

TEMPLATE

KEY PROJECT INFORMATION & VPA DESIGN DOCUMENT (PDD)

PUBLICATION DATE **04.05.2022**

VERSION **v. 2.0**

RELATED SUPPORT - [Programme of Activity requirements](#)

This document contains the following Sections

Key Project Information

Section A – Description of project

Section B - Application of approved Gold Standard Methodology (ies) and/or demonstration of SDG Contributions

Section BC – Duration and crediting period

Section BD – Summary of Safeguarding Principles and Gender Sensitive Assessment

Section BE – Summary of Local stakeholder consultation

Section BF - Eligibility and inclusion criteria for VPAs inclusion

Appendix 1 – Safeguarding Principles Assessment (mandatory)

Appendix 2 - Contact information of VPA Implementer (mandatory)

Appendix 3 - LUF Additional Information

Appendix 4 - Summary of Approved Design Changes (VPA specific)

KEY PROJECT INFORMATION

Type of VPA	<input checked="" type="checkbox"/> Real case VPA <input type="checkbox"/> Regular VPA
Scale of VPA Note that a VPA can be of one scale. Please select applicable scale accordingly.	<input type="checkbox"/> Microscale <input type="checkbox"/> Small scale <input checked="" type="checkbox"/> Large scale
Title of corresponding real case VPA (if applicable)	N/A
GS ID of real case VPA (if applicable)	NA
GS ID of VPA	GS12095
Title of VPA	<u>GS12094</u> TERRAGRN – Land Regeneration through Agroforestry in Mpumalanga, South Africa VPA - 01
Time of First Submission Date	26/03/2023
Date of Design Certification	N/A
Version number of the VPA-DD	06
Completion date of version	08/12/2023
Coordinating/managing entity	TERRAGRN PRIVATE LIMITED
VPA Implementer (s)	TERRAGRN SA (Pvt) Ltd.
Project Participants and any communities involved	No
Host Country (ies)	South Africa
GS ID and Title of applicable Design Certified VPA	N/A
GS ID and Title of applicable Performance Certified VPA	N/A
Activity Requirements applied	<input type="checkbox"/> Community Services Activities <input type="checkbox"/> Renewable Energy Activities

	<input checked="" type="checkbox"/> Land Use and Forestry Activities/Risks & Capacities <input type="checkbox"/> N/A
Other Requirements applied	Programme of Activity Requirements v2.0 Principles-Requirements Stakeholder-Consultation-Requirements Safeguarding-Principles-Requirements
Methodology (ies) applied and version number	- Methodology for Afforestation/Reforestation (A/R) GHGs Emissions Reduction & Sequestration Methodology v2.0 - LUF AR Methodology Soil Carbon Tool v1.0 - A/R Methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" (version 01)
Product Requirements applied	<input checked="" type="checkbox"/> GHG Emissions Reduction & Sequestration <input type="checkbox"/> Renewable Energy Label <input type="checkbox"/> N/A
VPA Cycle:	<input checked="" type="checkbox"/> Regular <input type="checkbox"/> Retroactive

Land-use & Forest and Agriculture - Key Project Information¹

Scope:	<input checked="" type="checkbox"/> Forestry <input type="checkbox"/> Agriculture
Silvicultural system:	<input checked="" type="checkbox"/> Conservation (no use of timber) <input checked="" type="checkbox"/> Selective Harvesting <input type="checkbox"/> Rotation Forestry
Project Area (ha):	16,272.9 ha

¹ Please refer to 0 for detailed information on LUF projects

Eligible Area (ha):	14,491.2 ha
10% Set Aside Conservation area (ha):	1691.4 ha
Evidence that Project Area Boundary is clearly distinguishable in the field:	The project area boundary is clearly distinguished from the project boundary demarcated on the ground. The shape maps also has the boundary marked.
Planting Area	14,491.2
How many Modelling Units (MUs) are included in the eligible area:	1 Model Unit of Bamboo + Fruit Trees
Summary of New Areas added (copy and insert as needed):	
Size (ha):	Not Applicable
Date Added	Not Applicable

Table 1 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in Error! Reference source not found.)	Estimated Annual Average	Units or Products
13 Climate Action (mandatory)	GHG Sequestration	436,296 tCO ₂	GS VERs
2 Zero Hunger	Food Produced	0.250 ton/ha/yr Number	
5 Gender Equality	i. Number of women employed ii. Gender wage equality	1/3 of the total employees Number 100% employees %	
8 Decent Work and Economic Growth	i. Number of jobs created ii. Number of local jobs created	i. 40 ii.10	Number Number
15 Life on Land	i. Area planted ii. Total number of species planted iii. Increase in Biodiversity	i.14,491.2 ha ii. 73 iii. Based on calculation of biodiversity index – Simpson's Index of Diversity	

17 Partnerships for the Goals	Investment for implementation of the project from multiple sources	Upto 140 Million USD
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SECTION A. DESCRIPTION OF PROJECT

A.1. Purpose and general description of project

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TERRAGR N Private Limited is a United Kingdom (UK)-based private sector company established to deliver nature-based solutions within local communities to address one of the causes of global warming, namely the build-up of carbon dioxide (CO₂) in the atmosphere. TERRAGR N's vision is to create and operate sustainable, biodiverse, agroforests for ecological benefits, and economic development within the local communities. TERRAGR N hopes to contribute to food security, gender equality, reduced inequalities, and climate action through nature-based solutions that will create new employment, bring more women into the workforce, and usher in progress and sustained livelihoods within communities.

The TERRAGR N – Land Regeneration through Agroforestry in Mpumalanga, South Africa – VPA 01 is the first voluntary project activity (VPA) that is included in the broader framework of the Programme of Activities (PoA) "TERRAGR N – Land Regeneration through Agroforestry in Mpumalanga, South Africa."

This VPA-01 consists of the ecological restoration of 14,491.2 ha of abandoned degraded farmland in Nkangala district, Mpumalanga province of South Africa, aimed at restoring and regenerating unused degraded land into a biodiverse agroforest. The soil structures here have been degraded due to lack of land use and low economic development over long periods of time, further exacerbated by continuous tree-cutting, and pollution from coal mines in the region. Mpumalanga is the coal-mining heartland of South Africa. The Nkangala district had a lot of vegetation, savannah grasslands, and forest cover several decades ago. Today, there are patches of grasslands, lots of barren land, with very little tree cover. There is widespread sentiment in the region that air is polluted and the water from the Olifants River is contaminated, due to mining activities, making living conditions challenging for the local people.

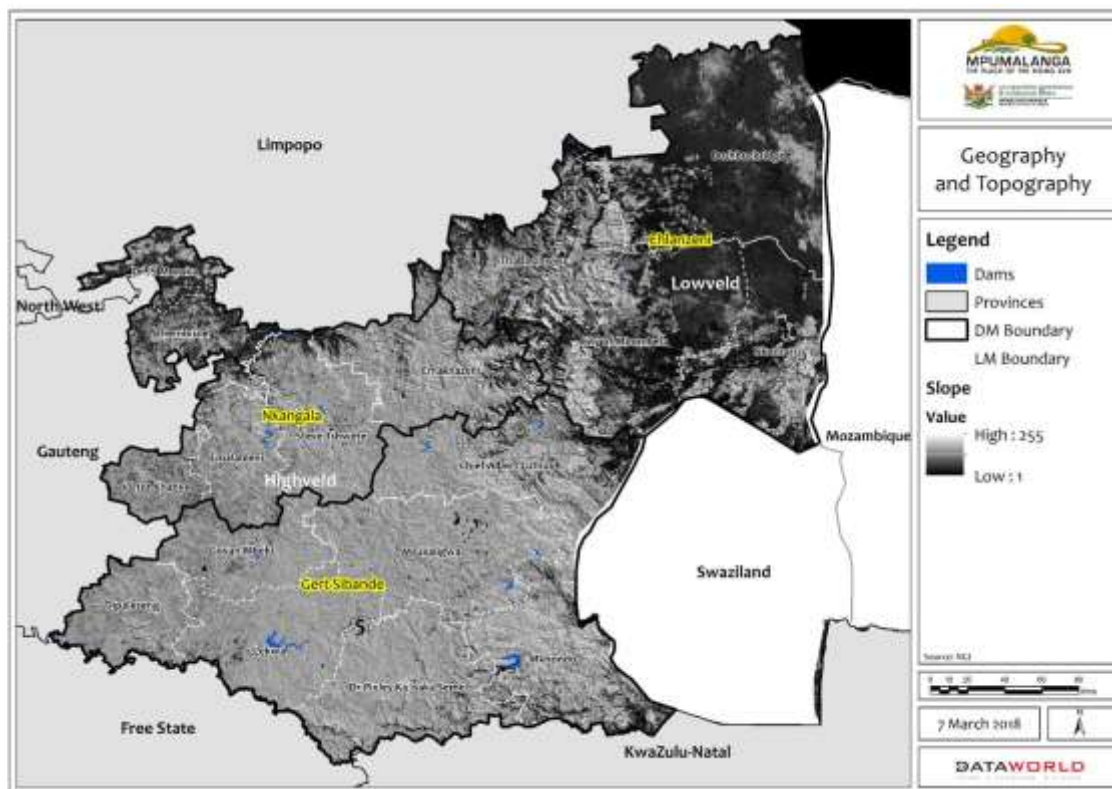
The main objective of the VPA are as follows:

- i) Sustainable land management of 14,491.2 ha of degraded land in Mpumalanga in an integrated agroforestry system by planting bamboo, fruit trees and crops from over 100 species.
- ii) New jobs for local people with skills development programmes
- iii) CO₂ sequestered thereby addressing global climate change
- iv) Bamboo biomass for the production of energy, materials, and power solutions in a sustainable way.
- v) Food solutions for local markets

As per requirement of Section 5.2.2 of the PoA requirements and procedures,V.2.,

a. **Describe the present environmental conditions of the area planned for the Forestry VPAs, including the climate, hydrology, soils and ecosystems:**

The project is aimed at restoring and regenerating abandoned and degraded farmland in Nkangala district of Mpumalanga province into a biodiverse agroforest. Mpumalanga, which means “Place where the Sun rises” lies in the north-eastern corner of South Africa. The topography of Mpumalanga region is a varied one, comprising of the Highveld (high lying) and the Lowveld (low lying) regions.

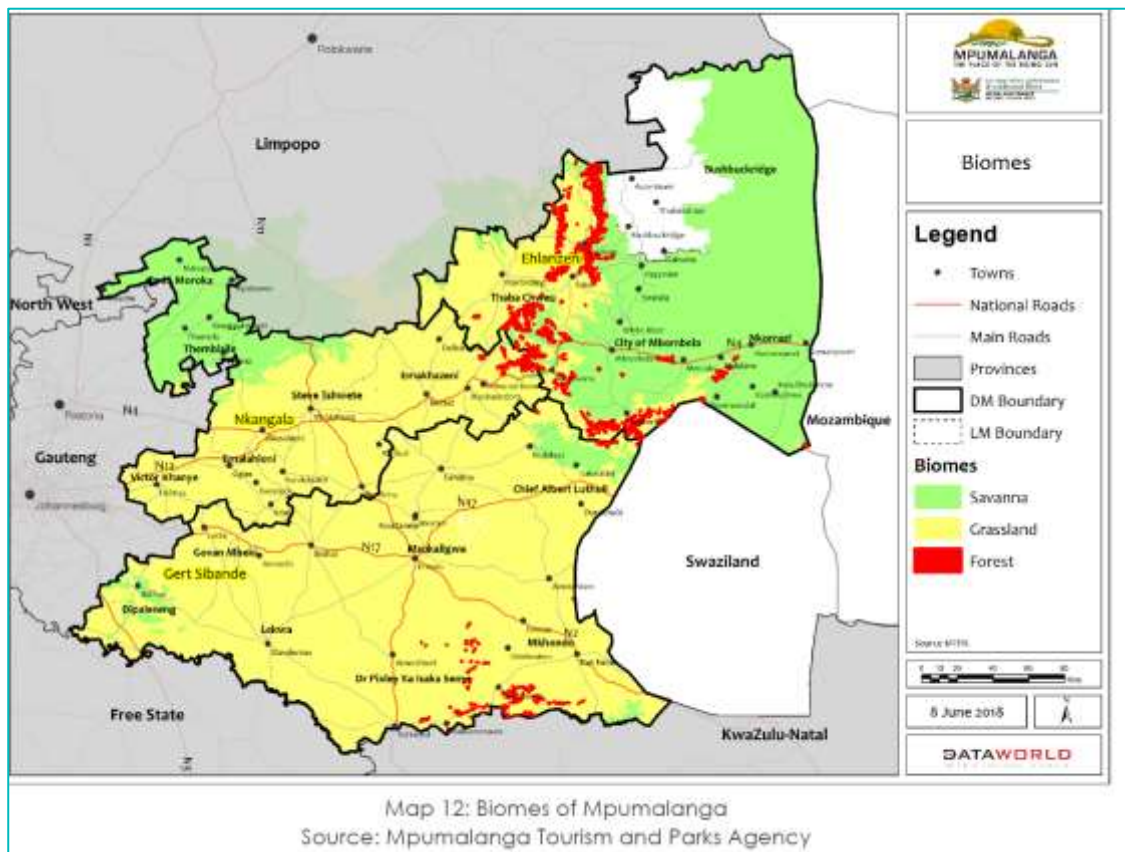


Mpumalanga is mainly situated on the high plateau grassland known as Highveld. The Highveld stretches for hundreds of kilometres eastwards, until it rises towards mountain peaks and deep valleys of the Escarpment in the north-east. From the escarpment, it plunges hundreds of meters down to the low-lying area known as the Lowveld. The province's landscape is characterized by the Northern Drakensberg escarpment, grasslands, numerous valleys, mountain passes, rivers, waterfalls, wetlands, and forests. The Bushveld includes the southern part of the famous Kruger National Park area. The central part of the province, being a part of the escarpment, is mountainous and consists of alpine grasslands and the Afromontane forest. The Lowveld region is mostly flat with some rocky outcrops. Nkangala is comprised on predominantly highveld grassland. The soil covers red soil which occupies about 18.7%, yellow soil 0.9%, vertic and melanic cover 17.7% while pedologically young soil covers 22.0% and exposed rock 6.9%. Loam soil covers 65% while sandy and clay soils cover 21.4% and 12.8%, respectively. The soil conditions in the project area² is as follows:

² Jacana Environmental, 2022. Soil Baseline Monitoring Study.

Table 1: Desktop based soil background information sourced from various databases.	
Parameters	Description
Mean Annual precipitation (MAP)	The Mean Annual Precipitation for the entire focus area ranges between 601 - 800 mm per annum. This rainfall is deemed insufficient for a variety of cultivated crops with a moderate yield potential. Planting date options may be limited for supporting rain fed agriculture, in some instances supplementary irrigation may be required if available.
Mean Annual Evaporation (MAE)	The MAE within the entire focus area ranges between 1801 – 2000 mm. The high evaporation rates pose risks to plant yield due possible plant permanent wilting resulting in plant desiccation and lack of adequate soil moisture.
Geology	The geology associated with the focus area comprises the Waterberg, Soutpanberg, Orange River geological formations.
Landform type	The landscape setting of the entire focus area is classified as the medium gradient hill. This landform type is considered suitable for cultivation.
Soil pH	The pH of the soils occurring within the focus area ranges between 0 and 5.5. This pH range is considered strongly acidic to slightly. As such, the soils are not expected to contain majority of the plant nutrients required.
Landtype data	The entire focus area is located within the Bb11 landtype class. This class is associated with a wide range of soils which are well drained and deep as well as wet based soils associated with the watercourses. Hutton (deep and high agricultural potential) soils can be anticipated with the focus area.
The Soil and Terrain (SOTER, 2013) soil classification	The Soil and Terrain (SOTER) database indicates that the entire focus area is characterised by Haplic Acrisols. Acrisols are often the dominant soil group on old erosional or depositional surfaces. These soils have a clay-rich subsoil.
Desktop land capability	The land capability of the soils within the entire focus area is of high potential arability (Class II) indicating that the soils are suitable for cultivation.
Grazing Capacity	According to the AGIS database, the livestock grazing capacity potential is estimated to be approximately 3 hectares per large animal. The grazing capacity is considered moderately suitable for commercial livestock agriculture.
Desktop based Land use	Cultivated land.
Desktop based soil depth	The soil depth in the entire focus area ranges between 450mm and 750mm.
Alkalinity and Sodicity of the soils	The soils are neither alkaline nor sodic, this indicates soils are not affected by high concentration of salts.
Probability of soil loss	Low to moderate susceptibility. This can be attributed to the gently to moderately sloping terrain.

South Africa's coal reserves are ranked amongst the top 10 largest in the world. The Waterberg, Highveld, Witbank, Free State and Emerlo fields have the greatest proportion of remaining reserves. 90% of South Africa's coal consumption is utilized for electricity generation and the fuel industry. More than 80% of South Africa's coal is sourced in Mpumalanga, with the town of Witbank (Emalahleni) being the centre of the industry. Mpumalanga has a sub-tropical climate characterized by hot summers and mild to cool winters shifting to cold and frosty conditions in the Highveld regions.



Terrestrial ecosystems in Mpumalanga consist of three biomes: the savannah (escarpment foothills and lowveld), grassland (Highveld and escarpment hills), and forest (south and east facing escarpment valleys). The project area in Nkangala is predominantly grassland. Grassland biomes are landscapes dominated by grass and cover the bulk of the Mpumalanga³. Based on study conducted by Jacana Environmental CC in the study area, a variable landscape was noted; four broad habitat units (with associated subunits) were identified during the field assessment:

Modified Habitat – this habitat unit is comprised of three subunits namely:

- Currently cultivated fields (in the south of the study area) in which indigenous vegetation is absent;

³ <https://cer.org.za/wp-content/uploads/2019/01/Phase2.pdf>

- Historically cultivated areas (within the northern and central sections of the study area) that have subsequently re-established pioneer floral communities. Typically, the habitat supports moderately low floral and faunal diversities; and
- Transformed areas (scattered throughout the study area) this habitat is associated with areas that have been significantly transformed for anthropogenic use (e.g., housing).

Degraded Thornveld Habitat – this habitat unit is comprised of open thornveld habitat which has been historically impacted by anthropogenic activities (e.g., grazing) and edge effects (e.g., alien, and invasive plant (AIP) species proliferation). This habitat is too rocky to have been historically cultivated;

Rupicolous Habitat – this habitat, which is often elevated above the surrounding habitat, is characterized by a high incidence of rocky ground. Three subunits are recognized (and distinguished based on floral species composition and structure):

- Loskop Mountain Bushveld: located in the north of the study area, this habitat forms part of a rocky ridge that supports more broadleaf woody species;
- Rocky Bushveld Habitat: located in the northwest of the study area this subunit comprised of a semi-dense (savannoid) woodland community;
- Rocky Grassland Habitat: located in the southeast of the study area, this habitat is characterized by rocky habitat that is interspersed by a homogenous grassy layer.

Freshwater Habitat – this habitat comprises of two wetland features, specifically:

- A channelled valley bottom wetland (CVBW); and
- An unchanneled valley bottom wetland (UCVBW).

b. Describe the presence, if any, of rare and endangered species and their habitats

Based on biodiversity assessment studies⁴ conducted in the project area there are 3 protected species in the area according to Mpumalanga Nature Conservation Act (MNCA). These are *Boophone disticha* (MNCA), *Hypoxis hemerocallidea* and Aloe greatheadii. Among fauna, Golden mole species is a threatened species. The Rupicolous Habitat and the Freshwater Habitat are considered High Risk areas as sensitive biodiversity features were observed within these habitats. Within these high-risk areas, the presence of protected species was confirmed. The Rupicolous habitat, which was often elevated above the surrounding habitat, is characterized by a high incidence of rocky ground.

c. Describe the species and varieties selected for the Forestry VPA

The species and varieties that will be selected for the forestry VPA are local and indigenous species and are as follows:

SL	Plant Name	Scientific Name	Function
Total Bamboo type (5)			
1	Bambusa balcooa	Bambusa balcooa	Biomass
2	Dendrocalamus hamiltoni	Dendrocalamus hamiltoni	
3	Bambusa vulgaris vittata	Bambusa vulgaris vittata	
4	Bambusa bambos	Bambusa bambos	
5	Dendrocalmus asper	Dendrocalmus asper	
Total Berries Types (3)			
6	Raspberries	Rubus idaeus	Berries
7	Blackberries	Rubus occidentalis	
8	Coffee (experimental)	Coffea arabica	
Total Fruit trees 1 (3)			
9	Plum	Prunus domestica	Fruits
10	Olive	Olea europea	
11	Lemon trees (Eureka)	Citrus limon	
Total Fruit tree 2 (3)			
12	Pecan	Carya illinoensis	Fruits
13	Apricot	Prunus armeniaca	
14	Peach	Prunus persica	
Miscellaneous Fruit tree (3)			
15	Avocado (experimental)	Persia Americana	Fruits
16	Mango (Experimental)	Mangifera indica	
17	Banana (Experimental)	Musa acuminata	
Total Nitrogen Fixers (4)			

⁴ Jacana Environmental CC, 2022. Pre-feasibility Biodiversity and Freshwater, Risk Assessment for the proposed TERRAGR N Trial Bamboo Project near Emalahleni, Mpumalanga Province.

18	Erythrina lysistemon	<i>Erythrina lysistemon</i>	Nitrogen fixers indigenous
19	Erythrina humeana	<i>Erythrina humeana</i>	
20	Calpurnia aurea (Wild Laburnum)	<i>Calpurnia aurea</i>	
21	Seaberries	<i>Hippophae rhamnoides</i>	Nitrogen fixer/Berry/Alley S
Total Integrated Pest Management Species (8)			
22	Tulbaghia violacea	<i>Tulbaghia violacea</i>	Integrated Pest Management
23	Tulbaghia silver lace	<i>Tulbaghia violacea</i>	
24	Rosemarinus officinalis	<i>Rosemarinus officinalis</i>	
25	Lavandula angustifolia	<i>Lavandula angustifolia</i>	
26	Becium obovatum	<i>Becium obovatum</i>	
27	Leonotis leonurus	<i>Leonotis leonurus</i>	
28	Resin bush (Euryops pectinatus)	<i>Euryops pectinatus</i>	
29	Vetiver	<i>Chrysopogon zizanioides</i>	IPM and Alley
Grid Indigenous			
30	Bahunia Galpinii	<i>Bahunia galpinii</i>	Indigenous species
31	Bauhinia tomentosa	<i>Bauhinia tomentosa</i>	
32	Celtis africana	<i>Celtis Africana</i>	
33	Halleria lucida*	<i>Halleria lucida</i>	
34	Heteropyxis canescens	<i>Heteropyxis canescens</i>	
35	Senegalia galpinii	<i>Senegalia galpinii</i>	
Fire and Wind break Species			
36	Budleja saligna (False Olive)	<i>Budleja saligna</i>	Windbreak
37	Searsia lancea (Karee)	<i>Searsia lancea</i>	
38	Rhamnus prinoides	<i>Rhamnus prinoides</i>	
39	Podocarpus elongatus	<i>Podocarpus elongatus</i>	
40	Pittosporum viridiflorum	<i>Pittosporum viridiflorum</i>	
41	Dodonea angustifolia	<i>Dodonea angustifolia</i>	
42	Maytenus undata	<i>Maytenus undata</i>	
43	Kei apples	<i>Dovyalis caffra</i>	
44	Dovyalis zeyheri	<i>Dovyalis zeyheri</i>	
45	Buddleja auriculata	<i>Buddleja auriculata</i>	
46	Ziziphus mucronata	<i>Ziziphus mucronata</i>	Alley
47	Olea europaea africana	<i>Olea europaea africana</i>	
48	Ehretia rigida	<i>Ehretia rigida</i>	
49	Aloe Ferox	<i>Aloe Ferox</i>	
50	Euphorbia lyndenbergensis	<i>Euphorbia lyndenbergensis</i>	Firebreak & Living Fence
51	Aloe arborescens	<i>Aloe arborescens</i>	Firebreak
52	Spekboom	<i>Portulacaria afra</i>	Windbreak/Firebreak
53	Dietes bicolor	<i>Dietes bicolor</i>	Firebreak
Autumn Cover Crops List			
54	Saia Black Oats	<i>Avena stigrasa</i>	Autumn Cover Crops
55	Targa White Oats	<i>Avena sativa</i>	
56	Witteberg White Oats	<i>Avena sativa</i>	
57	SSR1 Spring Rye	<i>Secale cereale</i>	
58	Southern Green Spring Rye	<i>Secale cereale</i>	
59	Namoi Vetch Grazing Vetch	<i>Vicia sativa</i>	

60	Black Mustard Nemafix	<i>Brassica nigra</i>	
61	Lupin Karo	<i>Lupinus perennis</i>	
62	Jupiter Forage Peas	<i>Pisum sativum</i>	
63	Soil Buster Ripper Raddish	<i>Raphanus sativus</i>	
64	Radish Samurai	<i>Raphanus sativus</i>	
Summer Cover Crop List			
65	Pearl Millet	<i>Cenchrus americanus</i>	Summer Cover Crops
66	Hybrid Millet		
67	Sudan Sorghum Multigraze	<i>Sorghum bicolor</i> x <i>S. bicolor</i> var. <i>Sudanese</i>	
68	Sudan Sorghum Big Chief BMR	<i>Sorghum bicolor</i> x <i>S. bicolor</i> var. <i>Sudanese</i>	
69	Black Saia Oats	<i>Avena stigrasa</i>	
70	Dolichos legume	<i>Lablab purpureus</i>	
71	Cowpeas legume	<i>Vigna unguiculata</i>	
72	Sunflower	<i>Helianthus annuus</i>	
73	Jap Radish	<i>Raphanus sativus</i>	

d. Describe the measures and know-how that will be transferred to the host Party, if applicable

There are no know-how that will be transferred to the host country.

e. Describe or list the legal title(s) to the land, current land tenure and rights enabling determination of the owner of the GS VERs to be issued for the Forestry and AGR VPAs

The project area is taken on long-term lease belonging to the Manala Mgibe Community Property Association (CPA), representing the Manala Mgibe community and Traditional Council (MMTC), and part of the Ndebele tribe. The lease is for a period of 50 years beyond the crediting period of the VPA 01 for 30 years. Hence the rights to the generated GS VERs and all the other products belong to TERRAGRN through its subsidiary, the VPA Implementer, TERRAGRN SA.

