

# EWAP Tanzania Stakeholder Workshop

## Presentation Compendium

EW

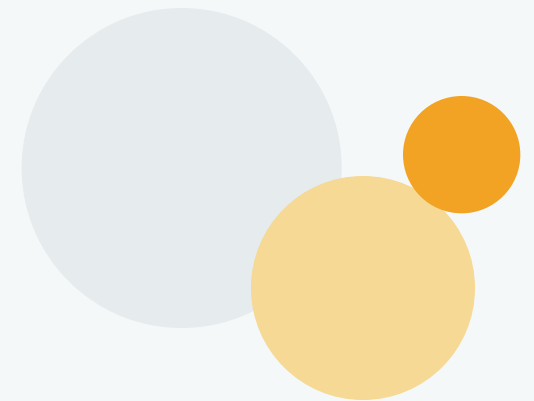
Nelson Mandela African Institution of Science and Technology (NM-AIST)  
x Enhanced Weathering Africa Partnership (EWAP)  
Arusha, Tanzania | 11 August 2026

### Compiled workshop presentations and supporting slides

Prepared for circulation as a single workshop compendium.

[www.ewap-project.org](http://www.ewap-project.org)

- Hyperlinked table of contents
- All presentation decks presented during the EWAP Tanzania workshop



# Table of Contents

EWAP Tanzania Stakeholder Workshop - Presentation Compendium



|    |                                                                                   |    |
|----|-----------------------------------------------------------------------------------|----|
| 01 | EWAP Tanzania Partnership: Where the Partnership Stands                           | 3  |
| 02 | Understanding the Tanzanian Context: Soils, Laboratory Capacity and Monitoring    | 12 |
| 03 | Tanzania Agriculture Priorities: Vision 2050 and FYDP 2025-2030                   | 21 |
| 04 | Article 6, Carbon Markets, and What They Mean for African Enhanced Weathering     | 30 |
| 05 | Mati Carbon: Boosting Small Farmer Resilience, Income and Soil Health through ERW | 41 |
| 06 | Workshop Photographs                                                              | 58 |

EWAP TANZANIA STAKEHOLDER WORKSHOP

# Partnership

Where the partnership stands, where it does not yet reach

**Joseph Kimaro**

EWAP Tanzania Lead, University of Exeter Business School  
NM AIST, Arusha - 11 August 2026



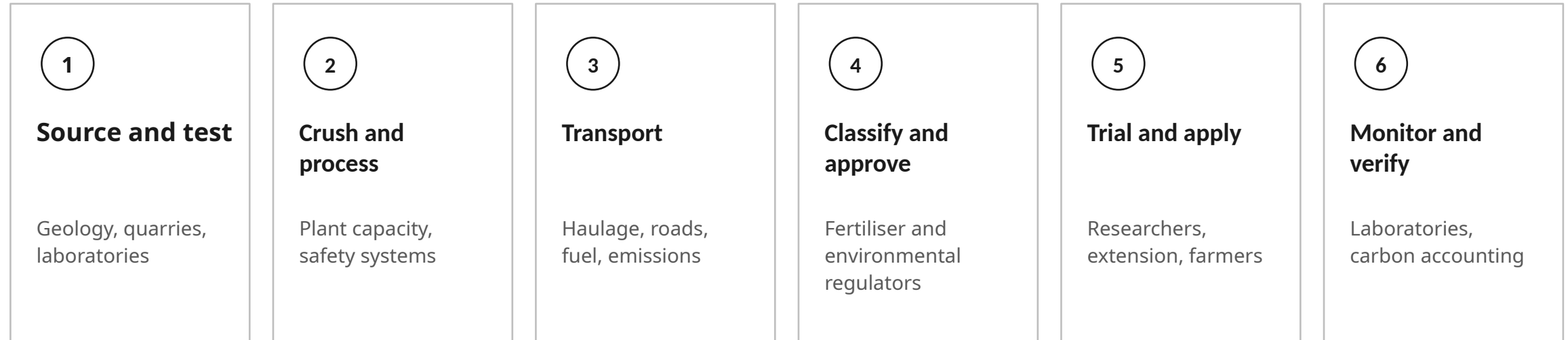
**What is each person doing? And who is not in this picture?**

Photo: Brian Kungu, Unsplash

**No single institution holds all the permissions, materials, land, knowledge, trust and finance needed to move even one tonne of rock onto a farmer's field.**

Partnership is therefore a central part of what decides whether enhanced weathering can work in Tanzania.

# From rock to field



**Every link sits with a different institution. No university, no company, no ministry and no community organisation holds more than one or two of them.**

# Sustainable Development Goal 17



## 17

### SDG 17 calls for

- Cooperation in science and technology
- Responsible technology transfer
- National capacity building
- Multi stakeholder partnerships

**Enhanced weathering is exactly the case SDG 17 was written for.**

Much of the scientific methodology, the investment and the demand for carbon removal currently sits outside Africa.

---

**How we structure this partnership decides whether enhanced weathering builds lasting Tanzanian capability and shared value or becomes another form of external dependency.**

WHERE WE STAND



# What we have

## NM-AIST

Host institution, Scientific leadership, soils and environmental knowledge, laboratory capacity, research training

## Vice President's Office

(Fredrick Kanizio Manyika, UNFCCC National Focal Point). The route from field evidence to national carbon accounting.

## TARI

Agricultural research and trial system, and the pathway to extension recommendations.

## Arusha Regional Offices

Agriculture and environment. Permission, siting, and the link to district level staff.

## Floresta Tanzania

Farmer relationships built over years. The reason we can speak to farmers at all.

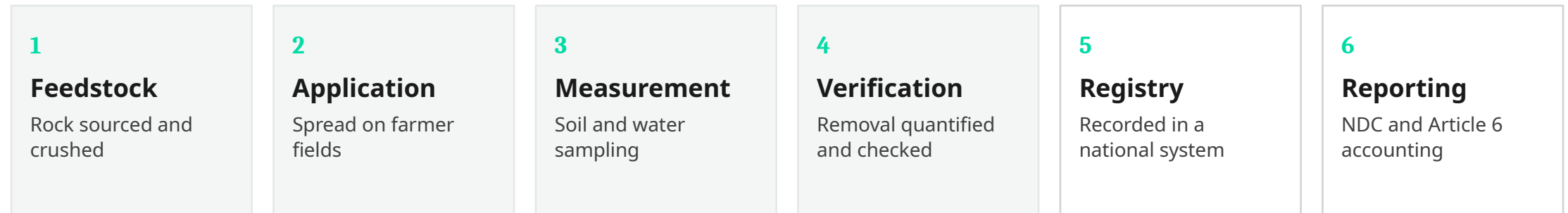
## Mati Carbon

Practical experience of sourcing, transporting, applying and monitoring at farm level

## University of Exeter

EWAP coordination, funding pathway, and International research links.

# From a field to a national account



**Steps one to four sit with the people in this room.**

Steps five and six sit with national institutions. We cannot build them and we should not try.

WHERE IT DOES NOT YET REACH



## What we need from this room

### Regulation

We need the right national regulatory connection.

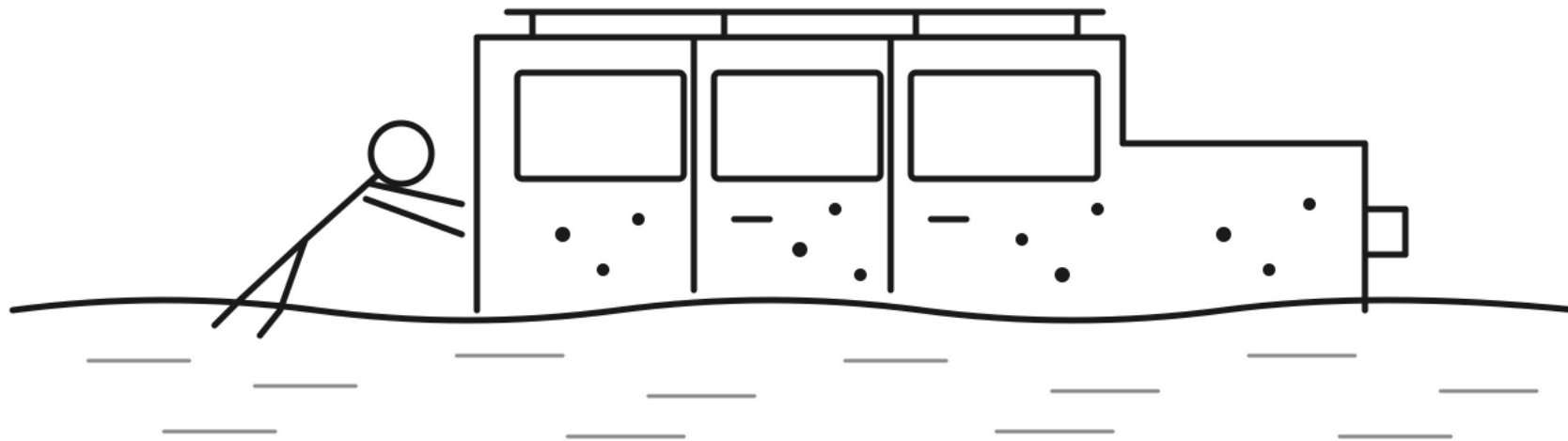
Crushed silicate rock will be applied on farmland.  
We need to establish how TFRA classifies it and what approvals are required before field application..

