



Project Idea Note

Project Name:

Ngxingxolo Social Bamboo Carbon Project

Project Developer:

The DGB (Pty.) Ltd.

Registration number: 1946/021311/07



Project Proponent:

Global Carbon Exchange (Pty.) Ltd.

Registration number: 2012/144204/07



Carbon Registry and Standard:

Credible Carbon (Pty.) Ltd.

Registration number: 2016/027710/07



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Project description

The **Ngxingxolo Social Bamboo Carbon Project** (here forth the “NSBCP”) includes aspects of regenerative agricultural practices, social upliftment through long-term job creation (as per the Republic of South Africa’s Nationally Determined Contributions (NDC’s), of the Paris Agreement, 2015) and additionally, Carbon sequestration.

DGB has incorporated and grown 11.23 hectares (ha.) of *Bambusa balcoa* (here forth: “bamboo”) across from the village of Ngxingxolo, and South African Police Service (SAPS) Mooiplaas, to promote agricultural commodity development and practices in a small holding, low-income (mostly unemployed) area, this to benefit some of the Ngxingxolo village residents, through development of their understanding of ecological dynamics, periodic wages offered during different activities of the bamboo plantation, and commodity creation through preparation and production of bamboo fencing products.

The agricultural activities include planting bamboo shoots for promotion soil stability and facilitating a water stress tolerant crop for commodity production. This was originally done, with fencing off the area to deter herbivorous activities on the bamboo plantation. The additional activities that are implemented from the initiation of the project registration, are the conversion of the bamboo AGB into long term sinks of carbon, where residents (mostly women) are employed to harvest and treat the bamboo to slow down decomposition/deterioration of the bamboo and produce a fencing commodity. These commodities will then be sold by the employees to the village for 5.00 ZAR. The poles are intended to be used for kraal poles, to keep livestock fenced in, as well as some distribution to market, if surplus amounts are produced, in East London.

Through yearly monitoring of how many bamboo poles are created and surveys of if these poles are used as they're intended, or if villagers want to purchase the poles will be reported annually as well.

Furthermore, the species are cropped so that they need minimal water input, such as that of the bamboo. Grasses and annuals are cut down mechanically to incur detritus as mulching for the bamboo crop. These activities all contribute to increased soil stability, water holding capacity and nutrient (cation exchange) holding capacity as well as fixing carbon within the soils, as stated by Giller *et al.* (2021), these activities need to be applied in context specific situations which are applicable to this land activity. Further tree cropping around the bamboo plantation will be encouraged to assist as a wind break, increase soil stability and increase in micro-climatic conditions for increased rainfall, as well as provide wind breaks for the bamboo plantation.

The site is in the Eastern Cape province, in the Republic of South Africa.

Specifically, latitude: -32.740764, longitude: 28.051768. Farm portion: 1002454, named "Farm 125".

The native vegetation unit of the area as described by SANBI (NVM18, GIS data) is Bhisho Thornveld (SANBI, 2018), where pre-planting land was used as opportunistic grazing land. Bhisho Thornveld is illustrated in Mucina and Rutherford (2006) as SVs Bhisho Thornveld, with characteristic open savanna with small trees of *Vachellia natalitia* (Previously *Acacia natalitia*) with short to medium understorey of sour grasses (*Themeda triandra*) if the veld is in good condition. The climate of the area is of relative high humidity and mean rainfall of 500 mm to the west and 900 mm in the east per annum (Mucina & Rutherford, 2006). Daily maximum temperatures for January are 28 degrees Celsius, and daily minimum of 9 degrees Celsius in July, for the east where Ngxingxolo is situated. The planting of bamboo commenced in November 2012, where DGB decided to grow a water-stress resistant crop, with intercropping of native grasses, for multi-use purposes of the Ngxingxolo village residents. These project activities have seen many reversals such as herbivory of the bamboo and fires reducing some of the plantation (carbon reversals), however, the bamboo have been a long standing growth, with minimal harvesting and these reversals due to the nature of the project registration at a later stage, are negligible. The initial hesitation to register the project under a carbon registry was to wait for reduced cost implications for registering a project.

