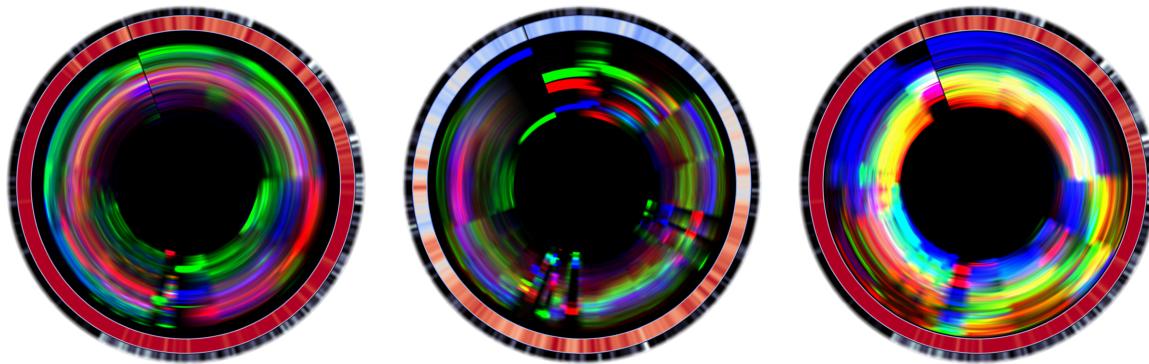
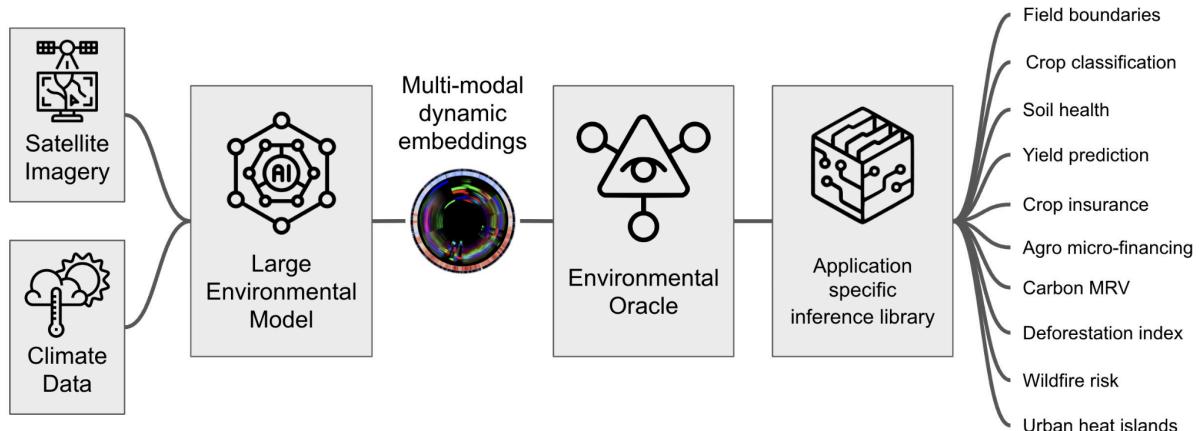


EcoMandala: Final report

Environmental Intelligence on Cardano



[The EcoMandala project](#) envisions a transformative approach to Environmental Intelligence by creating a standardized framework of environmental data tokens on Cardano. This innovation draws inspiration from the tokenization techniques used in the development of Large Language Models (LLMs), which decompose linguistic information into manageable and structured tokens. Similarly, the EcoMandala methodology aims to generate environmental data tokens that represent granular, interoperable units of environmental information.