A.1.1. Eligibility of the VPA under approved PoA

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GS4GG GENERAL ELIGIBILITY CRITERIA ACCORDING TO SECTION 3.1.1 OF GS4GG PRINCIPLES AND REQUIREMENTS

a. Types of project	Eligible projects shall include physical action/ implementation on the ground. Pre-identified eligible project types are identified in the Eligibility Principles and Requirements section.	Afforestation & Reforestation project is identified as eligible ⁵
b. Location of Project	Projects may be located in any part of the world.	The VPA 01 is located in farmlands of Blaauwpoort, Kransproot Alias Blackwood Camp, Kwarsspruit, Suikerboschplaat and Zaaihoek. These farmlands are in Nkambala District, Mpumalanga Province, Country South Africa.
c. Project Area, Project Boundary and Scale	<p>The Project Area and Project Boundary shall be defined.</p> <p>Projects may be developed at any scale.</p> <p>In order to avoid double counting the Project shall not be included in any other voluntary or compliance standards programme unless approved by Gold Standard (for example through dual certification). Also, if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature, the project shall</p>	<p>The project area and project boundary is described in section A.2 and B.3.</p> <p>The VPA 01 is large-scale.</p> <p>TERRAGRN Private Limited has provided in writing that there is no double counting and is not included in any other voluntary or compliance standard program.</p>

⁵ [OPTIONAL REQUIREMENT - GHG Emissions Reduction & Sequestration Product Requirements v.2.1 \(goldstandard.org\)](#) – Page 6.

	demonstrate that there is no double counting of impacts at design and performance certification (for example use of similar technology or practices through which the potential arises for double counting or misestimation of impacts amongst projects).	
d. Host Country Requirements	Projects shall be in compliance with applicable Host Country's legal, environmental, ecological and social regulations.	The project is in compliance with South Africa's policies ⁶ which includes the legal, environmental, ecological and social regulations. The policies and its compliance is provided in section C of the PoA-DD
e. Contact Details	As part of the Project Documentation the Project Developer shall provide (i) name and (ii) contact details of all Project Participants; AND in case of an organization (iii) the legal registration details and (iv) documentation by the governing jurisdiction that proves that the entity is in good standing (defined as being a legal or other appropriate entity registered in or allowed to operate within the required jurisdiction and with no evidence of insolvency or legal/criminal notices placed against it or any of its Directors). Gold Standard retains the right	<p>i. Contact details of CME are provided in Appendix 1 and can also be seen at TERRAGRN website⁷.</p> <p>ii. TERRAGRN and TERRAGRN SA is the only project participant. The lands are leased to TERRAGRN SA on which the project is being implemented.</p> <p>iii. TERRAGRN is a UK private sector enterprise, with a wholly owned subsidiary TERRAGRN SA incorporated in South Africa (Reg No. 2021 / 898846 / 07)</p>

⁶ General Profile | FAOLEX Database | Food and Agriculture Organization of the United Nations

⁷ <https://www.terragn.com/>

	(at its own discretion) to refuse use of the Standard where reputational concerns are highlighted.	iv. TERRAGRN and TERRAGRN SA a 100% subsidiary of TERRAGRN as a legal entity to operate in South Africa have provided in writing of good standing.
f. Legal Ownership	<p>Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification, (for example carbon credits) shall be demonstrated. Where such ownership is transferred from project beneficiaries this must be demonstrated transparently and with full, prior and informed consent (FPIC). Note that for certain Project types there is a requirement for full and uncontested legal land title/tenure to be demonstrated. These are contained within specific Activity or Product Requirements. All projects shall immediately report to Gold Standard any land title/tenure disputes arising.</p>	<p>The project owner TERRAGRN Private Limited has full and uncontested legal land title/tenure of the project area via the legal entity TERRAGRN SA which is a 100% subsidiary and the VPA implementer.</p> <p>TERRAGRN through its subsidiary TERRAGRN SA has Legal ownership of the land and products, namely the CO2 user rights, or carbon sequestration rights generated by the VPA.</p>
g. Other Rights	<p>As well as legal title and ownership, the Project Developer shall also demonstrate where required uncontested legal rights and/or permissions concerning changes in use of other resources required to service the Project (for example, access rights, water rights etc.). Any known disputes or contested rights must be declared immediately to Gold Standard by the Project Developer and</p>	<p>The project owner TERRAGRN through its subsidiary TERRAGRN SA has full and uncontested legal rights and/or permissions concerning changes in use of other resources required to service the Project wherever required.</p> <p>Depending on the requirement of South African laws and regulations, TERRAGRN has taken permissions to</p>

	resolved prior to further project implementation in affected areas.	access rights and water rights.
h. ODA Declaration	All Project Developers applying for project activities located in a country named by the OECD Development Assistance Committee's ODA recipient list and seeking Gold Standard Certification for carbon credits shall declare the Official Development Assistance (ODA) support.	No ODA is involved in the VPA, as confirmed by the CME. The signed ODA declaration is uploaded to the Registry.
Section 2.2.1., General Requirements as per GS4GG Land Use and Forestry Activity Requirements		
a. Eligible project type	Eligible project types are Afforestation & Reforestation Projects (A/R) and Agriculture Projects (AGR).	The project type is Afforestation & Reforestation (A/R)
b. No deforestation c. In the case when the eligible area has been deforested during the last 10 years prior to project start date, the eligibility of the project shall be determined by Gold d. Standard as part of the Preliminary Review.	The eligible area shall not meet the definition of forest 10 years before project start date and at project start date. The Project Developer shall provide evidence that the deforestation activity has not taken place with an intention to implement project activities that generate Gold Standard Certified SDG Impact Statements and/or Products, such as GSVERs.	The eligibility of the planting area is demonstrated by following the guidelines of Annex C – Guidelines to conduct a spatial forest/non-forest assessment of GS4GG LUF Activity Requirements, Version 1.2.1.
e. Double Counting	Projects issuing GSVERs with a vintage of 2021 or later and which are used	Full compliance with the double counting requirements of the Gold Standard as per GHG

	<p>i) towards an NDC or domestic climate mitigation target other than that of the Host Country;</p> <p>ii) under CORSIA</p> <p>shall conform to the GHG Emissions Reduction and Sequestration Product Requirements - Annex A.</p> <p>Annex A requirements are not applicable for projects generating GS VERs which do not fall under the abovementioned uses.</p>	<p>Emissions Reduction & Sequestration</p> <p>Product Requirements, Annex A will be proven in case that GS VERs are used towards an NDC or domestic climate mitigation target other than that of the Host Country or under CORSIA. A Letter of Authorization is not needed in case the GS VERs are not used for one of the abovementioned purposes.</p>
f. Eligible A/R Projects	<p>Can include planting trees</p> <p>Can include single-species plantations</p> <p>Can apply all silvicultural systems, e.g. conservation forests (no use of timber); forests with selective harvesting; rotation forestry</p> <p>All projects can include agriculture (agroforestry) or pasture (silvopasture) activities</p>	<p>The details of the planting trees and system are provided for the VPA 01 in section A.3.</p> <p>The planting system will be:</p> <ul style="list-style-type: none"> i. conservation forests (no use of timber); ii. forests with selective harvesting and iii. pasture (silvopasture) activities
g. FSC dual certification	Not Applicable	Not Applicable
h. Secured Titles	<p>For all project participants, the following information and evidence shall be provided:</p> <p>(a) Name and contact details</p> <p>(b) Each entity's legal registration number and documentation by the governing jurisdiction that proves that the entity is in good standing. AND (c) For the duration of the crediting period the</p>	<p>The requirements are be provided at the VPA level for the following:</p> <p>(a) Name and contact details are provided in Appendix 2</p> <p>(b) TERRAGRN's legal registration number and documentation by the governing jurisdiction that proves that the entity is in good standing is provided to the Gold Standard</p>

	<p>Project Developer: i. must own the CO₂ user rights or carbon sequestration rights for the project area, AND ii. hold an uncontested legal land title for the Project Area, AND</p> <p>iii. own the rights for timber and non-timber forest products for the project area, AND iv. hold all necessary permits to implement the project (planting permits, infrastructure permits, harvesting permits, etc.), AND v. participate in the financing of the project.</p>	<p>during opening of the account⁸.</p> <p>(c) For the duration of the crediting period the TERRAGRN owns:</p> <p>i. own the CO₂ user rights or carbon sequestration rights for the project area, AND</p> <p>ii. holds an uncontested legal land title for the Project Area, AND</p> <p>iii. own the rights for timber and non-timber forest products for the project area, AND</p> <p>iv. hold all necessary permits to implement the project (planting permits, infrastructure permits, harvesting permits, etc.), AND</p> <p>v. participate in the financing of the project.</p> <p>The VVB is provided with proof of all the above.</p>
i. Safeguarding principles and requirements	<p>The Project Developer shall conduct the Safeguarding Principles assessment following Safeguarding Principles & Requirements and Risks & Capacities Guideline assessed for the Project Area, taking into account likely issues in the context of the Project Region.</p>	<p>The safeguarding principles assessment is conducted and submitted for VPA 01.</p>

⁸ <https://www.terragn.com/>

j. Protected areas	A minimum of 10% of the total Project Area shall be identified and used to protect or enhance the biological diversity following High Conservation Value (HCV) approach.	An area of 10% of project area will be identified and used to protect the area.
k. Buffer zones for water bodies	The Project Developer shall maintain a buffer zone of 15 meters for water bodies on both sides of any permanent or temporary water bodies such as lakes, streams, rivers, wetlands, etc. Irrigation channels are excluded from this requirement.	In buffer zones for water bodies, (a) All existing native trees shall be kept, AND (b) No fertilizer and pesticides shall be used, AND (c) No logging activities shall take place, AND (d) No heavy machinery shall be used, AND (e) No cropping is allowed, AND (f) In case trees are being planted, these will to be native tree species.
l. Stakeholder inclusivity	The Stakeholder Consultation shall be conducted prior to the project start date. The Project Developer shall refer to Stakeholder Consultation Engagement Requirements for further details.	The stakeholder consultation report is submitted for preliminary review.
m. Crediting period	The crediting period shall be a minimum of 30 years and maximum 50 years. The crediting period starts either with the Project Start Date or three years prior to the date of Project Design Certification, whichever occurs later.	The crediting period shall be 50 years for the PoA and 30 years for the VPAs.

n. Verification and issuance	Verification shall be completed at least every 5 years until the end of the crediting period.	Verification shall be completed atleast every 5 years for each of the VPA.
o. Additionality	Any VPA shall demonstrate additionality as per the Principles & Requirements, or GHG Emissions Reduction and Sequestration Product Requirements, as applicable.	Additionality is proven by applying Option 1 – CDM tool: the latest version of the A/R CDM 'Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities'. The CDM specific terms of the A/R CDM additionality tool (tCERs, A/R CDM project, etc.) shall be interpreted in the context of Gold Standard. The 'Guideline on the assessment of investment analysis' and the 'Guidelines for objective demonstration and assessment of barriers' can be used.

No.	Eligibility Criterion	Description/ Required condition	Description of the VPA in relation to the criteria, means of Verification/Supporting evidence for inclusion
1.	Geographical boundaries	The details of Country and province provided in the VPA shall be within South Africa and Mpumalanga.	VPA-01 is in the country of South Africa, Mpumalanga Province, Nkangala district and within farm of Kranspoort alias blackwood camp, Zaaihoek, Suikerboschplaat, Kwarsspruit and Blaauwpoort. The shape maps are enclosed as evidence for inclusion
2.	Double Counting	The CME/VPA Implementer shall provide the geo-coordinates of the project area.	The details and shape maps of land parcels that are part of the VPA are provided.
3.	Exclusiveness of VPA	The CME/VPA Implementer shall provide an undertaking	They will not be part of any other VPA or PoA or standalone project activity within GS and

		that the VPA shall not previously be registered as a project activity or included as a VPA in any other registered PoA or deregistered as a VPA of a PoA.	other standards. A declaration is provided by the CME in this regard.
4.	Specification of technology/measure	Information provided in criterion 12	Information provided in criterion 12
5.	Start Date	The project start date is confirmed through evidence of first planting of the VPA and shall be on or after 29/11/2022, the start date of the PoA.	The project start date is 29/11/2022. This is the confirmed date of first planting that is done for the VPA, which is confirmed through field records and photographs.
6.	Applicability of the methodology	Compliance with the methodology applicability criteria will be demonstrated in section B.2. of the VPA-DD.	Compliance with the methodology applicability criteria is demonstrated in section B.2. of the VPA-DD.
7.	Conditions to ensure that VPAs meet the requirements for demonstration of additionality	Section B.5. of the VPA shall describe the chosen option and steps toward the determination of additionality based on Option 1 as set in the real case VPA or option 2 Latest version of Positive list (as per 3.1.16, (b) of the Land Use & Forests Activity Requirements).	The VPA has applied option 1 to describe the steps toward the determination of additionality.
8.	Conditions to ensure no diversion of ODA	ODA Declaration form shall be submitted for the VPA inclusion	ODA Declaration form is submitted for VPA-01 inclusion
9.	Target group	N/A	N/A
10.	Conditions related to sampling requirements for the PoA	Sampling in accordance with the sampling plan in the corresponding real case Forestry will be described.	Section B.7.2. of the VPA includes the forest inventory guidelines that will be followed by the CME, outlining the sampling requirements
11.	Scale of the VPA Conditions to ensure that VPAs that will be included meet the small-scale	VPA of small or microscale threshold will be within the thresholds and will meet the requirements of small-scale/microscale.	VPA-01 is large-scale and hence it is not applicable.

	on microscale thresholds and remain within those thresholds throughout the crediting period		
12.	Conditions to confirm that technologies in VPAs are eligible	The VPA shall include the details of planting, which could be conservation forests (no use of timber); forests with selective harvesting; rotation forestry. All projects can include agriculture (agroforestry) or pasture (silvopasture) activities	The details of planting, is included in section A.1., wherein the technology includes conservation forests (no use of timber); and forests with selective harvesting; rotation forestry with crops.
13.	Conditions to be met by each VPA regarding project boundary	The VPA shall provide lease agreements for the planting area at the latest by the time of monitoring report.	TERRAGRN has lease agreements for the planting area with Manala Mgibe Community Property Association (CPA), representing the Manala Mgibe community and Traditional Council (MMTC), and part of the Ndebele tribe
14.	Conditions to be met by each VPA regarding SDG outcomes assessment	SDG impact assessment will be conducted at regular VPA level and included in section B.6. in the VPA-DD.	SDG impact assessment will be conducted at regular VPA level and included in section B.6. in the VPA-DD.
15.	Conditions to be met by each VPA regarding safeguarding principles	The safeguarding principles and the methods of monitoring these principles wherever required will be included in regular VPA in Appendix I.	The safeguarding principles and the methods of monitoring these principles are included in in Appendix I.
16.	Conditions to be met for retroactive VPAs	Document to show GS VER revenue was considered for the retroactive project activity.	N/A as it is a regular project activity.
17.	Conditions to ensure that VPA meets general	The regular VPA shall include the details of VPA meeting the general criteria in the VPA-DD.	The VPA meets the general criteria as shown in section A.1.1

	eligibility criteria		
18.	Conditions to ensure that VPA follows the guidelines to conduct a spatial forest/non-forest assessment	Submission of the shapefiles and report of the spatial forest/non-forest assessment for the project area.	The shapefiles and report of the spatial forest/non-forest assessment for the project area is submitted to Sustaincert for preliminary review.
19.	Conditions on crediting period	The crediting period shall not exceed 28/11/2072.	The crediting period is from 29/11/2022 to 28/11/2052 and does not exceed 28/11/2072.
20.	Conditions related to stakeholder consultation	The LSC is applicable for a group of VPAs submitted within 2 years of the conduct of the stakeholder's meeting in Mpumalanga, South Africa.	The LSC was conducted specifically for this VPA and the VPAs that will be added till 01/02/2025 in Mpumalanga, South Africa.
21.	Conditions to specify the approach to address non-permanence	The applicable buffer will be applied.	The applicable buffer of 20% is applied.
22.	Approach chosen for VVB site-visits in view of inclusion of future regular VPAs	VPA inclusion for within Mpumalanga province, South Africa which is the administrative region of the real case VPA will not include VVB on-site visit. Other sites outside of that will include VVB site visit	VPA inclusion for within Mpumalanga province, South Africa which is the administrative region of the real case VPA will not include VVB on-site visit. Other sites outside of that will include VVB site visit
23.	Conditions to ensure a SOP for managing the input and grievance mechanism	SoP for the real case VPA and regular VPA will be submitted.	SoP for the real case VPA and regular VPA will be submitted to the VVB.
24.	Conditions to ensure the systematic description of the specific design of the real case VPA	The details will be included in section A.1 of the VPA-DD.	The details of specific design of the plantations is included in section A.1 of the VPA-DD, which will also be applicable to all regular VPAs.
25.	Conditions to be met for CER Labelling	Not Applicable	Not Applicable

26.	Conditions to be met in multi-country PoAs	Not applicable	Not applicable
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A.1.2. Legal ownership of products generated by the VPA and legal rights to alter use of resources required to service the project

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TERRAGRN through its subsidiary TERRAGRN SA has the following legal ownership

- i. full and uncontested legal ownership of GS VERs that are generated under Gold Standard Certification
- ii. legal rights concerning changes in use of resources required to service the Project (e.g water rights)
- iii. full and uncontested legal land title/tenure required to implement the Project.

TERRAGRN through its subsidiary TERRAGRN SA has legal ownership of all the farmlands Blaauwpoort, Kranspoot Alias Blackwood Camp, Kwarsspruit, Suikerboschplaat and Zaaihoek on which the project is being implemented. The farmlands are taken on long-term lease belonging to the Manala Mgibe Community Property Association (CPA), representing the Manala Mgibe community and Traditional Council (MMTC), and part of the Ndebele tribe. The lease is for a period of 50 years beyond the crediting period of the VPA 01 for 30 years. Hence the rights to the generated GS VERs and all the other products belong to TERRAGRN.

With regard to legal rights concerning changes in the use of resources required to service the project, the required permissions will be taken based on the extent of use of the resources.

A.2. Location of VPA

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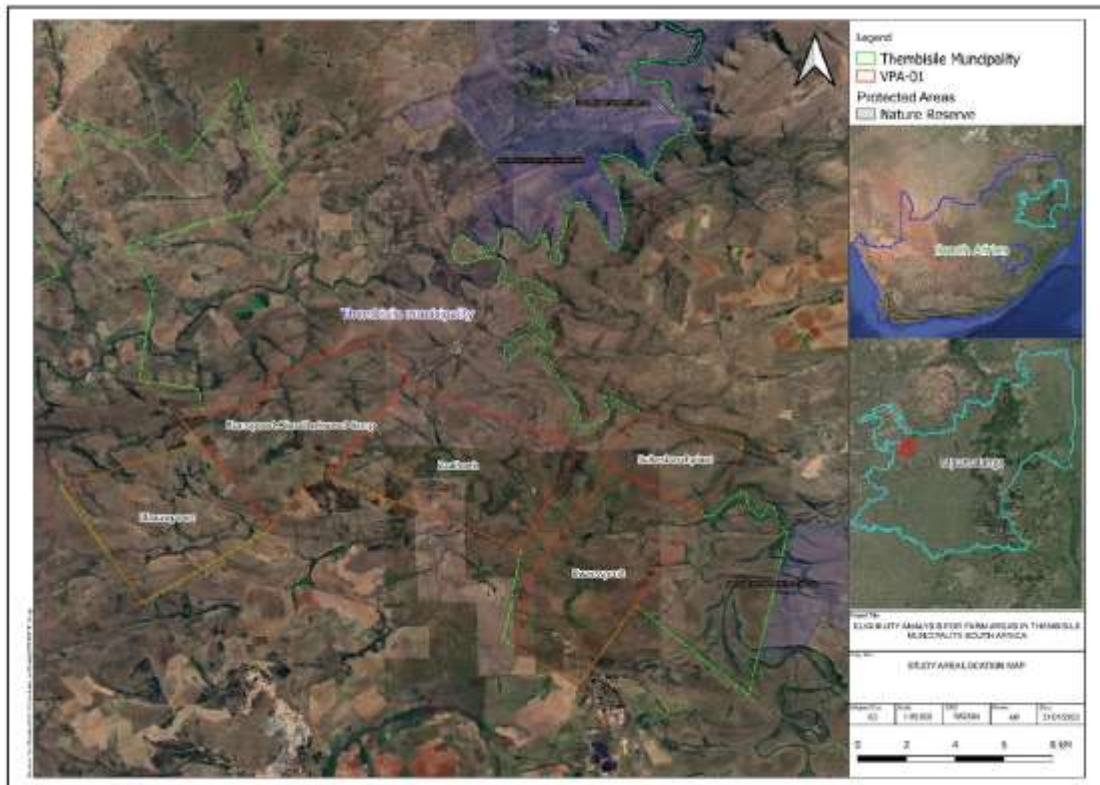
Country: South Africa

Province: Mpumalanga

District: Nkangala

Farm names	Farm Area (ha)
Blaauwpoort	3289.1

Kranspoot Alias Blackwood Camp	3659.0
Kwarsspruit	3721.6
Suikerboschplaat	1424.3
Zaaihoek	4178.9
Total	16,272.9



Project area

A.3. Technologies and/or measures

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Bamboo, *Bambusa balcooa* which is the main species that will be planted is one of the commercially grown bamboos in South Africa. Originally from India, it was introduced in South Africa in 1660 and has since become naturalized⁹. It can grow in virtually any soil type and can reach a height of up to 20 meters if left unchecked, with culms growing up to 15cm in diameter. As a clumping species, *Bambusa balcooa* does not send out runners as some species do. It also does not set seed, but sends out new shoots at the base of the clump which can be cultivated. These characteristics mean that this species will not be invasive or threaten surrounding indigenous vegetation. The fact that it does not set seed also rules out the problem of attracting rodents, which in turn may attract snakes¹⁰.

