UMBI Protocol: Tokenizing Farms

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ABSTRACT

UMBI Protocol is a decentralized finance (DeFi) framework designed to bridge the gap between agricultural financing and blockchain capital markets. Although Non Fungiable Token (NFT) technology has seen explosive growth, it remains underutilized in real-world scenarios, often limited to digital art and collectibles. UMBI repurposes NFTs as verifiable digital certificates of ownership, profit rights, and risk-sharing, unlocking their potential for productive, yield-bearing assets. By tokenizing farm operations into ERC-1155 FarmNFTs and powering the ecosystem with the ERC-20 UMBI Token, the protocol enables farmers to access funding while allowing crypto investors to share in both the income and the risks of farm operations — all in a trustless system with minimal centralization risk.

KEYWORD

Umbi Protocol; Decentralized finance (DeFi); Real World Asset (RWA); Agribusiness; Decentralized Autonomous Organization (DAO); Non Fungiable Token (NFT); Web3; Blockchain

1. INTRODUCTION

Agriculture is a bedrock of the real economy and a core benchmark for inflation, yet access to capital remains limited for small and medium-sized farms. Despite being comparatively lower-risk and essential, these operators often face slow, collateral-heavy, and opaque financing.

Past attempts to "solve" this with gamified virtual farming have failed: the Çiftlik Bank ("Farm Bank") case in Turkey showed how a centralized, trust-based scheme could collapse into a Ponzi, harming thousands of participants—an object lesson in why trustless systems matter [1].

Smart contracts offer a better path: their trustless and decentralized nature can remove single points of failure and enforce rules automatically. However, today's NFT usage is still dominated by hype and digital art, with little connection to cash-flowing, real-world assets.

UMBI Protocol seek to solve this by:

1. **Tokenized Farms (ERC-1155)** — We represent farm operational rights as FarmNFTs, enabling fractional, tradable ownership that can be listed on NFT marketplaces and programmatically integrated across DeFi.
2. **Decentralized & Trustless System** — Only FarmNFT holders can receive income and compensation/escrow tied to their specific farm token IDs; claims are executed on-chain without reliance on admins or a centralized authority, minimizing centralization risk.
3. **Governance & Community (ERC-20 + Foundation)** — The UMBI Token enables protocol income sharing and voting features on parameters (e.g., onboarding priorities, reward settings). The UMBI Foundation complements on-chain governance by supporting community, compliance, and farmer onboarding in the real world.

Through this structure, UMBI introduces a transparent, scalable, and community-governed approach to farm financing and profit-sharing with minimal centralization risk — enabling low-risk, high-capital farm businesses to meet the high-risk appetite of crypto investors.

2. PROTOCOL

The UMBI Protocol is a suite of on-chain smart contracts that manage farm fundraising, ownership, and profit distribution. Its primary purpose is to ensure that capital flows, ownership rights, and rewards are handled in a transparent, trustless, and verifiable way directly on chain.

2.1 FarmNFT (ERC-1155)

Each farm plot or operational right is represented as an ERC-1155 FarmNFT digital certificate. These NFTs provide fractional ownership, allowing investors to hold units of a farm plot rather than needing to buy it outright. Holders are entitled to profit rights, receiving 80% of the farm's net income distributed pro-rata. Each FarmNFT also carries time-limited rights, representing up to a 10-year operational period. To safeguard investors, an escrow mechanism holds 10% of the income as compensation if operations ends, ensuring accountability

and risk-sharing. This structure makes farm ownership transferable, liquid, and accessible to global investors [2].

Table 1. Farm NFT (ERC-1155) Attributes

Attribute	Value
Standard	ERC-1155 (Multitoken)
Representation	Each `tokenId` = one farm plot / container with a 10-year operational duration
Ownership	Fractional, enabling multiple investors to co-own farms.
Transferability	Fully tradable on-chain and secondary markets.
Profit Sharing	80% to NFT holders, 10% protocol, 10% escrow.
Compensation Escrow	Safeguard for NFT holders and its value if operations ends. NFT share burned upon claiming escrow

Unlike traditional NFTs that are often valued based on hype and pseudo-rarity, FarmNFTs derive their worth from real-world income and operational risk. The starting point is the farm revenue projection, which estimates the expected net income over a 10-year period. Investors typically set their bidding price below this projection to account for operational and market risks. The compensation value, provided through escrow, ensures that the NFT converges toward an intrinsic floor value if operations end. Finally, the time-limited nature of each farm means that as years pass, the remaining profit potential declines, reducing the fair value of the NFT.