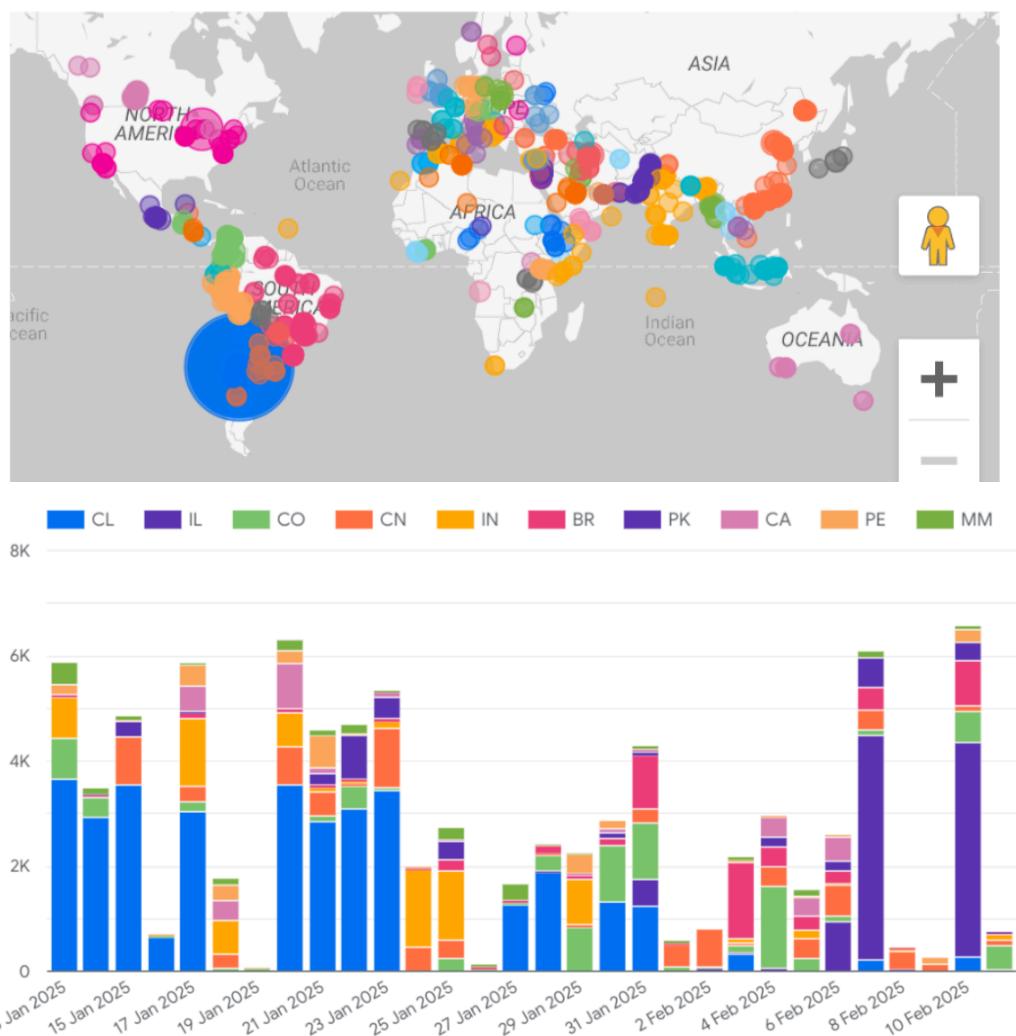
Large Environmental Model (LEM) and Oracle architecture.

These environmental data tokens will form the foundation for training a Large Environmental Model (LEM), a comprehensive AI system designed to address diverse environmental challenges. By integrating data across scales, types, and sources, LEMs will be capable of understanding, predicting, and recommending solutions to complex ecological and sustainability issues. The envisioned applications

include areas such as ecosystem monitoring, climate change mitigation, resource management, and biodiversity conservation.

Within this framework, the EcoMandala circle diagrams represent dynamic visual narratives, i.e. "stories" or "articles" of data describing the environmental record of a particular geographic location. These visualizations provide stakeholders with intuitive access to actionable insights while maintaining scientific rigor.

In the long term, the EcoMandala methodology, combined with the Large Environmental Model, aspires to become a cornerstone of data-driven environmental stewardship. By fostering collaboration among researchers, policymakers, and communities, this vision supports global sustainability goals through informed decision-making and innovative solutions to pressing ecological challenges.

