MINISTRY OF ENVIRONMENT,
FORESTRY AND TOURISM

How to Unlock Payment for Ecosystem Services for the Namibian Bush-Biomass Sector

Contents

Key Messages

Tapping into international 'Payment for Ecosystem Services' (PES) markets can create new revenue streams for bush-biomass utilisation.

There are a variety of PES schemes available. Experience has shown that appropriate design is crucial for the success of the scheme. **A study has found that Biochar Removal Credits (BCR) for the voluntary carbon market are to date the most promising approach for Namibia's bush-biomass sector.**

Biochar can create a triple win for the country. Utilising encroacher bush for biochar production helps restore rangelands, application of biochar can improve Namibian soils, production of biochar can be cross financed on the voluntary carbon market and made more profitable.

Carbon sequestration in soils is one requirement to obtain international carbon finance. However, in Namibia, farmers currently show limited interest in using biochar as a soil enhancer due to the absence of substantial evidence for its positive impacts on land productivity under Namibian conditions. At the same time, this also constitutes the required 'additionality' for carbon credits, which are typically only issued for activities that would not be viable without this additional funding.

Therefore, the domestic lack of demand poses a significant challenge to the development of the value chain.

To advance the development of the biochar sector and address the identified gaps and barriers, it is essential to empower a sector organisation to be tasked with coordinating, supporting and fostering the sector's growth, as well as overseeing sector-wide governance. Such role will ideally be taken up by the biomass industry representative bodies, such as the Charcoal Association of Namibia (CAoN) and the Namibia Biomass Industry Group (N-BiG).

Further gaps that need to be addressed include technology guidance for producers, technical facilities for biochar analysis and providers of monitoring solutions as well as validation and verification bodies.

Both compliance and voluntary carbon markets can represent a great opportunity for the Namibian bush-biomass sector. It is key that the Ministry of Environment, Forestry and Tourism (MEFT), representing the Namibian Government, provides further regulatory guidance to adapt the requirements of global carbon markets with Namibian circumstances (e.g. on the implementation of the Paris Agreement Art. 6) and ensures coherence with national strategies on climate change and savannah restoration.

Introduction

Ecosystem services are the benefits that ecosystems provide to humanity, from clean air and water to food production and cultural experiences.

Payment for Ecosystem Services (PES) is a concept for compensating individuals or communities for the positive impact they generate by maintaining or enhancing ecosystem services. PES originated in the late 1990s as a response to the lack of funding for conservation and sustainable management of natural resources. The development of various mechanisms led to a significant diversity of PES schemes at the local, regional and national levels, with more than 550 active programmes worldwide and an estimated value of USD 36-42 billion in 2018. The varying success rates of these mechanisms show that appropriate design of the PES mechanism for the local situation is crucial.

Namibia struggles with bush encroachment, a process in which woody plant species become the dominant component of savannahs. It is observed that up to 45 million hectares of the country's savannah ecosystem is affected. As a result, the carrying capacity of the land is reduced, threatening the livelihoods of farmers. Bush encroachment can also reduce further ecosystem services such as groundwater recharge, biodiversity, soil conservation, as well as recreational and tourism services. Implementing PES financing aligns with the key priorities of the 'National Strategy on the Sustainable Management of Bush Resources', particularly regarding resource mobilisation. Introducing PES schemes to restore savannah ecosystem services within the context of bush encroachment could incentivise farmers to adopt more environmentally friendly thinning and post-harvesting practises.

The table below shows the most common PES mechanisms and assesses their relevance for the Namibian bush-biomass sector. Market-based approaches appear to be the most promising here. In addition, the commoditisation of carbon sequestration as an ecosystem service is currently applicable and marketable. Readiness and applicability for other ecosystem services of the bush sector, such as biodiversity, soil conversation, groundwater recharge, vulnerability reduction and recreational and tourism services are limited.

Key PES mechanisms	Examples	Relevance for the Namibian bush-biomass sector
Payment for application of sustainable practices, typically funded publicly.	Countries can establish a national PES scheme to protect forest ecosystem services. An examples is the national PES scheme in Costa Rica which provides payments for landowners who adopt sustainable land use and forest management. Funding for Costa Rica's PES comes from the government through water and fuel taxes.	Challenging to implement due to Namibia's constrained financial resources.
User charges and compliance markets: Private sector actors purchase commoditised units of delivered ecosystem services.	A common example are charges imposed on water users which then finance water cleaning.	Challenging to implement as beneficiaries of ecosystem services from sustainable bush management are difficult to identify.