In theory, the fair value of a FarmNFT can be approximated as:

$$V = \sum_{t=1}^{T} \frac{R_t}{(1+r)^t} + C$$

Where:

- V = present value of the FarmNFT
- Rt = expected revenue distributed to the NFT holder in year
- r = discount rate (risk-adjusted)
- T = remaining operational years (up to 10)
- C = compensation escrow claimable if farm operations end.

This formula combines cash-flow projection with escrow-backed downside protection, making FarmNFTs both yield-generating and risk-mitigated assets. Actual FarmNFT values can vary significantly due to external factors such as:

- Operational risks (farm management, productivity efficiency,)
- Commodity price fluctuations (market volatility of crops)
- Environmental hazards (weather events, pests, natural disasters)
- Macroeconomic conditions (inflation, interest rates, demand shifts)

As such, FarmNFTs should be seen as risk-shared agricultural opportunities, not guaranteed returns.

2.2 UMBI Token (ERC-20)

The UMBI Token powers the protocol by aligning incentives across all participants. In the early stages, its main role is to fundraise and sustain development through audits, community growth, and ecosystem support (Table 3). Only staked UMBI grants governance rights, while stakers earn a protocol share from the 10% profit allocation. With a fixed supply and strong utility, UMBI is designed to be deflationary, as demand for governance, staking, and farm rewards reduces circulating supply over time (Table 2).

Table 2. Umbi Token ERC-20 Attributes

Attribute	Value
Name	Umbi Token
Decimals	18
Total Supply	16,000,000
Mintable	✗
Burnable	✗
Fixed Supply	✔
Governance	✔
Staking	✔

2.3 Profit Distributor

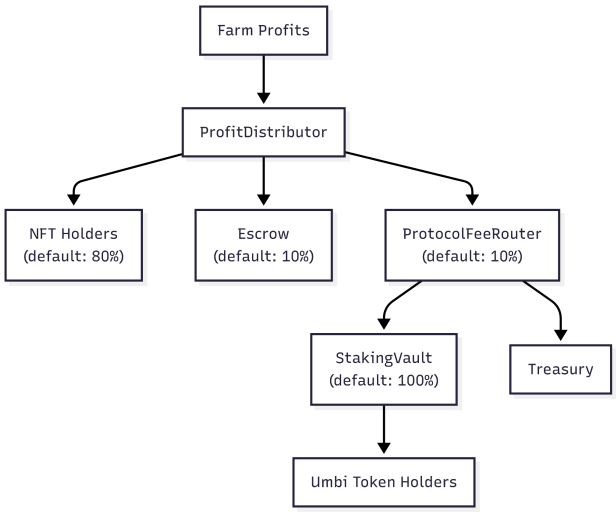
Profit distribution within UMBI is handled through a two-layer contract system. The ProfitDistributor accepts profits deposited by farmers in the designated payout token and splits them into three parts: 80% to NFT holders, distributed pro-rata based on FarmNFT balances; 10% to escrow, held aside as compensation for NFT holders if operations end prematurely; and 10% to the ProtocolFeeRouter, forwarded to sustain the protocol.

Table 3. Token Distribution

Allocation Category	Percentage	Notes
Founders & Core Team	30%	Vesting to ensure long-term commitment (strategy under discussion: time-based vs. market cap based).
Strategic Partners & VCs	15%	Early backers providing capital, tech, and market support (vesting).
Liquidity Provision	10%	To bootstrap decentralized exchange pools.
Community & Incentives	45%	Bug bounties, airdrops, staking rewards, ecosystem growth.

The ProtocolFeeRouter then divides the protocol's share into two allocations: the StakingVault, which provides rewards for UMBI token stakers, and the Treasury, which funds audits, development, bug bounties, and community initiatives. This layered design ensures transparency, fairness, and accountability across all stakeholders, as illustrated in Figure 1: Profit Flow Diagram.

