

Namizimu Forest Restoration Program

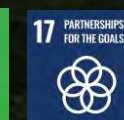
Ecological Reforestation and Carbon
Sequestration for Sustainable Development



MALAWI



SDGs



The Namizimu Forest Restoration Project

The Namizimu Forest, located in southeastern Malawi near the shores of Lake Malawi, covers an expansive 88,977 hectares of diverse and ecologically important forest landscapes. Positioned at the crossroads of the Southern Rift montane forests and the Miombo woodlands, this area harbors rich biodiversity and plays a key role in climate regulation across the region.

Although the forest is under formal protection, it continues to face intense pressures from unsustainable agriculture, firewood collection, charcoal production, and shifting cultivation. These human-induced threats have led to widespread degradation, threatening both biodiversity and the ecological services provided by the forest.

Key objectives of the Namizimu forest restoration program include:

- **Restoring up to 70,000 hectares** of degraded forest through Assisted Natural Regeneration (ARR/ANR) and enrichment planting.
- **Currently mapped and verified ARR-eligible area:** 37,758 hectares.
- **Sequestering tens of millions of tonnes of CO₂** over a 40-year crediting period, contributing to global climate mitigation efforts.
- **Planting millions of native and agroforestry species**, enhancing ecosystem services such as soil stabilization, water regulation, and pollination.
- **Protecting a highly biodiverse corridor** that supports endemic flora and fauna, and ensuring long-term conservation of key species and habitats.

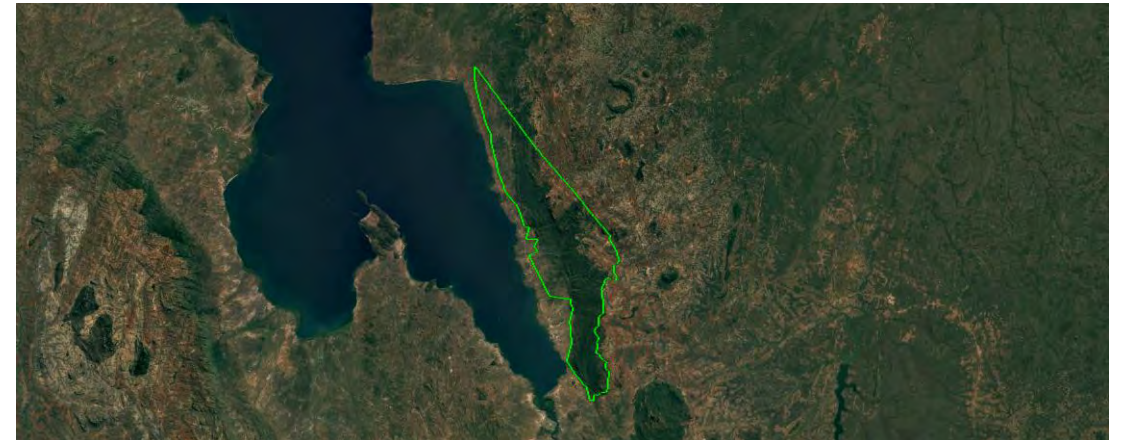
The Namizimu restoration program is currently undergoing a full technical and socio-environmental screening to assess its potential for large-scale implementation. Conducted in collaboration with local communities, stakeholders, and technical experts, this preparatory phase will inform the design of an inclusive and high-integrity reforestation initiative. The project's ambition is to become a flagship example of ecosystem restoration and sustainable development in Malawi.



This project focuses on reforesting non-inhabited and non-exploited areas along the degraded forest edge of Namizimu, ensuring that local livelihoods are preserved while promoting the restoration of native forest species that support both biodiversity and long-term carbon sequestration.

Alignment with Global Commitments

- Reinforcing **Malawi's Nationally Determined Contributions (NDCs)** under the **Paris Agreement** tackling deforestation and supporting sustainable land-use transitions.
- Designed in compliance with the **VERRA VM0047 methodology**, ensuring traceable environmental and social benefits aligned with international carbon market standards.





1. Note on Cost Estimations and Planting Strategy Assumptions

The following planting cost estimates represent a **preliminary calculation**, based on a standard reforestation model applied to eligible zones within the Namizimu landscape (areas <5m canopy height, degraded for over 10 years).