The single modelling unit (MU) that will be adopted is Bamboo plantations with fruit trees but the number of bamboo trees and the fruit trees may differ based on the area and soil conditions. The number of bamboo clumps in each hectare will be as follows:

MU-01: 400 bamboo grid MU-02: 121 bamboo grid

MU-03: 264 bamboo grid MU-04: 300 bamboo grid

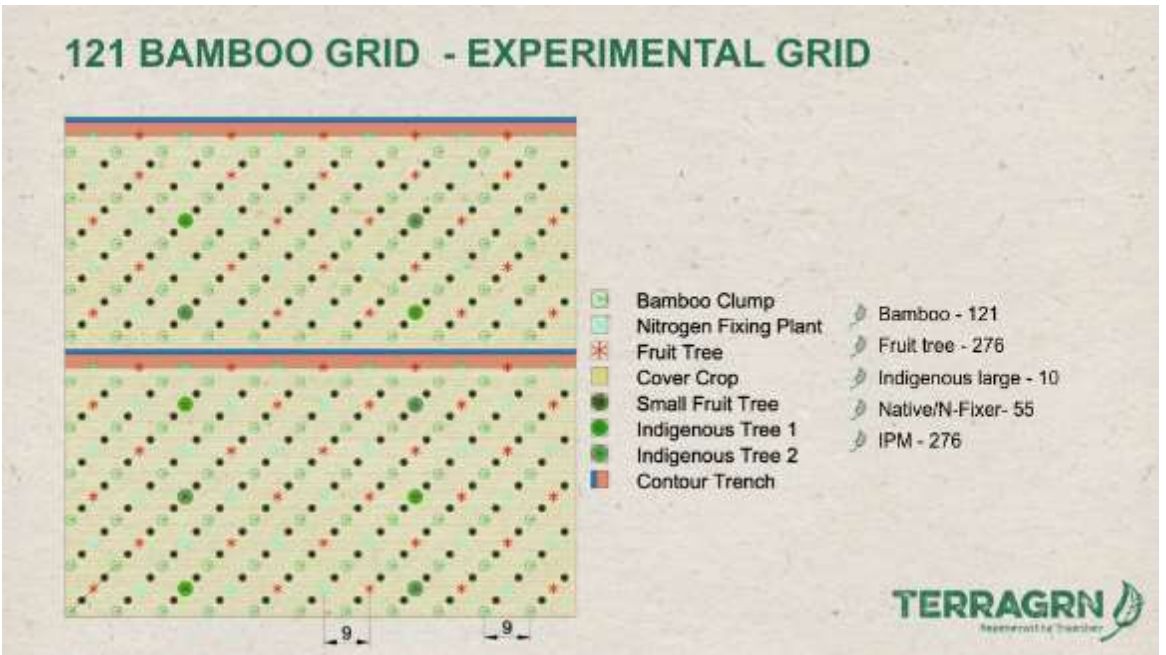
MU-05: 464 bamboo grid



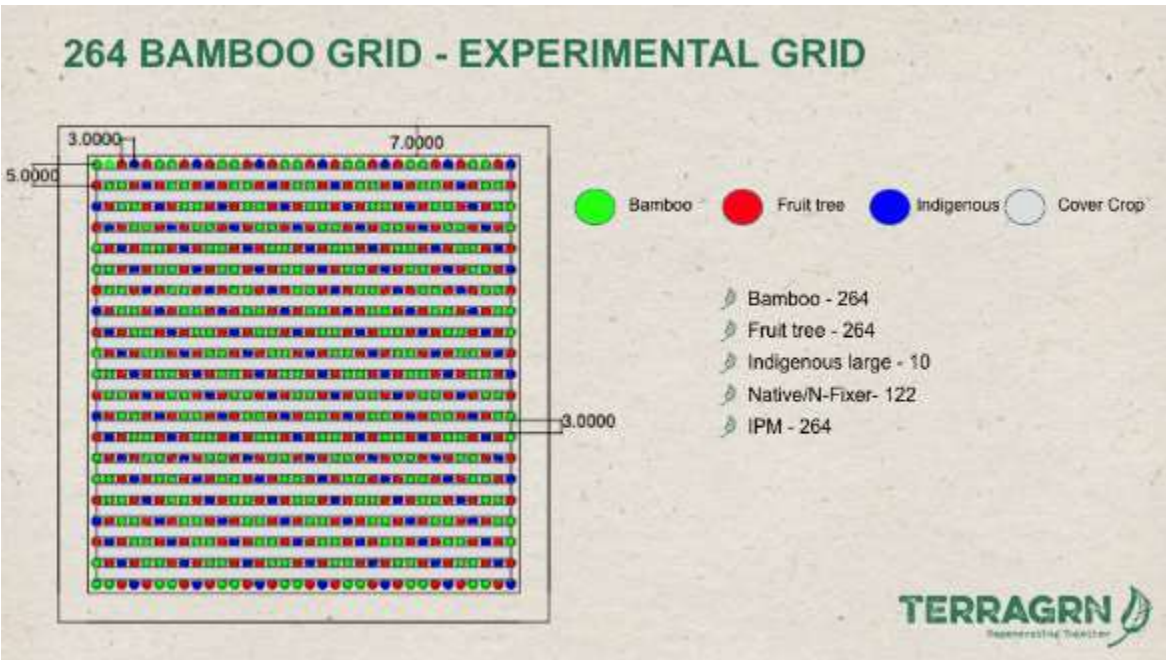
⁹ <http://www.brightfields.co.za/bamboo-farming#:~:text=Known%20to%20some%20as%20%22giant,runners%2C%20and%20has%20sterile%20seeds.>

¹⁰ <https://www.southafrica.com/blog/bamboo-south-africa-s-versatile-renewable-resource/>

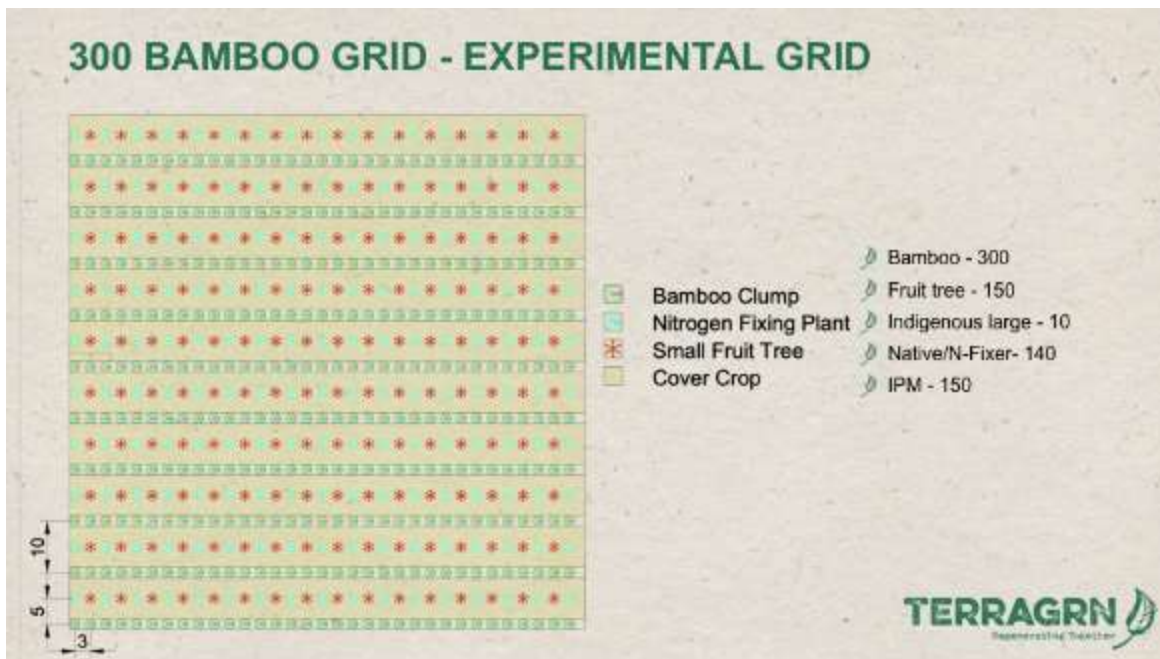
MU-01: 400 bamboo grid



MU-02: 121 bamboo grid



MU-03: 264 bamboo grid



MU-04: 300 bamboo grid



MU-05: 464 bamboo grid

Before planting bamboo, the following process will be followed:

The bamboo plants being supplied are primary hardened in nature. It can undergo secondary hardening directly in a polybag with soil: coir: sand at a ratio of 1:1:1 or

any other means. The addition of soil will increase the rhizome formation faster. Sand will increase aeration and coir or peat moss will help to retain moisture.

A most important step in recovering bamboo plants from stress will be followed as follows:

1. They will have polythene tunnels or the hardening will happen in hardening chambers.

2. All plants being transplanted is impossible to plant immediately. The consignment will be opened and all individual covers containing plants are kept straight while the roots face the ground and leaves face the sky. The plaster tape is opened and one of the cover removed from the outer region.

- The consignment base has 2 covers. One inner cover and one outer cover.
- Outer cover will be removed and retain the inner cover and note that the inner cover has the sides open which will drain excess water.
- So that will act as a polybag and can be stacked it all in a single tunnel. It will be watering and the tunnel kept closed for at least 10 days including the temporary rest time. Doing this will reduce the stress on the plantation immediately. Up to 4 days it can rest in the same fashion.

3. For planting in polybags or trays, the desired quantity of covers and plants are taken and ensured that the newly planted net pots also undergo 10 days of incubation under polytunnels. This polytunnels are important as stress will induce shedding of leaves in bamboo unlike other varieties. The leaves will turn yellow partially and fall. Rest will recover fast and start growing.



Simple poly tunnel structure

Importantly, the plants should be kept in the polytunnels for a minimum period of 10 days. However, generally the plants supplied are of different height based on season & hardening. In such a situation it would be necessary to prolong the stay of plants in the nursery (till the plants are at least 18 inches in height) before their transfer to the planting site in an open field.

The requirements of a bamboo nursery (holding area) is as follows and will be followed:

- The nursery site will be on level ground and well drained
- It will be as close as possible to the plantation site
- It will have all necessary facilities for irrigation of plants
- The site will be protected from animals

Nursery requirement for Primary and secondary hardening:

The plants to be used for field trials would be supplied either in polyethene bags or bare-rooted (to save the transportation cost). In both cases the plants will be kept in the nursery till they have recovered from the transportation shock. While the plants in polythene bags may be kept directly in the nursery, the bare-rooted plants will be transferred to the polybags prior to their transfer to the nursery. The plants will be kept in the nursery for a minimum period of 10 days.

However, many a times the plants supplied are not of planting height. In such a situation it will be necessary to prolong the stay of plants in the nursery (till the plants are at least 18 inches in height) before their transfer to the planting site in an open field.

The bamboo nursery (holding area) will be on level ground and well drained, close as possible to the plantation site, will have all necessary facilities for irrigation of plants and be protected from animals.

For managing diseases and varieties in the nursery,

- In the nursery the plants of different species will be kept in separate beds to avoid any mixing. If there are more than one genotype for each species, then it would be desirable to keep the plants genotype-wise.
- The approximate size of the nursery bed will be (8-10 m x 1-1.5 m)
- As much as possible, the beds will be prepared where there is some protection (shade of a tree/thatch) for the plants from direct sunlight
- The beds will be levelled so that there is no accumulation of water
- Each bed will be properly labelled so that there is no mixing of plants
- In the nursery the plants will be irrigated periodically, and care will be taken that they remain free of diseases
- Only healthy plants of uniform size (approximately) will be used for field trials, particularly experimental trials.
- The shade net facility will have double door entry with all the sides covered with insect-proof screen of 40-60 meshes for linear inch with top covered with polythene sheet against rain protection during monsoon period.

Other requirements

- The plants will be raised individually in poly-bags or other suitable containers on benches or raised beds on the ground. The soil floors will be covered by an impermeable plastic film to prevent plants coming in direct contact with soil and weed growth.
- Each batch of the plants will be appropriately labelled indicating plant species/variety, accession Number of clone/genotype, batch of production,

date of transplanting and the particulars will be recorded in shade-net house register, which is maintained in similar way as that of green-house register.

- The shade-net house will have drip irrigation and or fertigation arrangements for watering individual plants in poly bags or other containers.
- The plants will be monitored regularly for the presence of any pest/diseases and if any plants are suspected of virus symptoms, the affected plants will be immediately segregated and isolated and tested for the presence of virus before the same will be destroyed and the results will be recorded in the shade net house register.
- The dead plant will be promptly removed to avoid attack by saprophytic fungi and the seedling mortalities will be recorded in the shade net house register.
- Vector monitoring will be carried out at periodic intervals by placing yellow sticky cards close to the pots at the rate of one sticky card for every 10 m² space inside the facility and the same will be recorded indicating date/time, pest species trapped, average number/trap, action taken and name signature of supervisor.
- Any kind of treatment given to the plant such as application of fertilizers or micro-nutrient sprays or application of pesticides will be recorded in shade net house register indicating date/time of application, fertiliser or other chemicals applied, dosage rate and if any pesticides applied (including botanicals and microbial pesticides), pest against which it is applied and name/sign of applicator.

Attributes of receivables for primary hardened plants and what to be supplied back for plantation

Sl.No	Physiological trait	Being received	To be supplied
1	Minimum height of the shoot	6 inches	18 inches
2	Minimum number of shoots	>3	>4
3	Minimum number of leaves per shoot	>5	>8
4	Root system	Well developed	Well developed
5	Rhizomes	Small rhizomes in the initial	Proper rhizomes

		stages of development	
6	Minimum age of the plant	2.5-3 month	>1.5 months
7	Reference pic	Fig A	Fig B



Fig A



Fig B

Irrespective of the MU, the measures adopted for the project activity is the same and is as follows:

Planting area will be determined after analyzing the following layers of data.

- 1) GIS Study - Desktop Research Showing Eligibility of land for planting (Vegetation Maps)
- 2) Soil Studies - Shows suitability of soil for selected plants and intensity of soil inputs
- 3) Landscape scale plans - To conserve areas of high conservation value, Biodiversity hotspots and corridors to conserve and enhance biodiversity.

The project area is located within two vegetation types, namely the Loskop Mountain Bushveld and the Rand Highveld Grassland (Mucina & Rutherford, 2006). These lands have been highly impacted by agriculture, mining, and urban development across the entire Mesic Highveld Grassland Bioregion of Mpumalanga where this project occurs. More than half of the project area is Rand Highveld Grassland and almost half of the entire range of this vegetation type has *"been transformed by cultivation, plantations, urbanization or dam building"* (Mucina & Rutherford, 2006 and https://www.dffe.gov.za/sites/default/files/docs/olifant_vegetation.pdf).

The land classification based on satellite imagery also shows the land classification as predominantly Cropland, Forestland, Grassland, Scrubland and Shrubland (based on IPCC Classification). The Thembisile Hani Local Municipality Land Use Scheme (Mpumalanga 2020) indicates the entirety of the project area is zoned as agricultural land. As the name of the parcels suggest, i.e. Blaauwpoort, Kranspoot Alias Blackwood Camp, Kwarsspruit, Suikerboschplaat and Zaaihoek, these lands have been in agricultural use since at least the 1980's (Figures 1 & 2) (Department of Rural Development and Land Reform's (DRDLR) National Geo-spatial Information database; (<http://cdngiportal.co.za/cdngiportal/>) and much of the land has been classified as Heavily and Moderately Modified (Themhisili Hani_LUS_Grid_ReferenceA.pdf).

The Department of Forestry, Fisheries and the Environment also visited the site and acknowledged that the proposed farms are comprised of agricultural land, forest (natural, wooded and plantation), grassland and cropland. Essentially these lands were agriculture lands during apartheid, which was abandoned post-apartheid and is now community land under the Communal Property Association.

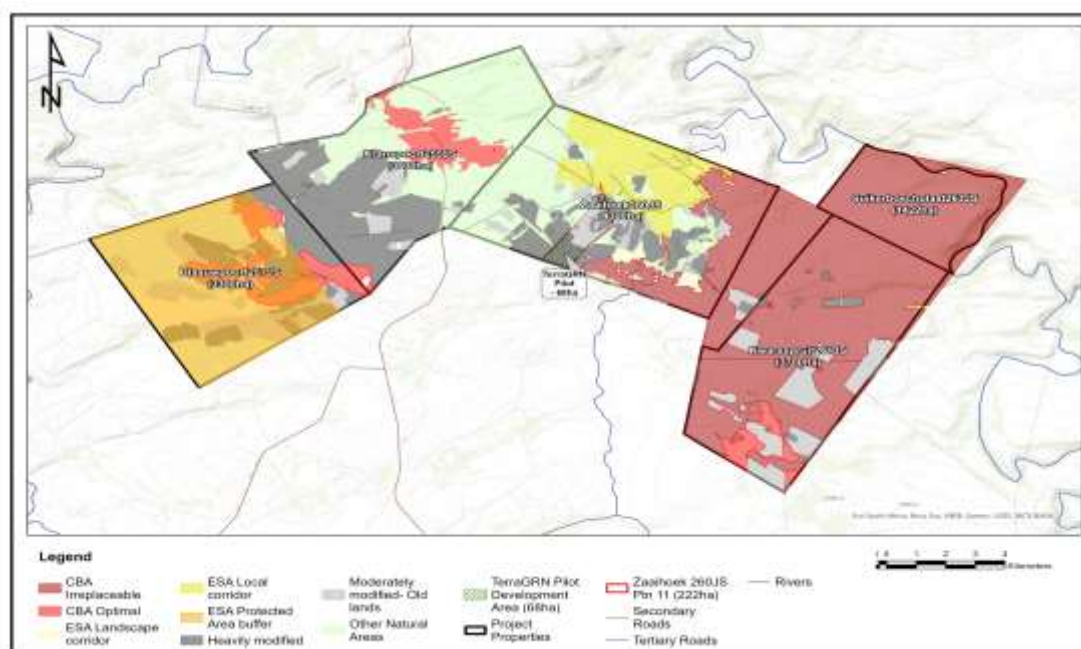
However, TERRAGRN is going beyond these classifications to look at the vegetation type and understand the critical biodiversity areas before undertaking any planting activities. Before the initial planting, a pre-feasibility study of biodiversity and water and risk assessment in this regard was undertaken for identifying the plantation area. The study was conducted by STS, 2022. The study determined and described habitat types, communities and the ecological state of the area and ranked each habitat type based on the risk (i.e., low, moderate, or high) that the proposed planting can pose to each habitat and identified all sensitive landscapes such as indigenous forests, rocky ridges, wetlands and/ or any other special features such as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) as shown below.

Low-Risk Areas	Moderate-Risk Areas	High-Risk Areas
<ul style="list-style-type: none"> • Areas of low and moderately low sensitivity. These include areas where biodiversity value was found to be degraded, with high levels of disturbance and abundance of alien vegetation. • These areas do not include sensitive biodiversity features that could negatively be impacted by proposed development activities. Indigenous vegetation largely absent. 	<ul style="list-style-type: none"> • Areas where significant biodiversity is present (e.g., presence of indigenous vegetation, increased faunal species activity and/or protected species recorded) but faunal and floral communities have lower habitat integrity resulting from exposure to current or historic disturbances. • Areas typically not within ESAs or Threatened Ecosystems. • Indigenous vegetation present 	<ul style="list-style-type: none"> • Areas containing highly sensitive biodiversity features, or unique habitat, including habitat likely to support faunal and floral SCC. Little to no alien vegetation occurs within these areas. • Habitat is dominated by indigenous species, and thus representative of significant biodiversity features such as ESAs and Threatened ecosystems.

Figure 1: Description of the risk categories applicable to the habitat on site.

Based on this study, **planting is being undertaken only on low risk areas**. The Currently Cultivated areas (within the Modified Habitat) and the Transformed Habitat (within the Modified Habitat) are considered Low Risk areas as no sensitive biodiversity features (e.g., CBAs or ESAs), or unique floral and/or faunal habitat was observed within these habitats. Indigenous vegetation was absent in both the Currently Cultivated areas as well as the Transformed habitat.

There are also areas considered environmentally sensitive and classified as Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). (Figure as shown below, Jacana 2023). Although these areas are part of the leased project area, they will not be disturbed and will be managed for protection and in some cases restoration work conducted, in collaboration with local communities, government and NGO's.



Thus, TERRAGRIN will only be doing agroforestry planting in heavily modified or moderately modified areas of the lands leased. Baseline surveys (STS, 2022) conducted in these modified areas determined these modified habitats to consist of the following:

- Currently cultivated fields in which indigenous vegetation is absent.
- Historically cultivated areas that have subsequently re-established pioneer floral communities. Typically, the habitat supports moderately low floral and faunal diversities.
- Transformed areas associated with areas that have been significantly transformed for anthropogenic use (e.g., housing).

The STS, 2022 report is for 221 ha in which the initial planting of 68 ha is done so far. A landscape planning approach for biodiversity conservation and plantation selection is done in a phased manner. This is a systematic process that progresses from conservation vision to science, to communication of impacts and engagement of stakeholders, to make decisions to achieve regional conservation and development goals. **The identification of planting areas as described above will be followed for every phase on planting as it progresses in the PoA/VPA.**

Several stakeholders are involved in the process that include Department of Environmental Affairs, South Africa (part of DFFE), Thembisile Hani and eMalahleni

municipalities, University of Pretoria Environmental Sciences, Jacana Environmentals CC, Manala Mgibe Traditional Authority, and the community.

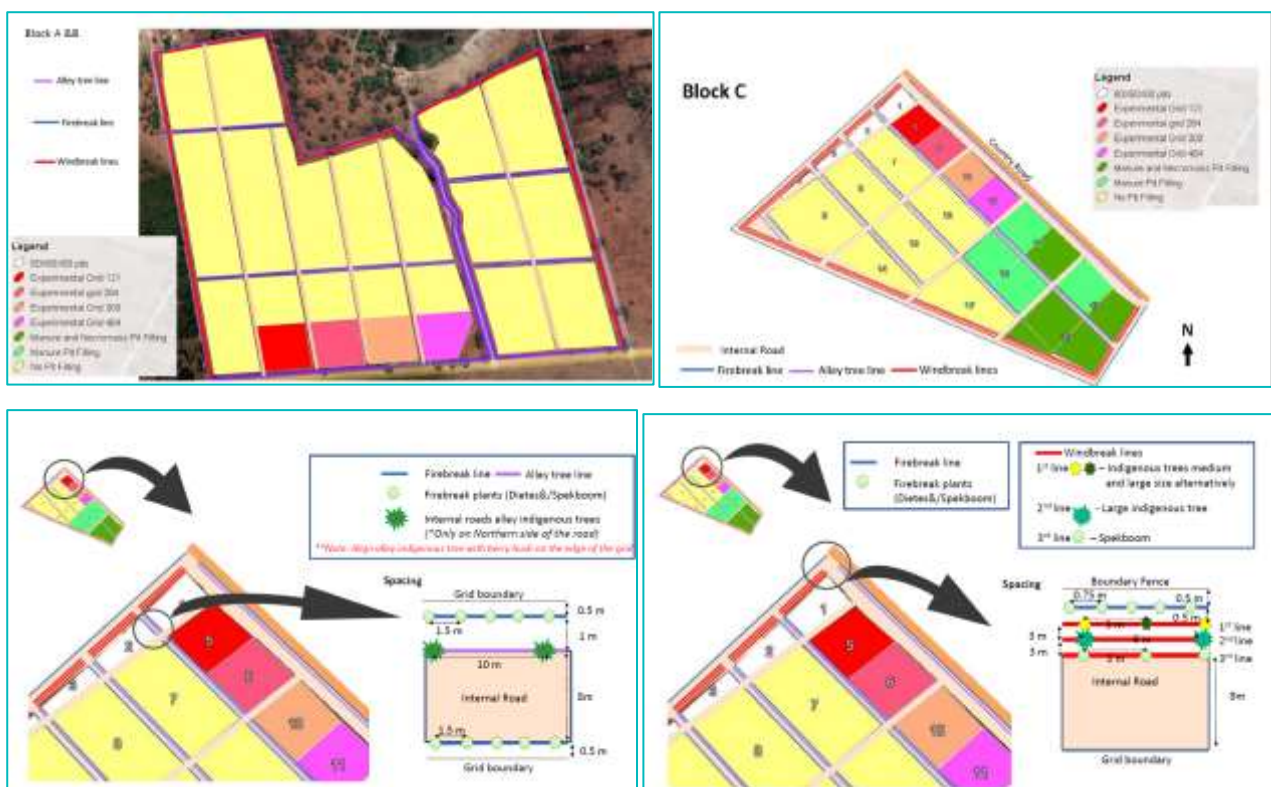
TERRAGRN's approach follows the philosophy of conservation of indigenous grassland ecosystems. The project is on heavily modified lands in the project area that have been subject to decades of agriculture and grazing activity. It's very clear for example that livestock herding that continues on much of these lands have been highly detrimental to grasslands and almost impossible to rehabilitate back to a natural state (SA Forestry Online, 2021). By focusing on only these heavily impacted areas we will avoid impacts to environmentally sensitive ecosystems. Furthermore, TERRAGRN's approach to work with local communities, government, and NGO's to better manage the sensitive environmental areas in and around the project area will lead to better management, restoration and improvement of these remnant habitats. TERRAGRN follows the same approach and philosophy of the SANBI Grasslands Programme (SFA Forestry Online, 2011).