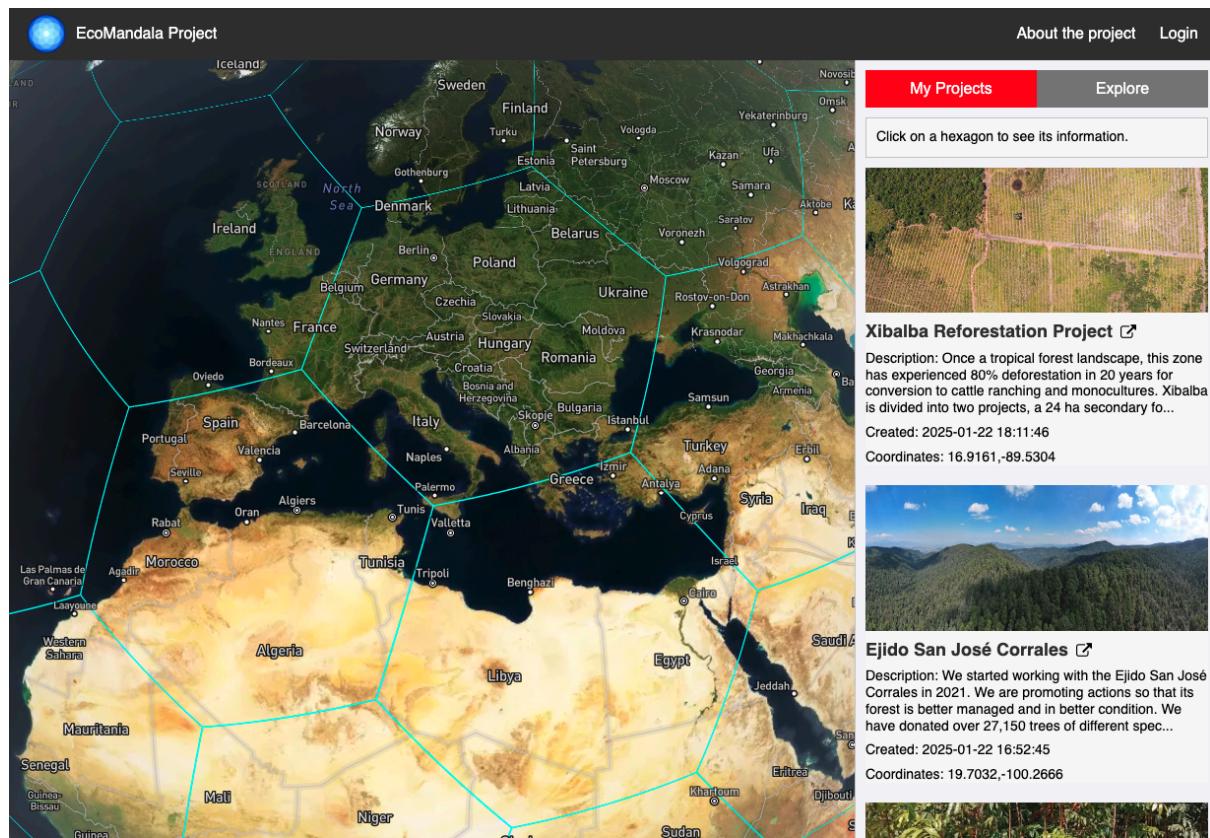


Open access S2DR3 Foundational Model Traction for the month of January, 2025. The model is used on a daily basis by dozens of research, humanitarian and commercial projects globally.

EcoMandala Portal

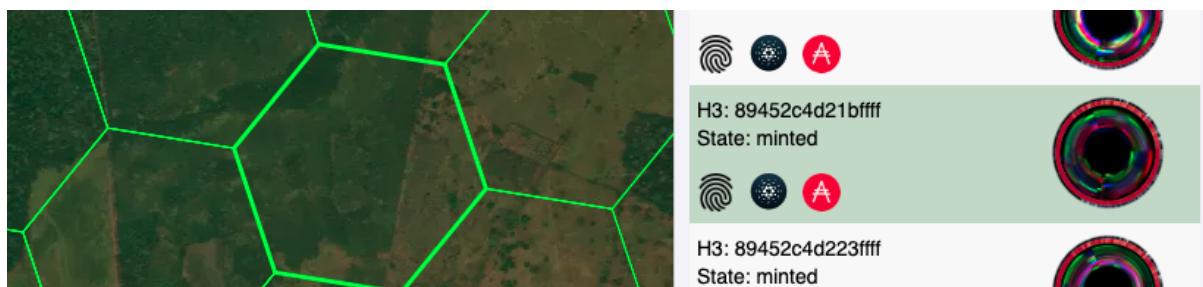
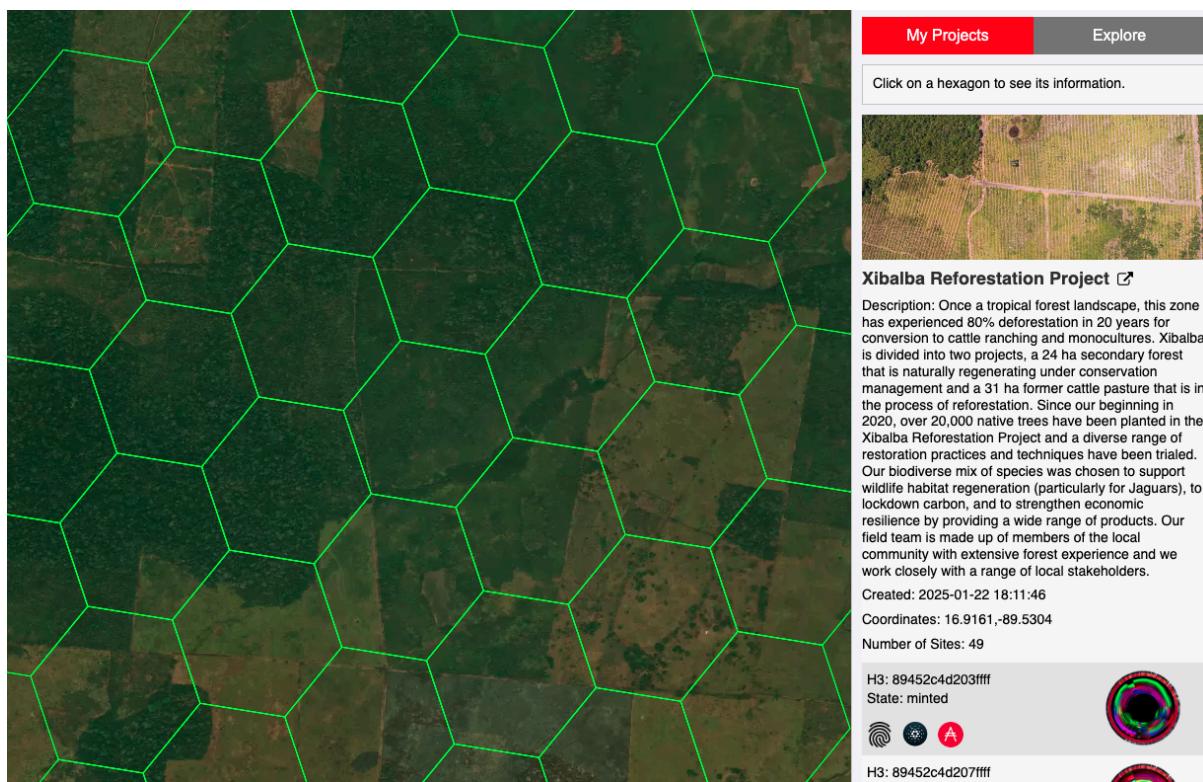
URL: <https://gamayos.github.io/pcf12-ecomandala/ecomandala-20241229-1.html>

