



LINDAMISITU

# LINDAMISITU

CONNECT WITH

## NATURE





# PROBLEM STATEMENT

Since 1977, the Green Belt Movement founded by Nobel Laureate Prof. Wangari Maathai has planted over 51 million trees and empowered thousands of women to protect Kenya's forests through community-led action. GBM's experience in Mau and Aberdare shows that when communities — particularly women — are given tools, knowledge, and safe channels to act, deforestation can be dramatically reduced. Prof. Maathai repeatedly emphasised the need to combine local knowledge with modern science and technology. Despite these successes, GBM and government agencies still rely heavily on periodic field surveys and lack scalable, real-time satellite monitoring and anonymous reporting mechanisms — gaps that continue to allow illegal logging to outpace protection efforts.

LindaMisitu directly addresses these gaps by modernising Prof. Maathai's vision: it delivers real-time satellite change detection (Sentinel Hub + Google Earth Engine), ground-truth validation through simulated IoT sensors (temperature & humidity), and fearless, immutable community reporting via Hedera blockchain — all wrapped in an accessible mobile-first platform named "LindaMisitu" (Swahili for "Protect the Forests"). This is the technological successor the Green Belt Movement has been waiting for: community-driven, women-empowered, and powered by cutting-edge data and blockchain tools to safeguard Kenya's forests for future generations.



# WHAT IS LINDAMISITU?

LindaMisitu is an innovative platform that leverages satellite APIs and blockchain technology to support Kenya's mission of watching, monitoring, and protecting its precious forests. Its core mission is to increase tree cover by preventing illegal logging through community-led watch and reporting mechanisms that provide timely alerts when deforestation activities are detected. By combining real-time satellite monitoring with secure, transparent, and anonymous reporting facilitated via blockchain, LindaMisitu empowers local communities and forest authorities to act swiftly and effectively to safeguard forest resources. This integration not only enhances environmental protection efforts but also strengthens community engagement and forest governance in Kenya, contributing to sustainable forest conservation and restoration goals.

LindaMisitu exemplifies a cutting-edge approach to forest conservation by uniting advanced technology with grassroots participation to protect Kenya's cherished natural heritage, ensuring rapid response and increased accountability in combating deforestation



# HOW IT WORKS



The platform LindaMisitu has two main parts. The first part is the home or dashboard section, which leverages satellite APIs from two key sources: Sentinel Hub and Google Earth Engine. For the dashboard, Sentinel Hub is used to display maps with a normal visual of the forest area—in this case, focusing primarily on the Mau Forest. The platform also incorporates NDVI satellite imagery to illustrate any changes in forest cover over time. Users can access a direct link to Google Earth Engine with coordinates for Mau Forest, allowing for a more detailed overview and visualization of the area. This feature is especially useful for professionals who need to analyze specific zones affected by deforestation.

Additionally, the platform includes simulated IoT devices that provide real-time environmental data such as humidity and temperature. This data is crucial for monitoring forest health and issuing warnings about high temperatures that could trigger fires or low humidity levels that may indicate tree loss.

The second main component is a blockchain-based reporting system that ensures anonymous and secure reporting of tree loss or deforestation activities. By leveraging blockchain's anonymity through hedera consensus services and immutability, community members can report illegal tree felling without fear of repercussions. This encourages open, honest participation in the fight against deforestation, empowering the community to actively protect their forests.

Together, these components provide an integrated forest monitoring and protection system that combines satellite data visualization, environmental sensing, and community-driven reporting to safeguard Kenya's cherished forests



# DATA FLOW AND ARCHITECHTURE

ANONYMOUS REPORT

HEDERA CONSENSUS SERVICE

GOOGLE EARTH ENGINE  
DASHBOARD

SENTINEL HUB API

SIMULATED IOT LAYER





# CORE MVP FEATURES

## REAL-TIME SATELLITE MONITORING

NDVI-BASED DEFORESTATION ALERTS  
VIA SENTINEL HUB + GOOGLE EARTH  
ENGINE

## DEFORESTATION HOTSPOT MARKERS

AUTOMATIC RED PINS WHERE  
 $NDVI < 0.2$

## INTERACTIVE GEE DASHBOARD

IN-APP LINK TO CUSTOM EARTH  
ENGINE DASHBOARD FOR TIME-  
SERIES & HOTSPOT VISUALIZATION

## SIMULATED IOT GROUND-TRUTH LAYER

TEMPERATURE & HUMIDITY → FIRE-RISK  
ALERTS (ORANGE = HIGH)

