Cardano Foundation

Traceability



Verifiable farm data for inclusive agricultural markets

Sharing trusted land and sustainability records on the Cardano blockchain for use across multiple applications

Challenge

Fragmented farm data limits access to financial services and markets

More than 100 million smallholder farmers in India operate outside formal economic systems because of the lack of trusted, verifiable agricultural data. Land boundaries often remain undocumented or disputed, sustainability practices go unrecorded, and historical yield data is fragmented across disconnected systems.

As a result, **farmers struggle to prove eligibility for credit, insurance, government programs, and premium supply chains.** Agri-Entrepreneurs (AEs) play a critical role in bridging this gap, providing local facilitation and advisory services. Yet, without a reliable data infrastructure, they too are limited in what they can offer.

For financial institutions, insurers, and supply chain participants, this **lack of reliable data results in higher due diligence costs and greater risk.** Verification depends on manual processes, local attestations, or obscure intermediaries that do not scale. Even when agronomic data exists, it cannot be independently validated or reused across institutions.

This structural data gap **limits inclusion, constrains market efficiency, and prevents sustainable agriculture models from operating at scale.**

syngenta foundation India

ANDAMIO

AIQUANT TECHNOLOGIES

ANASTASIA LABS

5am.Earth

Industry

- Agriculture and Agri-Finance

Size

- USD 183.21 Billion (2024)[1]
- USD 256.97 Billion (2032)
- CAGR: 4.32% (2025–2032)

The challenge

- Lack of verifiable land ownership and boundaries.
- Absence of historical sustainability and yield records.
- Exclusion from formal credit, insurance, and premium markets.
- High institutional risk and manual due diligence requirements.

The solution

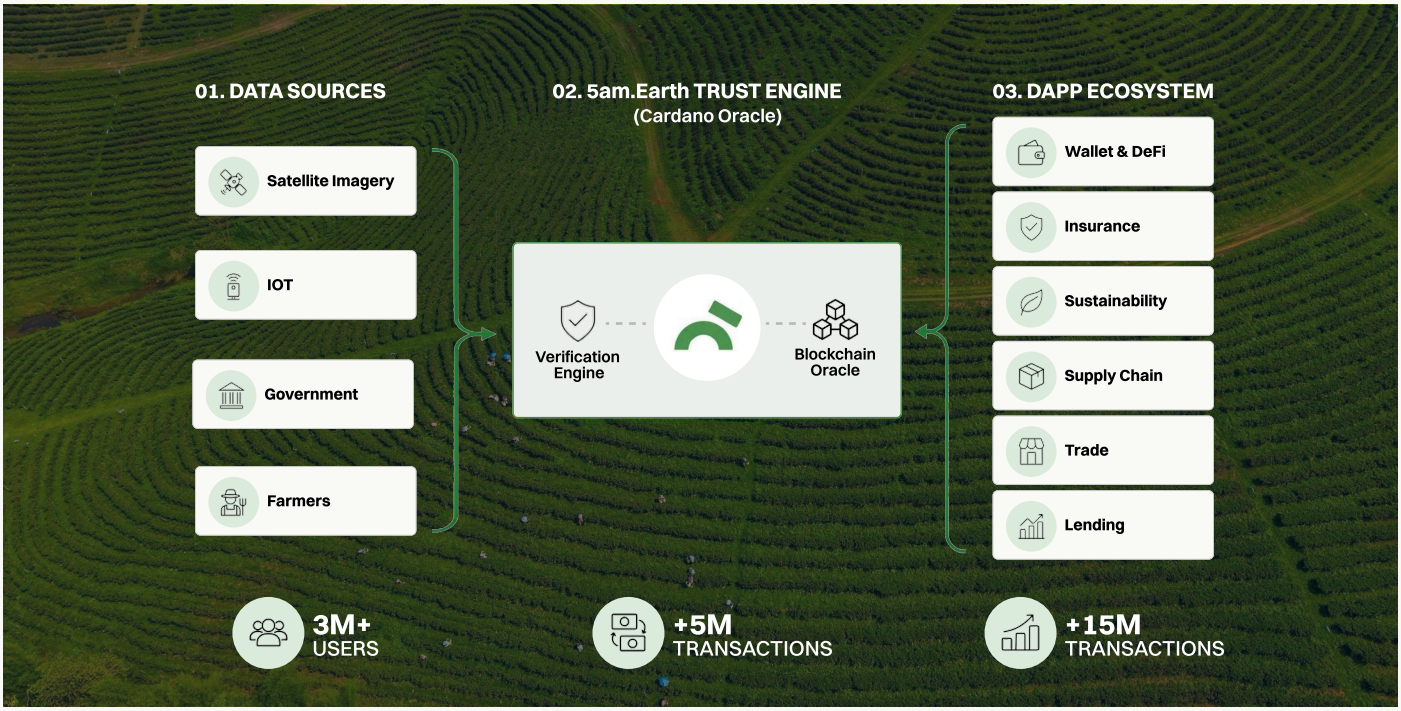
- Satellite-based land boundary verification.
- Decentralized identifiers for farm parcels, farmers, and AEs using Veridian.
- NFT-based verification of agricultural datasets.
- Public, auditable records on the Cardano blockchain.

