Dharitri

Whitepaper

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Table of Contents

- **Executive Summary**
    - Executive Summary — Pilot Scope & Reporting
- **1. The Problem: Global Challenges in Agriculture and Environment**
    - 1.1. Context and Rationale for the Dharitri Project
    - 1.2. Current State of Smallholder Agriculture: Global Significance and Persistent Challenges
    - 1.3. Identified Gaps & Requirements for Sustainable Improvement
- **2. The Solution: The Dharitri Platform**
    - 2.1. Project Mission and Guiding Principles
    - 2.2. Technological Foundation: A **MultiversX** Fork
        - 2.2.1. Chain Selection Rationale (Trade-offs)
        - 2.2.2. EVM Compatibility and Developer Tooling
    - 2.3. Platform Architecture and Key Components
    - 2.4. Core Technical Features
        - 2.4.1. Data Privacy & Consent Architecture
        - 2.4.2. Monitoring, Reporting, Verification (MRV) and Anti-Gaming
        - 2.4.3. MRV Parameters & Disputes
            - 2.4.3.1. MRV Spec Summary (Initial Defaults)
            - 2.4.3.2. Verifier Compensation & Data Sourcing (Governance-Controlled)
        - 2.4.4. Gasless UX for Core Farmer Actions (Meta-Transactions)
            - 2.4.4.1. Gasless UX Commitment (Initial Defaults)
            - 2.4.4.2. Long-Term Fee Experience (Governance-Controlled)
    - 2.5 Regenerative Agriculture Ecosystem
            - 2.5.1 Key Regenerative Activities Supported
            - 2.5.2 Outcome and Impact
- **3. The Dharitri Token System: pREWA and REWA**
    - 3.1. Overview
    - 3.2. pREWA (BEP-20 Token)
    - 3.3. REWA (Native L1 Token)
        - 3.3.1. Vesting, Lockups, and Supply Safeguards
    - 3.4. pREWA-to-REWA Conversion Mechanism
        - 3.4.1. Bridge Security & Incident Response

                - 3.4.1.1. Bridge Policy (Initial Defaults – subject to governance ratification)
                - 3.4.1.2. Incident Runbook (Summary)
        - 3.5. Token Release Timeline & Supply Management
        - 3.6. Staking and Validator Economics
            - 3.6.1. Validator Rewards & APR Method
                - 3.6.1.1. Issuance Schedule and Rewards Pool Longevity
                - 3.6.1.2. APR Examples (Derived from E(t), for illustration only)
                - 3.6.1.3. APR Illustration Clarification (Non-Binding)
            - 3.6.2. Slashing Semantics
- **4. Governance**
    - 4.1. Governance Lifecycle and Mechanics
        - 4.1.1. Governance Safeguards (Timelocks & Emergency Powers)
    - 4.2. Governance Phases (Foundation → Council → Full on-chain)
        - 4.2.1. Phase-2 Validator Council Bootstrapping (Interim)
- **5. Roadmap and Development**
    - 5.1. Current Development Phase & Immediate Objectives
    - 5.2. Phase 1 Implementation (Next 6–18 Months)
    - 5.3. Phase 2 Expansion (12–24+ Months Post-Phase 1)
    - 5.4. Phase 3 and Beyond (Further Expansion)
- **6. Project Execution**
    - 6.1. Core Team
    - 6.2. Application of Development Funding
- **7. Risk Analysis**
    - 7.1. Identified Risks and Mitigation Considerations
    - 7.2. Dharitri-Specific Risks
- **8. Conclusion and Further Information**
- **References**
- **Abbreviations and Acronyms (Consolidated)**
- **Appendix A: Regulatory & Compliance**
    - A.1: Regulatory Detail Addendum (Kenya DPA + GDPR mapping)
- **Appendix B: Receipts (Anchors & Links)**
- **Appendix C: Parameter Registry**
    - C.1: Parameter Snapshot (Human-Readable)

- C.2: Canonical Machine-Readable List (Template)

Executive Summary

Global ecosystems face increasing pressures, making sustainable land management and nature preservation critical objectives. Up to 40% of the global land area is degraded, directly affecting nearly half of the world's population. Agricultural producers, particularly smallholder farmers who are principal managers of agricultural land in many regions, play a central role in addressing these environmental considerations. Small farms (<2 ha) make up ~84% of the world's 608 million farms, operate ~12% of farmland, and produce about one-third of the world's food; family farms of all sizes produce ~80% of food in value terms, yet they often encounter operational and economic difficulties that limit the adoption of environmentally sound practices. The Dharitri Foundation, a non-profit organization, is developing the Dharitri project to support concrete actions for environmental sustainability, initiating its work within the agricultural sector.

The United Nations Environment Programme (UNEP) highlights that to tackle interconnected environmental crises, "it is critical to have accessible, timely, credible, and insightful information that can support environmental sustainability decision-making," noting a current "notable gap in DPI [Digital Public Infrastructure] to facilitate the flow of environmental sustainability information". The Dharitri Foundation addresses this gap by providing specialized blockchain infrastructure designed specifically for environmental sustainability applications.

Dharitri is a Layer 1 blockchain, forked from the **MultiversX** network, designed to provide this specialized infrastructure. The project's core objective is to offer an integrated suite of tools and services that facilitate transparent record-keeping, improved data management, and access to systems that assist ecologically beneficial activities. Key platform functionalities will include:

- **Digital Farmer ID:** A verifiable digital identity that links each farmer to their land, production records, and sustainability data. The ID is anchored on-chain but references off-chain records stored in the farmer's vault. It enables farmers to access credit, training, and reward programs through authenticated logins and QR-based verification at cooperatives or buyer depots.
- **Sustainability Logging:** A decentralized record-keeping module that documents field activities such as soil conservation, organic fertilizer use, crop rotation, and biodiversity protection. Each entry is hashed on-chain, creating a permanent sustainability ledger verifiable by NGOs, buyers, and financiers.
- **REWA token Incentives:** Farmers earn REWA tokens for verifiable positive actions — e.g., verified organic practices, tree planting, or reduced pesticide use. Tokens are automatically distributed upon MRV approval of sustainability logs and can be used for staking, trading, or redeeming goods on the Dharitri Marketplace.
- **Data-Driven Finance:** A secure, consent-based system for farmers to share verified data, unlocking access to credit from financial partners.

The native REWA token is the primary operational token of the Dharitri L1, used for transaction fees and network security. An interim BEP-20 token, pREWA (1 billion total supply), will secure initial development funding and enable early community participation, with conversion to native REWA post-mainnet launch.

Led by a team including **Kasi Viswanath Aurangabad**, **Anil K. Patel**, and **Mayank Patel**, with **Maureen Motho Wanjiru** leading Kenya operations, the Dharitri Foundation aims to contribute to a healthier environment and resilient ecosystems by supporting the significant role of agricultural producers in sustainable land management.