### Rock supply & Transport

We need suitable rock sources, crushing capacity and realistic transport costs for delivery to farms in Arusha and Manyara.

We need suitable rock sources, crushing capacity and realistic transport costs for delivery to farms.

**If your organisation can help with either of these connections, please speak to us today**



**One person. One vehicle. No movement.**

# Enhanced Weathering Africa Partnership (EWAP)

UNDERSTANDING THE TANZANIAN CONTEXT

Soils, laboratory capacity and monitoring

Dr. Ruth Moirana

# Soil at the Centre

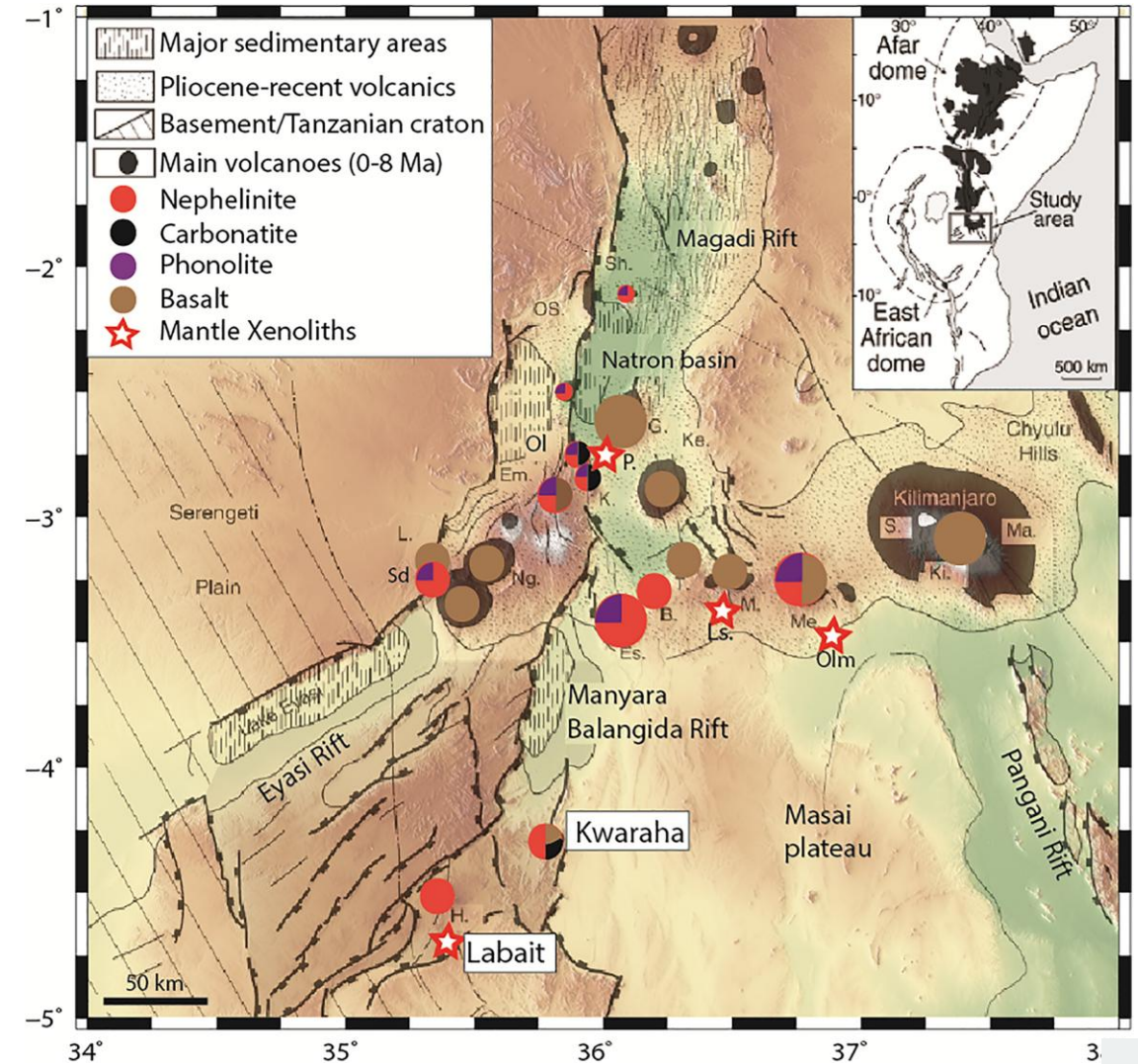
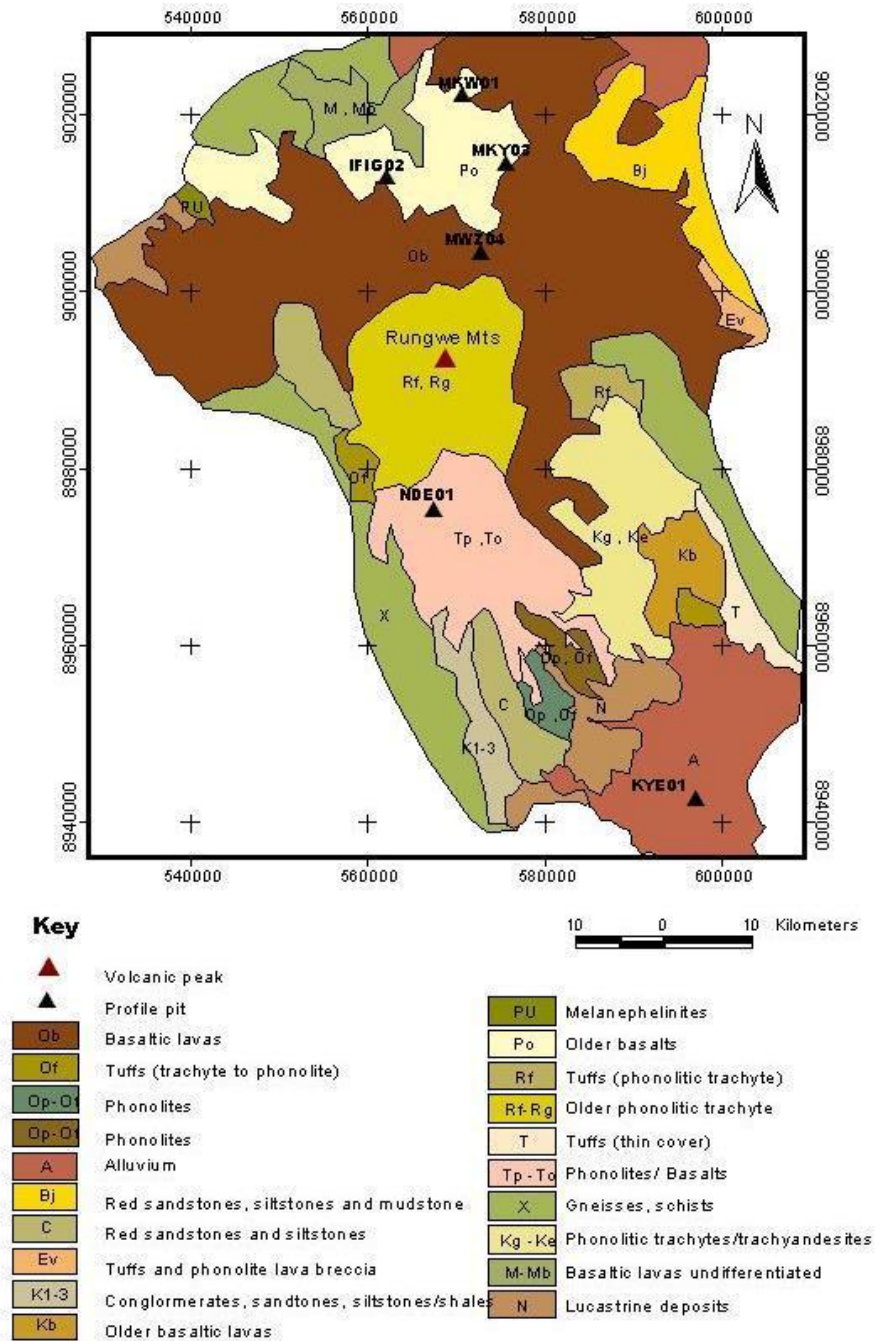
- Enhanced weathering acts in the soil.
- Understanding the soils and our ability to measure and monitor them determines both the agronomic *benefit to farmers* and the *carbon removal*.
- 30% of GDP from *agriculture*; about 65% of Tanzanians are *smallholder farmers*
- 70% of production driven by smallholder farmers
- Widespread soil degradation is reported in Tanzania
- pH < 4 in acutely acidified zones
  - *Nutrients locked away*

- The Tanzania **soil acidity** is associated with weathered **Acrisols** and **Ferralsols**
- *The Southern Highlands:* (Mbeya, Songwe, Njombe, Iringa, Rukwa and Ruvuma)- (*maize, coffee, tea, potatoes*)
- *Northwest regions:* Lake zone, Kagera regions (Bukoba, Karagwe, Biharamulo, southwestern Kagera)

Soil Map of Tanzania



# Basalt and nephelinite in Tanzania are reported in Manyara and Mbeya regions



# *Will Farmers Agree to this?*

- Neutralizes acidity
- Reduces Al toxicity
- Supplies nutrients
- Removes CO<sub>2</sub>

# *Laboratory Capacity*

## ***NM-AIST***

- ICP-MS
- CHNOS analyzer
- SEM
- ICP-OES
- UV-VIS
- ISO 17025 accreditation-Nationally recognized

# *Secondary Laboratory Capacity*

## ***WISE-FUTURE Material Lab***

- XRD
- FTIR

## ***TAEC***

- Radioactivity
- XRF

## ***ATC***

- ICP-AAS
- All other soil analyses

## ***A-Z lab***

- GC

# *Monitoring?*

- Measurement in open soil
- The CO<sub>2</sub> released is small
- Spatial variability
- Too slow

Thank you!