## REAL-TIME ALERT ENGINE

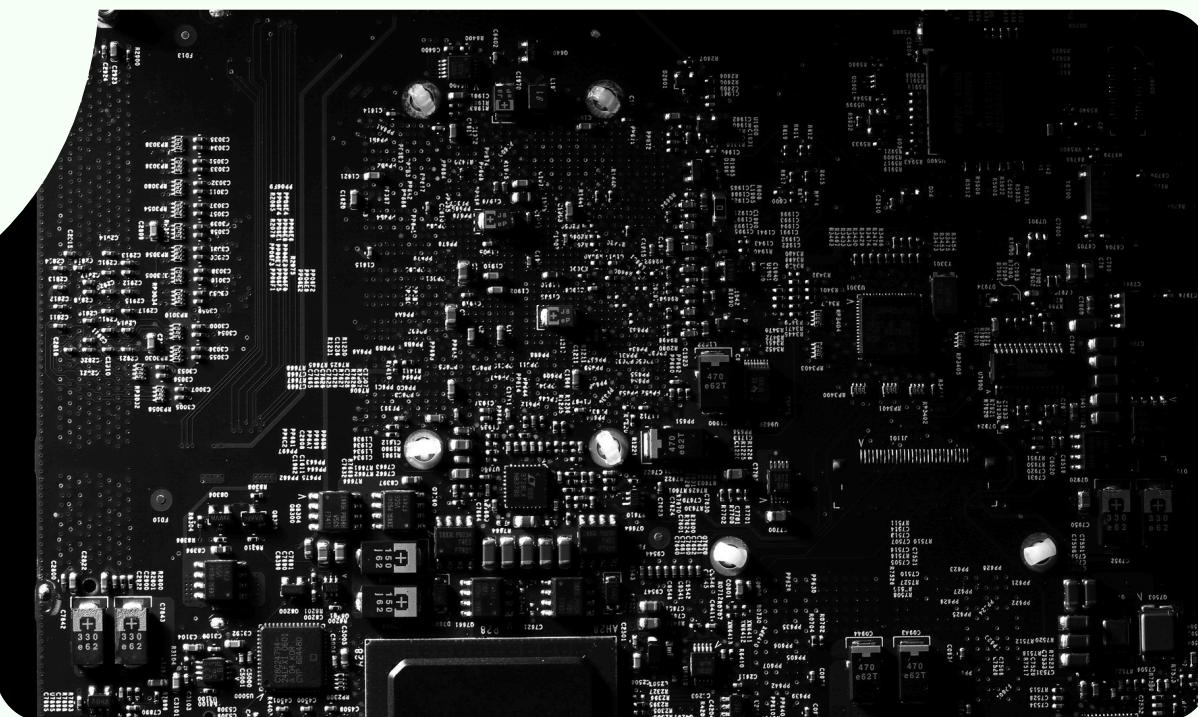
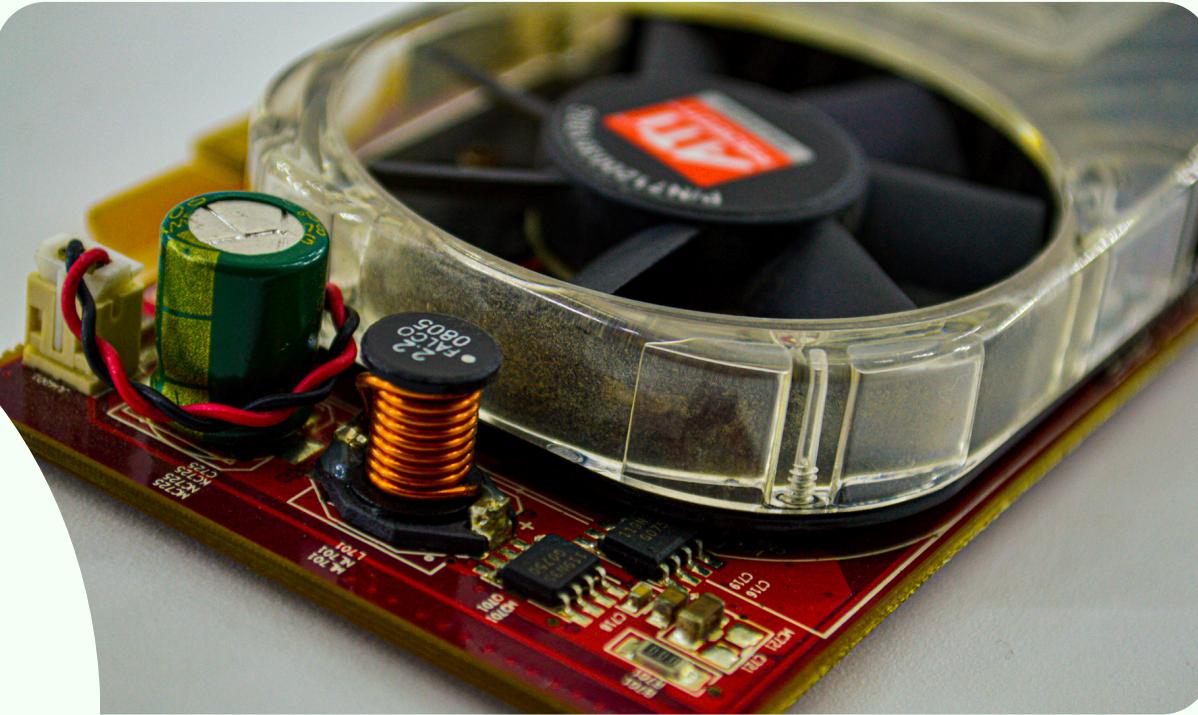
ALERTS TRIGGERED WHEN  $\geq 3$   
HOTSPOTS OR HIGH IOT FIRE-RISK  
READINGS ARE DETECTED