TREE SPECIES SELECTION

- The current species list is the result of an **initial bibliographic review** conducted internally.
- It **does not yet reflect the full range of native or high-performance species** that could potentially be reintroduced.
- Accurate figures per species **require ground-truthing** and ecological validation through fieldwork.
- **Planting densities** are indicative and should be confirmed on-site by qualified agroforestry experts.
 - Variations of up to **±30%** are expected depending on species-specific spacing and site conditions.
- **Post-planting mortality rates** remain high and must be **monitored over time**. Adjustments of **±20% in the number of seedlings planted** may be necessary based on survival rates.

LABOR ASSUMPTIONS

Wage rates used in this model are based on **median estimates of rural labor in Malawi**, across multiple roles.

These are generally **30–40% higher than the national minimum wage**, to account for skilled labor and retention in remote zones.

ASSISTED NATURAL REGENERATION (ANR) POTENTIAL

- The Namizimu landscape spans **approximately 89,000 hectares**, of which up to **40,000 hectares may be suitable for ANR**.
- In ANR-designated zones, **planting densities would drop significantly to 50–200 trees/ha**,
 - This would substantially **improve the overall cost-efficiency and yield of the program** by reducing nursery and planting costs.

COST OPTIMIZATION SCENARIO: DRONE-BASED PLANTING

In the event that traditional planting costs prove too high for long-term viability, we propose an **alternative cost-reduction strategy**:

DRONE-BASED DIRECT SEEDING

Advantages:

- Reduces labor dependency
- Accelerates planting over large areas
- Minimizes manual terrain disruption

Constraints:

- Requires significant **upfront investment** in equipment, training, and R&D
- A **24-month testing phase** is foreseen to:
 - Identify optimal seed substrate mixtures
 - Evaluate survival and germination rates
 - Build local technical capacity

Expected outcomes:

- Quantified number of trees established via drone method
- **Cost per surviving tree**
- **Cost savings per tree** vs. conventional planting



2. Reforestation Plan

The reforestation program is designed over a five-year timeline to restore **37,759 hectares** of degraded forest within the Namizimu landscape. The approach combines ecological integrity with operational scalability, ensuring long-term carbon sequestration and biodiversity enhancement.

YEAR 1 – FOUNDATION PHASE

- **Nursery Construction**
Establishment of a central 100-hectare nursery facility with the capacity to incubate over 7.9 million seedlings annually.
- **Recruitment & Training**
Formation of a qualified workforce drawn from local communities, trained in nursery management, planting techniques, and agroforestry best practices.
- **Seedling Incubation**
Propagation begins during the short rainy season (Q4) to prepare mature seedlings for planting at the onset of the Y2 rains.

YEARS 2 TO 5 – IMPLEMENTATION PHASE (Y2-Y4)

- **Annual Planting Targets**
Planting of approximately **9,440 hectares per year**, guided by ecological suitability, restoration principles, and carbon modeling requirements.
- **Species Deployment**
A balanced distribution of 10 carefully selected native species across planting zones to:
 - Maximize biomass and carbon storage,
 - Enhance habitat diversity and forest resilience,
 - Support multi-strata canopy structure restoration.

OPERATIONAL METRICS

- **Total trees to be planted:** 27.4 million
- **Total seedlings to be incubated (incl. mortality):** 31.9 million
- **Total seeds for germination:** 53.2 million
- **Planting density:** Defined per species, aligned with site-specific ecological assessments and mortality projections
- **Duration:** 5 years