Market-based approach: Ecosystem services are commoditised and can be purchased by private or public entities. This involves assigning a financial value to the service and allowing it to be bought, sold or traded like any other commodity.	Reducing carbon emissions is crucial to fight climate change. By using the capacity of terrestrial ecosystems to take CO_2 out of the atmosphere and store it permanently, so called 'carbon removal credits' have high global demand. Prominent examples for carbon removal are trees planting and biochar application to soils.	Such 'carbon removal credits' are the most promising approach for the Namibian bush-biomass sector. They can incorporate both Voluntary Markets as well as Compliance or Regulated Markets.

A Market-based Approach: Carbon Markets and Carbon Credits

There are two main types of markets, compliance or regulated markets and voluntary markets. They differ in terms of the source of demand, pricing and regulatory oversight.

Compliance or Regulated Markets

The Paris Agreement is a legally binding international treaty on climate change that was adopted by the Parties to the United Nations Framework Convention for Climate Change (UNFCCC) at the UN Climate Change Conference (COP 21) in Paris 2015. The Paris Agreement emphasises the need for global cooperation and action to reduce greenhouse gas emissions. Through its Article 6, the agreement provides for voluntary cooperation and market mechanisms to achieve emission reductions. On 'regulated' markets, countries can transfer their emission reductions to other countries in the form of credits in order to achieve the emission reduction targets set in their NDCs.

Governance frameworks: To participate, a country needs to meet preconditions and set up the required governance frameworks. While significant uncertainty surrounding Article 6 prevailed after the adoption of the Agreement in 2015, the COP26 in Glasgow 2021 brought the Article 6 rulebook. Countries are now increasingly embarking bilaterally in the development of mitigation activities. The Namibian government is interested in engaging with Article 6 markets and is currently working on the national Article 6 framework through the Ministry of Environment, Forestry and Tourism (MEFT).

Voluntary Carbon Market (VCM)

Corporate social responsibility strategies of non-governmental actors who seek to reduce their carbon footprint fuel the voluntary market. They can purchase various types of credits that align with their sustainability objectives, allowing them to make credible claims about the environmental impact of their products and operations, including net zero claims. The voluntary market operates as a self-regulating mechanism. Voluntary markets thus help attract private finance, also from outside Namibia.

Carbon Credits

Carbon credits are a primary currency in carbon markets. They serve to quantify and trade the avoidance, reduction or removal of greenhouse gas emissions, primarily carbon dioxide. Projects that avoid or reduce emissions or enhance carbon sequestration can earn carbon credits that can then be sold in carbon markets. Contribution to co-benefits, such as biodiversity or community livelihoods, can increase the value of the credits.

Removal carbon credits are generated from projects that actively remove carbon dioxide from the atmosphere, such as reforestation, afforestation or biochar production. Avoidance credits are generated from projects that prevent or reduce greenhouse gas emissions, such as renewable energy projects.

Carbon standards and principles: Several measures have been taken to address the challenges and risks associated with carbon markets and to improve their integrity, transparency and reputation. Carbon standards such as Verra, Puro.earth and Gold Standard set their own guidelines for the VCM; independent international initiatives aim to make the VCM less ambiguous, more transparent and robust. Prominent initiatives include the Integrity Council for the Voluntary Carbon Market (ICVCM), the Carbon Credit Quality Initiative (CCQI, a clearer framework for the quality of carbon credits) and the Voluntary Carbon Market Integrity Initiative (VCMI) with its guidelines for credit buyers.

The Core Carbon Principles (CCPs), developed by ICVCM, are a global benchmark for high-integrity carbon credits. Developed with input from hundreds of organisations, the CCPs provide a means for identifying high-integrity carbon credits that create real, verifiable climate impact based on latest science and good practice.

The Core Carbon Principles (CCP)

The CCPs are a set of interlinked principles to define a threshold standard to ensure integrity in the voluntary carbon market

Emissions Impact

1. Additionality
2. Permanence
3. Robust quantification of emission reductions and removals
4. No double counting

Governance

5. Effective governance
6. Tracking
7. Transparency
8. Robust independent third-party validation and verification

Sustainable Development

9. Sustainable development benefits and safeguards
10. Contribution to net zero transition

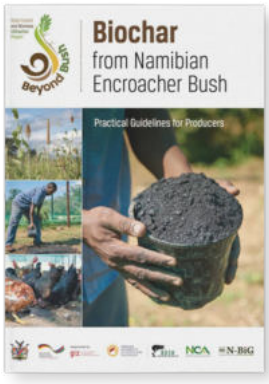
Opportunity for Namibia: Biochar Removal Credits for the Voluntary Carbon Market

