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THE FUTURE OF NAMIBIA'S FORESTS

Sustainable Forest Management as Key to Unlock its Potential

"Promoting Sustainable Forest Management in the Kavango-Zambezi-Region in Namibia"

EUROPEAN UNION

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PREFACE

On 16 May 2023, various experts met for a symposium on the future of Namibia's forests in Windhoek. Under the title of *'The Future of Namibia's Forests – Sustainable Forest Management as Key to Unlock its Potential'*, this second event of a series of conferences focussed on discussing the role of forests in sustainable development, as properly managed forests and forest products have great promise in helping countries to achieve the sustainable development goals. Against the backdrop of Sustainable Forest Management (SFM), the symposium aimed at providing decision-makers of the public and private sector and CSOs with a platform to discuss and understand the correlation between sustainably managed forests and sustainable development.

The keynote speech as part of the opening session shed light on the symposiums' topic from the perspective of government. On behalf of the Namibian Minister of Environment, Forestry and Tourism (MEFT), the Director of Forestry, Mr Johnson Ndokosho, elaborated on the importance of SFM for Namibia and how forest-based actions will help to further advance the country.

The symposiums' main session centered around topics such as a general perspective on forestry in sustainable development, a green economy or the role of forestland in mitigating climate change. The colleagues from the Food and Agriculture Organization (FAO) and the Gesellschaft für Internationale Zusammenarbeit (GIZ) used the event as platform to present their projects related to the events' topic. The FAO talked about the contribution of their 'DSL-IP Namibia Child' Project to SFM in the Mopane-Miombo belt of Northern Namibia and the GIZ provided insides into biochar, a product from sustainable de-bushing activities that can be used to enhance soil quality in agroforestry systems.

The conference organisers would like to thank the European Union for supporting the symposium as well as the compilation of these proceedings financially. Furthermore, we would like to thank our other development partners for their support, as well as the Ministry of Environment, Forestry and Tourism for their official endorsement of the project. Special thanks are directed to all speakers, presenters as well as the master of ceremony for contributing to a successful symposium.

Windhoek, July 2023

The organisers of the symposium on the future of Namibia's forests on 16 May 2023: The NSFM-Project team of HSF and DRFN.

KEYNOTE SPEECH OF THE SYMPOSIUM

Johnson Ndokosho[1]

[1] Director of Forestry in the Ministry of Environment, Forestry and Tourism, Republic of Namibia

Good morning, Ladies and Gentlemen, all protocols observed.

First and foremost, let me take this opportunity to thank the Hanns Seidel Foundation (HSF) and the Desert Research Foundation of Namibia (DRFN) for the invitation to speak at today's Symposium. I am honored to address this important event which connects issues that hold the key to our future sustainability.

Allow me to start with quoting our Namibian Constitution, one of the most progressive constitutions of the world regarding the protection of our environment. Article 95 states: *"The State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future".*

This Article 95 guides the Ministry of Environment, Forestry and Tourism in its mission to promote biodiversity conservation in the Namibian environment through the sustainable utilization of natural resources and tourism development for the maximum social and economic benefit of its citizens. Sustainability is no longer on the margins but has moved to the mainstream and has done so at lightning speed. It is now at the heart of not only the Ministry of Environment, Forestry and Tourism; it is also at the heart of policy, business, and social life.

Ladies and Gentlemen,

In 2015, the world leaders agreed on 17 global goals. Eight years on, we have made progress, but there is still work to be done, and the goals are more important than ever: The climate crisis, ensuring no one goes hungry, human rights abuses, extreme poverty. Problems of this scale can be overwhelming, but the SDGs are the solution to tackling them.

I would like to put a special emphasis on SDG 15: 'PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS'. A flourishing life on land is the foundation for our life on this planet. We are all part of the planet's ecosystem and we have caused severe damage to it through deforestation, loss of natural habitats and land degradation. Promoting a sustainable use of our ecosystems and preserving biodiversity is not a cause. It is the key to our own survival. Forests protect livelihoods, communities and infrastructure. They contribute to the sustainable development of rural economies, which promotes integrated territorial development and economic and social cohesion and is vital to the well-being of rural communities. Forests provide subsistence, employment opportunities and income to about 25% of the world's population.