The Grasslands Programme aims to sustain and secure the biodiversity and ecosystem services of South Africa's grasslands biome, while at the same time strengthening the economy and contributing to social development. A cornerstone of its strategy is to acknowledge the existence of production sectors as important stewards of the grassland biome, and to 'negotiate trade-offs between production and conservation needs through market mechanisms, incentives and conservation stewardship'. This is to be implemented through the creation of 'partnerships'.

- a) Fencing: Once the area of planting is identified a low fence for preventing cattle from entering and damaging new plantation to be implemented in the perimeter. The Site office, nursery and equipment storage areas to be fenced properly up to 6 feet height.
- b) Land Preparation: Land Preparation includes all activities involved in making the selected land parcel ready to use.
 - i. The chosen land parcel post fencing is crimped or cleared of grass that has covered the degraded lands.
 - ii. The grass is piled and stored for use as mulch and necromass in strategic positions for use after planting

- iii. Short woody bushes termed as bush encroachers are cleared from the area and broken into small usable pieces for use in pit filling or as part of compost process.
- c) Grid and Pit marking:
- i. Grid of 1 ha to be isolated and marked on the ground - 100m by 100m
 - ii. Refer to experimental design layout and identify which of the 5 grid designs is the grid allocated to the area.

Mark the pits according to the dimensions of 40x40 cm square according to the grid layout specified. The plants are spaced to accommodate canopy size and sufficient rhizome development area to create the 5 different modelling units. Each modelling unit varies in number of bamboo per hectare. Every modelling unit has been designed to accommodate bamboo, fruit trees, indigenous trees, nitrogen fixers and cover/cash crops.



d) Wind and Fire Breaks

Around the plantations wind and fire breaks will be established as shown above.

e) Digging

- i. Dig pits to a depth of 40 cm depth
- ii. Pile removed soil onto the side of the pit sloping towards lower elevation with a wide base and flattened top. This minimizes soil loss to wind and rain.

f) Soil Interventions: Soil interventions are organic and does not include applying inorganic fertilizers and pesticides. The soil regenerations strategy includes one of the following

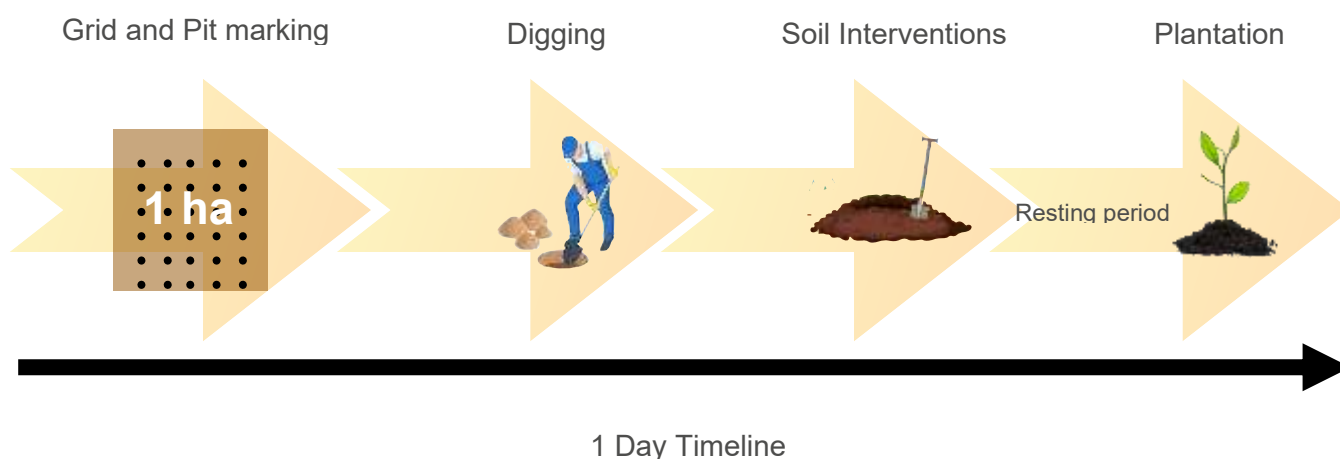
i. Necro-mass pit filling

i. cow manure	15 liters
ii. Chicken manure	5 liters
iii. Hay	10 liters
iv. Chips	10 liters
Total:	40 liters

ii. Manure + Compost filling

i. Chicken Manure	2 liters
ii. Cow manure	8 liters
Total	10 liters

iii. No pit filling – Topical application



i. Chicken Manure	1 liters
ii. Cow manure	4 liters
Total	5 liters

Fresh manure/Indigenous microbe solution of 3 litres will be applied once a month by feeding into the drip irrigation for all the above mentioned soil interventions.

Resting period before planting: Each method has a varied resting period before planting. For pits filled with necro-mass it is 3 months after filling in the pits that the planting will be done, while for Manure + Compost pit filling, planting will be done after 1 month and for No pit filling – Topical application, planting will be done immediately.

g) Planting

- Plants will be transported from nursery to grid area in a tractor and further distributed internally using wheelbarrows.
- While planting remove the plastic bag or pot in which plant arrived in and place separately for collection and transportation back to nursery.
- The plants stems are to be covered in soil only upto the depth it arrived in pot.
- Post plantation the plant is to be watered with 2 litres of water
- One 10 litre bucket of manure is added per plant only for plants undergoing soil regeneration by topical application
- Mulch is applied at the base to cover the watered and manure region

For each of the grid the number of seedlings that will be planted are as follows:

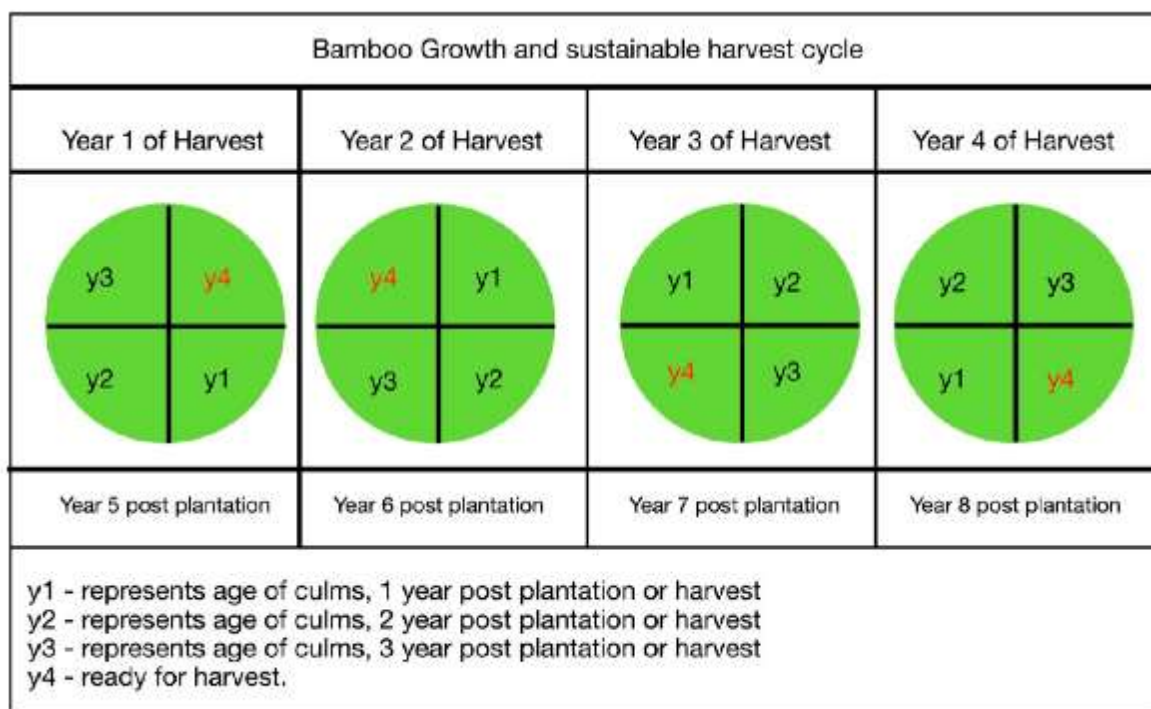
MU Grid	Bamboo	Fruit trees	Indigenous/ nitrogen fixing trees	Large deep rooted trees	Integrated pest management plants	Total
MU-01	400	40	100	10	80	630
MU-02	121	276	55	10	276	738
MU-03	264	264	122	10	264	924
MU-04	300	150	140	10	150	750
MU-05	464	121	111	10	121	827

h) Care and maintenance including survival rate and replanting

- i.** Monthly checks to be done on all grids according to routine
- ii.** Pits, trenches to be observed for structural integrity and issues to be resolved immediately
- iii.** Plant health will be observed and noted down on the reporting forms to indicate pest incidence or dead plants
- iv.** Plant health related incidents to be summarised and reported to plant maintenance team.
- v.** Dead plant species and number to be reported to plant maintenance team to collect from inventory in the nursery and replace on the ground
- vi.** Manure to be dosed once a quarter to all plants (1/4th of annual requirement of each species)
- vii.** Liquid organic fertilizers and indigenous microbe solutions to be added once a month.

i) Sustainable Harvest

In a bamboo plantation, each clump sends out new shoots every year. These shoots grow very fast and attain their maximum height in 6 to 8 months. In the successive years, the new shoots which are sent out are thicker and taller than the previous year and this increase in growth happens till the bamboo forest reaches steady state in about 8 years. Each clump will have culms which can be categorized into 4 groups of one year old culms (y1), two year old culms (y2), three year old culms (y3) and four year old culms (y4). Culms which have completed 4 years of growth will be harvested in the 5th year. As only the mature 4th year culms comprising 25% of the total culms are harvested, the green cover is maintained by the remaining 75% culms. The total green cover gets restored in a one year because of the new culms which reach their full height within 6 to 8 months of its emergence. This cycle continues each year over its entire lifecycle of nearly 100 years.



A.4. Scale of the VPA

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The carbon sinks is more than 16,000 tCO₂/yr. Hence it is a large scale VPA.

A.5. Funding sources of VPA

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There is no public funding of the project activity. Funding for the "TERRAGRN – Land Regeneration through Agroforestry in Mpumalanga, South Africa – VPA 01" will be from private investors including carbon funding.

TERRAGRN is exploring funding opportunities for the innovative ways of managing, measuring and valuing the impacts of the project. In practice this means that future carbon mitigation assets like carbon credits or other positive impacts expected to be delivered by the project could be used to secure loans. TERRAGRN has partnered with R20 (<https://regions20.org/> now <https://www.catalyticfinance.org/>) for funding and

signed a MOU with Gold Standard¹¹ for private funding the project activity. The CME confirms that no public funding or ODA is involved in the project. The CME has provided an ODA declaration letter in this regard.

¹¹ <https://www.goldstandard.org/blog-item/new-ways-valuing-climate-and-sustainable-development-impact-unlock-funding-innovative>

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

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- Methodology for Afforestation/Reforestation (A/R) GHGs Emission Reduction & Sequestration v.2.0.
- LUF AR Methodology Soil Carbon Tool v1.0.
- A/R Methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities", Version 01

B.2. Applicability of methodology (ies)

>>

Based on applicability requirements of the methodology, Methodology for Afforestation/Reforestation (A/R) GHGs Emission Reduction & Sequestration, Version 2, the project fulfills them as shown below:

Applicability Requirement	Fulfillment of the requirement
Projects that include the planting of trees on land that does not meet the definition of a forest are eligible to apply this methodology. Please refer to Annex C of Land-use & Forests Activity Requirements – Gold Standard for the Global Goals for carrying out spatial assessment of land to assess eligibility of areas.	The proposed project intends to plant trees on abandoned and degraded farmlands by planting bamboo and a variety of native tree species. Based on the spatial forest/non-forest assessment of the project area, the eligible areas that does not meeting the definition of forests according to South Africa ¹² as described below is taken up for planting.

¹² [CDM: Designated National Authorities \(DNA\) \(unfccc.int\)](http://unfccc.int)

	<p>Table 3: Threshold for forest/non-forest classification</p> <table> <tr> <th>Criteria for forest mapping</th><th>Threshold used</th></tr> <tr> <td>A single minimum tree cover crown value between 10 and 30 percent</td><td>30 percent cover</td></tr> <tr> <td>A single minimum land area value between 0.05 and 1 hectare</td><td>0.05 hectare</td></tr> <tr> <td>A single minimum tree height values between 2 and 5 meters</td><td>2 meters</td></tr> </table> <p>The eligible planting areas does not meet the definition of forest before the start date and 10 years before project start date. Kindly see the shape files submitted and the report of the assessment according to Annex C of LUF Activity Requirements.</p>	Criteria for forest mapping	Threshold used	A single minimum tree cover crown value between 10 and 30 percent	30 percent cover	A single minimum land area value between 0.05 and 1 hectare	0.05 hectare	A single minimum tree height values between 2 and 5 meters	2 meters
Criteria for forest mapping	Threshold used								
A single minimum tree cover crown value between 10 and 30 percent	30 percent cover								
A single minimum land area value between 0.05 and 1 hectare	0.05 hectare								
A single minimum tree height values between 2 and 5 meters	2 meters								
<p>2.1.2 The project area shall meet all of the requirements below for this methodology to be applicable for the calculation of CO₂ removal units from the project.</p> <p>a. Projects can apply all silvicultural systems:</p> <ul style="list-style-type: none"> i. Conservation forests (no use of timber) ii. Forests with selective harvesting iii. Rotation forestry 	<p>The project applies the following:</p> <ul style="list-style-type: none"> i. conservation forest (no use of timber) as the tree species planted are fruit trees. The fruit trees that will be planted in given is section A.1. ii. Forests with selective harvesting – Bamboo will be planted, which will be harvested sustainably. Sustainable harvesting is described in section A.3. 								
<p>2.1.2.b. All projects can include agriculture (agroforestry) or pasture (silvopasture) activities.</p>	<p>The VPA is for agroforestry activity on abandoned and degraded farmland, which will also include crops and fruit trees.</p>								
<p>2.1.2. c. Project Areas shall not be on wetlands.</p>	<p>The eligible area selected for planting is on abandoned and degraded farmlands and is not on wetlands.</p>								
<p>2.1.2. d. Project Areas with organic soils shall not be drained or irrigated (except for irrigation for planting).</p>	<p>The area with organic soils will not be drained. If it is used for irrigation for planting prior approval will be taken from regulatory authorities depending on the requirement.</p>								

e. Soil disturbance (through ploughing, digging of pits, stump removals, infrastructure, etc.) on organic soils shall be in less than 10% of the area that is submitted to certification (not 10% of the entire project area).	As can be seen from the spatial forest/non forest assessment, planting is not done on organic soil.
f. The most likely scenario without the project (baseline scenario) shall be defined for the project area. This scenario shall not show any significant increase of the Baseline biomass ('tree' and 'non-tree').	Based on the spatial forest/non-forest assessment of the project area for before the start date and 10 years before project start date, it can be seen that there is no significant increase of tree cover in the project area as it is dominantly abandoned and degraded farmlands. These lands have been abandoned for more than 30 years without cultivation and have remained without any tree cover since then.
2.1.3 Special Considerations for A/R Mangrove projects: a. 90% of the planting area shall be planted with mangrove species.	Not Applicable as it is not Mangrove plantations.
2.1.3. b. Due to the accumulation of soil organic carbon, an additional 1.8 tCO ₂ /ha/year can be accounted for in the first 20 years after a Modelling Unit (MU) is planted, unless transparent and verifiable information can be provided to justify a different value. This value is based on the recommendation of 0.5 tC/ha/year by the A/R CDM methodology AR-AM0014 v3.0. It has been converted to the unit tCO ₂ /ha/year.	Not applicable as it is not Mangrove plantations. The GS4GG soil carbon tool is used to assess accumulation of SOC.

2.1.3. c. In case there are targeted management / inputs leading to SOC improvement involved, applicable SOC Framework Methodology approaches may be allowed.	Not applicable
2.1.3.d. SOC sequestration component shall be excluded from the issuance of Planned Emission Reductions.	If the project is applying for PERs, the SOC sequestration will be excluded and only PERs from planting will be included for issuance.
2.1.4.e. Paragraph 2.1.2 (c) of this methodology does not apply to mangrove projects.	Not applicable as it is not mangrove plantations

B.3. VPA boundary

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a) *define the project boundary that geographically delineates the proposed VPA under the control of the CME or the project participants, including information allowing for the unique identification of the VPA. If the proposed VPA contains more than one discrete area of land, each discrete area of land shall have a unique identification.*

The project boundary is delineated and submitted as shapefiles. The project area is under the control of the VPA Implementer TERRAGRN SA. The project area contains five discrete area of land and is identified by the name of the farmland, which is as follows:

Farm Names	Farm Area (ha)
Blaauwpoort	3,289.1
Kransproot Alias Blackwood Camp	3,659.0
Kwarsspruit	3,721.6
Suikerboschplaat	1,424.3
Zaaihoek	4,178.9
Total	16,272.9

- b) *select the carbon pools, emission sources and GHGs to account for in the project boundary of the real case VPA, and provide explanation with justification for the choice*

Source		GHGs Included? Justification/Explanation		
Baseline scenario	Tree biomass (aboveground and belowground)	CO ₂	Yes	Could be a major source of CO ₂ emissions, however no trees in the baseline scenario will be removed. The existence of shrubs revealed not to be significant.
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Non-tree biomass	CO ₂	Yes	Could be source of GHG emissions
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Soil	CO ₂	No	No significant GHG source
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
Project scenario	Tree biomass (aboveground and belowground)	CO ₂	Yes	Major source of GHG sequestration
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source
	Soil	CO ₂	Yes	Source of CO ₂ sequestration in the project
		CH ₄	No	No significant GHG source
		N ₂ O	No	No significant GHG source

Carbon Pools Included for the real case and regular VPAs are Above ground biomass, Below ground biomass and Soil.

- c) *describe how to define the project boundary of its regular VPAs, including how to determine the physical delineation of each regular VPAs,*

The regular VPAs will be through physical delineation of the project boundary and submitting the shapefiles of the project boundary through spatial forest/non forest assessment.

d) which sources, which carbon pools (for Forestry and AGR VPAs) and GHGs are to be included/excluded in its regular VPAs boundary, under which conditions or circumstances.

The carbon pools and GHGs included in regular VPA boundary is as shown above in the table, which is Above ground biomass, below ground biomass and soil organic carbon.

B.4. Establishment and description of baseline scenario

>> Based Para 3.5.1. of the methodology, the baseline is the estimated carbon stock that would occur in the baseline scenario. The baseline scenario describes the activities that would occur in the absence of the proposed project.

- The baseline of the eligible planting area is abandoned and degraded farmland, which is Blaauwpoort, Kranspoot Alias Blackwood Camp, Kwarsspruit, Suikerboschplaat and Zaaihoek. These farmlands have been abandoned for more than 10 years as can be seen from the spatial forest/non-forest assessment. The eligible lands have been without trees for more than 10 years and will continue to be degraded farmlands in the absence of the proposed project activity.



Baseline scenario of the project area for VPA-01

Based on 3.5.1 and 3.5.2 of the methodology, the baseline shall be determined by estimating the tree and non-tree biomass that is present in the eligible planting area just period to the planting start. To determine the Baseline of the eligible planting area the land shall be

- a) stratified according to its vegetation types (grassland, bushland, etc.), AND*
- b) for each of these strata scientifically based project-specific, regional or national default values shall be found which state 'tree' and 'non-tree' biomass of these vegetation types.*
- c) default values from the IPCC shall only be used if no other values are available.*

a) Stratification according to its vegetation types

Based on the spatial forest/non-forest assessment, applying the IPCC land use category, the stratification of the eligible project area is as follows:

S. No	Land use class	Area (ha)	Percentage
1	Cropland	2968.1	20.482%
2	Grassland	10743.7	74.139%
3	Other land	13.4	0.092%
4	Scrubland	681.7	4.704%
5	Shrubland	84.3	0.582%
Total area in hectares		14491.2	100.00%

b) Biomass of tree and non-tree for the vegetation types based on national default values

Based on National GHG Inventory Report, South Africa, 2017, the following biomass carbon stock was applied for preparing the GHG Inventory. As per the methodology, for each of these strata scientifically based project-specific, regional or national default values can be applied for these vegetation types. The values are based on scientific studies¹³.

Land Class	Biomass C Stock (AG + BG)
	tC/ha
Annual crop (Pivot)	5.36
Annual crop (Non-pivot)	4.15
Subsistence crop	1.86
Grassland	4.42
Low shrubland	2.42
Woodland/open bush	4.21
Mine	4.2
Other land	0

Source: Table 5.36, Factors applied in the calculation of the land sources and sinks in South Africa. Page 317, National GHG Inventory Report, South Africa, 2017,

¹³ NTCSA report (DEA, 2015), Alembong (2015), NTCSA data overlay, Seydack (1995), Du Toit et al. (2016), Mills et al. (2005), Van der Vyver et al. (2013), NIR for SA for 2000 (DEAT, 2009), Van Leeuwen et al. (2014), Midgley and Seydack (2006), Geldenhuys (2011), Hoffman and Franco (2003), Calculated from biomass and applied an average harvest cycle of 25 years (CGA, 2016), Weighted average determined from FSA data on MAI per species and per product type.

Department of Forestry, Fisheries and the environment, Republic of South Africa, August 2021¹⁴.

The total biomass C stock is given as above ground and below ground biomass. The weighted average is considered for the project area, which is 4.19 tC/ha. At a conversion rate of 0.5 from carbon to biomass, the average above ground biomass in the eligible project area is 8.38 t/ha.

Hence the baseline above ground biomass stock for the project area is 8.38 t/ha.

S. No	Land use class	Area (ha)	Above ground biomass (t/ha)
1	Cropland	2968.1	3.79*
2	Grassland	10743.7	4.42
3	Other land	13.4	0
4	Scrubland	681.7	2.42
5	Shrubland	84.3	4.21
Above ground biomass tC/ha			4.19
Average above ground biomass t Biomass@0.5 conversion rate			8.38

*average of pivot and non-pivot annual cropland

B.5. Demonstration of additionality

>>

The project is a large-scale project activity and additionality is based on Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" (Version 01)¹⁵.

The steps as outlined in the Tool followed to demonstrate that the proposed project activity is additional and not the baseline scenario is as follows:

- STEP 0. Preliminary screening based on the starting date of the A/R project activity;
- STEP 1. Identification of alternative land use scenarios to the A/R project activity;
- STEP 2. Investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios; or

¹⁴ <https://unfccc.int/sites/default/files/resource/South%20Africa%20%20NIR%202017.pdf>

¹⁵ <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf>

- STEP 3. Barrier analysis; and
- STEP 4. Common practice analysis.

STEP 0: Preliminary screening based on the starting date of the A/R project activity:

The project is a regular project, wherein various stakeholders were consulted before the start of the project activity. Kindly see the stakeholder's meeting report. An MoU was signed between TERRAGRN, Gold Standard & R20, which was announced on 3/10/2022¹⁶ much before the start of the project, which is 29/11/2022. This MoU is to explore innovative ways of managing, measuring and valuing its impact on the climate and UN's SDGs and use the impacts as a form of collateral that increases the amount of investment to the project.

Hence, carbon revenue is seriously considered in the decision to proceed with the project activity.

STEP 1: Identification of alternative land use scenarios to the proposed A/R CDM project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed

A/R GS4GG project activity: Taking into account relevant national and/or sectoral policies and circumstances, such as historical land uses, practices and economic trends. The identified land use scenarios are which are credible alternative land scenarios to the proposed project activity is;

- a) *Continuation of the pre-project land use – abandoned and degraded cropland;*
- b) *Reforestation of the land within the project boundary performed without being registered as the carbon project activity.*
- c) *If applicable, forestation of at least a part of the land within the project boundary of the proposed A/R project at a rate resulting from legal requirements; or extrapolation of observed forestation activities in the*

¹⁶ [New ways of valuing climate and sustainable development impact to unlock funding for innovative regenerative agroforestry project in South Africa | The Gold Standard](#)

geographical area with similar socio-economic and ecological conditions to the proposed A/R project activity.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

- a) *Continuation of the pre-project land use:* As can be seen from the spatial forest/non forest assessment of the project area, the lands have been abandoned and degraded cropland in 2012 and 2022 and will continue to be abandoned and degraded cropland.