Executive Summary — Pilot Scope & Reporting

Initial Pilot — Kenya Implementation
The inaugural Dharitri pilot will be conducted in **Ngarariga, Kiambu County**, and **Olooloitikosh, Kajiado County, Kenya**, engaging an initial cohort of **five smallholder farmers cultivating a combined area of approximately 10 acres**.

Within these plots, farmers will practice **diversified regenerative agriculture**, including organic vegetable production, intercropped **maize**, and **sustainably managed beekeeping** to enhance pollination and ecosystem balance. A **controlled-environment mushroom production facility** has also been incorporated into the Kiambu County site to demonstrate short-cycle, high-value regenerative outputs that complement open-field farming.

All pilot activities are **fully funded by the Dharitri Foundation**, with live performance metrics, sustainability indicators, and on-chain verification data to be published transparently on the public status page **(https://status.dharitri.org).** Scaling beyond the initial ten acres will depend on the availability of external sustainability grants and protocol-generated revenues.

1. The Problem: Global Challenges in Agriculture and Environment

1.1. Context and Rationale for the Dharitri Project

The Dharitri Foundation is conceived to address critical gaps in the agricultural sector by developing a dedicated blockchain-based infrastructure to foster financial inclusion, efficient market participation, and the adoption of sustainable environmental practices.

1.2. Current State of Smallholder Agriculture: Global Significance and Persistent Challenges

Smallholder farmers constitute a significant majority of agricultural producers globally, with 84% of the world's 608 million farms operating on less than 2 hectares. Despite using only 12% of total agricultural land, these producers contribute approximately 35% of the world's food supply, representing ~450–500 million households worldwide. In Sub-Saharan Africa specifically, agriculture employs about half of the labour force and contributes roughly ~17% of GDP regionwide; family farms of all sizes account for ~80% of food by value.

These producers face several interconnected challenges:

- **Financial Exclusion:** The smallholder finance gap is ~$150B globally (higher in some methodologies), constraining credit access across SSA, SE Asia, and LatAm; lack of formal documentation is a primary barrier for ~37% of unbanked adults.
- **Market Access Limitations:** African smallholder farmers often receive less than 20% of the consumer price of their products. High transport costs and post-harvest losses—typically ~10–20% for cereals in SSA, with higher losses for perishables—further erode incomes; globally, losses between harvest and retail are ~14%.
- **Environmental and Climate-Related Pressures:** Roughly half of major crop sector production shocks are linked to climate and weather extremes. Current farming practices have been a leading cause of biodiversity loss, and approximately 64% of global agricultural land is at risk of pesticide pollution.

- **Infrastructure and Capacity Deficits:** Mobile internet adoption in Sub-Saharan Africa is ~27% overall with a large rural gap; rural electrification is ~30–33%. Gaps in technical knowledge and business skills further constrain farmers' ability to optimize their practices.

These challenges create a cycle of low productivity and limited income, affecting rural development and environmental sustainability.

1.3. Identified Gaps & Requirements for Sustainable Improvement

To support smallholder farmers and promote sustainable outcomes, several key areas must be addressed:

- **Need for Enhanced Financial Access:** Digital technologies like blockchain can reduce transaction costs and improve transparency, facilitating financial inclusion.
- **Requirement for Improved Market Linkages:** Systems are needed to create direct connections between producers and buyers, reducing the role of intermediaries.
- **Demand for Tools Supporting Sustainable Practices:** Incentives and accessible information are required to encourage the adoption of environmentally sound farming methods and Safeguards.
- **Necessity for Verifiable Record-Keeping:** Reliable, verifiable farm records and national ID for farmer identity and activities are crucial for accessing formal services and environmental programs. Digital identity is a vital component of foundational digital public infrastructure.
- **Importance of Addressing Infrastructure and Knowledge Gaps:** Continued funding for physical and digital infrastructure, along with knowledge-sharing platforms, is fundamental for systemic improvement.

2. The Solution: The Dharitri Platform

2.1. Project Mission and Guiding Principles

The mission of the Dharitri Foundation is to develop and provide transparent and accessible blockchain-based systems that support regenerative agricultural practices and facilitate sustainable finance mechanisms. Our work is guided by these core principles:

- **Producer-Centric Design:** Placing the needs of farmers at the centre of our development process.
- **Data Integrity and Transparency:** Implemented through on-chain cryptographic proofs (SHA-256 hashes of farm logs), timestamping, and cross-signature attestation from cooperatives and verifiers.
- **Focus on Sustainable Practices:** Including agroforestry, crop rotation, cover cropping, reduced tillage, compost use, and integrated pest management to restore soil and biodiversity.
- **Accessibility and Inclusivity:** Designing usable solutions for all, especially marginalized groups like women, who make up over 37% of the rural agricultural labour force.
- **Collaboration:** Dharitri partners with universities for agronomic R&D, with certified organic farmer’s cooperatives for field validation, and with digital marketplaces to give price premiums to verified sustainable produce.

- **Practical Application of Technology:** By digitizing farmer IDs and market access, Dharitri eliminates intermediaries, ensures fair pricing, automates reward distribution, and enables transparent traceability from soil to sale.

2.2. Technological Foundation: A MultiversX Fork

Dharitri is built as a fork of the **MultiversX** network, chosen for its secure, decentralized, and high-throughput architecture. Blockchain technology is essential for providing immutability, transparency, decentralization, and programmability—properties vital for building trust and creating fair incentive systems for millions of users. The fast finality of Secure Proof of Stake (SPoS) is particularly suited to the farmer user experience, ensuring that transactions are confirmed quickly and reliably even on low-end devices with poor connectivity.

Key technical characteristics of the **MultiversX** architecture include:

- **Adaptive State Sharding:** A comprehensive sharding mechanism that scales throughput as more nodes join the network, ensuring the platform can support a growing user base.
- **Secure Proof of Stake (SPoS):** An efficient and secure consensus mechanism that combines staking with a validator rating system, achieving block finality in seconds.
- **High Performance and Scalability:** The network has demonstrated tens of thousands of transactions per second (TPS) in test conditions, far exceeding typical application needs and ensuring a smooth user experience.
- **Low Transaction Costs:** The architecture is designed for affordability, a critical factor for the micro-transactions anticipated on the Dharitri platform.

2.2.1. Chain Selection Rationale (Trade-offs)

- **vs Cosmos app-chains:** Higher out-of-the-box throughput and mobile-first UX; trade-off is a smaller validator/tooling ecosystem initially.
- **vs EVM L2 rollups:** Avoids L1/L2 bridging trust and separate DA dependencies for farmer-critical flows; trade-off is EVM-native liquidity proximity (addressed via pREWA on BNB and a 1:1 bridge).
- **vs monolithic EVM L1:** Better parallelism and predictable fees for low-end devices; trade-off is fewer pre-existing EVM contracts without adaptation.
- **Fit-for-purpose:** Sharding + SPoS provides fast finality and low fees at farmer scale, with our dApps optimized for low-bandwidth regions.
- **Developer Migration:** WASM templates and an EVM-to-WASM porting guide reduce rewrite risk.
- **Liquidity Bridging:** pREWA on BSC plus a 1:1 conversion at mainnet preserves cap integrity while accessing early liquidity.