		Y1	Y2	Y3	Y4	Y5	TOTAL
Nb trees	21 144 872						
Nb plants to be planted	27 401 489	6 850 372	6 850 372	6 850 372	6 850 372	6 850 372	27 401 489
1. <i>Colophospermum mopane</i>	4 719 838	1 179 959	1 179 959	1 179 959	1 179 959	1 179 959	4 719 838
2. <i>Pterocarpus angolensis</i>	2 643 109	660 777	660 777	660 777	660 777	660 777	2 643 109
3. <i>Acacia nigrescens</i>	5 097 425	1 274 356	1 274 356	1 274 356	1 274 356	1 274 356	5 097 425
4. <i>Azelia quanzensis</i>	1 631 176	407 794	407 794	407 794	407 794	407 794	1 631 176
5. <i>Khaya nyasica</i>	1 887 935	471 984	471 984	471 984	471 984	471 984	1 887 935
6. <i>Uapaca kirkiana</i>	3 926 905	981 726	981 726	981 726	981 726	981 726	3 926 905
7. <i>Cassipourea malosana</i>	2 548 712	637 178	637 178	637 178	637 178	637 178	2 548 712
8. <i>Milicia excelsa</i>	1 887 935	471 984	471 984	471 984	471 984	471 984	1 887 935
9. <i>Widdringtonia whytei</i>	1 529 227	382 307	382 307	382 307	382 307	382 307	1 529 227
10. <i>Podocarpus latifolius</i>	1 529 227	382 307	382 307	382 307	382 307	382 307	1 529 227
Nb plants to incubate	31 903 836	7 975 959	7 975 959	7 975 959	7 975 959	7 975 959	31 903 836
Nb seeds for germination	53 191 503	13 297 876	13 297 876	13 297 876	13 297 876	13 297 876	53 191 503
Planting duration (years)	4						0
Nursery surface (ha)	101.40						0
Surface to plant (ha)	37 759	9 440	9 440	9 440	9 440	9 440	37 759



3. Workload

The overall workload estimation is based on **man-days** distributed across three key operational pillars:

1. Nursery Setup (Year 1 only)

2. Young Plant Production (Years 1–5)

3. Field Planting and Production (Years 2–5)

Each task has been translated into estimated **man-days**, then annualized into **man/year equivalents**, assuming full-time engagement.

1. NURSERY SETUP – YEAR 1 ONLY

This initial phase covers the installation of a 100-hectare central nursery. Activities include:

Land delimitation and preparation / Installation of basic infrastructure / Fence and road construction / Setup of production blocks

Total effort: 125,201 man-days

→ Equivalent to **521.7 man-years** (assuming 240 working days/year)

2. YOUNG PLANT PRODUCTION – YEARS 1–5

These tasks are repeated annually across the 5-year program and involve: Seed pre-treatment and sowing / Substrate transportation and preparation (sieving/mixing) / Potting, sorting, and nursery maintenance / Shade structure setup

Total effort over 5 years: 1,690,770 man-days

→ Equivalent to **422.7 man-years per year**, or **1,690 man-years total**

3. FIELD PLANTING AND PRODUCTION – YEARS 2–5

This component includes all activities from site preparation to final planting:

Land preparation (hole digging) / Hole backfilling / Transporting young plants from nursery to site / Planting the seedlings / Firebreak installation

Total effort over 4 years: 997,270 man-days

→ Equivalent to **1,346.2 man-years per year** from Y2 to Y5

→ **5,384.8 man-years** in total

12 months	man/day	man/year Y2	man/year Y2	man/year Y3	man/year Y4	man/year Y5	Total
Delimitation	3 059.9	12.7					12.7
Land preparation	76 497.3	318.7					318.7
Installation of basic infrastructure	20 144.3	83.9					83.9
Fence installation	7 904.7	32.9					32.9
Main and secondary road/alleys setup	16 064.4	66.9					66.9
Production block and section setup	1 529.9	6.4					6.4
TOTAL Nursery Setup	125 200.6	521.7					521.7

4 years	man/day	man/year Y1	man/year Y2	man/year Y3	man/year Y4	man/year Y5	Total
Seed pre-treatment	845.0		0.9	0.9	0.9	0.9	3.5
Nursery cleaning and bed preparation	29 744.0		31.0	31.0	31.0	31.0	123.9
Substrate transportation	22 815.0		23.8	23.8	23.8	23.8	95.1
Substrate preparation (Sieving, mixing)	7 605.0		7.9	7.9	7.9	7.9	31.7
Potting	147 199.1		153.3	153.3	153.3	153.3	613.3
Pot sorting	49 010.0		51.1	51.1	51.1	51.1	204.2
Seed sowing	14 703.0		15.3	15.3	15.3	15.3	61.3
Shade installation	88 218.1		91.9	91.9	91.9	91.9	367.6
Maintenance	45 630.0		47.5	47.5	47.5	47.5	190.1
TOTAL Young Plants Production	405 769.3		422.7	422.7	422.7	422.7	1 690.7