# **TZ AGRICULTURE PRIORITIES**

***THE VISION 2050***

***& FYDP (25-30)***

*Professor Kelvin Mtei*

*EWAP WORKSHOP AUGUST 2026*

## TZ Vision 2050

.....transform our economy from low-productivity **agriculture** to a semi-industrialised, human development-centred economy

### Potential sectors towards 2050:

*The Agriculture and forestry, remains a cornerstone of Tanzania's economy, contributing **26.5 per cent to the GDP**, employing **65 per cent of the workforce**, and generating **30 per cent of export earnings**. This sector holds immense potential for job creation and income generation through the sale of value-added products. Its strong linkages with the manufacturing, transport, and trade sectors underscore its critical role in driving employment and broad-based economic growth*



# TZ Vision 2050



# TZ Vision 2050



**Agriculture encompassing crops, livestock, fisheries and aquaculture and forestry**

**PILLAR 1. Strong inclusive and competitive economy.**

**Productivity Enhancement:** **Raising productivity across agriculture**, (industry, and services) is fundamental to increasing incomes and economic competitiveness (**livelihood**)

...achieved through the **adoption of modern technologies, mechanisation, skills development, and value chain enhancement.**

**Pilar 3: Environmental Integrity and Climate Change Resilience**

**Effective land management**; Biodiversity Integrity; Healthy Wetlands and Water Resources; Pollution-Managed Environment; Climate Change Resilience



TZ FYDP 2025-2030

# Pathways for Transformation

## FYDP 2025-2030



### Pathways for Transformation

*The 3i Pathway (Investment, Infusion, Innovation) provides a conceptual framework for accelerating structural transformation across priority sectors, **including agriculture**, manufacturing, mining, energy, construction, Blue Economy industries, tourism, financial services, and creative industries.*

.....drivers of transformation:

1. Integrated Logistics:
2. Science and Technology:
3. Research and Development (R&D):
4. Digital Transformation:
5. Energy:

### Strategic flagship 5

National Irrigation and Agro-Industrial Transformation Programme – modernising agriculture through irrigation expansion, agro-processing, and climate-resilient value chains.

## TRANSFORMING KEY SECTORS

...includes **agriculture** as the foundation of food security and raw-materials (**rural livelihood?**)

GDP contribution **Crops 16.1, livestock 6.2, fisheries 1.6, forestry 2.4**. remains the backbone of the economy, contributing 26.3 percent of GDP in 2024 and employing 54.2 percent of the labour force. It underpins **food security**, industrial supply chains, export earnings and **rural livelihoods** across the country.

The Plan shifts agriculture from **subsistence-based production** toward a **commercial, technology-enabled and export-oriented system anchored on flagship investments, climate-smart practices, agro-industrialisation and strengthened market linkages**.

## Main challenges;

### Crops

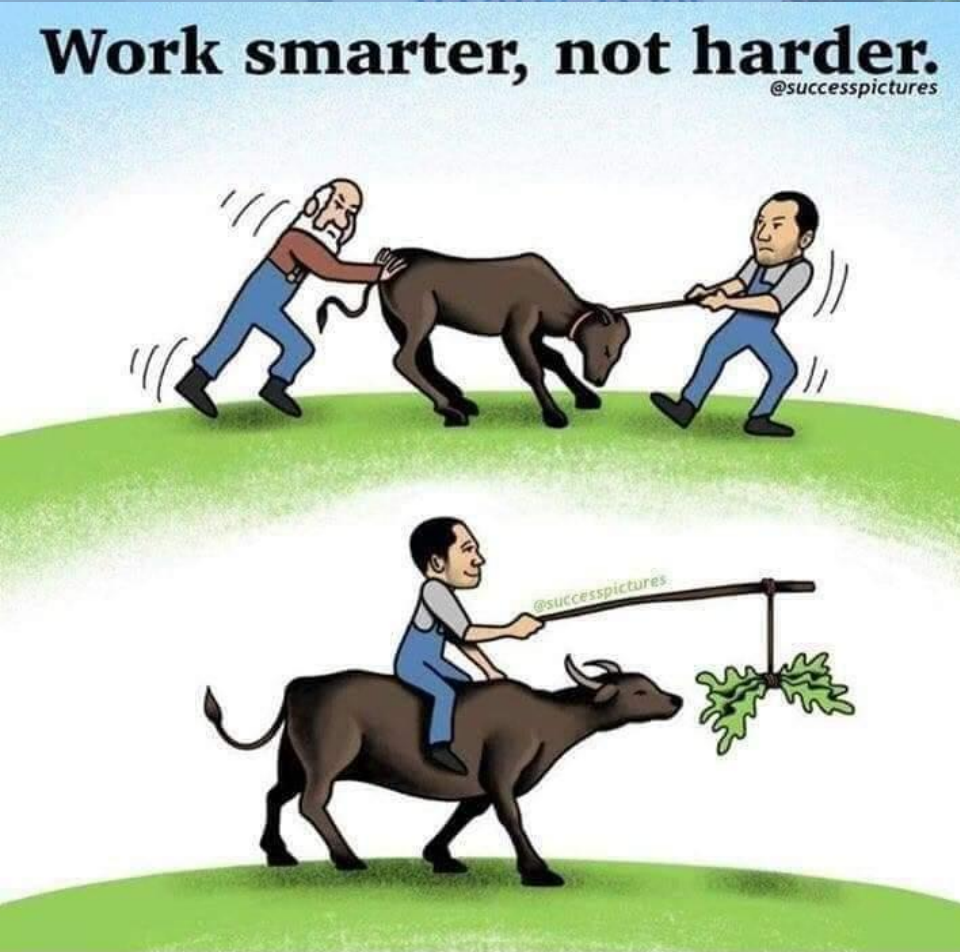
- Low mechanisation,
- poor soil fertility management,
- limited irrigation access.
- High post-harvest losses
- restricted access to finance and climate-related shocks

### Livestock

- Low productivity
- Underdeveloped value chains of products (e.g. meat, dairy, and poultry)  
Secondary processing and cold-chain systems are limited,
- value addition remains minimal.
- Slow uptake of improved breeds,
- weak veterinary and disease-surveillance systems,
- shortages of modern abattoirs, dairy facilities, and feedlots constrain commercialisation.
- Export readiness is further held back by inadequate compliance systems and procedural inefficiencies.

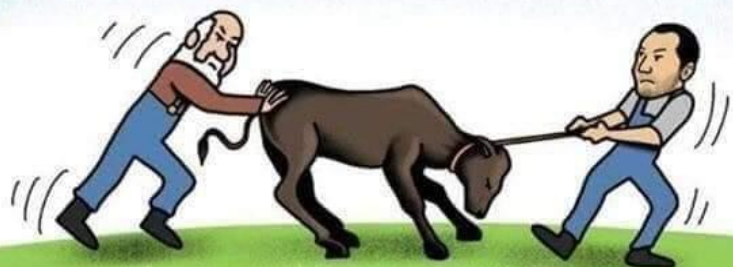


## Main Challenges



# Main challenges

**Work smarter, not harder.**  
@successpictures



## Main challenges;

### Fisheries and Aquaculture:

- illegal, unreported, and unregulated (IUU) fishing,
- outdated marine infrastructure,
- limited deep-sea capacity.
- Inadequate aquaculture inputs and weak compliance with international food-safety and certification standards restrict competitiveness and export potential.