Navigation



The EcoMandala portal is composed of a map on the left and the list of projects in the right panel. Each project in the project list corresponds to a real nature restoration project managed by our partner organisation Open Forest Protocol (<https://www.openforestprotocol.org/>).

By clicking on a project panel, the map will pan to the corresponding location and show the collection of hexagonal land cells covering the project area. Each hexagonal cell corresponds to the EcoMandala diagram listed in the right panel. The map cells and the mandala diagrams can be matched by clicking either of them. Upon such click both the cell and the corresponding diagram will be highlighted.



The three icons at the bottom left of the EcoMandala card represent the state of the corresponding EcoMandala NFT, where the fingerprint indicates that the NTF has been generated and the metadata is available. Cardano logo indicates that the NFT has been reserved and the ADA icon indicates that the NFT has been minted. Clicking on the ADA icon will open the transaction record of the minted EcoMandala NFT.

Cexplorer.io preprod

CARDANO EXPLORER

- Dashboard
- Watchlist
- Pools
- Assets

Ofac353c-bad1-1lef

Fingerprint: `asset1mn5qh4flus5my6q937s5ftkayn63wzjztm5tzu`

Asset Name	<code>Ofac353c-bad1-1lef</code>
Encoded Name	<code>3f975eef43...16566</code>

EcoMandala API

An advanced RISC API has been designed, deployed on Google Cloud and extensively tested.

Unset

Base URL:

<https://us-central1-ecomandala.cloudfunctions.net>

API calls:

```
/listProjects/{UserID}  
/listSites/{UserID}/{ProjectID}  
/getProjectInfo/{UserID}/{ProjectID}  
/getSiteInfo/{UserID}/{ProjectID}/{HexID}  
/addProject/{UserID}/{HexID}  
/addSite/{UserID}/{ProjectID}/{HexID}  
/mintProject/{UserID}/{ProjectID}  
/mintSite/{UserID}/{ProjectID}/{HexID}
```

Security

Although no complete user management and authentication system has been implemented in the scope of the current Prove of Concept project, security-sensitive API calls including addProject, addSite, mintProject and mintSite have been protected using the standard Bearer Token authentication method.

Testing

EcoMandala system have been extensively tested for both functionality and performance. All data management and computation tasks have been fully automated and deployed on scalable Google Cloud infrastructure. The backend has been stress tested by generating large projects of 300+ hexagonal units and the corresponding EcoMandala NFTs were generated and automatically minted.

The resulting 1000+ EcoMandala mints (in three projects) are listed in the following link:
<https://docs.google.com/spreadsheets/d/1-PgtYcHZqVcBQcoDjswwFcXsXMlnL4imdXXXPHpmHgo/edit?usp=sharing>