Figure one (1) illustrates the project activities being implemented from 2011 – 2022, where the GIS delineated polygon of the bamboo plantation area, can be seen to have been cropped.

Unfortunately, the Google Earth does not have images for the 2012, but one can see that in 2013 the project has already started with the planting activities, as can be seen by cropping lines from South Westerly direction to the North Easterly direction.

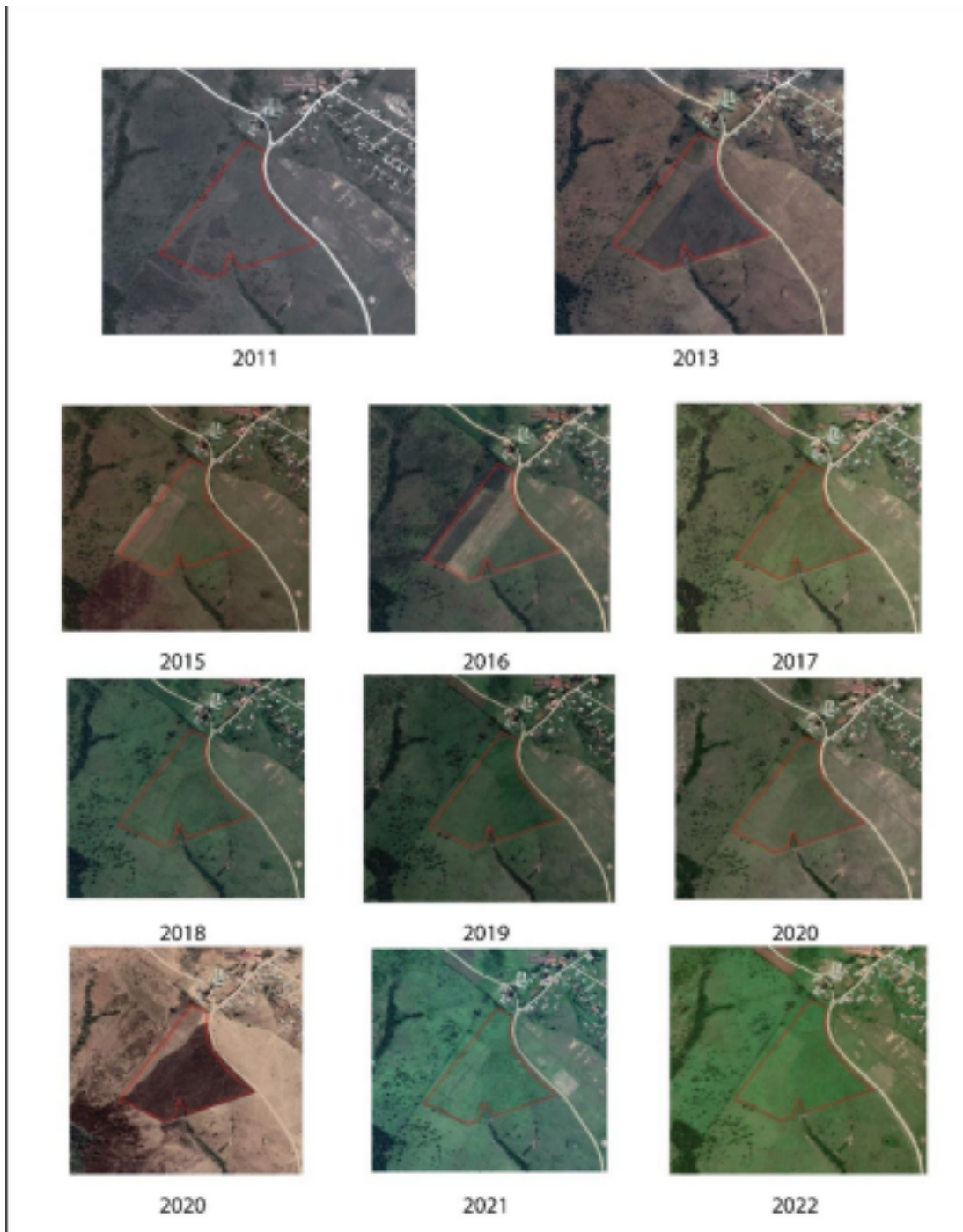


Figure 1: Location and history of land-use (2011-2022) of the NSBCP land, Ngxingxolo, Eastern Cape, South Africa. (Google earth, 2022; Maxar technologies, 2022).