Dear colleagues,

Todays' event is pulling together in a coherent way the next steps towards the future of our forests. Namibia, through the Ministry of Environment, Forestry and Tourism, remains committed to reverse the concerning trend in declining rates of deforestation.

The contribution of forests and trees to food security is also large, but often overlooked. The supplementary food and income derived from wood and other forest products are an essential part of livelihoods of rural people.

Forests are multifunctional ecosystems essential to landscape restoration, climate action and biodiversity protection. They provide a variety of services to society, including flood control, protection against soil erosion, carbon sequestration, and resilience to climate change. A forest-based economy plays a vital role in meeting the United Nations' 2030 Agenda for Sustainable Development.

Sustainable forest management covers the whole management cycle. It provides the means for protecting the environment, restoring biodiversity, and supporting the production of renewable materials that can replace fossil-based counterparts. In addition to timber production, forests, especially the old-growth ones, offer a wide range of other benefits, such as habitats for wildlife, recreational activities for families, and a large number of products, such as firewood, berries and mushrooms. Agroforestry systems are moreover important contributors to food security.

In this regard, the Ministry of Environment, Forestry and Tourism, through the Directorate of Forestry, is carrying out research on how to propagate native trees species with a view to make tree seedlings available for the community members to plant these species. The Ministry has been implementing the Community Based Natural Resources Management (CBNRM) Programme in forest management, which saw 43 Community Forests established across Namibia.

Forest-based actions will help to further advance Namibia. For example:

When forests are well managed, they offer nature-friendly solutions to most of the global challenges we face – from improved adaptation and mitigation measures to climate change, land degradation and biodiversity loss, to building resilience against future crises.

When forests are protected, they play a crucial role in eradicating poverty, growing food, improving energy security, and maintaining vital watersheds.

When forests are valued, they support the livelihoods of the most vulnerable segments of our society.

When forests are healthy, they work as a natural buffer against the transmission of zoonosis and other diseases. During the COVID-19 pandemic, forests provided us with essential health products – from masks, to cleaning supplies, and ethanol for sanitisers.

It is therefore crucial to promote sustainable forest management in Namibia.

One of the important lessons learned throughout the world is that sustainable forest management is only possible because local people are actively involved in this and experience tangible benefits from their involvement. I believe that there are many lessons to be learned in this regard and I hope that you will share these today.

Let me conclude with the FAO Director-General's words "there are four betters that depend on our forests and agroforests: a better production, a better nutrition, a better environment and a better life for all". I wish you every success for today, and I wish this symposium to become part of an ongoing 'learning through sharing process' that will enable Namibia to promote a vibrant, sustainable and socially conscious forestry sector.

I thank you!

ROLE OF FORESTLAND IN CLIMATE CHANGE MITIGATION: LAND ADMINISTRATION PERSPECTIVE

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ABSTRACT: **There is a consensus within the global community that climate change is an emergency that should be mitigated. As a matter of commitment, conceited efforts have been put to explore options on how to mitigate climate change. However, the dominant discourse is still focused on the environmental and ecological perspectives. This paper introduces the land administration perspective. The study, a literature-based summary paper, presents a brief communication on the link between climate change and land issues. It outlines why land administration matters in mitigating climate change and identifies policy recommendations for engaging in forestland administration for sustainable climate change mitigation. The paper is relevant because it presents evidence of tenure security in mitigating climate change. It also argues for the importance of forestland in climate change mitigation — a knowledgebase necessary for promoting sustainable forest management for climate change mitigation in the Okavango-Zambezi Region in Namibia.**

1 Introduction

Climate change, forestry and land administration share one commonality. They are cross- inter- and multidisciplinary themes that stand at the centre of the global, national and local development agendas. Climate change refers to long-term shifts in temperatures and weather patterns (natural or human-caused) that adversely affect the living conditions of people and the environment. The forest is the area of land (henceforth called forestland) dominated by natural or plantation trees. Land administration is concerned with ensuring that land use (including its development, security, value and other elements) is operational in improving the living conditions of people and their environment (Chigbu et al., 2021).

Climate change occurs due to greenhouse gas emissions that act like a blanket wrapped around the earth, trapping the sun's heat and raising temperatures, leading to unfavourable human and environmental conditions. Since the last two centuries, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas (Intergovernmental Panel on Climate Change or IPCC, 2019).

