TowerGuard

Data-Driven Restoration Intelligence for Kenya's Forests

Transforming Kenya's forest restoration through unified intelligence, real-time monitoring, and measurable impact; from nursery to canopy.

The Crisis in Kenya's Forests

50K

Hectares Lost Annually

Kenya's forest cover shrinks dramatically each year

$3

Per Hectare Budget

Insufficient funding for effective monitoring

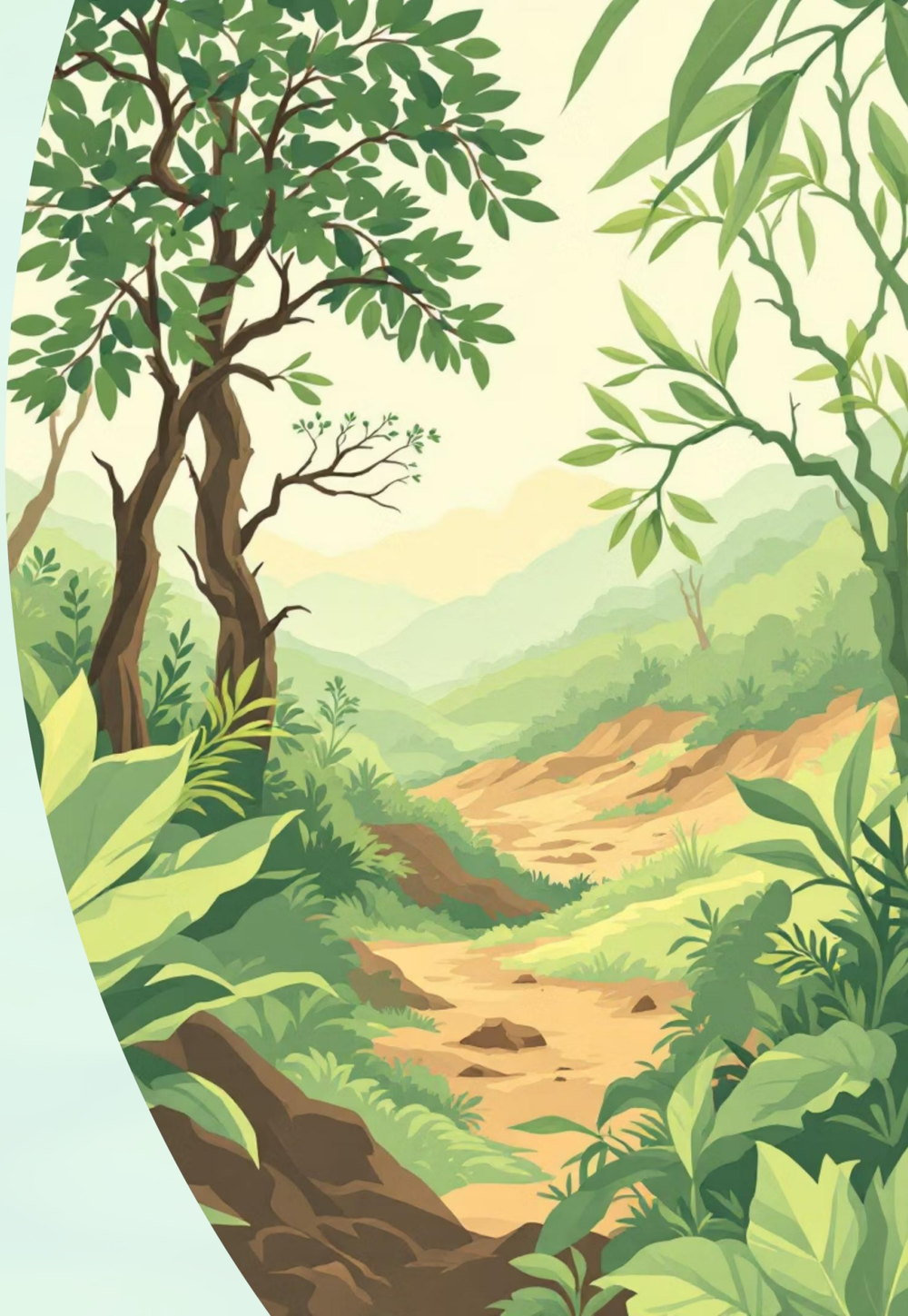
70%

Sites Unverified

Restoration efforts lack proper validation

Who This Hurts

- **Communities** struggle to prove their restoration impact
- **County governments** cannot plan effective interventions
- **Donors** lack the data to justify continued funding
- **Kenya's ambitious 15-billion-tree pledge** becomes nearly impossible to track and verify



Our Vision: Every Seedling Measurable

We envision a future where **every seedling is measurable: from nursery to canopy.** TowerGuard unifies satellite imagery, nursery records, field observations, and biodiversity insights into one trusted, transparent platform.