2.2.2. EVM Compatibility and Developer Tooling

To address the trade-off of fewer pre-existing EVM contracts, Dharitri will provide a robust WebAssembly (WASM) execution environment alongside a dedicated EVM-to-WASM porting guide. This includes WASM contract templates, comprehensive documentation for the eStandard Digital Token (ESDT) framework, and SDKs to streamline development for teams familiar with Solidity. Examples and templates will be listed on the status page and documentation site (contract repositories and docs).

2.3. Platform Architecture and Key Components

The Dharitri platform is an ecosystem of interconnected tools built on its Layer 1 blockchain, accessed primarily through mobile applications. Key components include:

- **Dharitri Farmer ID:** A unique digital identifier linking producers to their activities and records, addressing barriers to formal financial services.
- **Dharitri Knowledge Hub:** A digital resource providing access to curated agricultural information and training.
- **Dharitri Reward Mechanism:** A system to distribute REWA tokens to farmers for verifiable actions, such as adopting sustainable practices.
- **Sustainability Logging Tools:**
    - **Dharitri Green Badge:** A blockchain-recorded attestation (**SFT**) recognizing the adoption of verified sustainable practices.
    - **Conservation Records:** A system for creating verifiable digital logs of conservation activities.
    - **Sustainable Logger:** A tool for systematically documenting eco-friendly farming activities to support future environmental programs.
- **Dharitri Farm Records:** A digital log for farmers to record key activities, creating a verifiable history to support farm management and data-driven decisions.
- **Farm Data for Loans:** A secure, consent-based platform for farmers to share their verified records with financial institutions to facilitate credit assessment.
- **Farm Credit Access Facilitation:** Partnerships with Microfinance Institutions (MFIs) to enable access to agricultural loans.
- **Dharitri Marketplace (Phase 2):** A planned digital platform to connect farmers directly with buyers.
- **Dharitri Aid Platform (Phase 3):** An **SFT**-based voucher system for transparent aid distribution.
- **Dharitri Land Records (Phase 3):** A long-term goal to create community-validated digital records of land rights.

2.4. Core Technical Features

2.4.1. Data Privacy & Consent Architecture

The Dharitri platform adopts a privacy-first model for farmer data, aligned with Kenya's Data Protection Act (2019) and GDPR principles: For pilots outside Kenya, region-specific data rules will apply. Dharitri's architecture allows local Data Protection Acts (e.g., Nigeria NDPR, India DPDP Act) to define the applicable controller/processor roles through governance-set configurations in the Parameter Registry.

- **on-chain:** Only hashed attestations, farmer IDs, and sustainability badges are stored.
- **off-chain:** Sensitive data (GPS, yields, land ownership) stored in encrypted vaults controlled by farmer-owned keys.
- **Consent SFTs:** Farmers issue semi-fungible "consent tokens" granting MFIs or NGOs temporary access to their data.

- **Revocation:** Burning/revoking the consent token halts access.
- **Access Control:** Verifiers and partners require signed proofs to access off-chain records.

Farmers are the primary data controllers. The Foundation acts as a data processor for vault operations and may act as a joint controller for specific purposes where it determines the means and ends of processing. A formal ROPA will document purpose-specific roles.

2.4.2. Monitoring, Reporting, Verification (MRV) and Anti-Gaming

Verifier rotation and county-scoped random assignment lower collusion risk; a public leaderboard and slashing history improve accountability.

- **Multi-source inputs:** Farmer-submitted data (photo, GPS, timestamp), satellite NDVI analysis, and agronomist attestations.
- **Quorum:** At least 2 of 3 verification sources required for Green Badge issuance.
- **Sybil Resistance:** Farmer IDs linked to cooperative membership or national ID.
- **Disputes:** Contested badges resolved through on-chain arbitration with independent verifiers.
- **Penalties:** Verifiers found complicit in false attestations forfeit part of their bond and are temporarily suspended, though they may appeal through the governance dispute module within a defined challenge window.

2.4.3. MRV Parameters & Disputes

Let wf, ws, wh ≥ 0 with wf + ws + wh = 1. Let Sf, Ss, Sh be signal scores (farmer, satellite, human). A Green Badge is issued if Score = wf·Sf + ws·Ss + wh·Sh ≥ tau, where tau is the issuance threshold.

- **Verifier bond & reputation:** Verifiers post a bond Bv and accrue reputation R; after each case, R' = f(R, outcome). Verifiers have a path to appeal slashing penalties by submitting evidence within a defined window, with governance acting as the final arbiter.
- **Challenge window:** A dispute window of delta_challenge days permits challenges by bonded verifiers; a reputation-weighted random jury of size J decides with quorum q.
- **Penalties & bounties:** Confirmed misconduct slashes a proportion sigma_v of a verifier's bond and applies a reputation penalty; fraudulent badges are revoked and rewards clawed back; successful challengers earn a bounty beta.
- **Governance parameters:** (wf, ws, wh, tau, Bv, delta_challenge, J, q, sigma_v, beta) are listed in the Parameter Registry (Appendix C).
- **MRV Worked Example (Illustrative):** A farmer submits photos with GPS and timestamp (Sf=0.80), satellite NDVI returns Ss=0.72, and an agronomist attests Sh=0.85. With weights (wf, ws, wh) = (0.25, 0.55, 0.20), the score is 0.25×0.80 + 0.55×0.72 + 0.20×0.85 = 0.77 ≥ τ=0.70, so the Green Badge is issued. If challenged within 7 days by a bonded verifier, a jury of 7 rules with quorum 5; confirmed misconduct slashes 30% of the verifier's bond, and a 20% bounty is paid to the successful challenger.

2.4.3.1. MRV Spec Summary (Initial Defaults)

- **Signals & Weights:** (wf, ws, wh) = (0.25, 0.55, 0.20). Issuance threshold tau = 0.70.
- **Verifier Bond:** Bv = 10,000 REWA; sigma_v = 30% slashed on confirmed misconduct; beta = 20% bounty to successful challengers.

- **Assignment & Reputation:** Randomized pool per county; reputation R increases on upheld attestations and decays quarterly. Low-R verifiers require larger bonds.
- **Disputes:** Challenge window delta_challenge = 7 days; jury size J = 7; quorum q = 5 (reputation-weighted). Badge revoked upon failed challenge; rewards clawed back.
- **Anti-Spoofing:** GPS anti-spoof & EXIF checks, liveness prompts, multi-angle photo challenges, and satellite timestamp alignment.
- **Review cadence:** Parameters listed in the Parameter Registry and reviewed quarterly by governance.

2.4.3.2. Verifier Compensation & Data Sourcing (Governance-Controlled)

Satellite/remote-sensing inputs are sourced from providers selected through a governance process that prioritizes accuracy, continuity of coverage, and cost transparency. Provider lists and contract summaries are publicly posted and may be updated by vote. Dharitri does not commit to fixed rates or providers in this whitepaper; all details are parameterized and visible in Appendix C (Parameter Registry) and the status page.