1.1 Objective and structure of the study

This summary paper reflects the land administration perspective of climate change. It presents a generic perspective of the importance of forestland in climate change mitigation — a knowledgebase necessary for promoting sustainable forest management for climate change mitigation in the Kavango-Zambezi Region in Namibia. The paper is structured as follows: the next section reflects on the link

between climate change and land. The third section identifies why land administration matters in mitigating climate change. The fourth section (the closing section) dwells on policy recommendations for engaging in forestland administration for sustainable climate change mitigation.

2 Greenhouse gas emissions are the link to climate change and land

A critical factor in the climate change discourse is Green House Gases (GHG). The GHG emissions are what connect climate change and land issues. This climate change and land linkage is understandable based on the emission of GHG by sector and sources. The leading greenhouse gases whose rise in concentration exacerbates climate change effects are carbon dioxide (CO_2), methane (CH_4), nitrous oxide, hydro chlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs).

2.1 GHG emission by sector and sources as links between climate change and land

Data from the IPCC (2019) indicate that global GHG emissions by sector put the concentration of these gases at 24% (industry), 34% (energy supply), 22% (agriculture, forestry and land use), 15% (transport) and 5% (buildings). These sectors are among all land sectors, directly or indirectly. Furthermore, about 77% of the agricultural land on the planet is presently used for raising animals, and about 23% is used for growing crops.

Data on GHG emissions by sources indicate that the GHG comprises 75% CO_2, 17% CH_4, 6% nitrous oxide and 2% fluorinated gases (IPCC, 2019). Amongst these gases, CO_2 and CH_4 (92%) are directly linked to climate change and land. Evidence shows that land (with or without forests) stores three times as much CO_2 as the atmosphere. About 98% of the CO_2 stored on land is in forests and cropland, while 2% is in deserts and grazing land used for animal agriculture.

With these data, it is plausible to argue that climate change is a land issue because managing forestland, animals and agricultural land presents the biggest mitigation opportunities, as forests and soils absorb, and store emitted CO_2. Approximately 2.6 billion tons of carbon dioxide (one-third of the CO_2 released from other sources) are absorbed by forests yearly. However, reducing deforestation and increasing afforestation is a land use paradox.

3 Paradox of land use and land tenure security in climate change mitigation

Considering the established relationship between climate change and land, land tenure and tenure security are principal elements for climate change mitigation. Land tenure is the relationship people have with their land. Tenure security is the right land users and owners have to protection against forced eviction, harassment and other threats associated with land use (Chigbu, 2023). Managing these relationships is crucial because land use for climate change mitigation has many paradoxes. One paradox is that humanity must reduce agricultural land use to conserve forests and mitigate climate change. Another paradox is that livestock uses about 80% of agricultural land globally. Reducing CH_4 to plant more forests to absorb CO_2 implies that the future of livestock farming must be compromised (even though it is central to the survival of millions of people in Africa).

Evidence from literature (See Chigbu et al., 2021 and 2022) indicates that promoting responsible land administration activities can help mitigate climate change. For instance, some scholars found that the absence or presence of tenure security in forestland use enables or disables climate change mitigating actions.

3.1 Evidence: Presence of forestland tenure security in climate change

When land tenure is present in forestland use, it becomes an enabler of restorative practices, which can mitigate climate change. Some of the available evidence on the effects of the presence of forestland tenure security on climate change are that:

- Application of customarily based governance of small-scale forestry in Guinea is a key social and environmental practice leading to restoration of forestland. Land restoration is a key strategy for mitigating climate change effects in local communities.
- Creation of forest-use rules and regulations have been found to help with forest restoration in South-eastern Nigeria. This allows for clearly defined regulations (including conservancy and village bylaws) and traditional practice of periodical (e.g., only morning and evening) forest use practices. This is common in south-eastern Nigerian villages (Chigbu et al., 2022).
- A forest restoration plan (in the Central African Republic) led to identifying tenure rights and the implications of the plan on people's land rights and livelihood options to enable users to make informed decisions to avoid overgrazing and forest/grassland fires and to reduce their impacts (IUCN et al., 2020). This situation can help with solving the land use paradox.
- Enclosures has been reported to be used in the Somali Region Pastoral Areas of Ethiopia (Chigbu et al., 2022). In this custom, the pastoralists' traditional enclosures, considered protected grazing for calves, are strategies for forest regeneration.
- Local farmers in the Sahel have been known to conserve carbon in soils using zero tilling practices in cultivation, mulching and other soil management techniques.