Real-Time Alerts

Instant notifications when sites need intervention

Verified Survival Rates

Accurate, auditable seedling survival tracking

Unified Dashboards

All stakeholders access the same trusted data

Transparent Reporting

Evidence-based impact reports for donors and counties

What We Have Built

Kenya's First Unified Environmental Intelligence Layer

01

Complete Water Tower Mapping

All 18 gazetted water towers mapped with detailed geographic boundaries and restoration priorities

02

Comprehensive Nursery Atlas

Species catalogues, capacity assessments, and precise geolocation for every registered nursery

03

Biodiversity Explorer

Powered by GBIF records, tracking native species distribution and ecosystem health indicators

04

Integrated Impact Dashboard

Consolidating nursery data, biodiversity metrics, and water tower restoration progress in real-time

This MVP represents the foundation of a complete restoration intelligence system, designed to scale across Kenya's entire forest restoration ecosystem.

Impact Through The Community's Eyes

Imagine, a community nursery operator in Aberdare. Previously, they planted seedlings with no way to track their survival. Donors questioned their impact. Their community's income remained uncertain.

But now, with TowerGuard, everything changes.

- Nursery is digitally mapped.
- Species are catalogued.
- Seedlings are linked to specific planting sites.
- Instant alerts when a restoration site shows signs of failure.

> "This season, **survival increased by 20–30%.** That means several thousand additional seedlings survived, and a full season of community income was safeguarded."

For the first time, they have **proof of impact**, and the data to earn their community's trust and secure future funding.

Who We Serve

Building Trust Across the Entire Restoration Ecosystem

Community Forest Associations

Gain visibility into restoration efforts and justify payment claims with verified survival data and documented labour contributions

County Governments & KFS

Ensure compliance with national restoration targets, monitor site performance, and make evidence-based intervention decisions

CSR Teams & Donors

Access verified impact metrics, audit-ready evidence trails, and transparent reporting to justify continued investment

Research & Conservation NGOs

Leverage structured biodiversity datasets, historical trends, and restoration outcomes for evidence-based conservation strategies

TowerGuard brings every stakeholder onto one trusted, transparent platform, eliminating data silos and building collective accountability.

The Technology Behind It

Enterprise-Grade Infrastructure for Trusted Restoration Data

FastAPI Microservices

Scalable, high-performance backend architecture supporting real-time data ingestion and processing

TorchGeo + PyTorch AI Models

Advanced machine learning for satellite image analysis, survival prediction, and anomaly detection

Sentinel & Landsat Pipelines

Automated ingestion of multi-spectral satellite imagery every 5-10 days for continuous monitoring

React + MapLibre Dashboards

Interactive, responsive interfaces providing stakeholders with intuitive access to spatial data and insights

PostGIS Feature Store

Geospatially optimised database ensuring fast queries and reliable storage of restoration site data

Evidence Locker

Audit-proof reporting system maintaining immutable records for compliance and donor verification

This architecture keeps restoration data **fresh, explainable, and trustworthy**, ready to scale across Kenya's entire forest restoration ecosystem.

Future Intelligence

Scaling TowerGuard Into a Complete Restoration Economy

AI Survival Prediction

Machine learning models projecting 5-year survival outcomes based on species, soil, rainfall, and historical performance data

Satellite Anomaly Detection

Automated analysis every 5 days identifying degradation, encroachment, or restoration failures requiring immediate intervention

Restoration Marketplace

Connecting verified nurseries with funders, unlocking a **strong GMV pipeline** and creating transparent procurement pathways

Nationwide Monitoring

Expanding coverage and tracking restoration progress across all water towers, non-gazetted included.

Employment Documentation

Recording and verifying **1,000 seasonal jobs per county**, demonstrating the economic impact of restoration investments

This is how we move from **fragmented efforts to a measurable environmental economy**, where every stakeholder has the intelligence needed to succeed.

Business Model & Roadmap

Financially Sustainable Revenue Streams

SaaS Subscriptions

County governments, NGOs, and research institutions access the platform via tiered annual licences

Usage Credits

Pay-per-event pricing for satellite analyses, AI predictions, and custom reporting queries

Premium AI Audits

Donor-ready audit reports with verified survival rates, biodiversity metrics, and compliance documentation

Marketplace Fees

Transaction fees on nursery procurement, connecting vetted suppliers with restoration projects

1

Hackathon (Complete)

Prototype, data model, and mapping of all 18 water tower restoration sites

2

Q1 2026

MVP launch, onboarding 20 nurseries and 5 county pilot partners

3

Q2 2026

AI intelligence layer deployment and donor evidence pack generation

4

Q3 2026

Full monetisation rollout and expansion country-wide

The Risky Engineers

Meet the Team Building Kenya's Restoration Future

Ibrahim Salim

Team Lead & Backend Engineer

Architecting scalable systems for real-time restoration intelligence

Faith Karimi

Data Wrangler & Storyteller

Transforming complex datasets into actionable insights and compelling narratives

Francis Ndirangu

Project Manager & Quality Assurance

Ensuring delivery excellence and maintaining rigorous quality standards

Patrice Okoiti

Frontend Engineer

Designing intuitive interfaces that make restoration data accessible to all stakeholders

Patrick Maina

Machine Learning Engineer

Building AI models that predict outcomes and detect restoration anomalies

---

Together, we can make every seedling seedling count.