In South Africa, land degradation is a significant issue where nearly 60% of the land is degraded and 91% prone to desertification. Before apartheid ended in 1994, nearly 3.5 million African people were resettled in South African 'homelands', now called the communal areas, where enforced high densities of people and livestock resulted in rangeland degradation. Both the communal lands and the commercial lands historically occupied by farmers currently face the issue of land degradation due to unsustainable land management practices¹⁷.

These lands belongs to the Manala Mgibe Communal Property Association (CPA) and continuation of the land status as abandoned cropland is a credible land use scenario and not against any national laws and regulations.

- b) *Reforestation of the land within the project boundary performed without being registered as the A/R GS4GG project activity:* The reforestation of the land without being registered as a A/R GS4GG project activity is also in compliance with mandatory applicable laws and regulations
- c) *If applicable, forestation of at least a part of the land within the project boundary of the proposed A/R project at a rate resulting from legal requirements; or extrapolation of observed forestation activities in the geographical area with similar socio-economic and ecological conditions to the proposed A/R project activity:* There are no legal requirements for forestation of such community lands. Hence forestation of at least a part of the land within

¹⁷ Mani, S, Osborne, C.P., Cleaver, F., 2021. Land degradation in South Africa: Justice and climate change in tension. People and Nature. Vol 3, Issue 5, pp 978-989. <https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.10260>

the project boundary requiring from legal requirements is not a credible land use scenario. Most of the plantations in South Africa is under private and public ownership¹⁸. Plantations on community lands by the communities is not reported for extrapolation of observed forestation activities in the geographical area with similar socio-economic and ecological conditions.

The outcome of sub-step 1b is that a) and b) both the scenarios are credible land use scenarios.

STEP 2. Barriers analysis

Sub-step 2a: Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

Investment Barriers: The challenges of commercial development of bamboo are numerous. Commercial bamboo projects face financial and market-related challenges. The financing of commercial bamboo plantation is difficult because there are no dedicated public and private funds available. Additionally, in a still young Forest Landscape Restoration sector, financial institutions are reluctant to provide financing. They are risk adverse and require proof of concept prior to investing finances. Also governing bodies are unlikely to invest in new institutions without clear evidence of probable viability. Funders are hesitant to invest considerable sums in full implementation without proof of concept of all key elements at an initial smaller scale¹⁹. Financial institutions in South Africa are also not accustomed to commercial bamboo growing, which impacts on their willingness to provide low-interest loans to project developers. There is also no insurance market around bamboo industry, which would lower the risk to financial institutions²⁰.

¹⁸ https://www.gov.za/sites/default/files/gcis_document/202208/stateofforestssouthafricareport2018.pdf

¹⁹ Knowles, et al., 2021. Unlocking barriers and opportunities for land-use based climate change mitigation activities in sa. https://www.dffe.gov.za/sites/default/files/reports/unlockingbarriers_land-usebasedclimatechangemitigation.pdf

²⁰ Scheba, A., et al., 2017. Bamboo for green development? The opportunities and challenges of commercializing bamboo in South Africa.

Administrations within governments are also slow to translate regulations into incentives. The lack of funding and the absence of national policies and strategies to develop bamboo cultivation, exploitation, and processing are also slowing progress. Land restoration efforts are often focused on seedling production in nurseries and on planting operations. The subsequent monitoring and maintenance actions, which are equally important, also require funds to lead to self-regenerating ecosystems. Significant amounts of atmospheric CO₂ are absorbed and transformed into woody biomass between the fourth and eighth year of bamboo growth, which is also the time when financial needs are greatest. The required long-term capital are difficult to mobilize²¹.

Technical barriers: Necessary knowledge of species adapted to specific ecological conditions, seed sources and supply methods, and nursery operations is limited. Many restoration initiatives have failed due to a lack of knowledge about how to select, plant, and manage the appropriate species, which is also true for bamboo. The development of forest landscape restoration programs faces ecological constraints related to the availability of quality seed material. Bamboo's infrequent fruiting makes it necessary to disseminate vegetative production techniques that are still not available to everyone²¹.

Other technical challenges include unanticipated problems in the establishment of infrastructure, nursery, planting of the bamboo, growing and maintenance, harvesting and processing. The many unforeseen challenges have contributed to significant expenses that are not accounted for in initial budgets, but which increase the total costs of the projects. The many technical challenges are due to limited knowledge base that exists in South Africa about commercial bamboo growing. Projects have to undergo steep learning curves that require continuous experimentation and trial and error²².

²¹ Paul Donfack, 2020. Technical Paper: The use of Bamboo for Landscape Restoration in Central and West Africa. International Bamboo and Rattan Organization Working Paper. Research Program on Forests, Trees and Agroforestry. CGIAR.

²² Scheba, A., et al., 2017. Bamboo for green development? The opportunities and challenges of commercializing bamboo in South Africa.

Technological Barrier: Despite the business opportunities that may arise, organizations wishing to have bamboo-based products face constraints due to the lack of research and technological innovation. However, to be competitive in the country and later for export, bamboo productions must be adapted to international technological, commercial and forestry standards. Technological barriers to forestry and processing, low investment in research and development, and a lack of plant material are obstacles to the use of bamboo as a fibre alternative to lumber. Structural weaknesses of technological transformation microenterprises also limit the support of actors in the sector. The problem is further compounded by a significant technological gap and a lack of critical relevant skills²¹.

Political and regulatory barriers: Regarding national policies and their translation into action plans, a lack of an environment conducive to maximizing bamboo's contribution to the green economy is evident. Bamboo is a grass, it has no legislations binding it to timber policies and licencing issues in South Africa²³.

With regard to access to land for bamboo plantations, there are many complex relationships that need to be negotiated with communities and traditional authorities. Despite lengthy negotiations, access to tenure often remains insecure. Without clear tenure security, few companies or organizations are willing to make the large capital investments into commercial bamboo growing, which is a very risky undertaking. Project owners have tried to enter into agreements with local communities and traditional authorities, but their efforts either do not materialize from the start or end not long after the project start. The main difficulty is to know how to work with traditional authorities and communal land governance schemes, which use customary institutions to regulate different land uses including livestock grazing, crop cultivation and conservation²⁴.

https://www.academia.edu/35190753/Bamboo_for_green_development_The_opportunities_and_challenges_of_commercialising_bamboo_in_South_Africa

²³ <https://www.farmingportal.co.za/index.php/agri-index/74-tegnology/2862-bamboo-the-industry-of-the-future-especially-for-south-africa>

²⁴ Scheba, A., et al., 2017. Bamboo for green development? The opportunities and challenges of commercializing bamboo in South Africa.

Barriers due to social conditions: Communities that form partnerships with the company through lease agreements require training so that they can be able to actively engage with companies on matters that affect them. They should be engaged in training and learning programmes that develop their managerial skills and educate them about forestry industry²⁵. They should be given the opportunity to learn more about the forestry industry through skill development programmes so that the partnership with company is good. As a result, there is heavy investment into education, awareness and skill training programs to educate them of the social and environmental benefits of the project activity. This social development is critical especially in the initial stages of the project development . To implement the project on an appropriate scale, it is necessary to work with actors representing institutions and organizations inside and outside of governments who can play a role in the process. Therefore, the CME has to rely on institutions such as government, NGOs, and other civil society organizations, including representatives of local communities. Carbon financing for the project wherein the these actors and local communities are involved in achieving the host of co-benefits from the project by overcoming the barrier to social perception is of prime importance.

The project is an agroforestry model predominantly with bamboo plantations. There are not many agroforestry models or area under agroforestry in South Africa and there exists socio-economic barriers to adoption of agroforestry too. These include a lack of market for products from new or novel agroforestry species, perceptions of high initial capital and labour costs, and delayed returns on initial investments (particularly in timber plantations). Furthermore, there are management challenges associated with integrating trees and shrubs into cropping systems (and integrating

https://www.academia.edu/35190753/Bamboo_for_green_development_The_opportunities_and_challenges_of_commercialising_bamboo_in_South_Africa

²⁵ Mkhize, N., Opportunities and Challenges for stakeholders of land reform in forestry plantations January 2020
DOI:10.13140/RG.2.2.24068.48004,

https://www.researchgate.net/publication/338897402_Opportunities_and_Challenges_for_stakeholders_of_land_reform_in_forestry_plantations

crops into forestry systems). Building a sound economic argument to support agroforestry is necessary²⁶.

Outcome of step 2a: List of barriers that may prevent one or more land use scenarios identified in Step 1b.

The above barriers would prevent the scenario of the project activity occurring without being registered as an GS4GG carbon project.

However they do not affect or prevent the implementation of the following alternative land use scenario:

Continuation of pre-project land use – abandoned and degraded cropland. This land use does not require any upfront investment and is the most common land use in the project area.

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

Hence the option b. *Reforestation of the land within the project boundary performed without being registered as the carbon project activity* is eliminated based on the barrier analysis presented above.

To overcome barriers, Gold Standard and R20 will work with TERRAGRN and partners to explore innovative ways of managing, measuring, and valuing its impact on the climate and the UN's Sustainable Development Goals (SDGs). Valuing a diversity of impacts such as mitigation, adaptation, water, soil health, gender and welfare will allow projects like TERRAGRN's to use the impacts as a form of collateral that increases the amount of investment in their project. In practice this means that future carbon mitigation assets like carbon credits or other positive impacts expected to be

²⁶ <https://www.dffe.gov.za/sites/default/files/docs/agroforestrystrategyframework.pdf>

delivered by the project could be used to secure a low-interest loan. Lenders have the confidence that if the loan is defaulted on, they are entitled to the carbon credits or value of other verified impacts, just as mortgage providers may provide lower interest rates on mortgages by using the house as an asset for collateral. R20 will support outreach and fundraising, to help with scaleup, usability and replicability of the activities²⁷.

STEP 4. Common practice analysis

According to Para 33 of the Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" (Version 01), *"an analysis needs to be provided of the extent similar forestation activities to the one proposed as the A/R CDM project activity have been implemented previously or are currently underway. Similar forestation activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology"*.

With more than 0.7 million ha of extremely degraded agricultural land, South Africa has a high potential for bamboo as a tool for restoration and economic regeneration²⁸. But tree (pine and eucalyptus)-focused forestry and pulp industry was promoted. A number of public entities in South Africa, including the Eastern Cape Development Corporation, attempted to re-initiate the development of a commercial bamboo industry, indicating a positive political will towards the plant's potential. With a well-developed forest products sector and both primary and secondary domestic manufacturing of wood and fibre products in existence, the potential for bamboo to be a valuable solution that contributes towards South Africa's national development strategy is significant.

²⁷ [New ways of valuing climate and sustainable development impact to unlock funding for innovative regenerative agroforestry project in South Africa | The Gold Standard](#)

²⁸ FAO, 2018. Bamboo for land restoration. Policy Synthesis Report. <https://www.inbar.int/wp-content/uploads/2020/05/1528867712.pdf>

A few commercial growers of bamboo have attempted to grow bamboo. They have been a number of efforts exploring the potential development of a bamboo industry in South Africa²⁹:

- EcoPlanet Bamboo selected Eastern Cape as location for SA subsidiary – 485 ha farm near Bathurst, EC
- DGB launched 10 ha project in Mooiplaas -CSR programme
- Broad Based Bamboo Solutions negotiated with local farmers in KZN to grow bamboo for processing purposes (furniture and flooring)
- Food and Trees for Africa sources CSR funding for 20 ha Blue Disa bamboo carbon sequestration project in Lawley, JHB. Cooperative business model.
- Green Grid in KZN (320 ha) – plantation, nursery and gasification plant (national demonstration project)
- Brightfields Natural Trading Company started partnerships with at least two farmers in Kwazulu-Natal to grow selected bamboo species for local processing in 10 ha of land³⁰.
- The ECDC contributed to the establishment of three 5 ha pilot bamboo plantation sites in Centane, Ndakana and Uitenhage in the Eastern Cape.

Government has taken an interest in various forms

- Dept. Environmental Affairs – funded Green Grid Beema Bamboo project in KZN (bioenergy)
 - Dept. of Water Affairs – consultation regarding water consumption of different bamboo species
- IDC and ECDC – Other departments that has expressed interest in the bamboo industry, include, DAFF, Dept. of Rural Development and Land Reform, DTI.

According to para 34 of the combine tool of additionality, *"If forestation activities similar to the proposed A/R CDM project activity are identified, then compare the proposed project activity to the other similar forestation activities and assess whether there are essential distinctions between them. Essential distinctions may include a*

²⁹ http://www.resilientfutures.uct.ac.za/sites/default/files/image_tool/images/479/Events/2019-07-29%20The%20Fibrous%20Plant%20Industry%20in%20SA.pdf

³⁰ https://www.academia.edu/35190753/Bamboo_for_green_development_The_opportunities_and_challenges_of_commercialising_bamboo_in_South_Africa

fundamental and verifiable change in circumstances under which the proposed A/R CDM project activity will be implemented when compared to circumstances under which similar forestations were carried out. For example, barriers may exist, or promotional policies may have ended. If certain benefits rendered the similar forestation activities financially attractive (e.g., subsidies or other financial flows) explain, why the proposed A/R CDM project activity cannot use the benefits. If applicable, explain why the similar forestation activities did not face barriers to which the proposed A/R CDM project activity is subject”.

The proposed project by TERRAGRN differs from the various commercial growers of bamboo. The proposed PoA has memorandum of understanding with the CPA to afforest/reforest for 200,000 ha and has a lease for the first VPA of 14,491 ha. The scale of the activity is much bigger than the other bamboo forestry activities. The model is also different by way of promoting multiple species as an agroforestry model along with bamboo. TERRAGRN has a unique and innovative approach to the private-sector Nature-based solution business (NbS). The focus is to create nature capital through addressing ecological challenges, create significant positive impact on climate, social, food, energy, and local economy. The key areas of innovation are:

1. Local Biodiversity and Climate Resilience: This agroforest will sequester carbon, improve biodiversity by planting about 73 species.
2. Food Security: A large variety of food solutions from the sustainable harvest of fruit trees and cereal crops, made available creates downstream economic activity to the local communities.
3. Sustainable harvest of bamboo: From the sustainable harvest of bamboo plants (non-invasive clumping), which would be at least a third of all the plant species in this agroforest, TERRAGRN will make available dry bamboo biomass that could be used for several products including energy transition that can assist in plugging some of the gap in energy supply with contribution to renewable green energy.
4. Job Creation: New jobs will be created in various functional areas of TERRAGRN’s business including soil regeneration, forest planting, forest operations and management, sustainable harvesting practices, harvest processing plants (for Energy, Materials, Food, and Power), storage and

logistics, infrastructure monitoring, measurement and reporting, and central teams.

5. Social Development: TERRAGRN is developing plans to bring the landowners (Community Property Association) and the local workforce into the shareholding of the TERRAGRN South Africa company, enabling long-term alignment of interests, social infrastructure development, and wealth creation for the local people. These positive developments would create a jobs and skills transition path from the coal sector to an agroforestry sector in Mpumalanga, enable a more inclusive economy with more women and men in the workforce, and reduce the pressure of urbanisation.

All the commercial bamboo forestry activities faced barriers too as provided in Step 2. Despite large efforts, many projects have struggled to produce the anticipated results, which includes access to land, technical challenges, financial and market related challenges, social challenges and policy and regulatory challenges³¹. Given the lack of multi-species agroforestry bamboo revegetation projects in the region, it can be concluded that the project activity cannot be considered to be common practice.

Hence the proposed A/R carbon project is not the baseline and is additional.

>>

B.5.1. Prior Consideration

>> Not Applicable

B.5.2. Ongoing Financial Need

>> Not Applicable

B.6. Sustainable Development Goals (SDG) outcomes

³¹ Scheha, A., et al., 2017. Bamboo for green development? The opportunities and challenges of 64ommercializing bamboo in South Africa. HSRC.
https://www.academia.edu/35190753/Bamboo_for_green_development_The_opportunities_and_challenges_of_commercialising_bamboo_in_South_Africa

Relevant Target/Indicator for each of the three SDGs

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact
		Indicator (Proposed or SDG Indicator)
13 Climate Action (mandatory)	GHG Sequestration	GHG Sequestration
2 Zero Hunger	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	Food Produced
5 Gender Equality	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	Number of women employed Gender wage equality
8 Decent Work and Economic Growth	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	i.Number of jobs created ii.Number of local jobs created due to the project activity
15 Life on Land	15.2 By 2020, promote the implementation of sustainable	i.Area planted

	management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	ii.Total number of species planted iii.Increase in Biodiversity
17 Partnerships for the Goals	17.3 Mobilize additional financial resources for developing countries from multiple sources	Investment for implementation of the project from multiple sources

B.6.1. Explanation of methodological choices/approaches for estimating the SDG Impact

>>

SDG 13

Baseline

According to Para 3.5.3 of the methodology, the Baseline shall be determined on a Modelling Unit (MU) level using the following formula:

$$\text{Baseline MU,t [tCO}_2\text{/ha]} = \frac{\text{Baseline Eligible planting area [tCO}_2\text{]}}{\text{Eligible planting area [ha]}} \quad \text{Eq. 3}$$

As mentioned in section B.4. the baseline GHG is considered as 3.74 t Biomass/ha.

CO₂ removal

Biomass

According to the methodology, the following steps will be followed.

The yearly CO₂-removal is determined at the level of Modelling Unit (MU) during the crediting period.

For every MU a growth-model and conversion factors, the following conversion procedure will be followed and the conversion factors shall be determined at the level of a MU Unit. The conversion factor will be applied for each of the tree species for the following parameters and included as ex-ante in section B.6.2.

- Wood Density
- Biomass Expansion Factor
- Root-to-Shoot ratio

The conversion factors allow the conversion of the 'Stem volume', measured in cubic meters [m³] to 'tree biomass' with the unit tCO₂ and is included in section B.6.2. and subject to monitoring.

Aboveground biomass = stem volume x Biomass Expansion Factor x wood density x carbon fraction x C to CO₂ factor

According to Para 3.6.4 of methodology existing 'tree biomass' from the carbon stock of the Baseline that is not removed shall be reflected in the growth-model.

According to para 3.6.5 of the methodology, a realistic survival rate shall be reflected in the growth model.

In the first three years, the seedlings that do not survive will be replanted. According to para 3.6.6 of the methodology, the long-term CO₂ removal shall be determined depending on the silvicultural method applied and the following formula is used to determine the long-term CO₂ removal units.

The project is Option 1 – Selective harvesting and Conservation Forest

The bamboo plantations will be sustainably harvested as described in Section .1.1., while fruit trees is conservation forest.

$$CR_{MU, long_term} = \frac{\sum_{t=1}^T CR_{MU,t}}{T} \quad Eq. 4$$

Where

$CR_{MU, long_term}$ = Long-term CO₂-removal of a MU [tCO₂/ha]

$CR_{MU,t}$ = CO₂ removal of a MU in year t [tCO₂/ha]

T = Number of years between the planting start and the end of the crediting period []

t = Years [1, 2, 3, ...]

Soil Organic Carbon

The excel based LUF_AR Methodology_Soil Carbon Tool will be applied to determine the increment in SOC for the project area.

Leakage emissions

According to the methodology, leakage are emissions that occur due to a *shift of activities* from the inside of a project area to the outside of a project area and are due to a. collection of wood (for firewood, charcoal, etc.), b. timber harvesting, c. agriculture (crop cultivation, shrimp cultivation, etc.) and d. livestock.

Importantly, only the 'tree biomass' affected by these activity shifts shall be considered and will be determined on a Modelling Unit (MU) level using the following formula

$$\text{Leakage MU,t [tCO}_2\text{/ha]} = \text{Leakage Project area [tCO}_2\text{]} \div \text{Eligible planting area [ha]} \quad \text{Eq. 5}$$

Currently, the biomass in the project area accounts to 8.38 t Biomass/ha.

The area is essentially degraded croplands with very much tree biomass. There is no collection of wood for firewood or charcoal, or harvesting of timber.

The few trees that exist are mature trees and will continue to exist and will not be cut. Hence there is no leakage from the project area to outside of the project area to account for leakage. Hence leakage will not be estimated.

Other emissions

The emissions that result from certain land preparation techniques from the use of fertilizers and energy during project activities, and from nitrogen-fixing trees need to be included in other emissions.

With regard to site preparation – there is no burning of biomass in the project scenario. There is also no land tilling or any soil disturbance for accounting of emissions in the project scenario.

With regard to fertilizers, there is no organic and inorganic fertilizers that is being applied in the project scenario. As mentioned in section A.1.1, the various methods of soil enrichment is through necromass, mulch, manure, compost and tropical application. Hence there will be no emissions from fertilizer application. If the emissions from organic fertilizer application is applicable, as per the methodology, 0.005 tCO₂ per kg of N fertilizer shall be deducted.

Combustion of fossil fuel will be in terms of diesel use in tractors. These will be used before planting for levelling the grass at the line of planting as shown below. It will again be used to transport the sustainably harvested produce. The use of diesel will be insignificant (>5%) compared to carbon sequestration. But the use of fossil fuel will be tracked. If it is above 5% it will be accounted under other emissions.

Calculation of Yearly CO₂ Removals

The yearly CO₂-removal is determined at the level of Modelling Unit (MU) during the crediting period.

The CO₂ removal unit is determined for each year (t) of the crediting period using the following formula

$$\text{CO}_2 \text{ removal units MU,t} = (\text{CO}_2 \text{ removal MU,t}) - \text{Baseline MU,t} - \text{Leakage MU,t} - \text{Other Emissions MU,t} \times \text{Eligible Planting Area MU}$$

$$CO_{2\text{removal}} \text{ Project Area}, t = \sum_{MU=1}^{MUs} \sum_{t=1}^{CP} CO_2 \text{ removal } MU, t$$

Where,

$CO_{2\text{removal}} \text{ Project area}, t$ = CO2 removal units of a project area in year t (CO₂)

$CO_2 \text{ removal } MU, t$ = CO2-removal of a MU in year t (tCO₂)

MUs = MUs of a project area (1,2,3,...)

T = Years of the crediting period (1,2,3,...)

CP = Year the crediting period ends (1,2,3,...)

Other SDGs

The rest of the SDGs the SDG Impact is assessed as below

SDG Net Benefit = Project Impact – Baseline Scenario

B.6.2. Data and parameters fixed ex ante

SDG13

Data/parameter	SOC Increment
Unit	tC/ha/yr
Description	Increment is Soil Organic Carbon due to the project activity
Source of data	GS4GG Soil Carbon Tool
Value(s) applied	2.9333 tCO ₂ /ha/yr
Choice of data or Measurement methods and procedures	Based on LUF_AR_Methodology Soil Carbon Tool, following are the conditions. Land Use: Long-term cultivated cropland Management Input: Severely degraded % Disturbed: 0% will be disturbed Litter treatment: Litter from planted trees remain on site.

	For Tropical Dry Climatic Region and HAC Soils for the project area, the model returns a SOC increment of 2.9333 tCO ₂ /ha/yr.
Purpose of data	To estimate the increment in SOC in the plantation area
Additional comment	This is still a conservative value, as the project will have a high input management regime, which will increase the SOC to a greater extent.