To ensure the MRV system remains credible and economically sustainable at scale, verifier compensation and data sourcing are governed parameters. Compensation for human verifiers (e.g., agronomists) is drawn from a governance-managed budget and/or designated sponsorship pools. Specific rates, payment triggers, and rotation rules are approved by governance and published on the status page; these may be revised as pilot evidence accumulates.

2.4.4. Gasless UX for Core Farmer Actions (Meta-Transactions)

To remove cost barriers, Dharitri sponsors gas for core farmer actions—ID creation, sustainability logging, Green Badge claim, and Consent NFT issue/revoke—via meta transactions. Farmers sign messages; a relayer network submits them on-chain and pays fees in REWA.

- **Abuse prevention:** per-ID daily quota Q, device/DID rate-limits, and anomaly scoring.
- **Transparency:** monthly sponsorship metrics are published.
- **Funding:** A dedicated portion of the treasury is allocated for gas sponsorship, with a transparent monthly budget. If the sponsorship budget is exhausted or paused by governance, the user-facing application will revert to standard L1 fees with clear in-app notifications.

2.4.4.1. Gasless UX Commitment (Initial Defaults)

- **Sponsored Actions:** ID creation, sustainability logs, Green Badge claims, and Consent NFT issue/revoke via meta-transactions.
- **Quotas:** Q = 10 sponsored actions/day/ID; 200/month cap; per-device rate-limits; anomaly-score ban list with in-app appeal.
- **Transparency & Funding:** Monthly sponsorship metrics published in Appendix B. Funding via treasury and approved partners under governance policy.

2.4.4.2. Long-Term Fee Experience (Governance-Controlled)

Dharitri's fee experience is designed to remain user-friendly without making price commitments. Gas sponsorship for eligible actions is governed by parameters (e.g., available budget, per-ID quotas, eligible action set). When sponsorship is paused or exhausted, transactions revert to standard L1 fees. Governance may periodically adjust sponsorship parameters based on observed usage, security posture, and treasury health. Budget levels, eligibility criteria, and

historical consumption are continuously published on the status page; canonical parameter names and current values are listed in Appendix C.

2.5 Regenerative Agriculture Ecosystem

Project Dharitri's core mission is to accelerate the global shift toward **regenerative agriculture** — a holistic approach that restores soil health, enhances biodiversity, improves water cycles, and strengthens climate resilience while sustaining farmer livelihoods.

Unlike conventional agriculture, regenerative practices **rebuild natural capital** instead of depleting it. Every activity financed, rewarded, or verified within the Dharitri ecosystem is recorded on-chain through the **Proof-of-Regeneration (PoR)** mechanism, producing a transparent, tamper-proof trail of ecological impact and social outcomes.

2.5.1 Key Regenerative Activities Supported

1. **Soil Restoration & Organic Farming**
   • Promotion of natural composting, mulching, and green manuring.
   • Training farmers to eliminate synthetic fertilizers and pesticides.
   • Encouragement of bio-fertilizers and farm-based organic inputs.
   • Soil testing and yield tracking recorded as verifiable blockchain entries.
2. **Beekeeping (Apiculture)**
   • Installation of beehives to improve pollination and generate organic honey.
   • Integration of beekeeping within cropping systems to enhance biodiversity.
   • Provision of micro-loans and training for hive setup and processing units.
   • Tokenized sales of honey and beeswax through the Dharitri Marketplace.
3. **Organic Mushroom Cultivation**
   • Financing short-cycle (≈ 3-month) mushroom production using farm waste substrate.
   • Deployment of controlled-environment systems for organic certification.
   • Buy-back agreements via partner cooperatives to guarantee income stability.
4. **Water Storage & Irrigation Efficiency**
   • Construction of rainwater harvesting structures and micro-drip systems.
   • Adoption of solar-powered pumps and smart water sensors connected to IoT contracts.
   • On-chain tracking of water-use efficiency and drought resilience metrics.
5. **Agroforestry & Tree-Based Farming**
   • Integration of trees with crops for carbon sequestration and shade.
   • Planting of native bamboo and fruit trees for long-term carbon value.
   • Tokenization of each verified tree for carbon-credit issuance and NFT representation.
   • Support for rural nurseries to propagate saplings and create employment.
6. **Biodiversity Enhancement**
   • Creation of pollinator gardens and regenerative buffer zones.
   • Promotion of intercropping and multi-layered cultivation systems.
   • Establishment of community seed banks for indigenous varieties.
   • Integration of livestock (e.g., poultry + crops) for nutrient cycling.
7. **Composting & Waste-to-Value Systems**
   • Deployment of decentralized composting and biogas plants.

• Incentivization of crop-residue use instead of burning.
• Conversion of organic waste into soil enhancers tracked as methane and CO_2 reductions.

8. **Regenerative Market Linkages**
   • Development of local and digital marketplaces for verified regenerative produce.
   • Certification and tokenization of yield batches for traceable supply chains.
   • Consumer-facing visibility of origin and environmental impact data.
   • Reward distribution in pREWA or REWA tokens based on verifiable sustainability outcomes.
9. Other verifiable regenerative activities may be supported subject to MRV criteria and governance approval.

2.5.2 Outcome and Impact

Each regenerative practice is digitally verified through Dharitri's PoR protocol and MRV framework. Cumulative impact metrics include:

- Increase in soil organic carbon and microbial biomass.
- Improved biodiversity indices and pollinator populations.
- Enhanced water retention and reduced agrochemical run-off.
- Reduction in methane and CO_2-equivalent emissions.
- Diversified and stable farm income streams.
- Blockchain-based transparency for global donors and ESG partners.

Through this ecosystem, **Dharitri transforms agriculture into a climate-positive, data-verifiable, and economically rewarding model**, positioning farmers as front-line stewards of planetary restoration.

3. The Dharitri Token System: pREWA and REWA

3.1. Overview

The Dharitri ecosystem uses a dual-token model to support initial project development and power the long-term Layer 1 blockchain.

- pREWA (BEP-20 Token): A temporary, pre-mainnet fundraising and utility token on BNB Smart Chain (BSC). pREWA holders can participate in advisory, non-binding governance signalling but will have no formal on-chain voting rights until conversion to REWA.
- **REWA (Native L1 Token):** The permanent operational token of the Dharitri blockchain, with a fixed maximum supply of 10 billion REWA.

All pREWA supply (1 billion) is carved out of REWA's 10B allocations across multiple categories. At mainnet launch, every pREWA will migrate 1:1 into REWA, preserving the fixed REWA cap and avoiding any double supply.

3.2. pREWA (BEP-20 Token)

pREWA is designed for:

- Initial development funding.

- Community participation via staking and liquidity provision.
- Early support of the Kenya pilot and ecosystem growth.

Total Supply: 1,000,000,000 pREWA (drawn from REWA allocations).