### Forestry:

- Deforestation,
- frequent bush fires
- continued reliance on charcoal.
- Outdated processing technologies and skills
- Limited green financing
- Dependence on imported engineered-wood products widen the trade deficit and constrain sectoral transformation.
- Beekeeping; Limited modern hives, weak extension services and poor market linkages restrict its commercialisation and contribution to rural incomes

# Strategic Areas of Intervention



**"KNOWLEDGE IS POWER"**

**THE MORE YOU LEARN, THE  
BETTER YOU WILL BE ABLE TO  
MAKE DECISIONS ABOUT THE  
DIRECTION OF YOUR LIFE.**



## Strategic Areas of Intervention

.....*TZ has potential to evolve agricultural sector from a producer of raw commodities into a competitive, value-added agro-industrial powerhouse; by*

- **skills development** (high-potential areas e.g textiles and agro-processing)
- investing in **modern processing** infrastructure,
- **industrial clusters**,
- curb **post-harvest losses**,
- boost **export earnings and create quality jobs**.
- **overhaul of financial systems** through de-risking instruments and blended finance,
- **strengthening regulatory frameworks**,
- **adopting digital technologies** (e.g traceability, e-extension)
- Focusing on **climate-smart practices**

I Thank you for listening!  
Asanteni

[kelvin.mtei@nm-aist.ac.tz](mailto:kelvin.mtei@nm-aist.ac.tz)



# Article 6, carbon markets, and what they mean for African enhanced weathering

**In July 2026 I filed two amendments to the Article 6.4 rulebook. This is what they say — and what they would mean for a smallholder farmer in Tanzania.**

A plain-language guide to the Paris Agreement, Article 6.4, and two drafting choices that would price African carbon removals down — for reasons that have nothing to do with the carbon.

*Rulebook status  
current to 30 July 2026*

**Nduta Njenga** · EWAP Kenya Lead, University of Exeter · Energy lawyer and climate-finance practitioner · LLM International Energy Law & Policy, CEPMLP, University of Dundee

Sources: UNFCCC A6.4-SBM018-A13, in force 10 Oct 2025 · draft Tool: Reversal risk assessment, A6.4-MEP014-A07, 1 July 2026 · Kanzaki, Planavsky & Reinhard (2023), PNAS Nexus.

# Enhanced weathering speeds up something rocks already do — and once the carbon is in solution, it presents a permanent solution.

## 1 Crush the rock

Volcanic rock ground to a fine dust, much like the lime farmers already spread.

## 2 Spread it on fields

Rain and soil do the rest, exactly as they do in nature.

## 3 The carbon is locked away

It becomes dissolved bicarbonate and travels to the sea for around ten thousand years.

### Proven in the region — and the model already runs here

Kisumu, Kenya: 56 women farmers spread rock dust once. Maize rose 71% in the first year and 79% in the second — no re-application.

**+71%**

yr 1

**+79%**

yr 2

**Mati Carbon already runs this with smallholders in Tanzania, using rock powder from Kilimanjaro-region quarries. The harvest comes first; the carbon is a second income on top.**

### DOES THE TEMPERATURE MATTER?

A Swiss trial in December 2025 measured far less removal — in cool vineyard soils. It questions how much, not how long. Tropical soils weather faster, which is why field data from here is now the most valuable evidence in the sector.

Sources: Kanzaki, Planavsky & Reinhard (2023), PNAS Nexus 2(4):pgad059 · Kisumu smallholder maize trial, 56 women farmers, nephelinite at 20 t/ha, +71.17% and +79.24% — CDRXIV preprint, Sept 2025, not yet peer-reviewed · Swiss vineyard trial, Environmental Science & Technology, Dec 2025 · ICVCM reversal-risk tiering.

## Article 6 lets countries trade carbon — and Article 6.4 is the route that gives an African tonne a stamp the world trusts.

**A carbon credit is a receipt.** It says one tonne of carbon dioxide was kept out of the air or taken back out of it. A market lets that receipt be bought and sold — so the money moves to where the work is done.

### 1 Article 6.2

*Two governments deal directly.*

Fast — and only as trustworthy as the two who signed it.

### 2 Article 6.4

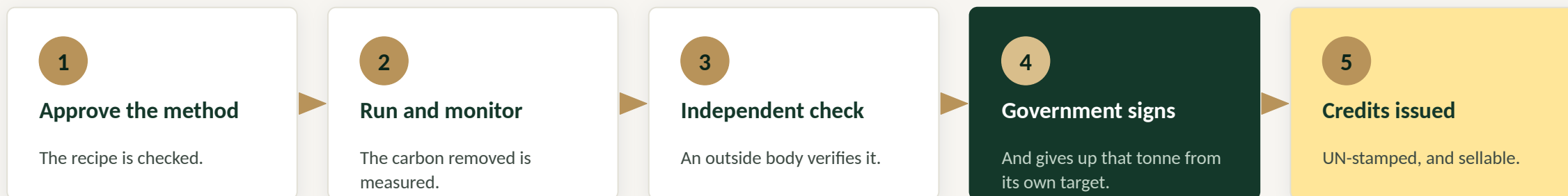
*One UN market, with an official inspector.*

One rulebook, one Supervisory Body. Successor to the Clean Development Mechanism. Its credits carry a UN stamp.

**Hold on to 6.4. That is where the issue is.**

Sources: UNFCCC, Paris Agreement (2015), Articles 2, 4 and 6 • Paris Agreement Crediting Mechanism (PACM), Article 6.4.

## Five steps turn a tonne into a UN-stamped credit.



**Why step four decides everything.** When Tanzania authorises a tonne, it gives that tonne away — it can no longer count it towards its own climate target. A real cost, and the reason the ministry is a partner in this rather than a bystander.

### WHERE THE RULEBOOK STANDS TODAY

#### New

The rules on keeping carbon stored came into force in October 2025 — and they name enhanced weathering by name.

#### Barely used

Only a handful of projects have ever been credited, all of them transferred cookstove programmes.

#### Wide open

No removal method has been approved. Our rules are being written before we arrive.

*Sources: UNFCCC A6.4-SBM018-A13, in force 10 Oct 2025, para. 6(d) and fn. 7 · PACM issuance register and draft annual report to CMA 8 (A6.4-SBM022-AA-A01) — issuance approvals to date are transitioned CDM cookstove programmes; no removal methodology approved.*

# Buffer: Every seller must leave credits in a shared insurance jar. The number of African credits is yet to be decided

## The buffer in brief – carbon reversal hedge

Selling a removal credit is a promise the carbon will stay put.

- Every project leaves a share of its credits in a shared jar.
- You cannot sell what is in the jar.
- The lower your country rating, the more you must put in the buffer
- The less you can benefit from the carbon credit generated

## Where the drafting has got to

The first draft of the tool that sets the jar went public on 1 July 2026. It already gives different countries different numbers — but only for clean cooking. Our pathway is still blank.

*Which is why a submission filed now can still move it.*

## WHAT OTHERS WITHHOLD, FOR A SIMILAR PROMISE

|                          |           |                                            |
|--------------------------|-----------|--------------------------------------------|
| Isometric                | None      | <i>weathering treated as very low risk</i> |
| Puro.earth               | 10%       | <i>the default rate</i>                    |
| Gold Standard            | 20%       | <i>flat, for all land use</i>              |
| American Carbon Registry | + up to 8 | <i>added from a governance score</i>       |
| Verra (land use)         | 12–60%    | <i>above 60% a project fails</i>           |

Nothing at one end. Sixty tonnes in a hundred at the other.

Sources: UNFCCC A6.4-SBM018-A13, Eq. 8 and fn. 15 • draft Tool: Reversal risk assessment, A6.4-MEP014-A07, 1 July 2026 — regional and national defaults for non-renewable-biomass activities only; human-induced factors and removal modules not yet drafted • Isometric Standard v2.0 (2026); Puro.earth General Rules; Gold Standard GS4GG; ACR Risk Tool v2.0 (2024); Verra AFOLU NPRT v4.2. PACM has proposed no figure for any removal pathway.

## One registry already sets part of a project's jar from its country's governance score — Not the field.

### What one registry does today

The American Carbon Registry adds up to 8 extra percentage points to a project's jar for “social and political risk”, taken from the World Bank's governance scores.

Political stability • Government effectiveness • Regulatory quality • Rule of law •  
Control of corruption • Voice and accountability

**Not one of those six was designed, or tested, to predict whether carbon leaves a field.**

*Imagine a motor insurer that ignored your driving record and priced your premium not on your personal record but on the crime rate statistics in your home country*

That is what a governance score does to a Tanzanian field. Two identical projects — same rock, same soil, same monitoring — credited differently because of the flag above them.

**Real risk should be priced at the rock and the project. That is what I asked for.**

Sources: American Carbon Registry, Tool for Reversal Risk Analysis v2.0 (19 Nov 2024): social and political risk at an assumed maximum of 8%, from five-year averaged World Bank Worldwide Governance Indicators. ACR is a non-UN registry serving voluntary and compliance markets, not PACM — the risk is that PACM adopts a design already normalised elsewhere. No validation study linking governance indices to observed carbon reversals was located as at July 2026: a search finding, not a proof of non-existence.

## Two amendments – raise the bar rest on evidence, applied universally.

### 1 Use the best data you have in hand

#### THE PROBLEM

As drafted, forest projects need a finished national monitoring system. Many African countries are still building one — so a gap in the plumbing becomes a closed door.

#### WHAT I ASKED FOR

A ladder instead. Use the best data you hold; where you have none, a cautious default set so high it can only under-count.

Data hierarchy • Conservative default • Non-exclusion • Non-regression

### 2 Judge the field, not the flag

#### THE PROBLEM

As drafted, the jar is left to a tool whose human-induced part is unwritten — and a governance score is the ready-made way to fill it.