Figure 1. Profit Flow Diagram



2.4 FarmICO

The FarmICO contract enables farmers to raise capital via on-chain offerings. Investors purchase units of FarmNFTs. Targets, deadlines, and refund logic ensure fair fundraising. Farmers gain capital while investors gain long-term income rights. This mechanism allows farmers to bootstrap operations without traditional lenders, while investors secure yield-bearing digital assets.

2.5 StakingVault & Gauges

The StakingVault allows users to stake UMBI tokens to earn rewards. Starting in V2, Gauges will be introduced, enabling token holders to vote on how rewards and allocations are distributed (e.g., treasury split, escrow percentage, dividend rate). This ensures that protocol parameters evolve dynamically through governance.

3. FOUNDATION

While the protocol ensures transparency and automation on-chain, the Foundation ensures trust, accountability, and execution in the real world. It operates as a non-profit entity that bridges farmers, investors, and regulators, making farm tokenization both legally compliant and operationally reliable.

3.1 Proxy Owner

The Foundation acts as a proxy owner of tokenized farms on behalf of the community:

- Works with farmers to define frameworks that align real-world agreements with their NFT representation.
- Ensures that farm profits are reported and deposited into the ProfitDistributor contract according to agreed terms.
- Facilitates communication and accountability between farmers and investors when issues or disputes arise.
- Performs KYC (Know Your Customer) and due diligence on farmers.

This means that although ownership rights are digitized through ERC-1155 NFTs, the Foundation provides the legal wrapper and operational framework that makes them practical and enforceable in the real world. This means that although ownership rights are digitized through ERC-1155 NFTs, the Foundation provides the legal wrapper that makes them enforceable.

3.2 Local Community Hub

The Foundation also operates as a local hub for farmers and agricultural partners:

- Provides onboarding assistance for farmers entering the protocol.
- Educates local communities about tokenization, profit-sharing, and reporting standards.
- Builds connections with distributors, buyers, and supply chain actors to strengthen farm operations.
- Encourages sustainable practices by linking farmers with ESG and green finance opportunities.

3.3 Development

Beyond oversight, the Foundation is also responsible for maintaining and building the UMBI applications alongside the community:

- Supports the development of the official web interface for farm offerings, staking, and governance.
- Ensures integrations with wallets, DeFi tools, and marketplaces remain user-friendly.
- Provides grants and guidance for community-driven apps and dashboards built on top of the UMBI Protocol.
- Facilitates open-source collaboration to expand the ecosystem beyond its core team.

4. GOVERNANCE

Governance in UMBI ensures that the protocol evolves in a community-driven and decentralized way. Only staked UMBI tokens grant governance rights, meaning participants must be long-term aligned with the ecosystem to influence its future.

4.1 Farm ICO Decision

Before a farm can raise capital through a FarmICO, the community of UMBI token holders will have a say in whether the farm should be offered to the protocol. This ensures that the decision of which farms get access to fundraising is not singlehandedly approved by the Foundation, but rather subject to community input.

In the early stages, this decision-making will take place through open discussions in Telegram and Discord groups. As governance evolves, the process will transition to on-chain voting using UMBI tokens, ensuring a transparent and decentralized mechanism for farm onboarding.

4.2 Gauges (Available in V2)

Gauges are on-chain governance mechanisms that allow token holders to vote on economic parameters of the protocol. This gives the community direct influence over how profits and allocations are distributed, ensuring flexibility as conditions change.

Table 4. Gauges Parameters of The Umbi Protocol

Variable	Explanation
Protocol Reward	Determines the reward token distribution (e.g., 100% UMBI, boosted UMBI, or mixed with ETH/USDC).
Protocol Allocation	Percentage of farm profits allocated to the protocol treasury.
Escrow Rate	Portions of farm revenue held in escrow to protect NFT owners if operations ended.
Dividend Rate	Percentage of profits distributed directly to token stakers instead of treasury reserves

4.3 Foundation Organization (in V3)

In later stages, governance extends beyond protocol parameters into real-world organizational actions. Through DAO voting, the community can issue binding decisions that shape the UMBI Foundation and its global expansion. Examples of governance actions:

- Appointing Foundation Heads who oversee regional or global operations.
- Approving regional expansion (e.g., Southeast Asia, Africa, Europe).
- Onboarding or removing strategic partners such as cooperatives, distributors, or compliance providers.
- Adjusting compliance standards for farmer KYC, auditing, and reporting.
- Allocating treasury funds for grants, sustainability initiatives, or marketing campaigns.