DGB has a representative from the Ngxingxolo, where they have done multiple stakeholder consultations during the initial development of the pilot project in 2012. The local stakeholder consultations aimed to understand where the stresses are within the community and how to best approach the project activities and the available resources as well as resources needed, please find reference “DGB_Meeting_Report.2013_2014.pdf”. It included communication with the landowner of farm 125, allowing DGB to use the land as a micro-economic upliftment project, where further consultations were had with the Mooiplaas Police Station across the road from farm 125. The aim of the development was clearly relayed to the community by Willem Malherbe (RESBIO),

Jan de Keyser as landowner, Phaki George from The Eastern Cape Development Corporation, the Local Councillor and Police Station Commander, with the Community Leaders.

The results from the stakeholder consultations are as follows:

- Mr Jan de Keyser allowing DGB to use his land (farm 125, figure 2) for the duration of the project, an indicative 10% equity holding has been set aside to compensate Mr de Keyser, document attached as "JandeKeyser_Signed 2011 farm lease agreement_DGB.pdf";
- The land is available to DGB for 25 years, from the inception of the project (2011) and can be renegotiated indefinitely;
- In January 2013 Stephan Joubert on behalf of DGB and Jan de Keyser (landowner) had another meeting with the community leaders and councillor responsible for that area (Mr Mali) to give them more details of the project and the potential of bamboo for the area should the bamboo give the expected growth per hectare. The meeting was very positive and committee members were all positive about the potential of the project;
- An agreement with Mr Zandisile Mali, to be on standby on across from the bamboo plantation area. DGB imburses him at ZAR 1,000.00 per month escalating at 6% yearly.

DGB is the project developer and will be the legal owner of all the carbon credits generated by the NSBCP.



Figure 2: Native vegetation unit (Bhisho Thornveld) as per the NVM18 (SANBI, 2018) overlaid on the Project Area.

Figure two (2) above shows the project site across from Mooiplaas Police Station, with fenced area outlining the red area around the bamboo plantation.

Project Boundary:

Spatial boundary:

The project is situated in the Eastern Cape, Ngxixololo, where the plantation land area is 11.23 ha.

Temporal boundary:

Accounting period: 09.2019 – 09.2032

Crediting period: Ten (10) years (09.2022-09.2032) from the start date and positive VVB assessment. First issuance is expected on 01.2023, for the activities of 2019-2022.

After 09.2032, the baseline of the project will be reassessed, and the Project Developer (DGB) can reapply for project continuation with the Credible Carbon Registry.

Methodology applied:

Clean Development Mechanism: A/R Small-scale methodology. Afforestation and reforestation project activities implemented on lands other than wetlands. AR-AMS0007. Sectoral scope 14.

The project activities application is relevant to the project instance since the land was only opportunistically grazed by residents with their cattle. The choice of establishing bamboo is accepted as having woody biomass as discussed by Lobovikov *et al.* (2009) and Tripahti (1996), since under the eligibility criteria of the chosen methodology, the “Eligible activities in the ARR project category consists of establishing, increasing or restoring vegetative cover through the planting, sowing or human-assisted natural regeneration of woody vegetation to increase carbon (C) stocks in woody biomass and, in certain soils”, where DGB implemented establishing and maintaining of vegetative cover through planting as illustrated in figure three (3).



1. 2.

Figure 3: Initial planting of bamboo, November 2012 (1.) and bamboo stands with vegetative cover (grass) over lanes in 2020 (2.), images: Stephan Joubert, DGB.