#### WHAT I ASKED FOR

Treat every country the same, unless there is published proof of a real difference. Price real risk at the rock, not the flag.

Uniformity • Evidentiary exception • No proxies • Transparency

**One principle, twice: keep the bar high, make it rest on evidence, and apply it equally everywhere.**

Sources: Njenga, N., submission on form A6.4-FORM-METH-007 v01.0, July 2026, Comments 1 and 2 • UNFCCC A6.4-STAN-METH-005 (leakage), in force 16 May 2025, paras. 15–16 — applies only to REDD+ activities within the scope of Article 5.2, and so not to enhanced weathering; revision deferred to 2027 • draft Tool: Reversal risk assessment (A6.4-MEP014-A07).

## Two amendments, filed in July. Neither lowers the bar — both make it evidence-based.

### COMMENT 1 • LEAKAGE

- ✓ Use the best data you actually have — sub-national first, then pan-tropical, then a conservative default.
- ✓ Don't exclude a project just because the national monitoring system isn't finished yet.
- ✓ No retroactive penalty when a country's data later improves.

### COMMENT 2 • REVERSAL RISK

- ✓ Apply human-induced risk factors evenly across all host countries.
- ✓ Differentiate by country only where evidence shows a real, causal link to reversals.
- ✓ Never use governance or political-risk proxies on their own to set the number.

# Tanzania is not at the starting line. It has already authorised a tonne — and it has a seat where the buffer is decided.

## TANZANIA

### THE ROCK

Meru and Kilimanjaro sit in the North Tanzanian Divergence. Rock powder is already produced from quarries in the Kilimanjaro region.

### THE LAW

Carbon Trading Regulations 2022, as amended in 2023, set the route: concept note, no objection, ministerial endorsement — plus a 61% gross revenue share.

### THE GATE

The Vice President's Office authorises. Tanzania has already issued a letter of authorisation with a corresponding adjustment, under Article 6.2.

## AND IN UGANDA

- Climate Change Act 2021 and Climate Change Mechanisms Regulations 2025 set the authorisation route.
- Uganda's Article 6.4 host-Party form is already filed with the UNFCCC.
- Mount Elgon is a nephelinite volcano — the same rock family as the Kisumu trial.

Two in every three working people here farm, on about a hectare each. The jar decides how much of the second income ever reaches those fields.

Sources: Tanzania Environmental Management (Control and Management of Carbon Trading) Regulations 2022 (GN 636) as amended by GN 721 of 2023, reg. 34(3) — procedural steps per law-firm commentary · UNFCCC Supervisory Body membership 2026 · UpEnergy / National Carbon Monitoring Centre: Tanzania's first Article 6.2 authorisation with corresponding adjustment, 2024 · Kilimanjaro-region quarries reported in non-peer-reviewed sources · XPRIZE Carbon Removal, April 2025 · UNFCCC national authorities register · ILO modelled estimates, 2023.

# Keep the bar high. Judge the field, not the flag. Use the best evidence — and this room can supply it.

- 1 Article 6 is the trading part** and 6.4 is the route that gives an African tonne a trusted stamp
- 2 Weathering does two jobs** more food now, and carbon locked away for millennia (carbon credit)
- 3 One rule is still open** and one live precedent would price our tonne down for the flag
- 4 I filed two amendments** both asking for evidence, applied to every country alike
- 5 The evidence is here** almost none exists for tropical Africa — so the panel reaches for a proxy

## THE ASK

- 1. Co-sign it** with NM-AIST and TARI and farmer representatives named
- 2. Supply the evidence** weathering rates and monitoring data from the partner sites
- 3. Help draft the text** regulators move faster when handed workable wording

**The clock: the Supervisory Body meets 5–9 October, in Bonn.**

**INTO THE AFTERNOON** Scientists — what field data could we contribute? Government — what would make authorisation worthwhile? Developers — how do we share income fairly? Farmers — what would make you comfortable taking part?

Sources: UNFCCC Article 6.4 Supervisory Body, SBM 023, 5–9 October 2026, Bonn • Methodological Expert Panel, September 2026 • COP31 / CMA 8, Antalya, 9–20 November 2026 • Njenga, N., submission on form A6.4-FORM-METH-007 v01.0, July 2026.

## CONTACT

Send me the hardest question in this file.



## Nduta Njenga

**EWAP Kenya Lead • University of Exeter**

Energy lawyer and climate-finance practitioner • LLM International Energy Law & Policy, CEPMLP, University of Dundee

**EMAIL** [nduta.njenga@outlook.com](mailto:nduta.njenga@outlook.com)

Send me one live problem from your own site or file — on the drafting, on what authorisation requires, or on how a buffer would hit a specific project — and I will come back with a written view before the Supervisory Body meets in October. No cost, no obligation.

*Filed the July 2026 submission to the Article 6.4 Supervisory Body and Methodological Expert Panel on the reversal-risk and leakage drafting.*

[ Enabling Planetary-scale Food Security ]  
**Boosting small farmer resilience,  
income, and soil health globally –  
through enhanced rock weathering  
based regenerative durable carbon  
removal.**



 **MATI**

 **PRIZE**  
GRAND WINNER 2025

# 30k+ Farmers

Partnered across India, Tanzania & Zambia

# 300k+ Tons

ERW basalt rock dust already spread

## Mati Carbon Snapshot

**Building for smallholders by restoring soil health, boosting income and resilience, and delivering durable carbon removal through ERW.**

# 7 Countries

Commercial scale in India and R&D phase elsewhere

- New trials
- Mature R&D
- Commercial Ops + R&D

### PROVEN SCALE

**500+ villages**  
with deployments across various districts

**25,000+ acres**  
of farmland treated

**8 agroecology zones** where feedstock was deployed in various crops like rice, maize, teff, casava etc

**\$3.5 million** in increased farmer income in 2025

## 2050 Ambition

35 Countries and ~100 Agro Ecology Zones

### CUSTOMERS



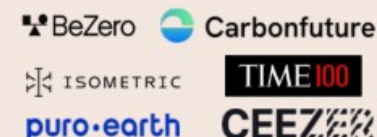
### FUNDERS AND BACKERS



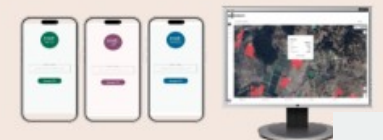
### ACADEMIC PARTNERS



### INDEPENDENT VALIDATORS



### PROPRIETARY TECH STACK



# Proven Hard Tech + Science Capabilities

Built Ground-Up to collect in-field soil profile and smallholder agro-ecology and resilience data at scale

## 117,692

Soil Samples Collected

## 158,134

Farmland Plots Registered

## 36,894

Farmers Registered

## 115,467

Acres of Land Enrolled

## Proprietary Data Infrastructure

### Field Capture

Offline-first apps built for zero connectivity rural environments

✓ Farm App

✓ Warehouse App

✓ HSE Module

7

Countries

### Lab & Processing

State-of-the-art ICP-MS Analysis with randomized sampling protocols

✓ Lab App

✓ Rock Sampling

✓ Quality Module

100k+

Samples

### AI/ML Intelligence

Automated data verification and carbon modelling at field scale

✓ Verifier Dashboard

✓ CDR Modelling

✓ ML auto-QA

20+

MRV Papers

### Verified Output

End-to-end Traceability from field sample to certified credit

✓ Customer Module

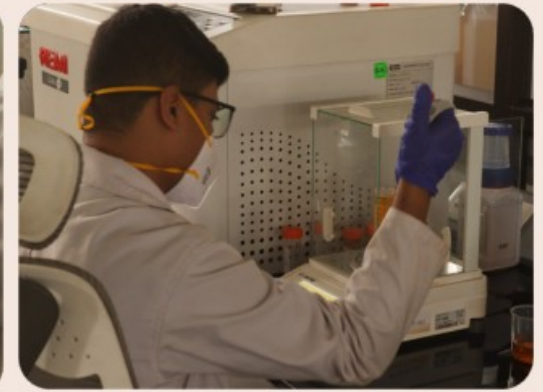
✓ Full Traceability

✓ AA pre-rating

AA

BeZero  
Rating

## State-of-art Lab Infrastructure (India - 2 sites)



# Enhanced Rock Weathering (ERW)

One reaction → Two pathways

▶ A nature-based adaptation intervention funded by the carbon market

1

## CARBON PATHWAY BENEFITS

Basalt spread  
on cropland



CO<sub>2</sub> + rain react  
with silicate minerals



Bicarbonates drain  
through watersheds



Stored in ocean  
as HCO<sub>3</sub><sup>-</sup> for >10,000 yrs

*what leaves the field →*



2

## AGRONOMIC PATHWAY BENEFITS

pH Correction  
Al toxicity eliminated



Nutrients Released  
Ca, Mg, K, P + micro-nutrients



Silicon Deposited  
Disease & drought resistance



Farmer Outcomes  
Higher yields, lower costs

*← what stays in the soil*

H<sup>+</sup> consumed by  
weathering reaction.  
Nutrient uptake unlocked.