Allocations:

Category	pREWA Allocation	% of pREWA	Corresponding REWA Allocation	Purpose
Early Supporters	400,000,000	40.00%	Part of 500M REWA Early Supporters	Strategic fundraising from private sales
Exchange Listings (DEX)	30,000,000	3.00%	Part of 1B REWA Exchange Listings	Liquidity provision and community access, and future CEX listings.
Reserve Treasury	300,000,000	30.00%	Part of 1.2B REWA Treasury	Ecosystem development, operational reserves, 120M for CEX listings, other project needs.
Staking & Liquidity Provision Rewards	100,000,000	10.00%	Part of 2.6B REWA Staking Rewards	Incentives for early participants
Community Rewards	60,000,000	6.00%	Part of 1B REWA Community Rewards	User growth and engagement
Marketing & Partnerships	50,000,000	5.00%	Part of 500M REWA Marketing	Awareness campaigns and partnerships
ReFi Pilot Program (Kenya)	60,000,000	6.00%	Part of 1B REWA ReFi Global Fund	Direct funding for Kenya pilot

Note: The total pREWA supply (1B) is a subset of REWA allocations. All pREWA will convert 1:1 into REWA at mainnet.

3.3. REWA (Native L1 Token)

REWA is the native cryptocurrency of the Dharitri blockchain, used for:

- Gas fees and transaction costs.
- Validator staking and delegation.
- Governance voting and treasury proposals.
- Ecosystem rewards and incentives.

Maximum Supply: 10,000,000,000 REWA (fixed cap).

Allocations:

REWA Category	Total REWA Allocation	% of Total REWA	Notes
Early Supporters	500,000,000	5.00%	Includes 400M issued as pREWA, 100M distributed post-mainnet
Development Team	1,500,000,000	15.00%	Team incentives with vesting
Exchange Listings	1,000,000,000	10.00%	Includes 30M issued as pREWA on DEX and 120M on CEX
Reserve Treasury	1,200,000,000	12.00%	Includes 300M issued as pREWA

Staking & Validator Rewards	2,600,000,000	26.00%	Includes 100M issued as pREWA
Ecosystem Grants & Development	700,000,000	7.00%	Third-party projects & infrastructure
Community Rewards	1,000,000,000	10.00%	Includes 60M issued as pREWA
Marketing & Partnerships	500,000,000	5.00%	Includes 50M issued as pREWA
ReFi Global Fund	1,000,000,000	10.00%	Includes 60M issued as pREWA for Kenya pilot

3.3.1. Vesting, Lockups, and Supply Safeguards

To ensure long-term alignment and project stability, key allocations are subject to programmatic vesting and lockup schedules managed by audited smart contracts.

Category	Amount (REWA)	Cliff	Vesting	Unlock Cadence	Controller	Timelock
Development Team	1.5B	6 months	24 months	Monthly, linear	Foundation 3/4 Safe	72 h
Early Supporters	500M	6 months	24 months	Monthly, linear	Foundation 3/4 Safe	48 h
Reserve Treasury	1.2B	None	None	Per DAO vote	Treasury 3/4 Safe	96 h

Note: 1. Addresses for vesting contracts and controllers will be published in Appendix B.

2. Development Team token will be allocated at Dharitri Mainnet as REWA not as part of pREWA.

3.4. pREWA-to-REWA Conversion Mechanism

At Dharitri mainnet launch, a bridge system will enable a 1:1 conversion of all pREWA into REWA.

- Each pREWA category maps directly into its corresponding REWA allocation.
- This ensures the REWA total supply remains fixed at 10B.

3.4.1. Bridge Security & Incident Response

Operational transparency: A public status page is available at **https://status.dharitri.org** for live incidents, maintenance windows, and post-mortems.

3.4.1.1. Bridge Policy (Initial Defaults – subject to governance ratification)

- **Signers & Threshold:** M/N = 3/5 (MPC or multisig allowed). Signers are rotated quarterly or upon a personnel change, following a key ceremony.
- **Guardians & Pause:** A dedicated Guardian Safe (2/3) can pause minting on anomalous activity.
- **Rate Limits:** Per-transaction limit ltx = 1,000,000 REWA; rolling 24-hour limit l24h = 10,000,000 REWA. These limits are applied per direction (inbound/outbound).
- **Unpause Policy:** Requires a super-majority (3/4) after a public incident report and t_unpause = 72 hours.
- **Bug Bounties:** A formal bug bounty program with tiered rewards will be maintained, with details published on the official website. A live status page will provide real-time updates on bridge operations.

3.4.1.2. Incident Runbook (Summary)

- **Detect & Alert:** on-chain monitors trip thresholds; public status page updated within 2 hours.
- **Contain:** Guardians pause; rate-limits enforced; pending queues flushed.
- **Eradicate:** Rotate keys, hot-fix contracts, revoke compromised signers.
- **Recover:** Dry-run, staged unpause after re-audit; small-cap trial before full restoration.
- **Disclose:** Full post-mortem within 7 days; on-chain hash and action items; 30-day follow-up review.

3.5. Token Release Timeline & Supply Management

- pREWA TGE: Launched 31 July 2025 on BNB Smart Chain (BSC); pREWA/USDT PancakeSwap pool created the same day.
- pREWA Staking & Rewards: See status page for availability.
- **Mainnet Launch (Q3 2026):** Dharitri L1 goes live, pREWA-to-REWA bridge activates.

3.6. Staking and Validator Economics

Validator entry: 1M REWA minimum self-staked.

Emission Controls: Rewards are split with 80% to validators/delegators and 20% to the treasury.

3.6.1. Validator Rewards & APR Method

- **Emissions function:** Yearly issuance from the Staking & Validator Rewards pool is defined by a governance-approved function E(t) (e.g., linear or disinflationary); the function and any change are published in the Parameter Registry.
- **APR method (no fixed promises):**
  APR_gross ≈ (Annual rewards to stakers) / (Total staked)
  APR_net (delegator) ≈ APR_gross · (1 − c) where c is validator commission.
  A public calculator will derive APR from live inputs (current E(t), total staked, block rewards, commission).

3.6.1.1. Issuance Schedule (Illustrative Defaults)

The issuance schedule, as defined by the governance-approved emissions function E(t), is as follows: Year-1 issuance is 400M REWA, followed by a 15% YoY decay until issuance falls to 100M/yr (reached ~Year 10), where it is then held flat. Under these parameters, the 2.6B REWA rewards pool is projected to be exhausted around Year 15. This model is subject to change via governance based on live network conditions, such as staking ratios and commission rates.

3.6.1.2. APR Examples (Derived from E(t), for illustration only)

*Assumptions: C*irculating stake ratio & commissions as shown, based on a Year-1 issuance of 400M REWA. APR is computed using the method defined in section 3.6.1.

Note: Assumes Year-1 issuance of 400 M REWA with 80% (320 M) allocated to stakers and 20% to treasury.