3.2 Evidence: Absence of forestland tenure security in climate change

When land tenure is absence in forestland use, it becomes a disabler of restorative practices, which can exacerbate climate change. Some of the available evidence (from literature) on the effects of the absence of forestland tenure security on climate change are that:

- In Democratic Republic of Congo, the lack of permission for the Pygmy groups to own forestland and exercise their forestland rights stifled them from gaining access to forests and protecting their indigenous species from arbitrary use and degradation (IUCN et al., 2020)
- Globally, weak conflict-resolution mechanisms enable large-scale land acquisitions, which cause tenure insecurity, and result in the lack of the responsibility to avoid forest degradation caused by large-scale land investors (Robinson and Raven, 2020).
- All over Africa, the abandonment of customary conservation practices, such as the observation of "oracular rivers and forest" and "fallow" agriculture has resulted in increasing deforestation and forest degradation (Orr et al., 2017). It has also reduced actions geared towards reducing degradation and reversing past degradation.
- In Cameroon, Nigeria, and Kenya, overlapping legal frameworks and legal pluralism create difficulties in following the customary system of forestland tenure. This usually leads to inappropriate use of forestland, which exacerbates existing forest degradation scenarios (UN-Habitat et al., 2012).
- In Malawi, communities (at households' level) with tenure insecurity caused by informal short-term tenancy contracts and customary gender-biased inheritance practices are less likely to invest in forest and soil conservation measures (Lovo, 2006).

4 Conclusion

This article has established a relationship between forestland (through land use and tenure systems) to climate change issues. It has shown that land tenure has a two-prong influence on climate change — as both an enabler and disabler of climate change mitigation. This is because land tenure rules can be used to determine climate change mitigation decisions and actions. The key conclusions drawn from the evidence presented in this paper as follows:

- People who have a long-term right or obligation on forestland are more likely to use the forest more productively, including for climate change mitigation.
- Those who have a short-term interest in forestland tend to use that forest inappropriately. This is because they are under immense pressure to reap benefit from the forest before the expiration of their short-term lease. This can lead to engagements in activities that exacerbate climate change.
- If people do not have secure titles (or provable documented evidence) to the forest they are using, they misuse it because they have no defined responsibility to improve it.
- Those who own forestland (i.e., communal freehold) are more likely to engage in activities that would not lead to forest degradation. This can also result in activities that exacerbate climate change.
- It is possible to own forestland through inheritances from ancestors (e.g., in customary and indigenous communities). Where this is the case, the customary/indigenous communities usually have traditional restorative knowledge can benefit climate change.
- Climate change objectives fail because users exploit the bundles of forestland rights that exist in the forest without fulfilling the required responsibilities for mitigating climate change.

From a policy standpoint (and based on the above conclusions), climate change mitigation can be achieved through land administration by tackling the land paradox effectively. This means managing land (forested or unforested) in ways that explore interdependencies across sectors (agriculture, forestry, building and transportation) and spatial units (urban and rural areas) for climate change mitigation. It requires regulating spatial adaptation and land conflicts between the land sectors of agriculture and nature, tackling conflicting and synergistic properties of different land uses, and adapting land tenure to ensure climate-mitigate human behaviour. These cannot happen unless policies are made to engage in cross-border land (including forest) tenure and climate change as a continuum of land issues.