Calcium, Magnesium,  
Potassium, Phosphorus  
+ Iron, Manganese, Zinc,  
Copper

Cell walls strengthened.  
Pest & disease resistance.  
Water-use efficiency  
improved.

Higher yields.  
Reduced input costs.  
Greater climate resilience.

# Need: The Planetary Scale Urgency

## ► Soil degradation & Ecological urgency

**40%**degraded  
soil globally

40% of Earth's soil degraded already,  
and further 95% projected to be degraded by 2050.<sup>1</sup>

## ► Smallholder resilience & Food security urgency

**0.8%**only of global  
climate finance

Smallholders produce ~35% of the world's food<sup>2</sup>  
but receive only 0.8% of global climate finance annually<sup>3</sup>.

1. <https://earth.org/95-of-the-earths-soil-on-course-to-be-degraded-by-2050/>

2. <https://www.fao.org/newsroom/detail/small-family-farmers-produce-a-third-of-the-world-s-food/en>

3. <https://www.ifad.org/en/w/opinions/the-75-billion-climate-finance-gap-an-imperfect-but-important-figure-for-small-scale-farmers>

4. <https://www.mckinsey.com/industries/agriculture/our-insights/what-climate-smart-agriculture-means-for-smallholder-farmers>

# Mechanism to Outcome: How ERW translates soil chemistry into boosted soil health and smallholder income/resilience



## pH Management

- Acidity buffering
- Mitigates aluminium toxicity
- Liming benefit where lime is unaffordable / inaccessible



## Nutrient Replenishment

- Slow release of Ca, Mg, K, Si, and P



## Addition Si

- Silicon uptake shows promise for drought and pest tolerance
- Supports plant structural strength and root health

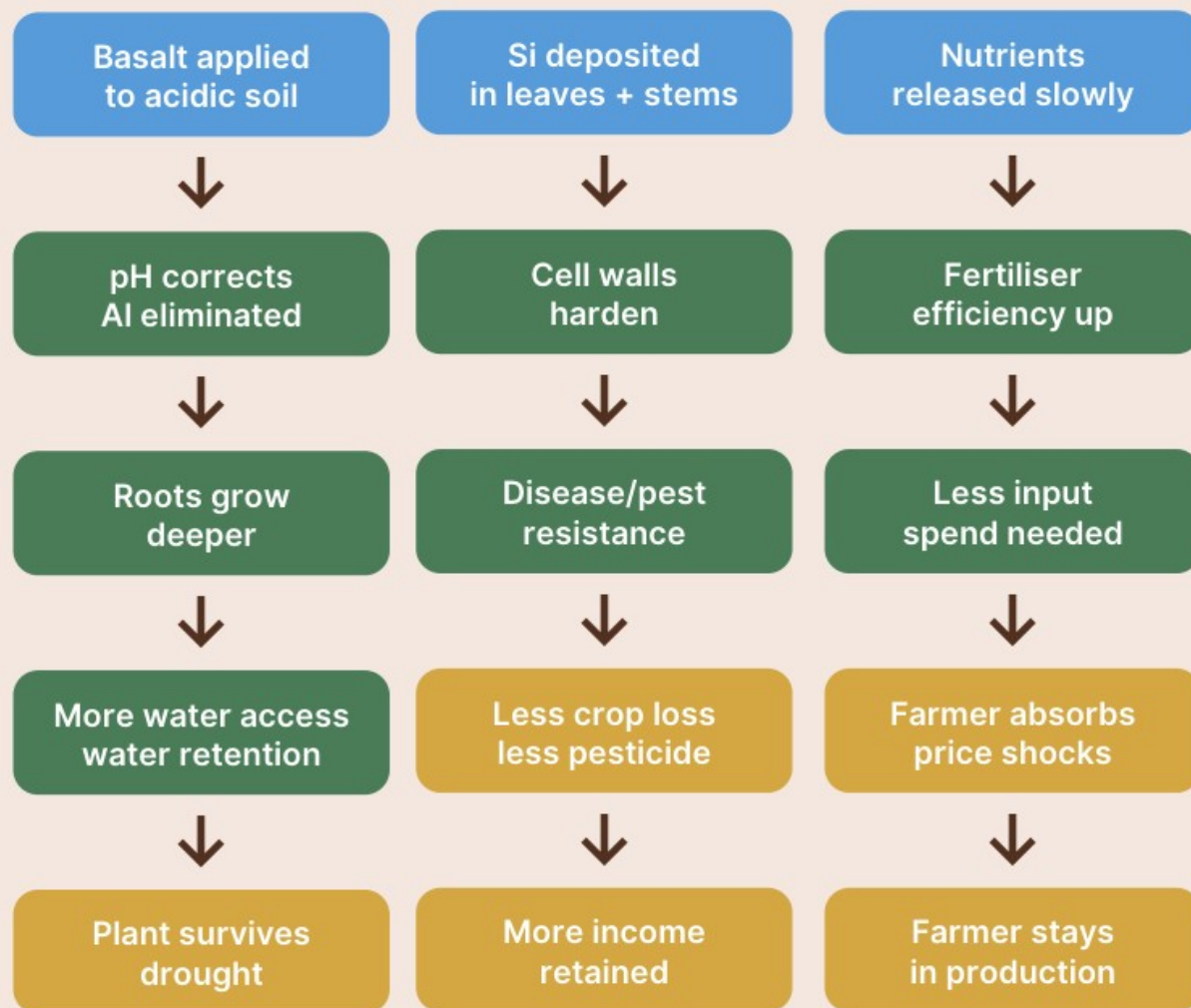
Mati Field yield increase average 20%

Image from Zambia/Millet field (Average income \$1,600/annum)



# Resilience Compounds – Increased water retention and drought resistance; Retained income; Farming Livelihood Continuity; Higher adaptive capacity

Each resilience mechanism reinforces the others. The result is a farming system that absorbs shocks rather than collapsing under them.



Rainfed Maize in Zambia with stark difference due to moisture retention following Mati Carbon deployment

Enhanced Rock Weathering

# Adaptation Outcomes Funded by the Carbon Market

Crushed basalt applied to smallholder cropland corrects soil acidity, releases nutrients, and builds crop resilience — while permanently removing CO<sub>2</sub>. The carbon market funds everything. The farmer pays nothing.

## YIELD INCREASE:

# 30%

## AVERAGE YIELD INCREASE

leading to stronger crop structure and more uniform maturation.

## CROP HEIGHT AND DENSITY:



83% reported increase in density



92% reported increase in height

## Proven at Scale

30,000+ farmers | 25,000+ acres | 220,000+ tonnes basalt

\$50M XPRIZE Carbon Removal Grand Prize winner

Peer-reviewed: Jordan et al., 2026 (Royal Society)

Operations in 7 countries. Expanding into 15 African countries

## Why This Matters for Adaptation

- The adaptation finance gap is \$187–359bn/year.
- Less than 1% reaches smallholders directly.
- ERW delivers measurable adaptation outcomes: yield resilience and income uplift, funded by carbon credit revenue.
- Aligned with GGA Targets 3 and 6 under the UAE Framework for Global Climate Resilience.



# 35% ADDITIONAL HOUSEHOLD INCOME

Average additional net income addition per farmer

# ERW provides significant benefits in comparison to existing adjacent Agronomic interventions and subsidy models

## How ERW Compares to Typical Donor Interventions

|                        | ERW                                                | Liming                                          | Fertiliser Subsidy |
|------------------------|----------------------------------------------------|-------------------------------------------------|--------------------|
| Who pays?              | Carbon market                                      | Farmer / trader                                 | Govt / donor       |
| Ongoing cost to donor? | None                                               | Recurring                                       | Recurring          |
| Agronomic Inputs       | ✓ Macro and micro-nutrients and plant available Si | X Ca/Mg only                                    | X NPK only         |
| Carbon removal         | ✓ Lasting carbon removal<br>✓ Carbon reduction     | X Classified as CO2 emissions source under IPCC | X None             |

### Why ERW intervention would become self-funding virtuous cycle

Once zone-specific agronomic evidence exists, the carbon market funds all ongoing deployment. Carbon credit revenue covers the full cost. The donor's role is catalytic and time-bound to fund the evidence generation.

**Zero farmer behaviour change required. No training, no certification, no monitoring burden.**

**A time-bound, catalytic investment that unlocks a permanently self-funding intervention**

## What ERW Delivers — From a Single Application



### Soil restoration

pH correction, nutrient replenishment, structure



### Increased resilience

Drought, heat, disease & pest resistance



### Increased productivity

+30% yield, 100% positive response



### Increased livelihoods

20% uplift in household income, zero cost



### Ecosystem services

Carbon removal, water regulation, soil biodiversity, reduced agrochemicals



### Unlocks other inputs

Recovers fertiliser value wasted on acidic soils

## Catalytic, time-Bound high-value use of grant capital

To reach self-funding, climate and agronomic testing must be completed across diverse agro-ecological zones. Grants generates the evidence — the carbon market funds ongoing operations.