The project proponents, DGB, chose the bamboo so to also include a viable income source or

material for the residents of the Ngxingxolo village, not to just revegetate native vegetation but allow for micro-economic benefits to the people, with DGB paying participating locals for their harvesting activities and maintenance of the project activities. Tripathi and Singh (1996) report that the net production of an annual cycle of bamboo plantation was $15.8 \text{ t ha}^{-1}\text{year}^{-1}$ on mature sites, which DGB site now has achieved. This also includes education/training of regenerative farming operations (holistic cattle management, and pilot implementation into the field, with expected results over 5 years). As well as residue management through corrective cutting of forage and the product harvested, belongs to the community to produce fencing for the cattle farmers kraals, by harvesting, treating and selling of the bamboo to fellow residents. There will be a few permanently hired staff for active management and harvesting and treatment of the bamboo. Thereafter, the bamboo is sold into the community, whereby if there is surplus this will be taken to East London. The education factor limiting that of emerging farmers to further progress to commercial agriculture, which this education could potentially make their cattle grazing more profitable (Khapayi & Celliers, 2016; Chitakira & Ngcobo, 2021).

DGB also assists in training and safe working conditions of creating harvesting and treatment as well as what one should charge for a pole to the residents of Ngxingxolo, if there is surplus after selling to the community themselves, DGB will assist in organisation of transport to market.

This includes leakage of the project activities, i.e., reversal of the carbon in bamboo biomass, however, these activities are ensuring that the bamboo poles stay as a stable carbon sink, and with additional treatments the bamboo will be protected against weathering.



Figure 4: Project plantings and local stakeholders participating in the project, image: Stephan Joubert (DGB).

The initial project activities included RESBIO and Jan de Keyser to make available farm 125 (figure 2) for the social project to take place. Thereafter the 11 hectares were fenced off and planting activities commenced (figure 3 and 4). With the planting of 2,300 plants on the site, at 230 plants per hectare.

The project plans to harvest bamboo culms, with long term stable carbon content since the culms will not be burned nor left to senesce within the plantation and thus biodegrade releasing GHG into the atmosphere. This harvesting rate will be done so that there are no reversals of the project activities with regards to removing more carbon than that which is sequestered. The harvesting

intervals for the project are indicated at four (4) years old culms, with the harvesting event allowing for regrowth and resprouting as well as maintain the SOC and BG Biomass concentration intact. For the first two years the young shoots were grazed upon by cattle, through negligence of the surrounding community, however this has been mitigated since with the fencing of the area and replanting of lost plants, reinstated the populations. The employment of Zandisile to stay on stand by and report incidents to DGB, has also been beneficial to the long-term stands and recovery of the bamboo plantation. There had also been a fire in 2020 (figure 1) where there were reversals, however, this only affected the annual grassy biomass and not the bamboo, with resprouting and vegetive springing once again. Thus, it is expected with more frequent monitoring and activities on the bamboo plantation, that the project will increase in sequestration without reversals or leakages.

DGB has not ploughed the land as per conventional agricultural practices and has not ploughed the land since the inception of the project. This reduces the volatilisation of organic material in the soils, reducing GHG emissions from that of open and barren soils. The soils are always covered by biomass, senescent grasses, and other annuals.

These annuals and grasses will be mowed by project local residents, through hand cutting down the biomass (surrounding the bamboo plantations) for working it back into the soil without breaking the soil as residue management and detritus deposition.

Table 1: Sequestration of different areas in the bamboo plantation from 2019 to 2022.

Carbon sequestration:	2011 t CO ₂ e	2019 t CO ₂ e	2020 t CO ₂ e	2021 t CO ₂ e	Total t CO ₂ e
AG Biomass	0	10.56	10.56	10.56	31.69
BG Biomass	0	9.61	9.61	9.61	28.82
SOC	1.596%	47.24	47.24	47.24	141.72
Total		67.41	67.41	67.41	202.24

Assumptions:

- linear incremental soil organic carbon (SOC) sequestration rates from 2011 to 2022, results in 47.24 t CO₂e annum⁻¹. With the latest SOC and measurements taken by DGB in early 2022, to calculate to date sequestration by the Bamboo plantation.
- Soil samples were done at the same localities within the plantation.