The Biochar Case

Biochar is a carbon-rich solid material formed by the thermochemical processing of biomass in an oxygen-limited environment. Biochar is considered a carbon sink when it is added to the soil or to non-soil applications, such as cement. According to one of the latest reports of the Intergovernmental Panel on Climate Change (IPCC), biochar is to date one of the safest, most durable and fastest ways to draw down carbon. Beyond its potential as a tool for climate mitigation, biochar is also widely known as a soil enhancer.

For Namibia, biochar creates a triple win:

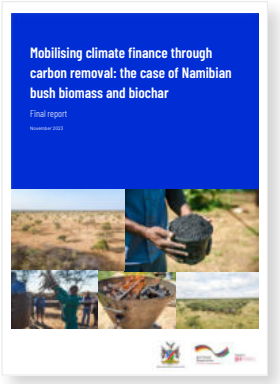
- Utilising encroacher bush for biochar production helps restore rangelands.
- Application of biochar can improve Namibian soils by increasing water retention, nutrient availability and microbial activity.
- The production of biochar can be cross financed through the generation and selling of carbon credits (Biochar Removal Credits, BCR) on the voluntary market.



Biochar from Namibian Encroacher Bush. Practical Guidelines for Producers.

Download here

https://www.n-big.org/download/Brochures/Biochar-from-Namibian-Encroacher-Bush.pdf



Mobilising Climate Finance Through Carbon Removal: The Case of Namibian Bush Biomass and Biochar

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https://youtu.be/N6vj2_BYmtw

A number of businesses already work in this space in Namibia. Their business models vary in regard to production methods and price for biochar based on carbon credit revenues.

Within the voluntary carbon market, biochar manufacturing is considered the most developed technology that may generate significant revenues. Globally, the biochar market is experiencing rapid growth and attracting various stakeholders, including project developers, marketplaces, associations and technology providers. Consequently, the demand for certification and verification of biochar products and projects is increasing, resulting in several emerging certification schemes and verification providers. Verra and Puro.earth, two standard-setting organisations, have methodologies for biochar that are endorsed by the International Carbon Reduction and Offset Alliance (ICROA). ICROA endorsement is considered a key requirement to ensure demand from buyers.

Actors and Stakeholders of a Biochar Removal Credits Project

The creation of a BCR project is a collaborative process which involves multiple actors and stakeholders with distinct capacities and responsibilities:

Biochar Producer

The role of biochar producer can be taken up by a variety of different actors, including subsistence farmers, small-scale kiln operators, commercial farmers or companies. The producers must have the ability to operate the pyrolysis equipment in accordance with relevant carbon standards.

Group Manager

The group manager facilitates communication between several biochar producers on one side and the project developer or financing institution on the other. They are also responsible for monitoring and reporting, benefit-sharing agreements, training and guidance.

Carbon Asset Manager / Project Developer

Their role is to connect the group manager with international carbon markets by registering the project in accordance with the relevant carbon standards. This involves navigating the often complex procedures underlying the relevant standards, obtaining the validation and verification that is required for the issuance of carbon credits.

Facilitators

The role of facilitators involves supporting the expansion of the biochar market, including the various value chains and off-takers that may exist beyond carbon-related matters. They are responsible for raising awareness about biochar and building demand for its use in soils, as well as for other applications. The two Namibian entities that are best placed to play the role of facilitators are the Namibian Biomass Industry Group (N-BIG) and the Charcoal Association of Namibia (CAoN).

Additional entities

That play integral roles are the scientific community, government bodies, as well as downstream industries across the entire biochar value chain.

Basic Considerations for Implementation

The process of establishing a carbon project for the voluntary market typically follows a structured series of steps. For Namibian Biochar Removal Credits the following steps are envisioned:

Biochar-related considerations

High- or low-tech production system

Conduct a rough estimation of the anticipated biochar volumes and choose a business model, either:

- a centralised pyrolysis plant with semi-continuous production processes characterised by advanced mechanisation or
- Kon-Tiki kilns which can be operated in a highly decentralised manner. To achieve the required scale for a viable BCR project, multiple kiln operators would be needed.

Large production volumes are needed to cover the carbon certification costs. If the estimated volume is less than 2,000 tonnes per year, it is advisable that the producer joins a project with a group manager. Depending on the number of producers and the resources required to conduct the monitoring, the group manager may decide to procure a provider of monitoring solutions.