## ANONYMOUS BLOCKCHAIN REPORTING

ONE-TAP ANONYMOUS REPORTING  
USING HEDERA CONSENSUS SERVICE  
(TESTNET)

## DARK-MODE UI WITH SWAHILI BRANDING

“LINDAMISITU” IDENTITY  
GROUNDED IN KENYAN CULTURE



# TOOLS, APIs & DATASETS USED



- REACT NATIVE (EXPO) → MOBILE APP
- REACT-NATIVE-MAPS → MAP + SATELLITE TILE OVERLAYS
- SENTINEL HUB API → CLOUD-FREE SENTINEL-2 NDVI & RGB
- GOOGLE EARTH ENGINE → ADVANCED ANALYSIS DASHBOARD
- IOT SENSOR SIMULATION → GROUND-TRUTH RISK MODEL
- HEDERA CONSENSUS SERVICE → ANONYMOUS REPORTING
- EOX & ARCGIS TILEFallbacks → ZERO-API-KEY OFFLINE CAPABILITY
- EASTERN MAU FOREST BOUNDARY DATASET → ACCURATE AREA OF INTEREST



# IMPACT AND FEASIBILITY



## ENVIRONMENTAL & COMMUNITY IMPACT (12–36 MONTHS)

- 15–30% DEFORESTATION REDUCTION IN EASTERN MAU & ABERDARE
- 40–60% FASTER FIRE DETECTION VIA IOT TEMPERATURE/HUMIDITY ALERTS
- TREE SURVIVAL RISES FROM ~60% → >85% BY GUIDING TEAMS TO HIGH-NDVI SAFE ZONES
- 5,000–10,000 ANONYMOUS REPORTS/YEAR (VS <500 TODAY) USING BLOCKCHAIN (ZERO RETALIATION FEAR)
- PROTECTS 5,000–15,000 HA, SEQUESTERING ~250,000 TCO<sub>2</sub> AND SAFEGUARDING WATER FOR 5M+ PEOPLE

## PRACTICAL IMPLEMENTATION PLAN (6–18 MONTHS)

- MONTHS 1–6: DEPLOY MVP IN EASTERN MAU & ABERDARE; TRAIN 200 WOMEN LEADERS (COST < \$5K)
- MONTHS 6–12: INSTALL 100 LORAWAN SENSORS (US\$30 EACH) TO REPLACE SIMULATED IOT
- MONTHS 12–18: EXPAND TO 5 COUNTIES (NAKURU, NAROK, KERICHO, BARINGO, NYERI)
- YEAR 2+: INTEGRATE WITH KENYA NFMS; UPGRADE TO HEDERA MAINNET
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## TOTAL SEED COST (5 COUNTIES): < US\$120K

## SCALABILITY

- GBM & WMF: SWAHILI-BRANDED (“LINDAMISITU”), ALIGNED WITH WOMEN-LED MONITORING
- COUNTY GOVTs: DIRECTLY FEEDS CIDPS & SPATIAL PLANS (ZERO NEW STAFF)
- NATIONAL: COMPATIBLE WITH KFS/KEFRI & NATIONAL FOREST MONITORING SYSTEM
- PAN-AFRICAN/GLOBAL: SAME PIPELINE; JUST SWAP POLYGON + TRAIN LOCAL GROUPS (OPEN-SOURCE)



# THANK YOU!

Protecting our forests is vital for life on Earth. Let's work together to maintain our planet's balance.