Data/parameter	Wood Density																					
Unit	t/m ³																					
Description	Ratio between the mass of dry wood divided by its volume																					
Source of data	Sahin et al., 2020. Determination of Some Wood Properties and Response to Weathering of Citrus limon (L.) Burm Wood. July 2020 Bioresources 15(3):6840-6850 ICRAF Database - Wood Density (worldagroforestry.org)																					
Value(s) applied	<table><tr><th>Scientific Name</th><th>Wood Density</th><th>Source</th></tr><tr><td><i>Dendrocalamus hamiltoni</i></td><td>0.643</td><td>https://vtechworks.lib.vt.edu/bitstream/handle/10919/28742/Chapter3.pdf</td></tr><tr><td><i>Bambusa vulgaris vittata</i></td><td>0.755</td><td>https://www.researchgate.net/publication/335234237_Density_Porosity_and_Dimensional_Changes_of_Naturally_Grown_Bambusa_vulgaris#:~:text=The%20mean%20density%20values%20were%20755%20kg%2Fm%2C%20,877%203%203%20kg%2Fm%2C%20and%20782%20kg%2Fm.</td></tr><tr><td><i>Dendrocalmus asper</i></td><td>0.57</td><td>https://tost.unise.org/pdfs/vol6/no1-2/6x1-2x95-101.pdf</td></tr><tr><td><i>Coffea arabica</i></td><td>0.62</td><td>Wood Density Database; http://db.worldagroforestry.org/wd/genus/</td></tr><tr><td><i>Prunus domestica</i></td><td>0.6055</td><td>Wood Density Database; http://db.worldagroforestry.org/wd/genus/</td></tr><tr><td><i>Olea europea</i></td><td>0.8065</td><td>Wood Density Database; http://db.worldagroforestry.org/wd/genus/</td></tr></table>	Scientific Name	Wood Density	Source	<i>Dendrocalamus hamiltoni</i>	0.643	https://vtechworks.lib.vt.edu/bitstream/handle/10919/28742/Chapter3.pdf	<i>Bambusa vulgaris vittata</i>	0.755	https://www.researchgate.net/publication/335234237_Density_Porosity_and_Dimensional_Changes_of_Naturally_Grown_Bambusa_vulgaris#:~:text=The%20mean%20density%20values%20were%20755%20kg%2Fm%2C%20,877%203%203%20kg%2Fm%2C%20and%20782%20kg%2Fm.	<i>Dendrocalmus asper</i>	0.57	https://tost.unise.org/pdfs/vol6/no1-2/6x1-2x95-101.pdf	<i>Coffea arabica</i>	0.62	Wood Density Database; http://db.worldagroforestry.org/wd/genus/	<i>Prunus domestica</i>	0.6055	Wood Density Database; http://db.worldagroforestry.org/wd/genus/	<i>Olea europea</i>	0.8065	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
Scientific Name	Wood Density	Source																				
<i>Dendrocalamus hamiltoni</i>	0.643	https://vtechworks.lib.vt.edu/bitstream/handle/10919/28742/Chapter3.pdf																				
<i>Bambusa vulgaris vittata</i>	0.755	https://www.researchgate.net/publication/335234237_Density_Porosity_and_Dimensional_Changes_of_Naturally_Grown_Bambusa_vulgaris#:~:text=The%20mean%20density%20values%20were%20755%20kg%2Fm%2C%20,877%203%203%20kg%2Fm%2C%20and%20782%20kg%2Fm.																				
<i>Dendrocalmus asper</i>	0.57	https://tost.unise.org/pdfs/vol6/no1-2/6x1-2x95-101.pdf																				
<i>Coffea arabica</i>	0.62	Wood Density Database; http://db.worldagroforestry.org/wd/genus/																				
<i>Prunus domestica</i>	0.6055	Wood Density Database; http://db.worldagroforestry.org/wd/genus/																				
<i>Olea europea</i>	0.8065	Wood Density Database; http://db.worldagroforestry.org/wd/genus/																				

<i>Carya illinoensis</i>	0.64	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Prunus armeniaca</i>	0.675	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Prunus persica</i>	0.6055	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Mangifera indica</i>	0.5675	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Erythrina lysistemon</i>	0.331	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Bauhinia tomentosa</i>	0.67	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Celtis Africana</i>	0.7448	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Halleria lucida</i>	0.715	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Heteropyxis canescens</i>	0.646	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Buddleja saligna</i>	0.98	https://en.wikipedia.org/wiki/Buddleja_saligna
<i>Searsia lancea</i>	0.89	https://uses.plantnet-project.org/en/Searsia_lancea_(PR_OTA)
<i>Podocarpus elongatus</i>	0.524	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Pittosporum viridiflorum</i>	0.633	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Dodonea angustifolia</i>	1.04	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Maytenus undata</i>	0.732	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Dovyalis caffra</i>	0.676	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Ziziphus mucronata</i>	0.758	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Olea europaea africana</i>	0.8065	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Ehretia rigida</i>	0.67	Wood Density Database; http://db.worldagroforestry.org/wd/genus/
<i>Euphorbia lydenbergensis</i>	0.511	Wood Density Database; http://db.worldagroforestry.org/wd/genus/

	<p>The major species that will be planted is Bambusa balcooa. The wood density of other tree species is as provided.</p> <p>If species other than that listed is planted, the appropriate wood density will be applied from secondary sources. In case data is not available for the species, the general wood density of trees in tropical Africa will be applied, which is 0.59³²</p>
Choice of data or Measurement methods and procedures	Secondary source of information
Purpose of data	To determine project GHG removals
Additional comment	

Data/parameter	Biomass Expansion Factor (BEF)																															
Unit	Dimensionless																															
Description	Biomass conversion factor to convert stem volume to above ground biomass.																															
Source of data	Table 4.5. Default Biomass Conversion and expansion factors; Chapter 4: Forest Land. 2006 IPCC guidelines for National Greenhouse Gas Inventories, Page 52 - https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf																															
Value(s) applied	<table><tr><th colspan="8">BEF based on growing stock level (m³)</th></tr><tr><th><10</th><th>11-20</th><th>21-40</th><th>41-60</th><th>61-80</th><th>80-120</th><th>120-200</th><th>>200</th></tr><tr><td>9</td><td>4</td><td>2.8</td><td>2.05</td><td>1.7</td><td>1.5</td><td>1.3</td><td>0.95</td></tr></table>								BEF based on growing stock level (m³)								<10	11-20	21-40	41-60	61-80	80-120	120-200	>200	9	4	2.8	2.05	1.7	1.5	1.3	0.95
BEF based on growing stock level (m³)																																
<10	11-20	21-40	41-60	61-80	80-120	120-200	>200																									
9	4	2.8	2.05	1.7	1.5	1.3	0.95																									

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https://www.researchgate.net/publication/236853212_Wood_density_phytomass_variations_within_and_among_trees_and_allometric_equations_in_a_tropical_rainforest_of_Africa/link/5a6b31be0f7e9b1c12d1f553/download

Choice of data or Measurement methods and procedures	Default data values accepted under GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.0.
Purpose of data	To estimate project GHG Removals
Additional comment	Nil

Data/parameter	Root to shoot ratio
Unit	-
Description	Root-to-Shoot Ratio (Rts) is the ratio of belowground (root) biomass to aboveground biomass (shoot) biomass.
Source of data	Table. 4.4, Page 18-21. Volume 4: Agriculture, Forestry and other Land Use, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value(s) applied	0.332
Choice of data or Measurement methods and procedures	The value for tropical Dry region for Africa is applied.
Purpose of data	To estimate project GHG Removals
Additional comment	

Data/parameter	Carbon fraction for tree biomass
Unit	tC/tdm
Description	The carbon fraction for tree biomass refers to the total carbon content that it is contained in the tree biomass.
Source of data	Default value as per GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.0
Value(s) applied	0.5

Choice of data or Measurement methods and procedures	Default value as per GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.0
Purpose of data	To calculated project GHG Removals
Additional comment	

Data/parameter	Conversion of tC to tCO₂
Unit	tCO ₂ /tC
Description	The factor to convert carbon content of biomass to CO ₂ .
Source of data	Default value as per GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.0.
Value(s) applied	44/12
Choice of data or Measurement methods and procedures	Default value as per GS A/R GHG Emissions Reduction & Sequestration Methodology, version 2.0.
Purpose of data	To estimate project GHG Removals
Additional comment	

Data/parameter	Baseline biomass
Unit	tC/ha
Description	Baseline biomass in the baseline scenario
Source of data	Source: Table 5.36, Factors applied in the calculation of the land sources and sinks in South Africa. Page 317, National GHG Inventory Report, South Africa, 2017,

	Department of Forestry, Fisheries and the environment, Republic of South Africa, August 2021 ³³ .
Value(s) applied	8.38 t biomass/ha
Choice of data or Measurement methods and procedures	Based on the methodology the project area is stratified according to its vegetation types (grassland, bushland, etc.), AND for each of these strata scientifically based project-specific, regional or national default values shall be found which state 'tree' and 'non-tree' biomass of these vegetation types. The national value is applied which is applied in the South Africa GHG Inventory. The value is a geometric average of the standing biomass of the various vegetation types.
Purpose of data	To estimate biomass in the Baseline scenario
Additional comment	

Other SDGs

There are no Parameters fixed ex-ante for other SDGs.

B.6.3. Ex ante estimation of SDG Impact

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Baseline Stocks

The average baseline stock is 8.38 t biomass/ha for the planting area. The baseline carbon stocks is as follows: This is deducted in the year of planting.

	Area of planting (ha)	Cumulative Area Planted	Baseline Biomass Stock (t Biomass)	Estimated baseline emissions or removals (tCO ₂ e)
Year 1	68.20	68	572	1,048
Year 2	2,423.00	2,491	20,305	38,273
Year 3	12,000.00	14,491	1,00,560	2,22,633
Year 4				2,22,633
Year 5				2,22,633
Year 6				2,22,633

³³ <https://unfccc.int/sites/default/files/resource/South%20Africa%20%20NIR%202017.pdf>

Year 7				2,22,633
Year 8				2,22,633
Year 9				2,22,633
Year 10				2,22,633
Year 11				2,22,633
Year 12				2,22,633
Year 13				2,22,633
Year 14				2,22,633
Year 15				2,22,633
Year 16				2,22,633
Year 17				2,22,633
Year 18				2,22,633
Year 19				2,22,633
Year 20				2,22,633
Year 21				2,22,633
Year 22				2,22,633
Year 23				2,22,633
Year 24				2,22,633
Year 25				2,22,633
Year 26				2,22,633
Year 27				2,22,633
Year 28				2,22,633
Year 29				2,22,633
Year 30				2,22,633

Project Scenario

The ex-ante estimation of GHG removals is based on primary field studies for *Bambusa bulcoa*. The number of culms and culm weight on yearly basis is as follows, which is applied for the ex-ante calculations:

Standing Biomass of each culm (kg)

	No. of culms	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13
Yr 1	1	1.6	2	2.5	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Yr 2	3		3.2	3.5	4.8	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Yr 3	3			4.8	6.4	8	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Yr 4	4				6.4	8	9.6	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Yr 5	4					8	9.6	11.2	12.8	12.8	12.8	12.8	12.8	12.8
Yr 6	5						9.6	11.2	12.8	14.4	14.4	14.4	14.4	14.4
Yr 7	5							11.2	12.8	14.4	16	16	16	16
Yr 8	6								12.8	14.4	16	17.5	17.5	17.5

Yr 9	6									12.8	14.4	16	17.5	17.5
Yr 10	7										12.8	14.4	16	17.5

After year 10, it is in a steady state on increment, adding 7 culms every year at the growth rate of culms as shown for year 10

Accordingly, the standing biomass of bamboo per ha is as follows:

		AGB/ha (Bamboo) (t)
Year 1		0.64
Year 2		4.64
Year 3		10.96
Year 4		24.96
Year 5		42.88
Year 6		61.44
Year 7		80.64
Year 8		102.40
Year 9		122.88
Year 10		140.80
Year 11		156.56
Year 12		162.96
Year 13		169.96
Year 14		169.96
Year 15		169.96
Year 16		169.96
Year 17		169.96
Year 18		169.96
Year 19		169.96
Year 20		169.96
Year 21		169.96
Year 22		169.96
Year 23		169.96
Year 24		169.96
Year 25		169.96
Year 26		169.96
Year 27		169.96
Year 28		169.96
Year 29		169.96
Year 30		169.96

The new shoots that emerge every year reaches a steady state in 4 years. The culms are sustainably harvested. At the 5th year, the 4 year old culms are harvested. Hence in the 5th year, the culms of year 1 is harvested, in 6th year, the culms of year 2 is harvested and so on.

For ex-ante estimations of fruit trees, IPCC mean annual increment for multistrata agroforestry in Africa is applied, which is 1.63 - 26% tC/ha/yr for AGB and 0.46 tC/ha/yr for BGB³⁴. A 25% of the value is considered, as the area under fruit trees will be in between rows of bamboo plantations. Hence a biomass accumulation rate of AGB - 0.6 t biomass and 0.23 t Biomass for BGB is considered for period of 10 years.

Increment in SOC

Based on LUF_AR_Methodology Soil Carbon Tool, following are the conditions.

- Land Use: Grassland
- Management Input: Severely degraded
- Area Disturbed: 0% will be disturbed
- Litter treatment: Litter from planted trees remain on site.

For Tropical Dry Climatic Region and HAC Soils for the project area, the model returns a SOC increment of 2.9333 tCO₂/ha/yr.

Accordingly for Project removals which includes AGB, BGB and SOC the GHG removals are as follows.

Year t	Estimated baseline (tCO ₂ e)	Project Removals (tCO ₂ e)	Estimated Annual GHG removals (tCO ₂ e)
1	1,048	211	-837
2	37,225	9,479	-27,747
3	184,360	83,035	-101,325
4	-	221,583	221,583
5	-	335,877	335,877
6	-	592,712	592,712
7	-	781,008	781,008
8	-	958,239	958,239
9	-	984,092	984,092
10	-	1,142,171	1,142,171
11	-	1,061,685	1,061,685
12	-	1,162,953	1,162,953
13	-	918,098	918,098
14	-	863,090	863,090

³⁴ Source of data, Table 5.2. For Tropical Dry Africa under multistrata agroforestry systems, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch05_Cropland.pdf

15	-	659,797	659,797
16	-	628,702	628,702
17	-	474,702	474,702
18	-	474,702	474,702
19	-	474,702	474,702
20	-	474,702	474,702
21	-	474,702	474,702
22	-	474,502	474,502
23	-	467,395	467,395
24	-	432,195	432,195
25	-	432,195	432,195
26	-	432,195	432,195
27	-	432,195	432,195
28	-	432,195	432,195
29	-	432,195	432,195
30	-	432,195	432,195
	222,633	16,743,506	16,520,872

Year	Annual GHG Removals	Harvest	After Harvest Annual GHG Issuances	After Buffer @20%	Issuance
2022-2023	-837	-	-837	-670	
2023-2024	-27,747	-	-27,747	-22,197	
2024-2025	-1,01,325	-	-1,01,325	-81,060	
2025-2026	2,21,583	-	2,21,583	1,77,266	
2026-2027	3,35,877	22	3,35,855	2,68,684	3,42,023
2027-2028	5,92,712	906	5,91,806	4,73,445	
2028-2029	7,81,008	8,689	7,72,320	6,17,856	
2029-2030	9,58,239	30,324	9,27,915	7,42,332	
2030-2031	9,84,092	45,764	9,38,327	7,50,662	
2031-2032	11,42,171	66,657	10,75,514	8,60,411	34,44,706
2032-2033	10,61,685	79,431	9,82,254	7,85,803	
2033-2034	11,62,953	1,06,500	10,56,453	8,45,162	
2034-2035	9,18,098	1,22,158	7,95,940	6,36,752	
2035-2036	8,63,090	1,52,277	7,10,813	5,68,651	
2036-2037	6,59,797	1,56,517	5,03,280	4,02,624	32,38,992
2037-2038	6,28,702	1,77,517	4,51,185	3,60,948	
2038-2039	4,74,702	1,77,517	2,97,185	2,37,748	

2039-2040	4,74,702	1,77,517	2,97,185	2,37,748	
2040-2041	4,74,702	1,77,517	2,97,185	2,37,748	
2041-2042	4,74,702	1,77,517	2,97,185	2,37,748	13,11,940
2042-2043	4,74,702	1,77,517	2,97,185	2,37,748	
2043-2044	4,74,502	1,77,517	2,96,985	2,37,588	
2044-2045	4,67,395	1,77,517	2,89,878	2,31,902	
2045-2046	4,32,195	1,77,517	2,54,678	2,03,742	
2046-2047	4,32,195	1,77,517	2,54,678	2,03,742	11,14,722
2047-2048	4,32,195	1,77,517	2,54,678	2,03,742	
2048-2049	4,32,195	1,77,517	2,54,678	2,03,742	
2049-2050	4,32,195	1,77,517	2,54,678	2,03,742	
2050-2051	4,32,195	1,77,517	2,54,678	2,03,742	
2051-2052	4,32,195	1,77,517	2,54,678	2,03,742	10,18,710
Total	1,65,20,872	34,32,003	1,30,88,870	1,04,71,093	1,04,71,093

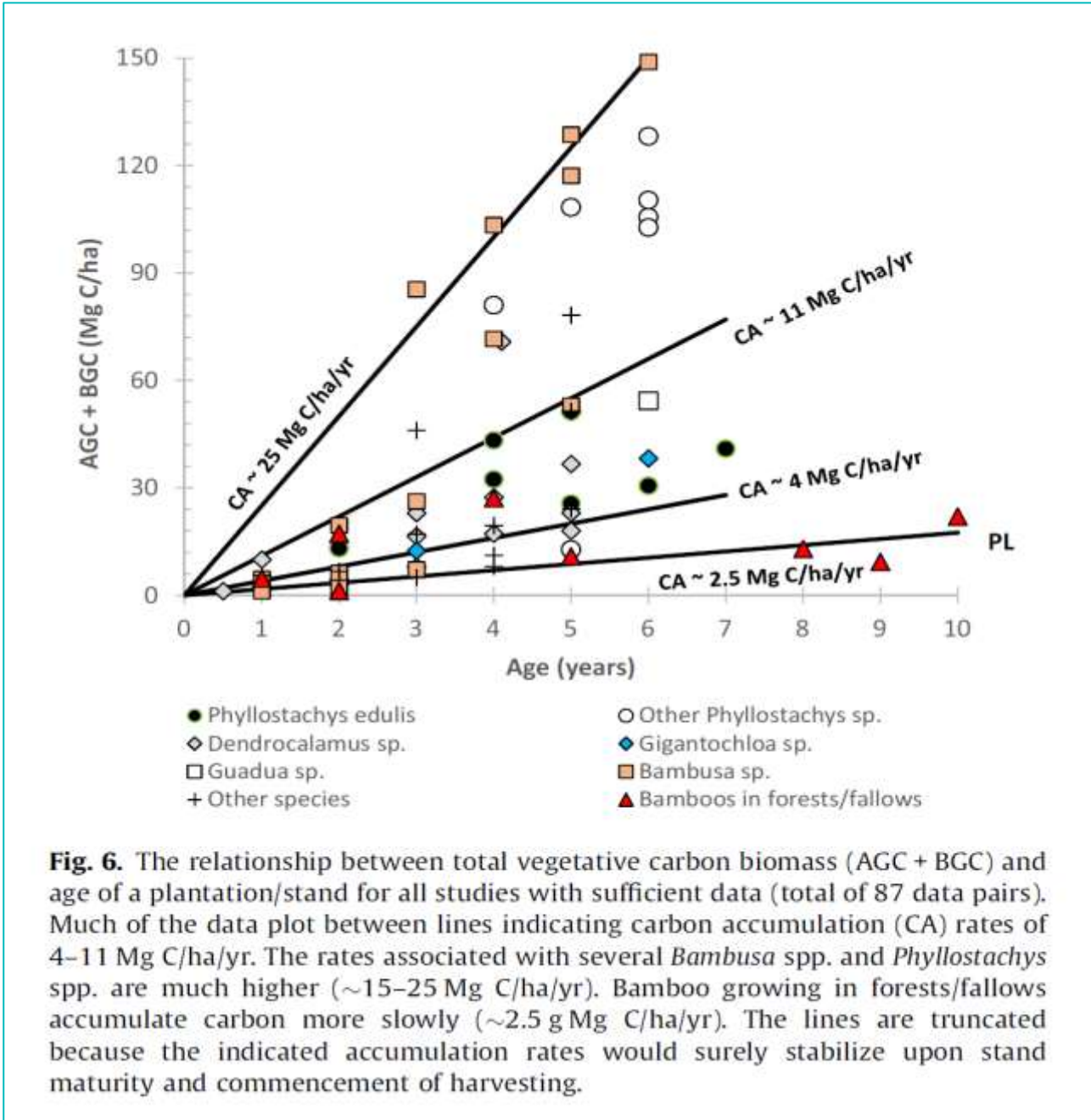
The total sequestration potential for VPA-01 in 30 years is 13.08 million tCO₂, which is an average annual sequestration potential of 436,296 or 30.11 tCO₂/ha/yr.

	GHG Removals		
	Before Buffer	After deducing Buffer @20%	
Total Sequestration (tCO ₂ - 30 Years)	13,088,870	10,471,093	tCO ₂
Average Annual Sequestration (tCO ₂)	436,296	349,036	tCO ₂ /yr
Per Ha Sequestration (with harvesting)	30.11	24.09	tCO ₂ /ha/yr

This is compared to available literature globally as there is no data available for South Africa. It can be seen that the increment for bambusa is 15-25 tC/ha/yr i.e. 55-90 tCO₂/ha/yr. This is further supported by studies conducted by Nath et al., 2015³⁵ which shows the biomass carbon sequestration range of 6-24 tC/ha/yr, while the project activity estimates the C sequestration range of 30 tCO₂/ha/yr i.e. 8.21 tC/ha/yr., which is within the range for Bambusa species. The ex-ante estimate is

³⁵ Nath, A.J., Lal, R., Das, A.K., 2015. Managing woody bamboos for carbon farming and carbon trading. Global Ecol. Conserv. 3, 654–663 (<https://www.sciencedirect.com/science/article/pii/S2351989415000281>)

very conservative considering the fact that the plantations will be irrigated and provided with high input.



Source: Yuen, J.Q., Fung, T. and Ziegler. 2017. Carbon Stocks in bamboo ecosystems worldwide: Estimates and uncertainties. *Forest Ecology and Management* 393 (2017) 113 - 138

B.6.4. Summary of ex ante estimates of each SDG outcome

Year	Baseline estimate	Project estimate	Net benefit
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2022-2023	1,048	-837	-837
2023-2024	37,225	-27,747	-27,747
2024-2025	184,360	-1,01,325	-1,01,325
2025-2026		2,21,583	2,21,583
2026-2027		3,35,877	3,35,855
2027-2028		5,92,712	5,91,806
2028-2029		7,81,008	7,72,320
2029-2030		9,58,239	9,27,915
2030-2031		9,84,092	9,38,327
2031-2032		11,42,171	10,75,514
2032-2033		10,61,685	9,82,254
2033-2034		11,62,953	10,56,453
2034-2035		9,18,098	7,95,940
2035-2036		8,63,090	7,10,813
2036-2037		6,59,797	5,03,280
2037-2038		6,28,702	4,51,185
2038-2039		4,74,702	2,97,185
2039-2040		4,74,702	2,97,185
2040-2041		4,74,702	2,97,185
2041-2042		4,74,702	2,97,185
2042-2043		4,74,702	2,97,185
2043-2044		4,74,502	2,96,985
2044-2045		4,67,395	2,89,878
2045-2046		4,32,195	2,54,678
2046-2047		4,32,195	2,54,678
2047-2048		4,32,195	2,54,678
2048-2049		4,32,195	2,54,678
2049-2050		4,32,195	2,54,678
2050-2051		4,32,195	2,54,678
2051-2052		4,32,195	2,54,678
Total	222,633	1,65,20,872	1,30,88,870

Total number of crediting years			30
Annual average over the crediting period	7,421	5,50,696	4,36,296

*after deduction of sustainably harvested biomass of **3,432,003** tCO₂.