Scenario	Validators (N)	Total Staked (% supply)	Annual Rewards to Stakers (REWA)	APR_gross	APR_net (delegator)
A	50	20% (2.0B)	320,000,000	16.0%	15.2% (5% commission)

B	150	35% (3.5B)	320,000,000	9.1%	8.6% (5% commission)
C	300	50% (5.0B)	320,000,000	6.4%	6.1% (5% commission)

3.6.1.3. APR Illustration Clarification (Non-Binding)

APR figures shown in this document are illustrations, not targets. Actual APR is emergent from (i) the issuance function E(t) and (ii) the live fraction of stake participating in consensus. Governance may update parameters (e.g., decay, allocations) in the future to preserve network security and sustainability. The status page displays live inputs and derived APR; the authoritative parameter set is maintained in Appendix C.

3.6.2. Slashing Semantics

Penalties: A 5% double-sign slashing and a 0.5% downtime slashing apply to the validator's effective stake (self-stake plus eligible delegations counted for consensus).

4. Governance

Governance defines how Dharitri decisions are proposed, discussed, and enacted. It ensures community participation and transparent control of parameters, treasury, and upgrades. Dharitri's governance combines on-chain smart-contract voting with interim multisig oversight until full decentralization.

4.1. Governance Lifecycle and Mechanics

Dharitri governance is designed to be transparent, accessible, and robust.

- **Proposal Threshold:** A proposal can be submitted by any address holding at least 0.1% of the circulating REWA supply or by a coalition of addresses meeting this threshold.
- **Voting Period:** A standard voting period lasts for 7 days.
- **Quorum & Approval:** A proposal requires a 15% quorum of the circulating REWA supply to be considered valid and must achieve a 65% approval threshold to pass.
- **Vote Delegation:** REWA holders can delegate their voting power to another address to participate in governance without voting on every proposal directly.
- **Treasury Spending:** Treasury proposals are managed in tiers, with parameters defined in Appendix C:
    - **Tier 1 (Operational):** Up to 1M REWA/month, approved by the Foundation multisig (during Phase 1-2).
    - **Tier 2 (Strategic):** Above 1M REWA/month, requires a full on-chain DAO vote.

4.1.1. Governance Safeguards (Timelocks & Emergency Powers)

- **Timelocks:** 48–96 hours on parameter changes, treasury transfers, and upgrades.
- Emergency Powers: The Guardian Safe (distinct from the Foundation) can execute emergency pauses on critical contracts. This action must be ratified by a governance vote within 14 days to remain in effect.
- **Veto Sunset:** Foundation veto powers are limited to Phases 1–2 with public rationale and on-chain record; they are sunset at the start of Phase 3.

- **Upgrade Policy:** Critical contract upgrades are gated by a timelock and require at least one independent audit. An emergency bypass requires Guardian approval and a public rationale with a backout plan.

4.2. Governance Phases (Foundation → Council → Full on-chain)

- **Phase 1 (2025–2026):** Foundation-controlled 3-of-4 multisig governs upgrades and treasury.
- **Phase 2 (2026–2027):** Validator Council introduced, Foundation retains veto powers.
- **Phase 3 (2027 onward):** Full on-chain governance with REWA-weighted voting.
- **Composition:** The 9–15 member size balances decentralization with coordination efficiency. Quadratic dampening avoids dominance by large validators, ensuring equitable influence across regions.
- **Mandate:** advisory approval on protocol upgrades and parameter changes; all decisions published with rationale. Non-emergency vetoes require 2/3 Council support and expire in 30 days unless ratified by DAO.
- **Sunset:** Council powers automatically sunset at the start of Phase 3 (full on-chain governance).

4.2.1. Phase-2 Validator Council Bootstrapping (Interim)

Before the first scheduled election, an interim Validator Council may be seated using a temporary rubric (e.g., operational readiness, uptime history, independence requirements, and regional diversity). The interim roster (entity names, validator pubkeys, contact) is ratified on-chain and published on the status page, and remains in force only until the first election. Conflict-of-interest declarations, rotation/recusal expectations, and early recall by governance are documented alongside the roster. Upon election, the interim council automatically sunsets.

5. Roadmap and Development

Note: Milestones and scale are contingent on funding and partner capacity; the public status page supersedes this PDF for timeline changes.

5.1. Current Development Phase & Immediate Objectives

The project is in an active development phase, with key activities including:

- **Layer 1 Blockchain Development:** Ongoing work on the core infrastructure.
- **pREWA Token & Staking Contracts:** Details (contract, pair, LP, lock proof) are in Appendix B (Receipts).
- **Audit Reports:** Audit reports and hashes: see Appendix B (Audits).
- **pREWA Token Launch:** Launched on **July 31, 2025** on **BNB Smart Chain (BSC)** as a **BEP-20** token. The **pREWA/USDT** liquidity pool on **PancakeSwap** was created the same day, with initial liquidity of **30,000 USDT** and **30,000,000 pREWA**, locked via **Team Finance** until **July 31, 2026**. The pREWA/USDT liquidity lock has been **renewed until the full migration to REWA is completed** (expected Q3 2026), ensuring price and liquidity stability throughout the transition period.
- **Partnership Development:** Engaging with NGOs and cooperatives for the Kenya pilot.
- **Kenya Pilot Program Preparation:** Groundwork for the initial pilot program.

5.2. Phase 1 Implementation (Next 6–18 Months)

This phase focuses on establishing foundational elements and launching the Kenya pilot.

- **Q4 2025:** Public testnet launch; bug bounty program initiated.
- **Q1 2026:** Final security audits for mainnet components.
- **Q2 2026:** Bridge activation dress rehearsal on testnet.
- **Q3 2026:** Dharitri L1 Mainnet Launch.
- **Core Phase 1 Features in Kenya:** Dharitri Farmer ID; Knowledge Hub; Reward Mechanism; Green Badge & Conservation Records.
- **Kenya Pilot Operations:** Onboarding farmers and gathering operational data.
- **Kenya Pilot Context:** Smallholder farmers dominate domestic production yet face credit constraints and meaningful post-harvest losses. Dharitri's pilot prioritizes low-bandwidth UX, cooperative-led onboarding, and consent-based data sharing with MFIs to improve credit access.

5.3. Phase 2 Expansion (12–24+ Months Post-Phase 1)

This phase expands platform utility and financial integrations:

- **Advanced Features Launch:** Farm Records & Sustainable Logger; Dharitri Origin Track & Marketplace; Farm Data for Loans & Credit Access tools.
- **Ecosystem Growth:** Expanding Kenya operations and partnerships with MFIs.
- **pREWA-to-REWA Bridge Activation:** (projected Q3 2026).

5.4. Phase 3 and Beyond (Further Expansion)

This phase represents the realization of Dharitri's broader vision:

- **Advanced Platform Features:** Dharitri Land Records; Dharitri Aid Platform; Dharitri Green Payments; Dharitri Finance Access (e.g., carbon credits).
- **Ecosystem Maturity:** Decentralized governance and support for third-party dApps.
- **Geographical Expansion:** Expanding to other regions with similar challenges.