### US\$0.5–1M

**Phase 1: Agronomic Trial**  
Secondary data analysis. In field feasibility study. Government alignment and permitting. Agronomic trials

### US\$1–1.5M

**Phase 2: MRV Basics**  
Multi-season factorial trials, baselines, farmer engagement, analytics, synthesis. MRV basics to prove viability

### US\$2–3M

**Phase 3: MRV Proof**  
Multi-season MRV trials, with solid and liquid phase multi-season data sets to certify and establish MRV in new region.

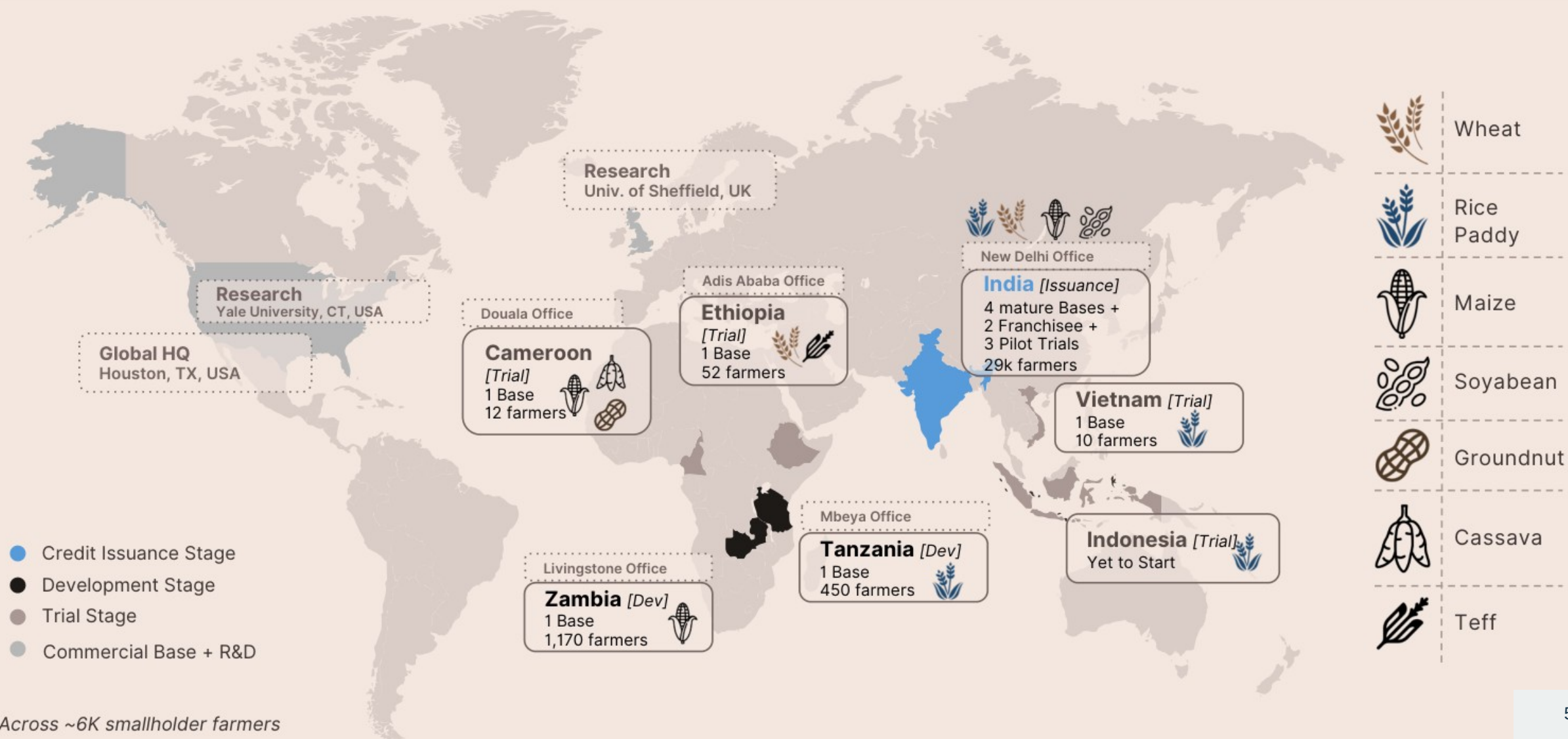
Other intervention requires ongoing donor funding. ERW is funded by the carbon market once the evidence exists. Grant is the catalyst.

# ERW Differentiation against other Carbon Removal pathways and Co-benefits

▶ ERW uniquely combines scalability, durability, and strong agricultural co-benefits.

|                                                                                                                           |  <b>Scale-Up Potential</b>                                |  <b>Cost per ton of CDR</b>                        |  <b>Permanence</b>                                    |  <b>Co-Benefits</b>                                                                               |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>ERW</b></p>                        | <br>Abundance of Rock to scale geographically             | <br>\$100–150/tCO <sub>2</sub> at scale            | <br>10 <sup>3</sup> –10 <sup>5</sup> year timescales  | <br>Improves soil fertility, nutrient supply, and crop productivity while reducing soil acidity.  |
|  <p><b>Bio-Char</b></p>                   | <br>Limited biomass availability & competing biomass uses | <br>\$100–300/tCO <sub>2</sub> depending on system | <br>Carbon stability varies by feedstock & conditions | <br>Improves soil water retention, nutrient holding capacity, and soil microbial activity.        |
|  <p><b>Regenerative Agriculture</b></p> | <br>High potential due to applicability                 | <br>~\$20–100 / tCO <sub>2</sub>                 | <br>Lower permanence; high reversal risk.           | <br>Improves soil structure, biodiversity, water retention, and climate resilience for farmers. |

# Demonstrated Scale & Impact: \$3.5M in farmer\* income uplift by 2025; Reach across 7+ countries, 7+ crop value chains, 30K+ Farmers



\*Across ~6K smallholder farmers



## XPRIZE Grand Winner

### April 2025

Among 1,300 carbon removal teams, Mati was awarded the Carbon Removal XPRIZE Grand Prize. Awarded by the Musk Foundation for our breakthrough science, scalable model, and unwavering commitment to farmers.



Mati secures BeZero's Pre Rating

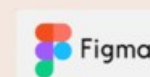


## 'AA' Pre-Rating

Only ERW provider globally to achieve AA Pre-Rating in BeZero

Reflects confidence in Mati's MRV rigor, governance, and long-term impact, providing independent validation for buyers and partners.

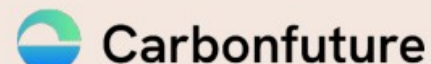
### Customers



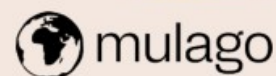
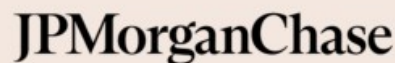
### Research Partners



### Ecosystem Partners



### Funding Partners



Forbes named Mati's CEO / Founder among the world's Top 50 Sustainability Leader

# Science-first approach with demonstrated credibility and granular traceability to deliver certified credits

- ▶ 50K field samples collected & processed & 100K plots of farmland covered

## Digital-first MRV



### SOIL SAMPLING

Rigorous protocols for randomized sampling



### ROCK SAMPLING

Composition parameters aligned with compliance



### LAB TESTING

Robust measurements of CDR using ICP MS



### CUSTOM APPS

End-to-end traceability



### CARBON MODELLING

CDR permanence prediction



### FRANCHISE MANAGEMENT

Creating village entrepreneurs to launch ERW ventures



### LOGISTICS MANAGEMENT

Tracking-led route optimization

## Academic Partners



Yale University



Leverhulme  
Centre for Climate Change  
Mitigation



UNIVERSITY of  
WASHINGTON



University of  
Sheffield



## In-Country Research Partners

Zambia, Tanzania, Ethiopia, Vietnam, Indonesia, Cameroon etc.



Mukuni  
Development  
Trust



ĐẠI HỌC CẦN THƠ  
Can Tho University

## Scientific Credibility

Our Team members have authored/co-authored **20+** widely cited, globally recognized **MRV publications**



Association for the Sciences of  
Limnology and Oceanography



ACS Publications  
Most Trusted. Most Cited. Most Read.