The AGB was tested through extractive methodologies which includes weighing the different components of a bamboo plant, and calculated BGB as per a ratio factor to get accurate representations of carbon sequestered in AGB and BGB.

The total sequestration of the project since inception (2011) is: 743.44 t CO₂e.

Poverty alleviation impacts:

DGB implemented this project for the main purpose of climate benefit and social responsibility as a corporate entity. They have started with this project instance as a pilot project in the 2011, and now want to expand on the social impacts that it has, as well as the carbon sequestration potential through added activities from the plantation activities, as well as product use activities.

These include:

- Micro-economic activities of the tending to bamboo plantation and permanent employment of Ngxingxolo residents, even further than those already paid for their standby activities, see attached “Bamboo project expenses.xlsx”, “IN100015_DGB_RES_INVOICE.pdf”, “INV30_DGB_Bamboo plants.pdf”, “Invoice 23, June, 2020_.pdf”, “Invoice 30, 28 May, 2021”, “DGB_Scan, Wage pay sheet, 28 May 2021.jpg”, and “DGB_Scan, Wage sheet 13 Feb 2020.jpeg”;
- Providing seasonal training on regenerative land-management (for the cattle grazing pilot) and harvesting periods, included in monitoring plan;
- The residents of the area having the information and expertise to manage land wisely, regenerate land, and reduce erosion, as Khwidzhili (2019) reports that sustainable land management in the RSA is not common practice, with most of the country using exploitative farming techniques;
- The harvested produce from the plantation area going towards the residents for their own use and additional revenue streams (above the permanent and harvesting positions) from these activities where DGB assists in processing of the bamboo into fencing for cattle kraal and other fencing operations.

Leakages:

The project assumes no leakages except for those of fire and harvesting. With harvesting occurring in such a way that the end-use of the fencing product will result in a mitigation of business-as-usual activities of which harvesting surrounding trees unsustainably as the baseline. However, if there are burns affecting the bamboo, those reversals will be accounted for accordingly, and no credits shall be issued with the reversal not being replaced or new growth above the previous stand. The project only accounts for the biomass within the boundaries of the project instance.

Monitoring plan:

From the project initiation date, DGB project instance at Ngxingxolo will be subject to annual verification audits by independently assigned VVBs as discerned by the Credible Carbon registry. DGB will supply any documentation to support the claims of emission reductions/Carbon sequestration, these documents include:

This entails a written plan after submission of the PIN to Credible Carbon, for the submission to the VVB.

- Seasonal training on how to safely cut bamboo and produce commodities for sale, including agricultural residue management, treatment of the bamboo, proper protective etiquette, and the pilot grazing events as well as for other agricultural activities (such as that to use resources most effectively);
- Bamboo harvesting dates and amounts harvested, including rest times for new growth (resprouting) of bamboo;
- Grazing events of pilot incorporation of cattle in bamboo plantation so that the new sprout time and grazing of those sprouts do not overlap, carefully monitored to see what the cattle graze on and their grazing patterns within the plantation;
- Areal photographic evidence of DGB project instance, produced by the Google Earth latest images taken or any other remote sensing such as that LANDSAT (NASA) for production of NDVIs, and showcase of soil coverage throughout the year. These will be collated or collected for Verification audits by DGB;
- SOC samples every 2 years (to reduce costs evoked). It is not expected that SOC to accumulate so fast that there is a great change in stocks within one year, the year in between the last

SOC stock readings and the next will be assumed to be that of the previous years SOC $t \text{ ha}^{-1} \text{ annum}^{-1}$ sequestration rates. E.g., SOCT^{2022} will be applied to SOCT^{2023} and then SOCT^{2024} will re-establish a new benchmark;

- If the SOC benchmark is changed, to a concentration higher than that of the 2 year prior baseline, then there will be accounting of the latest baseline with regards to the difference between the two;
- All calculations will use best practice of the ISO 14064-2, IPCC and the GHG Protocol, to remain accurate and consistent in DGBs monitoring of its project activities.

References:

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