Certification and Verification for Biochar Removal Credits (BCR)

Verra (VM0044 Methodology for Biochar Utilisation in Soil and Non-soil applications) and Puro.earth (Biochar methodology) verification are mainly applicable to larger biochar-producing installations with advanced technical characteristics. More artisanal production methods such as the Kon-Tiki kiln are not covered due to their methane emissions. Of all available carbon credit standards, the C-Sink certificate, operated by Carbon Standard International (CSI) and developed by the European Biochar Certificate (EBC), is the only one that can be applied for biochar production in Kon-Tiki kilns. However, the EBC C-Sink credit is currently not approved by ICROA and cannot be used for CORISA compliance purposes but only for contribution claims on VCMs.

VERRA puro·earth EBC

Consider feedstock and transportation of feedstock

The feedstock should be obtained from nearby, since sourcing materials in proximity is preferable due to reduced emissions and lower transport costs. The assessment should include type of feedstock, where it's sourced and what would happen to the feedstock without the project.

Consider offtake

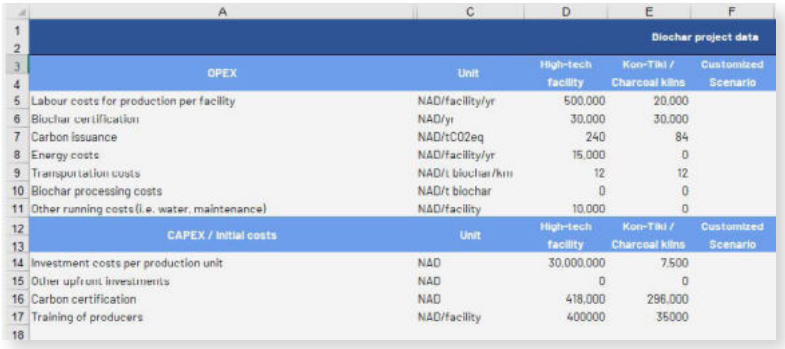
Utilisation of biochar needs to be considered, including the end-use application, who the end users are and the transportation distance from production to application site. Exploring additional applications of biochar beyond soil usage, with a particular focus on Namibia's construction sector, cattle industry and road infrastructure is essential. It's important to specify the types of biochar that can be utilised.

Compile Feasibility Assessments

Above considerations need to be compiled into a technical assessment, considering technical viability, relevant methodologies and eligibility criteria. Additionally, a financial feasibility assessment needs to be compiled. For biochar production to be economically viable, it needs multiple sources of revenue. This means that reliance on carbon credits alone is not sufficient to create a sustainable business model.

Business Case Tool for Biochar Producers

A business case tool has been developed in the form of an Excel-based workbook. This tool enables biochar producers to simulate results for different project design options, consider different parameters for investment costs, operational costs and revenue streams. It shows the relevant carbon credit prices and calculates the costs associated with the carbon project development process. The business case tool clearly illustrates that biochar production needs diversified revenue streams to be financially sustainable. It cannot rely on the income from carbon credits alone.



	A	C	D	E	F
1					Biochar project data
2					
3	OPEX	Unit	High-tech facility	Kon-Tiki / Charcoal kilns	Customized Scenario
4					
5	Labour costs for production per facility	NAD/facility/yr	500,000	20,000	
6	Biochar certification	NAD/yr	30,000	30,000	
7	Carbon issuance	NAD/tCO2eq	240	84	
8	Energy costs	NAD/facility/yr	15,000	0	
9	Transportation costs	NAD/t biochar/km	12	12	
10	Biochar processing costs	NAD/t biochar	0	0	
11	Other running costs (i.e. water, maintenance)	NAD/facility	10,000	0	
12	CAPEX / Initial costs	Unit	High-tech facility	Kon-Tiki / Charcoal kilns	Customized Scenario
13					
14	Investment costs per production unit	NAD	30,000,000	7,500	
15	Other upfront investments	NAD	0	0	
16	Carbon certification	NAD	418,000	296,000	
17	Training of producers	NAD/facility	400000	35000	
18					

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BUSINESS CASE TOOL FOR PROJECT DEVELOPERS

Download here

https://n-big.org/download/farmers_tools/GIZ-South-Pole-Mobilising-climate-finance-through-carbon-removal.-Business-Case-Tool-for-Project-Developers.xlsx

Actor related considerations

Engage Carbon Asset Manager / Project Developer

The producer or group manager approaches a project developer to scope how the project could be developed. Based on the feasibility assessments, the project developer will take a decision to develop the project or not. Once the positive assessment is confirmed, a detailed project design document (PDD) is created. This document outlines the project, methodology selection and monitoring procedures. The PDD is then submitted to a third-party entity known as the 'validation and verification bodies' (VVB). The VVB validates the PDD's coherence, confirming its alignment with established standards and methodologies. Upon successful validation, the project is registered and the PDD becomes publicly accessible.