This dual model — Gauges for protocol economics and DAO-driven foundation governance — ensures that UMBI evolves with both on-chain adaptability and real-world accountability.

5. RISK FACTORS

Like any protocol that bridges blockchain with real-world assets, UMBI carries inherent risks that must be recognized. While the system is designed with safeguards, transparency requires acknowledging these risks.

Table 5. Umbi Protocol Roadmap and Milestone

Feature / Milestone	V1 (Pilot)	V2 (Expansion)	V3 (Global Scale)
Launch Date	Q4 2025 or Q1 2026	Q4 2026	2027+
Farm Onboarding	Internal (Akar Farms)	External (Akar Community)	External (international farmer network)
Number of Farms	1-3	25–50	100+
Estimated Marketcap	$10M – $20M	$100M – $200M	$500M – $1B
Foundation	Regional: Indonesia	Global	Global
Govern Gauges	x	v	v
Govern Foundation	x	x	v
Govern ICO Decision	v (community discuss)	v (on-chain voting)	v (on-chain voting)
Reporting	Document-based	IOT-based	IOT + Oracle
Feature Development	FarmICO (ERC-1155), Staking (ERC-20), Claim	Governance, Analytics, IoT Integration	Point of Sale, Oracle, DeFi Treasury Integration, Vault Strategies

The following point summarizes the key risks and how the protocol seeks to address them:

- **Farmer Compliance** - In the early stage, only trusted partners such as Akar Farms are onboarded. Meanwhile, the UMBI Foundation develops reporting standards and a legal framework for farm tokenization. This approach will form the bedrock for scaling to more farmers in later phases.
- **Smart Contract Risk** - V1 is designed with simplicity first, minimizing features to reduce the attack surface and bug risk. UMBI also partners with a local exchange for technical support and independent auditing.
- **Governance Risk** - In V1, the protocol remains partially centralized with a multisig admin, creating a potential single point of failure. However, claims can only be executed by NFT holders, preventing admin overrides. In V2, administrative controls will progressively migrate to the DAO.
- **Farmer Operator Risk** - Farmers are not typically accustomed to operating wallets or smart contracts. The UMBI Foundation, alongside a web3 interface, provides onboarding and operational support. Exchange partners will also assist with farmer integration into the protocol.
- **Protocol Token Risk** - Deploying ERC-20 UMBI introduces liquidity and pricing risks. To mitigate this: co-founder and VC allocations are locked (time-based or market-cap based, TBD), while ERC-20 ICO efforts focus on providing liquidity. A market-making strategy and liquidity airdrop program will help balance farmer onboarding, token distribution, and market depth.

6. ROADMAP

UMBI Protocol is designed to evolve in phases, starting from a pilot with trusted partners and expanding toward a global, community-governed ecosystem. Each phase introduces new farms, deeper governance, and more advanced integrations from IoT-enabled reporting to DeFi treasury strategies. The cornerstone of progress will remain the number of farms successfully onboarded, serving as both a milestone and a measure of adoption.

Table 5. illustrates the progressive decentralization of UMBI:

- **V1 (Pilot):** Establish trust with a small number of farms and simple, reliable smart contracts.
- **V2 (Expansion):** Scale into a broader community with governance, analytics and IoT transparency.
- **V3 (Global Scale):** Achieve global reach with advanced integrations, DeFi treasury management, and cross-border farm networks.

7. ACKNOWLEDGMENT

The development of UMBI Protocol would not have been

possible without the contributions and support of key individuals and communities:

Farras and Bintang (Co-founders of Akar Farms): Their firsthand experiences and pain points in operating farms became the inspiration for building a system that truly addresses the financing and accountability challenges faced by farmers.

Exchange Partner: For providing technical expertise, smart contract auditing, and community support during the early stages of development.

Ethereum Community: For building the open-source technology and standards (ERC-20, ERC-1155, governance frameworks) that serve as the foundation of UMBI Protocol. We extend our gratitude to all contributors, partners, and communities who believe in the vision of bridging agriculture and blockchain to create sustainable, transparent, and globally accessible farm financing.

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