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

SDG 13

Data / Parameter	Area planted under the project activity
Unit	Ha
Description	The project area that will be planted under the VPA
Source of data	Field measurements
Value(s) applied	14,491.2 ha
Measurement methods and procedures	GPS readings of the polygons
Monitoring frequency	Continuous as and when planting is done
QA/QC procedures	The total control of land is with TERRAGR N SA, the VPA Implementer
Purpose of data	To estimate GHG Removals
Additional comment	

Data / Parameter	Date of planting
Unit	-
Description	The date of planting for each of the seedlings will be recorded
Source of data	Field data
Value(s) applied	DD/mm/yyyy

Measurement methods and procedures	The date of planting will be recorded and maintained based on which GHG removals can be calculated.
Monitoring frequency	Continuous as and when planting is done
QA/QC procedures	The data can be triangulated with the bills and invoices for purchase of seedlings from the nursery.
Purpose of data	To estimate GHG Removals
Additional comment	

Data / Parameter	Survival Rate
Unit	%
Description	Number of seedlings that has survived
Source of data	For initial 3 years
Value(s) applied	90%
Measurement methods and procedures	The survival rate will be recorded at the time of monitoring to ensure that the GHG removals are calculated only for trees that have survived.
Monitoring frequency	At the time of monitoring
QA/QC procedures	Sample plots will be cross checked
Purpose of data	To determine GHG Removals
Additional comment	

Data / Parameter	Mean Annual Increment in above-ground biomass
Unit	t/tree/year
Description	Mean annual increment in above-ground biomass for species j ,
Source of data	Based on field data for Bambusa bulcooa. Cross checked with global literature

	Source: Yuen, J.Q., Fung, T. and Ziegler. 2017. Carbon Stocks in bamboo ecosystems worldwide: Estimates and uncertainties. Forest Ecology and Management 393 (2017) 113 - 138
Value(s) applied	The values applied are given in section B.6.3. for bamboo and fruit trees.
Measurement methods and procedures	<p>Allometric equation will be applied to determine standing biomass and the mean annual increment accordingly for Bamboo. The allometric equations corresponding to models to explain the total biomass of <i>B.balcooa</i> culms are</p> <ol style="list-style-type: none"> 1. $\ln Y = -3.358 + 1.954 \cdot \ln G$ 2. $\ln Y = -3.016 + 1.188 \ln G + 0.804 \cdot \ln H$ <p>where Y = Biomass in Kgs and G is Girth (cm) and H is height in metres.</p> <p>From Syam Viswanath, V.B. Sreekumar and S.Sruthi. 2021. <i>Bambusa balcooa</i> Roxb. : A multi-utility bamboo for domestication. KSCSTE - Kerala Forest Research Institute.</p> <p>Other equations will also be assessed from literature. The existing allometric equation for <i>bambusa bulcooa</i> will be used to determine the biomass of bamboo. The applicability of existing biomass regression equation will be determined. To verify the applicability of an existing selected biomass regression equation, >5 samples will be destructively sampled.</p> <p>If the equation is not applicable, new biomass regression equations will be developed. At least 30 samples covering the full range of sizes need to be harvested (if the 30 individuals do not result in a significant equation with high r-squared, then additional individuals will need to be harvested). Further details are provided in the SoP and Carbon Inventory</p>

	<p>developed. Allometric equations will be developed through destructive harvesting for bamboo during the first verification.</p> <p>Volume/AGB/Bole biomass of the tree will be calculated based on allometric equations developed with DBH and height measurements of trees.</p> <p>For fruit trees, species specific allometric equations will be used from secondary sources. If no equations are found, general equations will be applied for estimation of standing stock.</p> <p>Permanent plots will be established. The number of plots will be determined through sample size determining equations. Average girth and height of each of the species in permanent sample plots will be measured. Applying biomass equations and BEF, biomass will be calculated.</p> <p>Standing biomass for each of the plot will be calculated based on estimation of mean annual increment (MAI)/tree from permanent plots.</p>
Monitoring frequency	The Girth and Height will be measured every 5 years during the monitoring report submission.
QA/QC procedures	<p>Based on the allometric equations derived from studies conducted on project site.</p> <p>In absence of species specific allometric equations, general equations are used. During verification it will be verified if any species specific and location specific equations are available and will be used for estimation of above ground biomass.</p>
Purpose of data	To estimate GHG removals in the project area.
Additional comment	

Other SDGs

SDG 2

Data / Parameter	Food Produced
Unit	ton/ha/yr
Description	The fruit trees will produce fruits and intercropping with summer and autumn crops will produce grains.
Source of data	Monitoring data of harvest by the company
Value(s) applied	0.250 t/ha/yr
Measurement methods and procedures	Seasonally, the crops and fruits harvested will be recorded.
Monitoring frequency	Seasonal
QA/QC procedures	This can be collated with the communities that will receive the usufructs
Purpose of data	Contribution to SDG 2
Additional comment	Local entrepreneurs will be developed to market the usufructs and community can benefit from the sale of the produce.

SDG 5

Data / Parameter	i. Number of women employed ii. Gender wage equality
Unit	i. Fraction ii. %
Description	i. The number of women employees of the total employees of TERRAGRN SA ii. Gender wage equality of all the women employees of the company
Source of data	i. and ii. HR Records
Value(s) applied	i. 1/3 of the total number of employees will be women ii. Gender wage equality for 100% of women employees

Measurement methods and procedures	i. and ii. HR Records – Employment Contracts
Monitoring frequency	Continuous as and when employees are hired.
QA/QC procedures	
Purpose of data	Contribution to SDG 5.
Additional comment	

SDG 8

Data / Parameter	i. Number of jobs created ii. Number of local jobs created
Unit	i. and ii. Number
Description	i. Number of employees permanent and temporary that will be involved in the project activity for implementation and monitoring. ii. Number of local people in and around the project activity involved
Source of data	HR Records of employment for the project activity
Value(s) applied	i. 40 jobs created ii. 10 local jobs created
Measurement methods and procedures	Records of employment for the project activity who will be involved in implementation, monitoring and maintenance of the project activity
Monitoring frequency	Continuous
QA/QC procedures	There are no QA/QC procedures
Purpose of data	Contribution to SDG 8
Additional comment	N/A

SDG 15

Data / Parameter	<ul style="list-style-type: none"> i. Area Planted ii. Total number of species planted iii. Increase in biodiversity
Unit	<ul style="list-style-type: none"> i. Number ii. Ha iii. Number
Description	<ul style="list-style-type: none"> i. Area Planted ii. Total number of species planted including Bamboo, fruit trees, wind breaks and fire breaks, summer and autumn crops iii. Increase in biodiversity based on biodiversity Index calculated for the project scenario against the baseline scenario.
Source of data	Field data
Value(s) applied	<ul style="list-style-type: none"> i. 14,491.2 ha ii. 70 species iii. Based on the calculations of biodiversity index.
Measurement methods and procedures	<ul style="list-style-type: none"> i. Area calculations based on GPS readings of the plots established. ii. Record of the species planted and number of seedlings planted iii. Based on species planted and the number of seedlings planted the biodiversity index will be calculated, which will be assessed with the baseline scenario. Simpson's Index of Diversity will be calculated for the baseline and project scenario. As the planted area will retain the baseline trees, the Simpson's Index of Diversity for the baseline trees will be estimation in the project area. Simpson's Index of Diversity will be estimated for the project scenario too based on the species planted. Simpson's Index of Diversity is estimated as follows: Denoted as D, this index is calculated as:

	$D = \sum n_i(n_i-1) / N(N-1)$ <p>where:</p> <ul style="list-style-type: none"> • n_i: The number of trees that belong to species <i>i</i> • N: The total number of trees <p>The value for Simpson's Diversity Index ranges between 0 and 1. The higher the value, the lower the diversity. Since this interpretation is a bit counterintuitive, it is often calculated as Simpson's Index of Diversity, which is calculated as 1 – D. The higher the value for this index, the higher the diversity of species³⁶.</p>
Monitoring frequency	Continuous as and when planting is done.
QA/QC procedures	The geocoordinates of the plots will be recorded with the details of the species planted and the number of seedlings planted and submitted for verification along with monitoring report.
Purpose of data	Contribution to SDG 15
Additional comment	GHG Removals will also be based on this parameter

SDG 17

Data / Parameter	Investment for implementation of the project from multiple sources
Unit	USD
Description	The investments from various sources including carbon funding for the project activity
Source of data	Financial audit statement
Value(s) applied	Upto 140 million USD

³⁶ <https://www.statology.org/simpsons-diversity-index/>

Measurement methods and procedures	Will be based on annual financial audit statements of the company
Monitoring frequency	Annual
QA/QC procedures	There are no QA/QC procedures
Purpose of data	Contribution to SDG 17
Additional comment	N/A

B.7.2. Sampling plan

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SDG 13

The GHG Removals through reforestation of the project area, will be estimated by a sampling approach. A Forest inventory guideline is developed for description of the strata determination and sampling plan. The guideline including the project stratification and sampling plan is submitted to the VVB .

B.7.3. Other elements of monitoring plan

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The PoA level monitoring is included in the PoA. The VPA level monitoring plan including the operational management structure for monitoring, data archiving and responsibilities and institutional arrangements for data collection and archiving will be included and provided at the time of validation to the VVB.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1. Start date of VPA

>> 29/11/2022 – first date of planting

C.1.2. Expected operational lifetime of VPA

>> 100 Years

C.2. Crediting period of project

C.2.1. Start date of crediting period

>> PoA: 29/11/2022

VPA 01: 29/11/2022

Consultations with the communities, government officials and other local partners including the research organizations such as IUCN, CSIR, University of Pretoria was conducted and the project was designed as a Gold Standard Project. A MoU was signed by [Gold Standard & R20 sign with TERRAGRN](#) which was announced on 3/10/2022³⁷. According to the press release, Gold Standard and R20 will work with TERRAGRN and partners to explore innovative ways of managing, measuring, and valuing its impact on the climate and the UN's Sustainable Development Goals (SDGs). Valuing a diversity of impacts such as mitigation, adaptation, water, soil health, gender and welfare will allow projects like TERRAGRN's to use the impacts as a form of collateral that increases the amount of investment in their project.

In practice this means that future carbon mitigation assets like carbon credits or other positive impacts expected to be delivered by the project could be used to secure a low-interest loan. Lenders have the confidence that if the loan is defaulted on, they are entitled to the carbon credits or value of other verified impacts, just as mortgage providers may provide lower interest rates on mortgages by using the house as an asset for collateral. R20 will support outreach and fundraising, to help with scaleup, usability and replicability of the activities.

The design consultation was initiated in December 2022. The stakeholder meeting was conducted in February as most of the people was away for Christmas and New Year. For better participation to the project activity the stakeholder's meeting was conducted in February 2023.

A pilot was initiated on 29/11/2022 for 26 ha of land, which is part of the eligible area and will be included.

C.2.2. Total length of crediting period

³⁷ [New ways of valuing climate and sustainable development impact to unlock funding for innovative regenerative agroforestry project in South Africa | The Gold Standard](#)

>>

PoA: 50 years

VPA-01: 30 Years, 0 Months

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1. Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in [Appendix 1](#), ongoing monitoring is summarised below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 1. Human Rights	Business License of TERRAGRN SA
Principle 3: Community Health, Safety and Working Conditions	Protective clothing and first aid kit at site office
Principle 9.2. Vulnerability to Natural Disaster	Planting of wind breakers and fire breakers as plants around the project area.

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	<p>TERRAGRN applies the foundational gender-sensitive standard among other things as follows:</p> <p>a. Establishes basic gender equality safeguards and principles: South Africa has Basic Conditions of Employment Act, 1997, which includes gender safeguards and principles for men and women. TERRAGRN SA being the project implementer in South Africa, is governed by the Act and will follow it which clearly establishes basic gender equality safeguards and principles.</p> <p>b. Addresses gender inequalities and gender-related risks identified in project gender analyses: South Africa has higher unemployment rates for the general population as compared to rest</p>
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	<p>of the world³⁸. Nearly 47% of south African women are recorded as economically inactive. Rural areas in particular present difficult socio-economic conditions, including high unemployment, poverty and inadequate access to economic opportunities³⁹. TERRAGRN SA intends to address this gender inequalities and have women employees from local community.</p> <p><i>c. Outlines mandatory 'standard gender equality design elements' to encourage women and men to participate equitably and meaningfully in project design and implementation; to mitigate risks of a project intervention to ensure that it does not increase gender inequity; as well as to increase the project benefits for women and men:</i> As included in the SDG indicators, 1/3 of the employees will atleast be women and will have gender wage equality, which will be monitored and reported during verification.</p> <p><i>d. Ensures gender-sensitive approaches in stakeholder consultation: information sharing equitably with women and men stakeholders is a minimum standard, in which information is both available and presented in an accessible format across all stakeholder groups, including those more marginalized (e.g. women, youth, indigenous peoples, etc.). The approach also includes opportunities for stakeholders to share information in a two -way exchange, give regular feedback during implementation and ensure their views and priorities are incorporated in design and practice:</i> TERRAGRN</p>
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³⁸ <https://www.statssa.gov.za/?p=15668>

³⁹ [LOCAL ECONOMIC DEVELOPMENT AND RURAL WOMEN IN A DEVELOPMENT PARADIGM: A PERSPECTIVE OF VULINDLELA IN KWAZULU-NATAL, SOUTH AFRICA \(jsju.org\)](#)

	<p>held meetings with local women before the implementation of the project to get their perspective on the project activity. TERRAGRN has hired local women for the project activity.</p> <p><i>e. Provides quantifiable 'easy-to-measure' indicators potentially aligned to the SDG goals that measure gender-related gaps and risks:</i> Towards SDG 5, the measurable indicator is number of women employed for the project activity.</p> <p><i>f. Establishes a checklist of gender-sensitive processes, procedures and implementation risks against which auditors can check for the level of gender-sensitivity compliance:</i> TERRAGRN will develop a SoP for gender-sensitive processes, procedures and implementation risks against which auditors can check for the level of gender-sensitivity compliance.</p> <p><i>g. provides guidance on gender analysis, or similar methods to assess the potential roles, benefits and risks for women and men of different ages, ethnicities, and social structure and status. These studies may be used to inform project formulation, implementation, and monitoring and evaluation:</i> TERRAGRN will develop a SoP for gender analysis to assess the potential roles, benefits and risks for women and men for perusal.</p>
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	<p>As mentioned above, South Africa has Basic Conditions of Employment Act, 1997, which includes country policies and strategies for gender safeguards and principles for men and women. TERRAGRN SA being the project implementer in South Africa, is governed by the Act and will follow it which clearly establishes basic gender equality safeguards and principles</p>

	<p>Also South Africa's National Policy Framework for Women's Empowerment and Gender Equality. The Policy Framework aims to work towards the achievement of equality of opportunity in terms of access to and share of employment opportunities, services and resources as well as equality of treatment by employers and service providers. Equality of treatment, of course, does not mean treating all men and all women in exactly the same way (i.e. in a gender-blind fashion). This would only serve to perpetuate existing disparities. Equality of treatment entails meeting the specific and distinct needs of different categories of women and men. This can often require special programmes and the commitment of additional resources, for example, as in the case of women and men with disabilities⁴⁰.</p> <p>TERRAGRN intends to employ local communities for the activities and promote women employment in line with the country policies.</p>
<p>Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?</p>	<p>TERRAGRN has included a woman employee from the local community as a Community & Stakeholder liason with the responsibility for facilitation and coordinating community Engagement strategy for Terragrnr, Work closely with SA team to assist overall coordination and ensure adherence to mission and vision, engage community stakeholders to build support for terragrnr operations, develop, maintain and expand goodwill in the community, build robust and healthy stakeholder relationships, arrange and attend stakeholder</p>

⁴⁰ https://www.dffe.gov.za/sites/default/files/docs/national_policy_framework.pdf

	meetings, attend Community Facing Meetings.
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	The above mentioned employee assisted in gender issues not only at the stakeholder consultation meetings, but also held several women only meetings and community meetings with the local people and the king and his family members to address all their issues.

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The below is a summary of the 2 step GS4GG Consultation for monitoring purposes. Please refer to the separate Stakeholder Consultation Report for a complete report on the initial consultation and stakeholder feedback round.

E.1. Summary of stakeholder mitigation measures

>>

Stakeholder's feedback was sought three times. Firstly through design consultation process, through the physical stakeholder's meeting for VPAs and the stakeholder's feedback round for a month. In addition several stakeholder consultations were held with local people, government officials, academia including research organizations.

There was one feedback received during design consultation at the PoA level. The feedback during design consultation was from the local municipality representative. As per the feedback, the PoA is well designed with clear objectives and in line with the national and regional SDGs for restoration of degraded lands through reforestation. He stressed upon good communication and interaction with the municipality including ward councillors, environmental division, traditional leadership and local people. He also agreed to the suggestion of stakeholder's meeting at least biennially for a group of VPAs.

Based on both the consultation process, there was only positive feedback. The feedback was with regard to having continued partnership with various organizations and stakeholders throughout the project activity, provide jobs for local communities and especially women and build capacities amount local people and youth. These feedback will be implemented by TERRAGRN.

There are no stakeholder mitigation measures that need to be monitored. In case of any feedbacks received for the group of VPAs in the coming two years, it will be updated.

E.2. Final continuous input / grievance mechanism

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	A process book will be kept at the site office as it is accessible to local people on-site to log their grievance
GS Contact (mandatory)	help@goldstandard.org
Other	Raise grievance with TERRAGRN through email help@terragn.com especially for people who cannot travel to the site.

SECTION F. Eligibility and inclusion criteria for VPAs inclusion

>>

The below table shall be completed for all VPAs.

The CME shall provide clear description on how eligibility criteria set at real case VPAs are complied with for each real case and regular VPAs submitted for inclusion.

The CME shall not change the eligibility criteria and required condition set at real case VPAs. At the time of inclusion of regular VPAs, the CME shall only describe how the regular VPAs comply with the eligibility criterion.

No.	Eligibility Criterion	Description/ Required condition	Description of the VPA in relation to the criteria, means of Verification/Supporting evidence for inclusion
1.	Geographical boundaries	Geographical boundaries of VPAs consistent with the geographical boundary of the PoA.	The details of Country and province provided in the VPA shall be within South Africa and Mpumalanga.
2.	Double Counting	Conditions to avoid double counting of Impacts.	The CME/VPA Implementer shall provide the geo-coordinates of the project area that are part of the VPA.
3.	Exclusiveness of VPA	The VPA shall not previously be registered as a project activity or included as a VPA in any other registered PoA or deregistered as a VPA of a PoA.	The CME/VPA Implementer shall provide an undertaking that the VPA shall not previously be registered as a project activity or included as a VPA in any other registered PoA or deregistered as a VPA of a PoA.
4.	Specification of technology/measure	N/A, since information is already provided in criterion 12.	Information provided in criterion 12
5.	Start Date	The project start date shall be the earliest date when the first trees are planted. The start date of any of the VPA and shall be on or after the start date of the PoA.	The project start date is confirmed through evidence of first planting of the VPA and shall be on or after 29/11/2022, the start date of the PoA.
6.	Applicability of the methodology	The only methodology used for VPAs under the PoA is "LUF_AR-Methodology-GHGs-emission-reduction-and- Sequestration-Methodology". The tool "LUF AR Methodology Soil Carbon Tool" is used in order to calculate the Soil Organic Carbon.	Compliance with the methodology applicability criteria will be demonstrated in section B.2. of the VPA-DD.
7.	Conditions to ensure that VPAs meet the requirements for demonstration of additionality	For demonstration of additionality, one of the two options will be applied:	Section B.5. of the VPA shall describe the chosen option and steps toward the determination of additionality based on Option 1

	Option 1: Latest version of A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities Option 2: Latest version of Positive list (as per 3.1.16, (b) of the Land Use & Forests Activity Requirements).	as set in the real case VPA or option 2 Latest version of Positive list (as per 3.1.16, (b) of the Land Use & Forests Activity Requirements).
8. Conditions to ensure no diversion of ODA	Affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance	ODA Declaration form shall be submitted for the VPA inclusion
9. Target group	N/A	N/A
10. Conditions related to sampling requirements for the PoA	Any VPA will follow the sampling requirements for forest inventories described in the LUF_AR-Methodology-GHGs Emission Reduction & Sequestration Methodology.	Sampling in accordance with the sampling plan in the corresponding real case Forestry will be described.
11. Scale of the VPA Conditions to ensure that VPAs that will be included meet the small-scale on microscale thresholds and remain within those thresholds throughout the crediting the AR LUF Activity Requirements. period	Any VPA following the smallholder or microscale scheme will follow the requirements for LUF Smallholder & Microscale Projects as outlined in Annex B of the AR LUF Activity Requirements.	VPA of small or microscale threshold will be within the thresholds and will meet the requirements of small-scale/microscale.
12. Conditions to confirm that technologies in VPAs are eligible	Can include planting trees Can include single-species plantations Can apply all silvicultural systems; timber); forests with selective e.g. conservation forests (no use of harvesting; rotation forestry timber); forests with selective harvesting; rotation forestry All projects can include agriculture (agroforestry) or pasture (silvopasture) activities	The VPA shall include the details of planting, which could be conservation forests (no use of harvesting; rotation forestry timber); forests with selective harvesting; rotation forestry (agroforestry) or pasture (silvopasture) activities
13. Conditions to be met by each VPA regarding project boundary	According to paragraph 5.8.10.,b. CME/VPA Implementer shall demonstrate that all areas of land planned for the proposed VPA comply with all relevant requirements, except for those related to the control and for all areas of land for which the control for the VPA has not yet been established when the VPA-DD is submitted to a VVB for validation, the CME shall provide evidence of control at the latest by the time of submitting the monitoring report that covers the first monitoring period for the VPA to a VVB for verification.	The VPA shall provide lease agreements for the planting area at the latest by the time of monitoring report.

14. Conditions to be met by each VPA regarding SDG outcomes assessment	SDG outcomes, and the methods of monitoring these outcomes, are defined in the VPA-DD Section B.6. The option a) of paragraph 5.6.2 of the PoA requirements and procedures is chosen.	SDG impact assessment will be conducted at regular VPA level and included in section B.6. in the VPA-DD.
15. Conditions to be met by each VPA regarding safeguarding principles	Summary of Safeguarding Principles, and the methods of monitoring these principles, are defined in the VPA-DD Section D.1. The option a) of paragraph 5.5.2 of the PoA requirements and procedures is chosen.	The safeguarding principles and the methods of monitoring these principles wherever required will be included in regular VPA in Appendix I.
16. Conditions to be met for retroactive VPAs	<p>Retroactive VPAs shall submit the required documents to Gold Standard within five years of its start date (time of first submission).</p> <p>Retroactive VPAs shall demonstrate that the revenues from Gold Standard Certified SDG Impact Statements or Products, such as GSVERs, were seriously considered in the decision to implement the project, AND</p> <p>there was continuous interest in Certified Impact Statements or Products for the project in parallel with its implementation.</p> <p>The maximum period for retroactive issuance is three years – which starts either with the Project Start Date or three years prior to the date of Project Design Certification, whichever occurs later.</p> <p>New areas added to retroactive projects must follow the requirements for retroactive issuance as per the Principles and Requirements, GHG Emissions Reductions & Sequestration Product Requirements, and the Requirements stated in this document.</p>	Document to show GS VER revenue was considered for the retroactive project activity.
17. Conditions to ensure that VPA meets general eligibility criteria	Conditions to ensure that VPA meets general eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements and general eligibility criteria as per section 2.1.1 of GS4GG Land Use & Forests Requirements	The regular VPA shall include the details of VPA meeting the general criteria in the VPA-DD.

18. Conditions to ensure that VPA follows the guidelines to conduct a spatial forest/non-forest assessment	Every VPA to be included under the PoA shall not meet the definition of forest 10 years before project start date and at project start date. In the case that the eligible area has been deforested during the last 10 years prior to the project start date, the VPA implementer shall provide evidence that the deforestation activity has not taken place with an intention to implement project activities that generate GS VERs. The Guidelines as per Annex C of the Land Use & Forests Activity Requirements should be followed.	Submission of the shapefiles and report of the spatial forest/non-forest assessment for the project area.
19. Conditions on crediting period	Every VPA shall make sure that the crediting period of the VPA shall not exceed the end of the duration of the PoA, which is for forestry PoAs 50 years.	The crediting period shall not exceed 28/11/2072.
20. Conditions related to stakeholder consultation	A local stakeholder consultation (LSC) following the Stakeholder Consultation and Engagement Requirements has to be carried out for each VPA or a group of VPAs in case that the applicability requirements included in paragraph 5.7.3. of the PoA Requirements are complied with.	The LSC is applicable for a group of VPAs submitted within 2 years of the conduct of the stakeholder's meeting in Mpumalanga, South Africa.
21. Conditions to specify the approach to address non-permanence	Every VPA shall outline in the Land Use & Forests Risks & Capacities Guideline the non-permanence approach.	The applicable buffer will be applied.
22. Approach chosen for VVB site-visits in view of inclusion of future regular VPAs	A validation on-site visit will be conducted by the VVB for each VPA, unless GS requirements allow an exception of a VVB site visit or a deviation request has been approved by GS.	VPA inclusion for within Mpumalanga province, South Africa which is the administrative region of the real case VPA will not include VVB on-site visit. Other sites outside of that will include VVB site visit
23. Conditions to ensure a SOP for managing the input and grievance mechanism	Every VPA shall adhere to the SOP for managing the input and grievance mechanism outline in the PoA Management System Manual, or describe in detail any necessary deviation of the SOP to better adjust to the specific VPA conditions.	SoP for the real case VPA and regular VPA will be submitted.
24. Conditions to ensure the systematic description of the specific design of the real case VPA	Every VPA shall describe, as per section 5.2.2 of the Programme of Activity Requirements: a) the present environmental conditions of the area planned for the Forestry VPA, including the	The details will be included in section A.1 of the VPA-DD.

	climate, hydrology, soils and ecosystems b) Describe the presence, if any, of rare and endangered species and their habitats c) Describe the species and varieties selected for the Forestry VPA d) Describe the measures and know-how that will be transferred to the host Party, if applicable e) Describe or list the legal title(s) to the land, current land tenure and rights enabling determination of the owner of the GS VERs to be issued for the Forestry and AGR VPAs.	
25. Conditions to be met for CER Labelling	Not applicable, as it is a VER project	Not Applicable
26. Conditions to be met in multi-country PoAs	No applicable, as it is in a single country, South Africa	Not applicable

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into [SECTION D](#) above. Please refer to the instructions in the [Guide to Completing](#) this Form below.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights	Yes	<p>TERRAGRN SA is governed by the Basic Conditions of Employment Act, 1997 of South Africa⁴¹, which states the rights of employees and protection of rights.</p> <p>TERRAGRN's policy is to provide job opportunities to local people without discriminating with regards to participation and inclusion.</p>	Business licence of TERRAGRN SA for implementation of the project.

