

NGXINGXOLO SOCIAL

BAMBOO CARBON

PROJECT

AUDIT REPORT



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1 INTRODUCTION AND OBJECTIVES

DGB has approached Credible Carbon to register the Ngxingxolo Social Bamboo Carbon Project in the Eastern Cape of South Africa on Credible Carbon's carbon registry, for the purposes of selling greenhouse gas emission reduction credits generated by growing of bamboo. Through the project DGB not only seeks to mitigate greenhouse gas emissions, but also provide a source of revenue and training/education for residents in the area.

This document provides the outcomes of an audit that was conducted by an independent auditor to determine the eligibility of the project for registration on the Credible Carbon registry. In particular, the audit seeks to determine if the project meets the registry requirements, namely whether:

- The project is real.
- The project's described technology is in place and functioning according to its design specifications.
- The estimates of greenhouse gas emission reductions are reasonable in terms of accepted international standards and unbiased towards buyer or seller.
- The project has a discernible impact on poverty.

The auditor declares upfront that he has no conflict of interest or potential for material gain from conducting the audit.

2 PROJECT OVERVIEW

DGB, the project proponent, has cultivated an area of around 11 hectares of bamboo close to the Ngxingxolo village and South African Police Service (SAPS) Mooiplaas Station in the Eastern Cape. Bamboo was chosen for cultivation in that it is water-stress resistant, promotes soil stability and grows quickly (while absorbing carbon from the atmosphere), and potentially has positive socio-economic benefits as discussed later in this report.

The site was established in 2011 and the planting of bamboo commenced in November 2012. The main species is *Bambusa balcooa*, although the project includes trials of other species. The site is leased from a local farmer, with an initial lease agreement for 25 years from 2011, and with potential for indefinite renegotiation. It is overseen by a local resident, with a consultant based in East London being actively involved in site management.

The Project Information Note (PIN) identifies a potential for sale of the bamboo stems ("culms") as fencing poles, although other potential uses were identified during the audit which could represent a higher value add.

3 AUDIT SCOPE AND APPROACH

The audit was conducted to determine the potential for registration of the project on the Credible Carbon registry, for the initial sale to cover the period 2019 to 2022. The PIN suggests a 10-year crediting period (2022-2032), with reassessment of the baseline in 2033.

The project is applying to register the sequestration of the carbon contained in the above-ground culms only, in the below ground biomass, and through increasing the carbon content of the soil. The branches and leaves of the plants are excluded, as is the grass growing between the bamboo plants.

The audit was prepared based on the PIN developed on behalf of DGB by GCX and underlying spreadsheets supplied to the auditor. A thorough interrogation was undertaken of assumptions and checking of calculations. This was followed by a site visit on Wednesday 7 June 2023 and a further conversation with the primary author of the PIN.

4 FINDINGS

The findings are structured to align with the Credible Carbon registry requirements as identified above.

4.1 Q1: IS THE PROJECT REAL? Q2: IS THE PROJECT TECHNOLOGY IN PLACE AND FUNCTIONING ACCORDING TO DESIGN SPECIFICATIONS?

During the site visit It was observed that the site is as described, with the plants appearing to be growing and healthy as per the PIN – albeit with quite significant variability in the size of plants across the site. Plants lower down on the site are larger than those slightly higher up – with a combination of site-specific factors being understood to be responsible for this variability. The site is fenced off and is well maintained and both the caretaker and the consultant are very engaged with management thereof. At present it is understood there is no active harvesting of the culms for sale.

There was an unavoidable fire the week before the visit which burned most of the leaves on the plants as well as the grass between the plants – apparently before the fire the site was very green. None of the culms (which are the part of the plant for which carbon sequestration is being claimed) appeared to be damaged. It was interesting to note that a few culms that had been cut before the fire did not burn, which is positive in terms of limiting leakage from the project. It is understood that the leaves will grow back quickly.

It is noted that a decision was reached during the site visit to begin selective cattle grazing on the site to keep the grass short and limit the potential impact of future fires.



4.2 Q3: ARE ESTIMATES OF GREENHOUSE GAS EMISSION REDUCTIONS REASONABLE IN TERMS OF ACCEPTED INTERNATIONAL STANDARDS AND UNBIASED TOWARDS BUYER OR SELLER?

The PIN refers to the methodology for the calculation of greenhouse gas emissions savings from the growing of the bamboo as being the Clean Development Mechanism's: A/R Small-scale methodology. Afforestation and reforestation project activities implemented on lands other than wetlands. AR-AMS0007. The methodology is considered appropriate: although bamboo isn't mentioned explicitly in AMS0007, the related VCS methodology¹ for A/R does mention bamboo as a crop for reforestation and various other publications confirm the appropriateness of bamboo for this purpose. Having said that, once the methodology had been identified in the PIN there is little reference to or utilization of the methodology in the remainder of the PIN, to allow for confirmation that the methodology has been closely followed. As such, the approach to calculation of emissions cannot conclusively be stated to follow a standardized methodology.