Throughout the project implementation phase, continuous monitoring is conducted. Regular monitoring reports are submitted, detailing the project's progress. These reports are again reviewed by the VVB, which conducts site visits to verify the emission reductions or removals claimed by the project. Once these reductions and removals are verified, the carbon credits are issued.

Engage with facilitator

The facilitator should provide extensive support, such as capacity building and information dissemination, including on production technologies and material. The should connect different stakeholders like industry groups and farmer's unions.

Gaps and Barriers

A number of gaps and barriers need to be addressed for the scaling of biochar in Namibia:

- **Launch projects to test the impacts of biochar on Namibian soils**, consolidate existing knowledge on biochar impact on dryland savannah ecosystems and conduct awareness-building initiatives for soil application. Substantive evidence of the positive impacts of biochar on land productivity under Namibian conditions is still lacking. In order to incentivise stakeholders to use biochar, it is important to demonstrate to farmers the positive impacts of biochar on the productivity of their farmland.
- **Develop technology guidance:** Potential producers need to understand the technical requirements and characteristics of the biochar production process. Currently, there still exists confusion in the sector as to when a product is actually classified as biochar and which technical and quality requirements have to be met for specific applications (e.g. as animal feed and for industrial application).
- **Enhance knowledge on good practice and aftercare:** The lack of regulations and requirements on post-harvesting activities poses a challenge to achieving the sustainable restoration of savannah grasslands. From a carbon standard perspective, aftercare is not an element required for a BCR project, but credits with demonstrated environmental and social benefits may be able to fetch higher prices on the market.
- **Implement a governance framework on biomass utilisation in communal areas:** Implementation of carbon projects in the communal areas is more challenging, due to the legal status of communal lands, which prohibits the commercial utilisation of biomass resources. However, the status is currently under revision by MEFT. Commercial use might be possible for selected value chains in the future.
- **Improve technical facilities for biochar analysis** to ensure that Namibian biochar not only meets the material requirements but also aligns to the requirements of farmers.
- **Create a coordinating body:** to advance the development of the biochar sector and address the identified gaps and barriers, it is essential to establish an organisation tasked with coordinating, supporting and fostering the sector's growth, as well as overseeing sector-wide governance. The responsibilities of this governing body would encompass: coordinating the implementation of biochar pilot projects in Namibia, bolstering technical expertise and awareness, facilitating organised and coordinated efforts among stakeholders involved in biochar initiatives. Both sector associations (N-BiG and CAoN) could take up these tasks, with combined responsibilities.
- **Identify providers of monitoring solutions and validation and verification bodies (VVBs):** Monitoring, verification and validation of removals are key requirements in the voluntary carbon market and must be provided by an eligible third party, a so-called 'VVB'. At present, no VVBs are operational in Namibia. Overseas verifiers will have to be used.

Beyond Carbon Credits

Internationally, climate action is increasingly aligned to biodiversity conservation and ecosystem restoration. The Namibian bush-biomass sector contributes to the rehabilitation of degraded grasslands and thus holds potential to provide benefits not only in terms of carbon sequestration, but also in terms of biodiversity.

Like carbon credits, biodiversity credits follow a market-based approach. Their implementation is still in its infancy, as first methodologies, schemes and standards are currently being developed. It is expected that biodiversity credits are more difficult to attain, as the monitoring of biodiversity is inherently more complex than that of carbon storage. While biodiversity credit schemes are in development, a positive biodiversity impact is a co-benefit. Marketed as biodiversity-positive carbon credits, with respective evidence, Namibian bush-related carbon credits will stand out in the international market.

Imprint

This policy brief is based on the study "Mobilising Climate Finance Through Carbon Removal: The Case of Namibian Bush Biomass and Biochar (2023)" by South Pole and VO Consulting. This study was commissioned by the Bush Control and Biomass Utilisation Project (BCBU), a bilateral project jointly implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Ministry of Environment, Forestry and Tourism (MEFT).

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