6. Project Execution

6.1. Core Team

- **Kasi Viswanath Aurangabad (Founder):** Guides the technical vision, combining enterprise consulting experience from IBM and EY, with a deep focus on blockchain and an agricultural family background.
- **Anil K Patel (Co-Founder):** An SAP Financial Consultant who architects the platform's economic models and financial integrations, also grounded in a farming background.
- **Mayank Patel (Co-Founder):** An Enterprise Program Manager with experience at Caterpillar and Merck, leading project management and operational efficiency.
- **Maureen Motho Wanjiru (Kenya Operations Lead):** An active farmer and founder of Ematrio Organic Farms, leading on-the-ground operations, farmer engagement, and local partnerships in Kenya.

6.2. Application of Development Funding

Funding will be allocated across four primary areas:

- **Platform Development & Core Infrastructure:** Continued development, testing, security auditing, and maintenance of the L1 blockchain, user applications, and smart contracts.
- **Kenya Pilot Program & Operational Rollout:** On-the-ground operations, farmer onboarding, training, and collaboration with local partners.
- **Team & Operational Support:** Supporting the core team and strategic new hires, along with general administrative needs.
- **Ecosystem Growth & Community Engagement:** Awareness campaigns, community management, exchange listings, and marketing efforts.

7. Risk Analysis

7.1. Identified Risks and Mitigation Considerations

- **Technological Risks:** Mitigation includes rigorous testing, third-party audits, using a proven technology fork (**MultiversX**), and a phased rollout.
- **Market Adoption & User Engagement Risks:** Mitigation includes a producer-centric design, collaboration with trusted local partners, and a clear incentive-based value proposition.
- **Operational & Execution Risks:** Mitigation includes phased implementation, strong local leadership, and structured project management.
- **Regulatory & Legal Environment Risks:** Mitigation includes ongoing regulatory monitoring and structuring operations for compliance.
- **Financial & Funding Risks:** Mitigation includes a clear tokenomics model, a phased development approach, and exploration of diverse funding sources like grants and strategic partnerships.
- **Partnership & Ecosystem Risks:** Mitigation includes careful partner vetting, clear agreements, and regular communication.
- **Farmer Adoption & Usability (low-connectivity, varied digital literacy):** Adoption depends on field support and simple workflows. Mitigations: gasless UX for key actions; minimal-step flows; collaboration with local partners for onboarding, training, and basic device support; progressive disclosure in the app; and clear, language-appropriate instructions. Pilot-stage UX metrics and completion rates are tracked and reported on the status page; findings inform parameter updates and product iterations.

7.2. Dharitri-Specific Risks

- **Identity Fraud:** Fake farmer IDs mitigated by cooperative KYC and NGO verification.
- **Verifier Collusion:** Random verifier assignment and reputation scoring to prevent cartelization.
- **Bridge Exploits:** pREWA-to-REWA bridge follows burn-and-mint with an emergency circuit breaker and ≥3 independent audits. The rate limits and emergency pause policy (see Appendix C) are designed to cap the blast radius of any potential incident.
- **Climate Shock Defaults:** Farmer loan defaults due to drought/floods mitigated by insurance reserves and flexible repayment rebates.

- **Regulatory Classification:** Ongoing legal reviews to confirm REWA as a utility token in each jurisdiction.
- **Operational Key Management:** Loss or compromise of administrative keys is mitigated through the use of HSMs, formal key ceremonies, multi-party controls, and regular key rotation policies.
- **Data Vaults Availability:** Risk of data loss is mitigated via multi-region storage, a clearly defined SLA, and escrowed decryption keys for disaster recovery scenarios.
- **Regulatory Drift:** Changes in regulations like the EUDR or cross-border data transfer rules are monitored continuously, with mitigation strategies linked to the platform's adaptable governance framework.

8. Conclusion and Further Information

The Dharitri Foundation is building specialized blockchain infrastructure to support sustainable agriculture, starting with smallholder farmers. By leveraging the technical capabilities of **MultiversX** and a phased, producer-centric approach, we aim to provide tools for better data management, transparent record-keeping, and enhanced access to financial and market systems.

The pREWA token facilitates initial development and community participation, aligning early supporters with the long-term vision of the Dharitri L1 network and its native REWA token. While we acknowledge the complexities of this undertaking, our team is committed to diligent planning and adaptive management to create tangible, positive environmental and social outcomes.

Get Involved

Participate in the Community: Visit our official website for information on the pREWA token and join our community channels.

Explore Partnerships: For inquiries regarding partnerships or development support, please use the contact information on our official website.

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Abbreviations and Acronyms

- BEP-20: BNB Smart Chain (BSC) Token Standard
- **DPI:** Digital Public Infrastructure
- **ESDT:** eStandard Digital Token
- **FAO:** Food and Agriculture Organization
- **IFAD:** International Fund for Agricultural Development
- **MFI:** Microfinance Institution
- **NGO:** Non-Governmental Organization
- **pREWA:** Pre-REWA (Interim BEP-20 Token)
- **REWA:** Regenerative Web Agriculture (Native L1 Token)
- **SFT:** Semi-Fungible Token

- **SPoS:** Secure Proof of Stake
- **TGE:** Token Generation Event
- **TPS:** Transactions Per Second
- **UNEP:** United Nations Environment Programme
- **WASM:** WebAssembly

A.1 Regulatory Detail (Kenya DPA + GDPR Mapping)

A.1.1 Roles & Responsibilities

- Data Controller / Joint Controller (purpose-specific): The farmer (data subject) controls primary personal data in their vault. Depending on the purpose and means of processing, the Dharitri Foundation may act as a processor or a joint controller. Purpose-specific role determinations are documented in the ROPA and published templates.
- Processors / Sub-processors: MRV verifiers and satellite/remote-sensing providers may act as processors/sub-processors for specific purposes.

Data Roles Note. MRV verifiers and satellite providers act as processors/sub-processors where applicable; compensation and provider selection are governance-controlled parameters. See §2.4.3.2 and Appendix C (Parameter Registry); live artifacts are listed in Appendix B (Receipts).

A.1.2 Lawful Bases & Consent

- Consent: Consent is captured and managed via Consent NFTs and farmer-controlled data vault permissions. Consent scope, duration, and revocation are auditable.
- Purpose Limitation: Processing is restricted to clearly specified, legitimate purposes (e.g., MRV, rewards eligibility, fraud prevention, compliance).

A.1.3 Data Categories & Minimization

- Categories: Identity and contact metadata (farmer ID), agronomic activity logs, plot/geo approximations, MRV artifacts (farmer attestations, verifier attestations, remote-sensing derivatives).
- Minimization: Only the minimum data required for the stated purpose is processed; sensitive elements remain off-chain or pseudonymized.

A.1.4 Retention & Deletion

- Retention follows purpose-specific policies and governance-approved parameters. Deletion/exit workflows are provided and logged; retention schedules and exceptions are published on the status page and in the ROPA.

A.1.5 Data Subject Rights

- Access, Rectification, Erasure, Portability, Restriction, Objection: Supported through wallet-mediated or documented service channels. Responses are tracked with auditable timestamps.

A.1.6 Security Measures

- Encryption in transit/at rest, scoped access control, key-management ceremonies, and tamper-evident logging. Operational keys are guarded by “multisig/HSM-backed” controls where applicable.
- Regular third-party audits; public reports and hashes listed in Appendix B.