ADVANCING  
EARTH AND  
SPACE SCIENCE



# Digital Infrastructure Built to Scale ERW Across Smallholder Agriculture

► **Highly granular & scalable** enabling future franchise licensing model

## MatiC Components

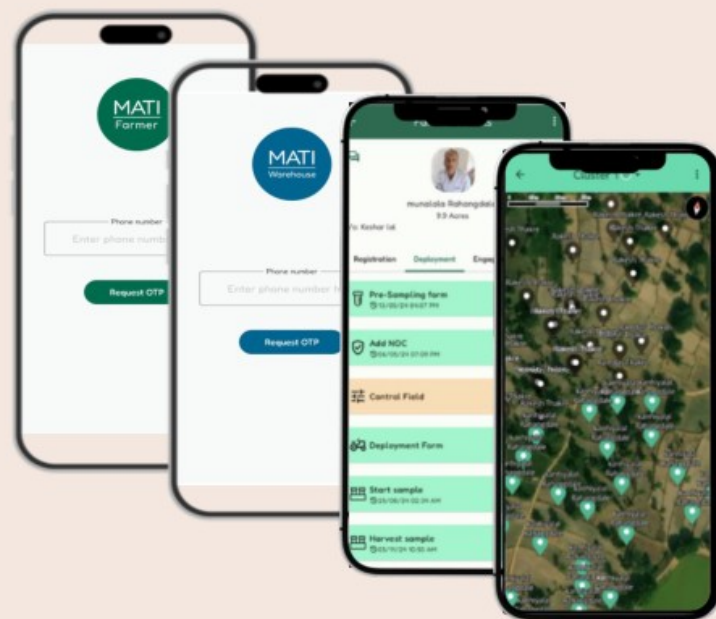
- i Farm App
- ii Warehouse App
- iii Lab App
- iv Verification Module
- v Customer Module
- vi Quality Module
- vii HSE Module
- viii Franchise System

**MatiC  
Tech Stack**

## Mati Farm

## Mati Warehouse

## Mati Lab



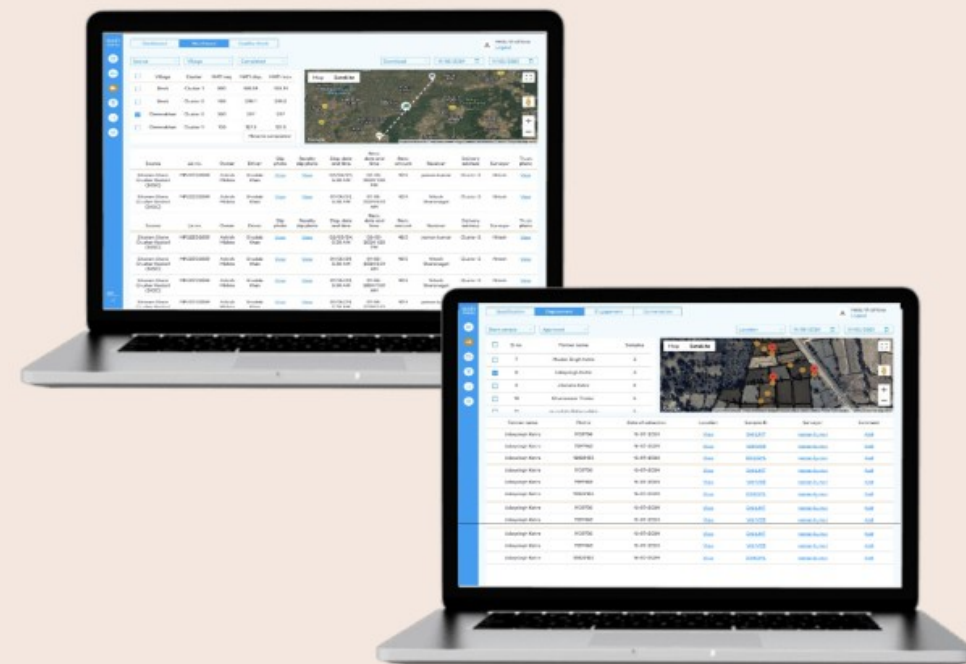
**Proprietary data capture apps that work offline in rural infrastructure**

## Verification Module

## Franchise Module

## Customer Module

## Finance Module



**Verifier Dashboard with AI & ML to automate data verification for MRV**

# Key Staff & Leadership

## MANAGEMENT TEAM



**Shantanu Agarwal**  
**Founder & CEO**  
 Serial Entrepreneur,  
 B. Tech IIT Roorkee,  
 MBA Harvard



**Dr. Jake Jordan**  
**Chief Science Officer**  
 PhD, Geological and Earth  
 Sciences  
 The University of Texas



**Rwitwika Bhattacharya**  
**Climate Justice Lead**  
 Ex-World bank. MPP,  
 Harvard University,  
 Founder: Swaniti initiative



**Tom Mills**  
**Policy Head**  
 Strategy & Policy Leader,  
 Stripe Climate Fellow,  
 MBA, MSc- Oxford



**Ashish Kumar**  
**Finance & Strategy**  
 Ex-Shell Foundation, Dalberg  
 B. Tech IITR, MBA Oxford



**Sitali Clifton**  
**Director, Zambia**  
 Secretary and Business  
 Manager, Livingston



**Maneesh P Chandran**  
**Operations Lead**  
 Tata Coffee, Indian Institute  
 of Forest Management



**Samridhi Singh**  
**People & Expansion**  
 National University  
 Singapore (NUS)

## SCIENTIFIC ADVISORS



**DR. NOAH PLANAVSKY**  
*Isotope Geochemist*  
 Director, Yale metal geochemistry  
 Center



**DR. REBECCA NEUMAN**  
*Hydro-biogeochemistry expert*  
 Associate Professor, University of  
 Washington



**DR. DAVID J. BEERLING**  
 Founder/Director of Leverhulme  
 center for climate change  
 mitigation



**DR. INDRA SEKHAR SEN**  
*Biogeochemist & Earth system  
 Scientist*  
 Associate Professor, IIT Kanpur

# One Intervention, Three Scalable Outcomes

**Smallholder Farmer  
Income & Resilience**

**ERW**  
One  
Intervention

**Durable  
Carbon  
Removal**

**Soil Function  
Regeneration**



## **Soil Regeneration**

Corrects pH, replenishes nutrients, adds silicon, and improves soil structure in a single application



## **Farmer Income & Resilience**

Higher yields and reduced fertiliser costs directly improve smallholder livelihoods and food security



## **Durable Carbon Removal**

Silicate weathering permanently sequesters CO<sub>2</sub> as stable bicarbonates — measurable and verifiable

**Funded by the carbon market – delivering  
adaptation outcomes**

**Join us in  
the mission.**



# Workshop Photographs



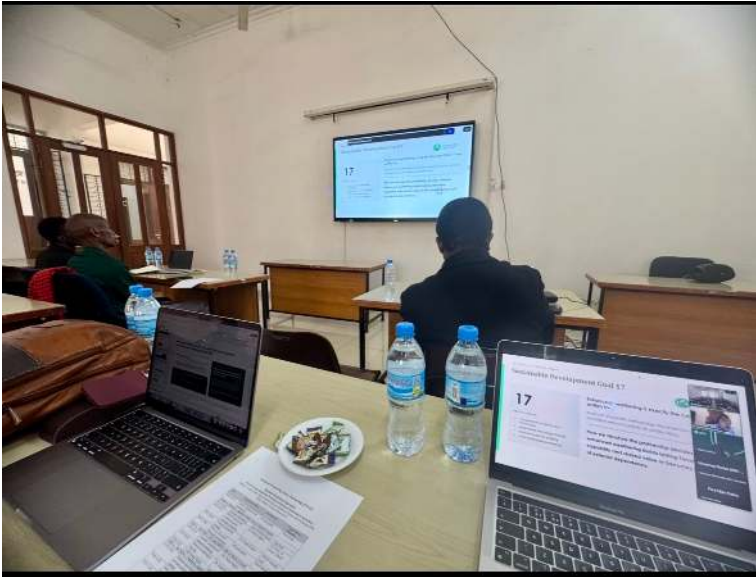
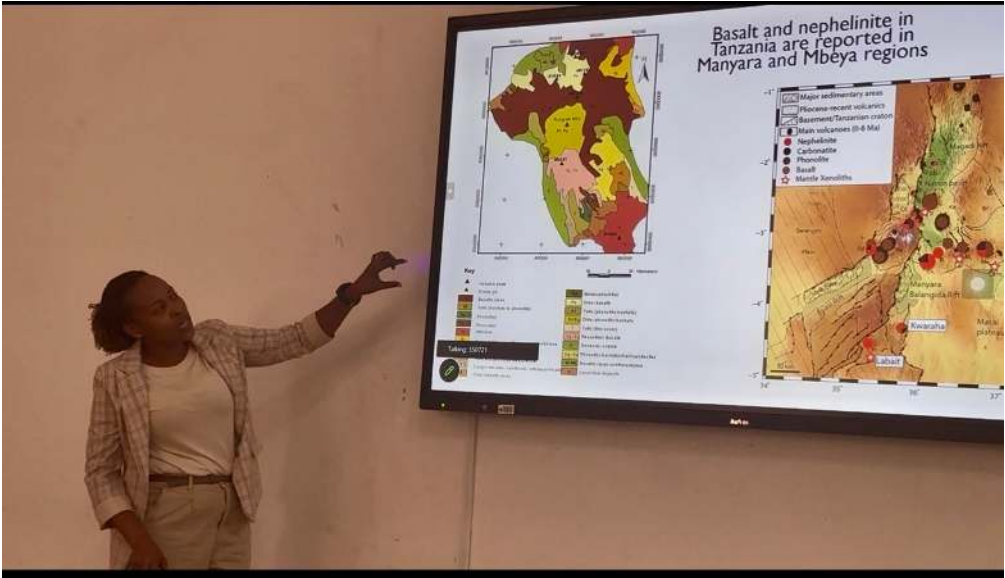




Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha





Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha



Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha





Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha



Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha







Enhanced Weathering Africa Partnership (EWAP)



Tanzania Stakeholder Workshop | 11 August 2026 | NM-AIST, Arusha