"Public blockchain infrastructure enables independent verification at a scale traditional systems cannot match, driving down the cost of information from farm to market and the cost of services from market to farm."

Deepak Ekka
Key Account Manager, Syngenta Foundation India

Solution

Satellite-verified agricultural data infrastructure



Syngenta Foundation India, in collaboration with 5am.Earth, AIquant, Anastasia Labs, and Andamio implemented a **Cardano-based Satellite Oracle to establish a trusted data foundation for smallholder agriculture.** The solution combines Earth Observation data with decentralized identifiers (DIDs) and blockchain-based verification to create persistent, tamper-resistant digital records for individual farm parcels.

Rather than introducing a single application, **the platform functions as shared public infrastructure.** Verified land boundaries, sustainability histories, and crop data are recorded once and reused across multiple institutional contexts, including finance, insurance, government programs, and agricultural trade.

By anchoring these records on the Cardano blockchain, **the system enables independent verification, long-term auditability, and interoperability** without reliance on centralized control.

Solution Walkthrough

5am.Earth

01. Farm parcels are mapped using satellite imagery and assigned decentralized identifiers.

02. A sustainability index is derived from historical Earth Observation datasets.

03. Data points are verified, tokenized, and recorded on the Cardano blockchain.

04. Institutions consume verified data through integrated financial and compliance platforms.

Results

Measurable economic and institutional impact

Farmer income uplift
Verified data unlocks a range of applications, including access to credit, insurance, regulatory compliance, and premium markets, with the goal of increasing farmer income by up to 100% within five years of joining the ecosystem.

Expanded rural service economy
AEs gain new service offerings and earn an incremental USD 120-140 per month through facilitation and advisory services.

Reduced institutional risk
Independent verification lowers due diligence costs and improves risk assessment for lenders and insurers.

Proven implementation readiness
The system successfully completed mainnet deployment and initial field trials, validating large-scale feasibility, with over 100,000 farms now registered on the Cardano blockchain.

Scalable agricultural data infrastructure
Infrastructure supports expansion to one million farmers without a proportional increase in costs.

CARDANO Advantages

Proven resilience
Demonstrated security and reliability support continuous operation.

Scalable network
Future-ready infrastructure supports platform growth without sacrificing performance.

Secure data
Robust architecture protects sensitive data, minimizing the risk of breaches or fraud.

Sustainable operations
Energy-efficient consensus and ethical governance align with sustainability efforts.

Open connectivity
API-enabled connectivity to DeFi, stablecoins, and business applications.

Source
[1] Yahoo Finance, Farming and Agriculture Finance Market

Cardano Foundation

The Cardano Foundation is an independent, Swiss-based not-for-profit advancing Cardano as a public digital infrastructure across a wide range of industries.

Contact us

cardanofoundation.org