4 years	man/day	man/year Y1	man/year Y2	man/year Y3	man/year Y4	man/year Y5	Total
Land preparation / hole digging	572 043.8		595.9	595.9	595.9	595.9	2 383.5
Hole backfilling	286 021.9		297.9	297.9	297.9	297.9	1 191.8
Transporting young plants to fields	24 309.7		25.3	25.3	25.3	25.3	101.3
Planting the seedlings	286 021.9		297.9	297.9	297.9	297.9	1 191.8
Firebreak installation	123 957.4		129.1	129.1	129.1	129.1	516.5
TOTAL Planting and Production	997 269.7	0.0	1 346.2	1 346.2	1 346.2	1 346.2	5 384.8

TOTAL Work Quantity	man/day	man/year Y1	man/year Y2	man/year Y3	man/year Y4	man/year Y5	Total
TOTAL	1 528 239.6	521.7	1 768.9	1 768.9	1 768.9	1 768.9	7 597.2

4. The Project in Numbers



Project area

37k ha of ARR



Nursery creation

100 ha
(140 football pitches)



Agro-forestry

1.5k ha to support
communities



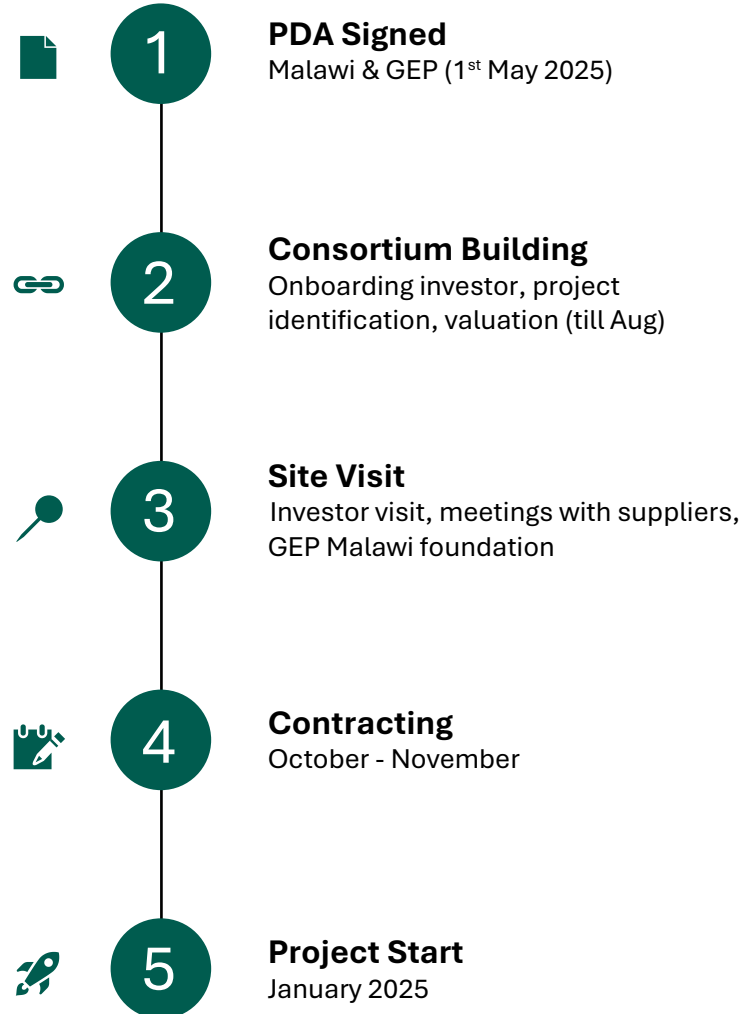
Carbon Production

16VCUs/ha/yr
(~600,000VCUs/yr)

Operational Metrics	
 Total trees to be planted:	27.4 million
 Total seedlings to be incubated (incl. mortality):	31.9 million
 Total seeds for germination:	53.2 million

Significant Employment	
 Year 1 – 521 man-years	
 Young plant production – 1.7 million man-days	
 Field planting (Yrs 2-5) – 1 million man-days	

5. Timeline



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