and aggregating it. Digital creatives utilise this data in their projects, which can range from gaming and virtual environments to art and music production. The digital representations created using this data, so-called eco-linked assets, are then made available for purchase and the proceeds are shared between the conservation organisations (50-70%) and Sovereign Nature Initiative for funding its continued operations.

What is Eco-Data

Eco-data is data produced through the work of ecological stewards in their daily activities to inform their conservation and/or restoration strategies and actions internally, and to report on their biodiversity impact.

As it is impossible to measure ecology in all its complexity, we work with the particular data our partners deem important for their work. There are numerous organisations involved in the process of collecting, storing, and processing information about ecology while doing their conservation and regeneration activities. Through collecting relevant and educational eco-data we work toward a mechanism of biodiversity impact reporting 'from below' ultimately avoiding the typical pitfalls of early standardisation.

Eco-Linked Assets

Physical or digital goods can be connected to the eco-data through the DEEP link - a smart contract that stores the eco-data together with the digital asset, creating an eco-linked asset.

Creating such eco-linked assets is the key for generating substantial funding streams while imbuing the linked goods with tangible meaning.

DEEP Link

DEEP Link is an **ERC721** token that stores the connection between the linked asset and the ecological data set referencing an entity like an animal or a particular geographical area, enabling the creation of the eco-linked asset. It can link any ecological data set to a product - like nature-inspired in-game items, artworks, event tickets, etc. Such eco-linked assets can gain new properties, functions, and representations based on the data set they are connected to.

DEEP Link has the following parameters:
id - unique DEEP Link ID which is a product of caching the address of the linked asset into a big integer number.
entity_id - ID of the ecological entity according to the protocol.
steward_id - ID of the biodiversity steward according to the protocol.
funds_raised - amount of funds raised through the sale of the eco-linked asset.

Asset DID Address System

DEEP uses an address system based on the **Asset Decentralised Identifiers** (DID) Method Specification. The linked asset address is encoded into the DEEP link token ID via the keccak256 function.

Rarity Index

The Rarity Index is a custom metric designed to quantify and communicate the uniqueness and importance of various ecological features captured in the eco-data provided by conservation organisations. This index is key for integrating eco-data into gaming as it responds to the request of assigning rarity to items and functionalities by connecting it to real scientific data. The rarity attributes can be updated from real-life events so that the index evolves together with the linked eco-data.

Registry for Ecological Asset Linking (REAL)

The Registry for Ecological Asset Linking is the community interface and registry hosting all eco-linked assets and represents their ecological contribution. Each eco-linked asset in REAL showcases information about the relevant eco-data and the contribution toward the supported project. Utilising dAPP functionalities, REAL is geared toward democratising public access, participation and verification processes conducive to the effective and transparent allocation of monetary contributions towards biodiversity restoration. Each eco-linked asset hosted on REAL integrates comprehensive qualitative and quantitative data about a supported project, the biodiversity stewards running it and its objective and metrics used to track progress.

Ecological Impact Methodology

To structure the type of information and reporting needed to track the impact of biodiversity contributions, Sovereign Nature Initiative developed its own methodology for impact reporting, measurement and verification. The methodology informing the metrics expressed in REAL is an adaptation of globally applied best practices for international conservation project management, while innovating on modes and mechanisms for expressing biodiversity impacts and engaging directly with eco-linked asset holders. By introducing a legible and interactive data matrix, REAL enables the transparent tracing of each contribution. In staying close to the field work of the organisations, REAL allows biodiversity stewards to dynamically express their achievements.

With REAL, SNI aims to enhance trust and commitment between funders and stewards of biodiverse ecosystems, highlighting the potential of alternative funding sources and private involvement in supporting the ambitious targets the world has set to support significant biodiversity conservation and restoration efforts globally.

All about value(s)

Financial independence of the ecological world is the main aspect of our work. We believe that the key to sustainable life on Earth lies in a revaluation of ecological efforts. The dominant paradigm for funding ecological work revolves around donations, philanthropy and public funding. The key characteristic is thus a dependence on the willingness of other actors to support biodiversity stewardship. As such they sit at the bottom of the priority list rendering their work structurally vulnerable.

We counteract this paradigm by developing new ways of valuing the work of biodiversity stewards, moving the appreciation from 'nice to have' toward 'essential necessity'. The key to this shift lies in integrating the eco-data that the stewards produce into products of the digital economy thereby making the data indispensable. This differs from conventional approaches, usually in the realm of what has come to be known as ecosystem services. In our proposition, the value derives from the utility of the data that is produced by doing ecological work. It is thus independent from typical valuations of nature as natural capital in service of human life. The commodification is located at the level of data production and data utility, leaving the integrity of ecological groundwork intact.

Our valuation practices are not aimed at putting a price tag on nature, nor at assessing the value of its eco-systemic services. We are building toward a new economy that leaves enough on-site space for biodiversity stewards to continue doing their work. It enables them to avoid full integration and exposure to the pressures of the market while stepping into the digital economy to sustain the funding of their work.

Digital life not digital twinning

Our pipeline connects eco-data to the digital creative space, where individuals and communities create representations and assets, so-called eco-linked assets. By utilising our protocol, these digital creatives can access and incorporate eco-data provided by ecological stewards into their projects. We do not impose a specific aesthetic or representation of nature in the digital world, but rather empower digital creatives to collaborate, innovate, and showcase their unique perspectives. We embrace the idea that there must be a plurality of valid representations of eco-data, multiplying the impact and possibilities for biodiversity restoration.

Sovereign Nature as co-existence

The Sovereign Nature Initiative was inspired by the idea of self-owning and self-governing forests and thus autonomous, non-human agency. Exploring avenues for acknowledging non-human agency is inscribed into the core of our mission. Yet, we emphasise the role of the foundational existing embeddedness of humans within nature, within ecosystems. We are also deliberately seeking collaborations with organisations that work with a holistic approach, including the role that human communities play for interspecies co-existence. Our work taught us that the separation of humans from nature is artificial and not experienced or lived as such by our partners. The amalgam of the daily work in the field, the data produced about it, as well as the formal modes of representation in the technical and administrative organisational structures are part of the same organism. The fantasy of unmediated support for an animal or a plant absurdly reduces this complexity and is counter-intuitive when taking the work of biodiversity stewards seriously.

It is precisely the respect for the complexity of this layering that makes our work stand out. In a time when the pressure for ever more accurate and ever less mediated eco-data is accelerated by technological innovation, the most important work is to hold space for the thick entangled fabric of life where technology is in service of facilitating conviviality.

We do our part. But it neither constitutes a silver bullet, nor a final destination. It is the important next step that enables a larger socio-ecological transformation, or as we like to call it, that forges a pathway to flipping the economics of ecology.

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