⁴¹ https://www.gov.za/sites/default/files/gcis_document/201409/a75-97.pdf

2. The Project shall not discriminate with regards to participation and inclusion			
Principle 2. Gender Equality			
<p>1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women</p> <p>2. Projects shall apply the principles of non-discrimination, equal treatment, and equal pay for equal work</p> <p>3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks</p> <p>4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)</p>		<p>1. TERRAGRN is governed by The Basic Conditions of Employment Act, 1997 of South Africa⁴¹ that provides for conditions that ensure the participation of women and benefits based on pregnancy, maternity leave and marital status.</p> <p>2. TERRAGRN's policy is to promote local workforce and empowerment of local women entrepreneurs. TERRAGRN applies the principle of non-discrimination, equal treatment and equal pay for equal work.</p> <p>3. TERRAGRN strives to bring more women into the workforce, enabling economic independence and progression to a more inclusive economy. That means supporting jobs and skills through training programmes and creating opportunities for all. The company believes that it is important for local rural communities to be sustainable, reducing socio-</p>	Monitored as it contributes to SDG Impacts

		economic disparities and lowering the regional pressures of urbanisation ⁴² .	
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	Yes	The exposure of the community is to planting activities on the lands. The employers are provided safety clothes as per work industry guidelines. The site office also has first aid kit for any treatment on field.	Protective clothing and first aid kit at site office.
Principle 4.1 Sites of Cultural and Historical Heritage			
Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture?		The eligible planting area does not have any sites, structures or objects with historical, cultural, artistic, traditional or religious values of intangible forms of culture.	N/A
>>		But the project area includes cemeteries of local people. The project shall not alter, damage or remove these sites and objects.	
Principle 4.2 Forced Eviction and Displacement			

⁴² <https://www.terragrnr.com/about>

Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?		The PPs hold uncontested legal land lease titles for the areas. The project area has settlements which will continue to exist. There is no physical or economic relocation of people temporarily or permanently in full or partially. Only the eligible planting areas are afforested.	N/A
>>		The spatial/non-spatial forest assessment has settlement areas, which are shown as non-eligible area for project implementation and the communities will continue to live there. No population displacement is foreseen nor desirable because people from the nearby communities are employed for establishment and maintenance activities.	
Principle 4.3 Land Tenure and Other Rights			
a.Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? b. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?		The land is taken on long-term lease belonging to the Manala Mgibe Community Property Association (CPA), representing the Manala Mgibe community and Traditional Council (MMTC), and part of the Ndebele tribe. The lease is for a period of 50 years which is beyond the crediting period of 30 years. The lease is in line with the relevant law and regulations of South Africa and carried out in strict adherence with laws. There are no legal	N/A

>>		<p>disputes for the land and the lease has been agreed upon with free, prior and informed consent of the CPA. TERRAGRN SA has uncontested lease on the project boundary to complete the project design certification.</p> <p>There are no uncertainties with regard to land tenure, access rights, usage rights or land ownership as the lease documents are very clearly documented</p>	
Principle 4.4 - Indigenous people			
Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?		<p>The lands on which planting is done is leased lands from the CPA. There are native people leaving within the project area, but outside the eligible planting area. They are provided with jobs due to the commercial development on eligible planting areas. The planting activities does not impede on their access to basic services including health services, clean water, energy, education, safe and decent working conditions and housing.</p> <p>TERRAGRN has an expert stakeholder from the native community who interacts with them to ensure that there are inclusive and their opinions are taken into consideration.</p>	Monitored as it contributes to SDG Impacts
>>			
Principle 5. Corruption			

1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	Yes	The project is in line with the South African laws and regulations. The Project doesn't involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects. The Project is implemented on TERRAGRN leased land holding uncontested legal land titles for the areas. One of the non-negotiables that TERRAGRN will have zero tolerance is corruption as defined in the internal company policy "Internal Purpose and Culture". South Africa has signed the OECD anti-bribery convention which is followed by TERRAGRN ⁴³ .	N/A
Principle 6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied	Yes	1.TERRAGRN SA's employment is in compliance with Basic Conditions of Employment Act, 1997 of South Africa ⁴¹ which includes the national labour occupational health and safety laws and South Africa has ratified the ILO's C155 - Occupational Safety and Health Convention, 1981 (No. 155) ⁴⁴	N/A

⁴³ <https://www.oecd.org/daf/anti-bribery/southafrica-oecdanti-briberyconvention.htm>

⁴⁴ https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:11110510347507:::P11200_INSTRUMENT_SORT:1

<p>in the ILO fundamental conventions</p> <p>2. Workers shall be able to establish and join labour organisations</p> <p>3. Working agreements with all individual workers shall be documented and implemented and include:</p> <p>a) Working hours (must not exceed 48 hours per week on a regular basis), AND</p> <p>b) Duties and tasks, AND</p> <p>c) Remuneration (must include provision for payment of overtime), AND</p> <p>d) Modalities on health insurance, AND</p>		<p>2. South Africa has ratified the ILO's C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) and C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)⁴⁵. The staff are hired following labour laws according tof Basic Conditions of Employment Act, 1997 of South Africa.</p> <p>3. Agreements with individual workers are documents and implemented, which includes the working hours which much not exceed 45 hours per week on a regular basis; includes duties and tasks; remuneration which also includes provision for payment of overtime; Modalities of termination and Provision for annual leave of 15 days.</p> <p>4.South Africa has ratified the ILO's C138 - Minimum Age Convention, 1973 (No. 138)⁴⁵. The Basic Conditions of Employment Act, 1997 of South Africa prohibits employment of</p>	
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⁴⁵ https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:11110510347507:::P11200_INSTRUMENT_SORT:1

<p>e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND</p> <p>f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave.</p> <p>4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion)</p> <p>5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures</p>		<p>children below 15 years. TERRAGRN does not subscribe to children labour.</p> <p>5.All the workers use appropriate equipment and have undergone training. The site has register to document and report accidents and incidents. The site office is also prepared for emergencies and response measures. They have first aid kit and a nurse on site, with telephone numbers of doctors who can attend to any emergencies.</p>	
Principle 6.2 Negative Economic Consequences			

1. Does the project cause negative economic consequences during and after project implementation?		TERRAGRN promotes equitable, sustainable economic growth and stability. By investing time and capital into nature TERRAGRN is reviving biodiversity, sequestering carbon, improving productive yield, generating jobs, bringing more women into the workforce, and creating socio-economic progress. TERRAGRN's mission is to create positive social, environmental, and economic change through nature-based solutions, developed in collaboration with local communities. TERRAGRN is uniting government agencies, local communities, global foundations, multilateral banks, development finance institutions, research universities, regional NGOs, and corporations ⁴⁶ . Hence the project does not cause negative consequences during and after project implementation.	N/A
>>			
Principle 7.1 Emissions			
Will the Project increase greenhouse gas emissions over the Baseline Scenario?		The project will sequester GHG and does not increase GHG emissions over baseline scenario.	N/A

⁴⁶ <https://www.terragn.com/about>

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Principle 7.2 Energy Supply			
Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?		The project does not affect the availability and reliability of energy supply to other users. The site office is powered with solar energy to provide for electricity at the site office.	N/A
>>			
Principle 8.1 Impact on Natural Water Patterns/Flows			
Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?		The eligible planting area are away from water bodies. The project will be following all the requirements of GS4GG and the requirements of South African Laws for Plantations, which includes protecting watercourses, ground-water and watersheds and permissions will be taken from authorities whenever and wherever required.	N/A
>>		A study with the University of KwaZulu Natal into the water usage of bamboo involved equipment onsite analyzing the water uptake of our bamboo on a daily basis throughout a 2+ year period. The results of this study have allowed for bamboo to maintain its status as a	

		<p>non-stream flow reduction activity, meaning that the plant does not suck up large amounts of water, and does indeed have a positive impact on restoring and protecting water tables⁴⁷.</p> <p>Bamboo plantations are good at retaining rain water. Bamboo has fibrous root system that grows up to a depth of 2 to 2 ½ ft from the ground surface. In a matured bamboo plantation of 4-5 years old, the root covers almost entire soil section to an extent of 30-40 % of the soil, the roots create anywhere between 200 to 400 mm of water. The excess water either goes as run off or charges the ground below where by increases the natural water table over a period of time⁴⁸.</p>	
Principle 8.2 Erosion and/or Water Body Instability			
a. Could the Project directly or indirectly cause additional erosion and/or water body		Because bamboo is a grass, it has a very shallow root system — with rhizomes only populating the top 6 inches of the soil. The rest	N/A

⁴⁷ <https://www.ecoplanetbamboo.com/south-africa-bamboo-plantations>

⁴⁸ <http://www.growmorebiotech.com/environmental-impact.html#:~:text=In%20a%20matured%20bamboo%20plantation,over%20a%20period%20of%20time.>

<p>instability or disrupt the natural pattern of erosion?</p> <p>b. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?</p>		<p>of the roots only spread around 14 inches deeper. But because the roots are so densely clumped, they do a great job at holding the top layer of the soil together, thus preventing soil erosion⁴⁹.</p>	
<p>>></p>		<p>Bamboo forests protect rivers and their ecosystems by regulating the quantity and quality of water. They form a sort of wall that serves as sediment control and to prevent the loss of flow in rivers. Bamboo acts as a reservoir by collecting and storing large amounts of water in its rhizomes and stems during rainy season, and returning water to the soil, rivers and streams during droughts. Bamboo's extraordinary ability to hold and control large amounts of water makes it a plant that can help reduce soil desertification. The extensive root system and forest cover of bamboo prevents streams from evaporating and can raise groundwater levels within a few years. Research has shown how severely degraded soil has been restored after planting</p>	

⁴⁹ <https://onetreepanted.org/blogs/stories/bamboo#:~:text=Because%20bamboo%20is%20a%20grass,spread%20around%2014%20inches%20deeper.>

		<p>bamboo. Within 20 years, the groundwater level has risen by 10 meters, which made it possible to add agricultural crops and tree species into the bamboo landscape⁵⁰.</p> <p>The project area is not situated within a strategic water resource area as identified by WWF South Africa. Further, the Pre-feasibility study also identified freshwater ecosystems subsequent to their delineation and classification. Two freshwater ecosystems comprising two hydrogeomorphic (HGM) units were identified within the area and 500 m thereof, specifically an unchannelled valley bottom system along the north-eastern boundary and a channelled valley bottom system in the far north-west Figure 4, STS, 2022). These freshwater ecosystems were classified according to Levels 1-4 of the Classification System (Ollis et al, 2013) as outlined in Appendix C of the report. Both identified freshwater ecosystems were classified as Inland Systems falling within STS</p>	
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⁵⁰ <https://www.guaduabamboo.com/blog/bamboo-produces-water-for-rivers-and-streams>

		<p>22-2061 September 2022 12 the Mesic Highveld Grassland Group 4 wetland vegetation (WetVeg) group, indicated as 'Least Concern' by Mbona et al., 2015.</p> <p>These studies will also be undertaken whenever planting is done in a phased manner.</p> <p>Furthermore, TERRAGRN's approach to the problem deals directly with the core of these issues through ensuring agricultural best-practices, soil regenerating protocols and selecting water-wise crops which also promote soil stability as already included in the section A.3. One of the main crops considered is <i>Bambusa balcooa</i>, a giant clumping (non-invasive) bamboo variety known for its ability to reduce erosion and promote infiltration of rainwater. The lower water demand and ability to improve groundwater recharge will have a net positive effect on the area's water balance, ensuring the sustainability of the planned forests on a large scale. Through reforestation with water-wise and some deep-rooted indigenous species, a positive water cycle is promoted where trees redistribute moisture from deeper groundwater sources to the surface layers. This, along with permaculture</p>	
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		practices of using organic materials to fertilise soils, create a lower need for soil inputs year-on-year compared to conventional chemical supplements which require ever increasing volumes.	
Principle 9.1 Landscape Modification and Soil			
Does the Project involve the use of land and soil for production of crops or other products?		The project includes incorporation of N-fixing plants, no use of ecologically harmful substances, organic manure, crop cover and necromass that enhances soil conditions. Bamboo due to its fast growth and extensive root system improves soil physical, chemical and biological properties; controls soil erosion; filters sediment and is considered suitable for rehabilitation of degraded lands within a short period of time ⁵¹ .	N/A
>>		Bamboo plantations will be harvested sustainably and fruits will allow for production of food and thus will follow sustainable resource management practices.	
Principle 9.2 Vulnerability to Natural Disaster			

⁵¹ Kaushal et al, 2020. [Rooting behaviour and soil properties in different bamboo species of Western Himalayan Foothills, India | Scientific Reports \(nature.com\)](#)

Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?		<p>Kindly see the risk assessment report, which provides a detailed description.</p> <p>Fire is a reality and a natural part of most ecosystems and in particular grassland ecosystems. The density of woody trees in the planted areas are relatively low at 40 trees per planted hectare. Bamboo itself is not a fire hazard. Live bamboo canes are made up of cellulose, hemicellulose, lignin, unusually high amounts of silica, and water⁵². Live bamboo, which lacks volatile oils and has a high silica and water content, is much harder to ignite⁵³. In addition, there are several mitigation measures that will be in place.</p> <p>Additionally, the plantations are designed with sufficient spacing to allow access to vehicles for harvesting and the system of paths through the plantation provide natural firebreaks. Finally, and most importantly the design provides for a 25-meter fire and wind break corridor around</p>	Planting of wind breakers and fire breakers around the project area.
>>			

⁵² <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.553.9762&rep=rep1&type=pdf>

⁵³ <https://bamboosourcery.com/project/flammability/>

		<p>the periphery of each agroforest unit and between our agroforest and neighbouring lands. Firebreaks consist of a 10-meter peripheral road, a 1-meter wind break planted with indigenous fire resistant species such as Spekboom and Aloe Arborescens and finally a 14 meter cover crop zone that will be harvested and kept plant free during the fire season.</p> <p>TERRAGRN are affiliated with the Lowveld & Escarpment Fire Protection Association (LEFPA), and several members of the workforce are trained for firefighting by the LEFPA. Firefighting equipment is maintained on site to be operated in event of fires by trained personnel. TERRAGRN communicates and coordinates with LEFPA and maintains, particularly during the high fire season, close contact with the agency and surrounding landowners to monitor and stay on top of fire incidents.</p>	
Principle 9.3 Genetic Resources			
Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting,		The project does not involve genetically modified organisms and hence is not negatively impacted.	N/A

commercial development, or take place in facilities or farms that include GMOs in their processes and production)?			
>>			
Principle 9.4 Release of pollutants			
Could the Project potentially result in the release of pollutants to the environment?		The project is not using any pollutants and hence potentially does not result in release of pollutants to air, water and land.	N/A
>>			
Principle 9.5 Hazardous and Non-hazardous Waste			
Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?		There are no chemical wastes, containers, fuels and oils and human waste including rubbish and abandoned buildings, machinery or equipment from the project activity that is hazardous/non-hazardous.	N/A
>>			
Principle 9.6 Pesticides & Fertilisers			
Will the Project involve the application of pesticides and/or fertilisers?		The project adopts integrated pest management to reduce use of chemical pesticides. Inorganic fertilizers are not used at all and soil interventions include organic fertilizers of necro-mass pit filling, manure, compost filling, tropical application, indigenous microbe solutions and Nitrogen fixing plants.	N/A
>>			

Principle 9.7 Harvesting of Forests			
Will the Project involve the harvesting of forests?		The project involves sustainable harvesting of bamboo plantations, while fruit trees will be not be disturbed. As only the mature 4 th year culms comprising 25% of the total culms are harvested, the green cover is maintained by the remaining 75% culms. The total green cover gets restored in a one year because of the new culms which reach their full height within 6 to 8 months of its emergence. This cycle continues each year over its entire lifecycle of nearly 100 years.	N/A
>>		In addition to Bamboo, by planting several fruit trees, nitrogen fixers, integrated pest management species including wind breakers, fire breakers and cover crops there is enhancement of biodiversity and ecosystem functionality in the project area. Thus improved forest management is undertaken.	
Principle 9.8 Food			
Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?		By planting fruit trees and crops, there is food production over baseline, which is abandoned cropland that is degraded. There a positive influence access to and availability of food for people in the region.	N/A

>>			
Principle 9.9 Animal husbandry			
Will the Project involve animal husbandry?		The project does not involve animal husbandry and hence not applicable.	N/A
>>			
Principle 9.10 High Conservation Value Areas and Critical Habitats			
Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?		The eligible planting area does not involve HCV ecosystems, critical habitats, landscapes, key biodiversity areas. The non-eligible areas are not disturbed and will not affect HCV ecosystems, critical habitats, landscapes, key biodiversity areas, if present.	N/A
>>		<p>The plantations are not done on indigenous grasslands and hence will not be replacing species on indigenous grasslands.</p> <p>The plantations are on heavily modified lands in the project area that have been subject to decades of agriculture and grazing activity. The approach to biodiversity conservation is twofold. At the plantation level our focus is on heavily modified areas and a nature-based approach underpinned by regenerative agricultural practices. Supporting every bamboo, fruiting tree and cover crop is a whole</p>	

		<p>world of soil-enriching microbes, pollinating insects, water-filtering plants—a symphony of life in which all players depend on each other. This biodiversity is essential to healthy ecosystems and serves as nature’s own system of checks and balances. The 3 main drivers of regeneration are biomass, biodiversity and cycling of nutrients. These three drivers produce a net positive effect on the above ground proliferation potential and activation of microbial life below the ground. A rich mix of microorganisms in the soil, plants, and animals on our plantation create healthy soil, strong crops and resilient natural systems while simultaneously sequestering more carbon in the soil and help make farmland—and local communities—more resilient. These healthy functioning plantation ecosystems, rather than acting as barriers in a matrix of varying quality habitats, will enhance movement of species through the matrix leading to an overall more biodiverse and healthy landscape throughout the project area. Finally, as per above TERRAGRN will be working closely with local communities, government, and NGO partners to manage, restore and maintain the matrix of sensitive habitats across the project area.</p>	
Principle 9.11 Endangered Species			

<p>a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?</p> <p>b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?</p>		<p>There are no endangered species. But about 3 species were identified in the project area (not in the eligible planting area), which is protected according to Mpumalanga Nature Conservation Act (MNCA). The areas that are outside of the eligible planting area will not be disturbed. The existing patches of native tree species, all freshwater resources and areas relevant for habitat connectivity shall be identified and managed to protect biological diversity. A minimum of 10% of the project area including the buffer zones for water bodies will be maintained.</p>	N/A
>>			

APPENDIX 2- CONTACT INFORMATION OF VPA IMPLEMENTER

Organization name	TERRAGR N SA (Pyt) Ltd.
Registration number with relevant authority	Reg No. 2021 / 898846 / 07
Street/P.O. Box	WORKSHOP 17
Building	138 WEST STREET
City	SANDOWN
State/Region	GAUTENG
Postcode	2196
Country	South Africa
Telephone	
E-mail	
Website	
Contact person	
Title	
Salutation	
Last name	
Middle name	
First name	
Department	
Mobile	
Direct tel.	
Personal e-mail	

APPENDIX 3- LUF ADDITIONAL INFORMATION

<p>Risk of change to the Project Area during Project Certification Period:</p>	<p>The risk of change to the project area is very low as the CME/VPA Implementer has long-term lease of the land belonging to the Manala Mgibe Community Property Association (CPA), representing the Manala Mgibe community and Traditional Council (MMTC). The lease is for a period of 50 years beyond the crediting period of the VPA 01 for 30 years.</p>
<p>Risk of change to the Project activities during Project Certification Period:</p>	<p>The vision and mission of TERRAGRN is to create and operate sustainable, biodiverse, agroforests for ecological benefits, and economic development within the local communities. TERRAGRN hopes to contribute to food security, gender equality, reduced inequalities, and climate action through nature-based solutions that will create new employment, bring more women into the workforce, and usher in progress and sustained livelihoods within communities. TERRAGRN is also exploring innovative ways of managing, measuring and valuing its impact on the climate and UN's SDGs and use the impacts as a form of collateral that increases the amount of investment to the project. Hence the risk of change to the project activity during project certification period is low.</p>
<p>Land-use history and current status of Project Area:</p>	<p>Based on the spatial forest/non forest assessment, the land use 10 years back and before the project activity is abandoned and degraded cropland.</p> <p>These lands were commercial lands and before 1994 people were resettled. Hence</p>

	these lands which were earlier cropped is abandoned and face the issue of land degradation.
Socio-Economic history:	
Forest management applied (past and future)	There was no past forest management on these farmlands. The future forest management is described in section A.3.
Forest characteristics (including main tree species planted)	The project area will be an agroforestry model. The project area will be planted mainly with bamboo (<i>Bambusa balcooa</i>) along with other native fruit trees, nitrogen fixing species, IPM species, windbreak and firebreak species and autumn and summer crops. The list of species is provided in section A.1. and the planting models are provided in section A.3.
Main social impacts (risks and benefits)	TERRAGRN is developing the project as a community-centric activity fostering a lasting relation between business and the local community, by using a novel concept of offering equity ownership to the workforce and the Community Property Association (CPA). TERRAGRN is looking at Holistic and Integrated solution by solving interconnected issues of climate, energy, food, employment, and socio-economic development, through an integrated solution. TERRAGRN is aiming for impact at scale by making a big difference to tackle climate crisis, energy transition, food security, and job creation.
Main environmental impacts (risks and benefits)	TERRAGRN is looking at bamboo as a climate agent factoring the climate and soil

	benefits of planting and sustainable harvesting bamboo in a species diverse, regenerative agroforestry model.
Financial structure	<p>Understanding and using carbon innovatively is key to TERRAGRN's and the planet's success. The company wants to use carbon to reward patient investors, the community who look after the agroforest, and pay for insurance to protect the forest investment.</p> <p>Gold Standard and R20 are working with TERRAGRN and partners to explore innovative ways of managing, measuring, and valuing its impact on the climate and the UN's Sustainable Development Goals (SDGs). Valuing a diversity of impacts such as mitigation, adaptation, water, soil health, gender and welfare will allow TERRAGRN to use the impacts as a form of collateral that increases the amount of investment in their project. In practice this means that carbon mitigation assets like carbon credits or other positive impacts are expected to be delivered by the project would be used to secure a low-interest loan⁵⁴.</p>
Infrastructure (roads/houses etc):	The infrastructure (roads and houses etc.) is shown in the spatial forest/non-forest assessment. These will remain in the project area.

⁵⁴ <https://www.goldstandard.org/blog-item/new-ways-valuing-climate-and-sustainable-development-impact-unlock-funding-innovative>

Water bodies:	The water bodies is shown in the spatial forest/non forest assessment. The water bodies will remain undisturbed including the buffer region of about 15 meters around the water bodies.
Sites with special significance for indigenous people and local communities - resulting from the Stakeholder Consultation:	Sites within the project area include cemeteries of the local communities that will not be disturbed.
Where indigenous people and local communities are situated:	The settlements where local communities are living will be kept intact and not disturbed. Some of the local people living there are also employed by TERRAGRN creating local employment
Where indigenous people and local communities have legal rights, customary rights or sites with special cultural, ecological, economic, religious or spiritual significance:	There are no sites with legal rights, customary rights or rights with special cultural, ecological, economic, religious or spiritual significance other than the cemeteries, which will not be disturbed.

APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

Please refer to [Design Changes Requirements](#) for more information on procedures governing Design Changes

Revision History

Version	Date	Remarks
2.0	4 May 2022	
1.1	7 October 2020	<p>Hyperlinked section summary to enable quick access to key sections</p> <p>Improved clarity on Key Project Information</p> <p>Inclusion criteria table added</p> <p>Gender sensitive requirements added</p> <p>Prior consideration (1 yr rule) and Ongoing Financial Need added</p> <p>Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity</p> <p>Improved Clarity on SDG contribution/SDG Impact term used throughout</p> <p>Clarity on Stakeholder Consultation information required</p> <p>Provision of an accompanying Guide to help the user understand detailed rules and requirements</p>
1.0	10 July 2017	Initial adoption