A.1.7 International Transfers

- Where vendors change, we will update the public sub-processor list and provide a change-notice window before transfers begin.

A.1.8 DPIA & ROPA

- A Data Protection Impact Assessment (DPIA) is maintained for high-risk processing. A Record of Processing Activities (ROPA) documents purposes, data categories, recipients, retention, and roles. Public summaries are anchored in Appendix B.

A.1.9 Incident Response & Breach Notification

- Incidents follow a published runbook aligned with applicable notification timelines. Live status, maintenance windows, and post-mortems are published on the status page. See also §3.4.1.2 Incident Runbook.

A.1.10 Sub-processor Management

- Sub-processors are approved by governance, monitored for compliance, and listed publicly with scope and change logs. Material changes are announced via the status page.

Appendix B: Receipts (Anchors & Links)

Status Page (public) — live metrics, incidents, parameter snapshots, and change logs.

1) Live Operations

- **Status Page (public):** https://status.dharitri.org
- **ROPA summary (public):** *will be updated in next release of whitepaper.*

2) Official Links

- **Website:** https://www.dharitri.org
- **dApp:** https://prewa.dharitri.org

3) Token Contract (BNB Smart Chain / BSC)

- **pREWA (BEP-20):** 0x828f07e624F227Fde5906611461deAb26dcCc600
  BscScan:
  https://bscscan.com/address/0x828f07e624f227fde5906611461deab26dccc600

4) Markets (PancakeSwap V2 on BSC)

- **Official Pair: pREWA / USDT**
  Trade link:
  https://pancakeswap.finance/swap?outputCurrency=0x828f07e624F227Fde5906611461deAb26dcCc600&chain=bsc&inputCurrency=0x55d398326f99059fF775485246999027B3197955

- **Token addresses:**
  - pREWA: 0x828f07e624F227Fde5906611461deAb26dcCc600
  - USDT (BSC): 0x55d398326f99059fF775485246999027B3197955
- **LP (Cake-LP) / Pair contract:** 0xb01c948466512e8cfC2881D52911c6A1a62eD21a
- **Liquidity lock: 30,000 USDT + 30,000,000 pREWA** locked via **Team Finance** until **2026-07-31**
  - **Lock proof (Team Finance):** https://www.team.finance/view-coin/0x828f07e624F227Fde5906611461deAb26dcCc600?name=pREWA%20Token&symbol=pREWA&chainid=0x38
  - **BscScan Tx:** https://bscscan.com/tx/0x32401bb04b94bae8bd9bfc85bd7e17394f95e4a0da11b2f3b5c5ada8c60336cb
    Note: Always verify the contract addresses above before trading.

5) Audits

- **Audit reports (PDF) + SHA-256 hashes:**
  Repo: https://github.com/Saferico/The-pREWA-Protocol-smart-contracts-audit-.git

Appendix C: Parameter Registry

Preface: This registry lists the exact technical defaults that govern Dharitri (e.g., bridge rate-limits, MRV weights, governance thresholds). Changes require formal governance, ensuring transparency and predictability.

C.1: Parameter Snapshot (Human-Readable)

Key	Module	Default Value	Description	Governed By
M / N	Bridge	3 / 5	M-of-N multisig threshold for bridge operations.	Multisig
ltx	Bridge	1,000,000 REWA	Per-transaction rate limit per direction.	Multisig
l24h	Bridge	10,000,000 REWA	Rolling 24-hour rate limit per direction.	Multisig
t_unpause	Bridge	72 hours	Timelock required to unpause the bridge after an incident.	Multisig
wf / ws / wh	MRV	0.25 / 0.55 / 0.20	Weights for farmer, satellite, and human verification signals.	DAO
tau	MRV	0.70	Minimum weighted score required to issue a Green Badge.	DAO
Bv	MRV	10,000 REWA	Bond required for verifiers to participate.	DAO
delta_challenge	MRV	7 days	Window for challenging a verification attestation.	DAO
sigma_v	MRV	30%	Percentage of verifier bond slashed for confirmed misconduct.	DAO
J	MRV	7	Jury size for dispute resolution.	DAO

Key	Module	Default Value	Description	Governed By
q	MRV	5	Quorum required for jury verdict.	DAO
beta	MRV	20%	Bounty paid to successful challengers.	DAO
Et	Economics	Year-1 400M, 15% decay	Emissions function for staking rewards.	DAO
quorum	Governance	15%	Minimum percentage of circulating supply for a vote to be valid.	DAO
approval	Governance	65%	Minimum percentage of “yes” votes for a proposal to pass.	DAO
proposal_threshold	Governance	0.1%	Minimum circulating supply required to submit a proposal.	DAO
treasury_tier1_cap	Governance	1,000,000 REWA	Max monthly spends approved by Multisig without a DAO vote.	Multisig

C.2: Canonical Machine-Readable List (Template)

A canonical machine-readable list of all tunable parameters will be published as a versioned JSON file and mirrored on-chain for transparent governance and automated tooling


```
{
  "schema_version": "1.0.0",
  "effective_from_timestamp": "1757827200",
  "metadata": {
    "rationale_doc_cid": "[IPFS CID of rationale document]",
    "on_chain_registry_address": "[Address of on-chain registry contract]",
    "tags": ["initial_defaults", "mainnet_v1"]
  },
  "parameters": {
    "bridge": [
      { "key": "M", "value": 3, "type": "uint8" },
      { "key": "N", "value": 5, "type": "uint8" },
      { "key": "ltx", "value": "1000000", "type": "uint256", "unit": "REWA" },
      { "key": "l24h", "value": "10000000", "type": "uint256", "unit": "REWA" },
      { "key": "t_unpause", "value": "259200", "type": "uint64", "unit": "seconds" }
    ],
    "mrv": [
      { "key": "wf", "value": 0.25, "type": "float" },
      { "key": "ws", "value": 0.55, "type": "float" },
      { "key": "wh", "value": 0.20, "type": "float" },
      { "key": "tau", "value": 0.70, "type": "float" },
      { "key": "bv", "value": "10000", "type": "uint256", "unit": "REWA" },
      { "key": "delta_challenge", "value": "604800", "type": "uint64", "unit": "seconds" },
      { "key": "j", "value": 7, "type": "uint8" },
      { "key": "q", "value": 5, "type": "uint8" },
      { "key": "sigma_v", "value": 0.30, "type": "float" },
      { "key": "beta", "value": 0.20, "type": "float" }
    ],
    "governance": [
      { "key": "quorum", "value": 0.15, "type": "float" },
      { "key": "approval", "value": 0.65, "type": "float" },
      { "key": "proposal_threshold", "value": 0.001, "type": "float" },
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```
    { "key": "treasury_tier1_cap", "value": "1000000", "type": "uint256", "unit": "REWA" }
   ]
  }
}
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Note: This whitepaper is for informational purposes only and does not constitute investment, legal, or financial advice. All operational parameters are subject to on-chain governance review.