In terms of the calculations of emissions reductions, the following concerns were raised during the audit.

4.2.1 Calculation of total biomass for the purposes of calculating carbon sequestration

The baseline assessment selects four plants from the total of 3,286 on sites and measures an average weight per culm (kg), the average number of culms per clump and then calculates the total weight per plant. For the 2022 year, the same approach was followed, with a total of 6 plants being selected out of a remaining 2,936 plants (it is not clear if the other plants had died in that period, and noting also that the PIN mentions 2,300 plants being planted initially – more would then have been planted subsequently).

As indicated previously, there is wide variability in the size of plants across the site, with some having significantly thicker and taller culms than others. It is not clear that the four or six plants chosen for analysis represent a suitable cross-section of the plants across the site. Furthermore, at the time of sampling both the baseline and 2022 plants, it is possible that the plants selected were at different stages of their growth cycles, which could have skewed results. A statistical sampling approach, including a greater number of plants and a rationale for choice of samples, is required to provide confidence that the numbers are representative.

It is also not clear from the information provided how the ratio of underground to aboveground biomass ("root to shoot") is calculated.

4.2.2 Calculation of the carbon content of the bamboo

It is not clear from the PIN how the carbon content of the culms was calculated – some figures appear in the spreadsheet provided but it is not clear whether these were ascertained using a standard scientific methodology. Having said that they do appear to be in the correct range based on selected literature found.² The carbon content of the below ground biomass is taken as an average of that found in the culms, leaves and stems. It is not demonstrated that this is appropriate.

¹ <https://verra.org/wp-content/uploads/imported/methodologies/VCS-ARR-Methodology.pdf>

² See, for example, <https://www.nature.com/articles/s41598-020-80887-w>

A minor calculation error was found in the spreadsheet. However, the impacts of this error are not material but should be corrected if the calculations are to be used further.

4.2.3 Calculation of change in soil carbon

It is understood that the baseline soil carbon content was determined by blending soil from a selection of locations around the site prior to planting of the bamboo and sent for analysis. No indication is available of whether the sampling was statistically representative and what depth the samples were taken at. For the purposes of claiming credits for soil carbon sequestration, statistically representative sampling is critical.

Furthermore, it is understood that the 2022 soil samples were taken adjacent to the root zone of the bamboo plants, in a similar fashion – a small selection of soil samples was taken, blended into two samples, and sent for analysis. Once again, there is no guarantee that this will be statistically representative of the whole site.

A further limitation to the soil carbon calculations relates to the area used to calculate overall sequestration as a result of the project. For the 2022 year, the calculations take the average soil carbon *in the bamboo root zone samples* and multiple by the entire hectare of the site. The bamboo is planted around 3 meters apart. As such, any sequestration (which was not measured) between the plants would be largely because of grass growing – which would form part of the baseline. As such, the soil carbon sequestration is considered to be significantly overestimated in the PIN.

4.3 Q4: DOES THE PROJECT HAVE A DISCERNABLE IMPACT ON POVERTY?

As mentioned previously, one person earns a small retainer income working as an overseer on the project. The PIN suggests that the project intends to employ women from the community to harvest and treat the bamboo, providing them with a source of revenue from selling as poles, or potentially in future as value added products. In conversation, it was indicated that this could provide opportunity for around three women.

At the time of the audit extensive harvesting had not yet begun. There was an indication that community members are occasionally employed on site, for example to clear biomass from the base of the plants. Based on the limited employment opportunity at this stage, the project cannot yet claim to be having a “discernable impact on poverty”.

5 CONCLUSION

This audit indicates that, based on the information contained in the PIN and accompanying spreadsheet, observations from the site visit and interviews with key stakeholders that the DGB project does not meet the requirements for registration. Successful registration of the project would require, *inter alia*:

- Greater confidence in the calculations of the carbon sequestration associated with the growing of the bamboo;

- An improved soil sampling regime which would provide statistically defensible data that could account for differences in soil carbon between the root zone of the bamboo plants and the spaces between the plants; and
- A greater demonstration of the socio-economic benefits of the project.

Prior to investing further in gathering the above data for the purposes of project registration with Credible Carbon, consideration needs to be given to whether this would be worthwhile, given the associated transaction costs compared to the realizable value from sale of credits. The project suggests relatively small sequestration potential, and the calculated savings would likely be lower than those suggested by the PIN (due to a likely overestimation of soil carbon that could be attributed to the project).