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GREENING THE ECONOMY FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT: **The world is faced with serious environmental challenges because of the past unstainable practices to meet the demands of rapid human population growth. Achieving sustainable development through green economic growth is one of the solutions to those environmental crises while fighting poverty and ensuring equitable access to decent jobs and wealth for everyone. Namibia needs to strengthen its green economic sectors as that would benefit most of its population. Sustainable forest management has the potential to improve the country's economy from the local to the national scale. Government action in facilitating necessary policy development and implementation is key to successfully implementing green economic practices in Namibia and strengthening stakeholders' collaboration.**

1 Introduction to the green economy

Humans affect the environment in both negative and positive ways. The past economic and human population growth has led to the overexploitation of natural resources, burning of fossil fuels, pollution, land degradation and deforestation. Changes like these have triggered climate change, soil erosion, poor air quality and undrinkable water. Should countries around the world keep basing their economies on such old practices? Most definitely – no – hence the need to switch to a sustainable green economy. A low-carbon, resource-efficient, and socially inclusive economy is what is meant by the term. In a green economy, infrastructure and assets that enable decreased carbon emissions and pollution, improved energy and resource efficiency, and the prevention of the loss of biodiversity and ecosystem services are what drive growth in employment and income (Cato, 2009; UNEP, 2018). In the Namibian context, the social equity concept of the green economy is defined as jobs and wealth created by such an economy that should be accessible to and equally shared by all Namibians (Lubinda, 2015). While the green economy is environmentally friendly it is anticipated that Namibia's natural resources are utilized efficiently and sustainably for both present and future generations.

1.1 Why should Namibia consider the green economy?

Constitutionally, Namibia has a legal mandate to protect its natural resources for the well-being of future and present generations. Since independence, this country has enacted several environmental frameworks to better manage its natural capital. Therefore, a green economy is not a new concept for a country that envisioned developing its economy based on natural resources.

Like several African countries, Namibia is rich in natural resources however its economic growth has not equitably enhanced the livelihoods as it should have. A large proportion of Namibians are still directly dependent on natural resources for survival. What does this mean for natural resources? It means that there are possibilities of unstainable livelihoods and environmental degradation in rural areas. Population pressures on natural resources such as deforestation resulting from poverty and

underdevelopment have been identified little after this country's independence (Brown, 1992), and necessary initiatives should have been implemented to address such environmental challenges.

It is documented that the structural growth of the Namibian economy is concentrated in sectors such as financial intermediation and insurance, real estate, and business services; that do not directly benefit most Namibians (Lubinda, 2015). The majority of Namibians are employed by the informal sectors with no job security, no medical insurance, and not covered for social security while subjected to long working hours for a low monthly income also regarded as the working poor. The sectors identified to have a significant impact on poverty and income distribution are agriculture and sustainable wildlife [fauna and flora] utilization.

2 The links between sustainable development and green economy

Sustainable development is defined in all works of life as the ability to meet the needs of the present without compromising the future generations the same ability to meet their needs. On the other hand, the green economy advocates for improved human well-being and social equity while safeguarding the environment to prevent the depletion of natural resources i.e., ensuring that natural assets continue to provide resources and ecosystem services for a continued well-being. Marrying the two concepts, both are concerned with sustainability – that what we do today does not deplete resources for future generations. Hence, the green economy is considered one of the important tools available for achieving sustainable development (Mikhno et al., 2021).

2.1 Green economic opportunities for Namibia to achieve sustainable development

Although regarded as the driest country in southern Africa and vulnerable to the accelerated impacts of climate change, Namibia's diverse ecosystems provide a range of ecological services to its people. Since independence, the rights-based approach has been applied to community spaces in addition to freehold farms. Throughout the past few decades, Namibia's plan has benefited both the economy and conservation, and the future of wildlife-based land use is even more promising. When we look to the future, we must consider regional and international economic and environmental trends that Namibia may exploit to maximise the utilisation of its natural resources and advance sustainable development (Brown, 2019).

The nature-based economic sectors such as sustainable agriculture, bio trade, ecotourism, conservation hunting, and renewable energy amongst others decently benefit the Namibians at the grassroots level. Although Namibia can be pleased with its expanding environmental sector and accompanying conservation successes, there is still considerable space for both economic and environmental growth.

The forestry sector, for example, is one that we need to dedicate efforts to for sustainable development. While the number of community forests (CFs) has increased to 45 CFs countrywide since the enactment of the Forestry Act of 2001, the forest cover has been declining over the same period. At the same time, this is an opportune time to drive forest rehabilitation initiatives to mitigate the impacts of climate change. Forest and woodland restoration has the potential to enhance forest-based ecosystem services such as those essential for human survival. The climate regulating services such as carbon sequestrations qualify the country to obtain Carbo credits to enter the Carbon markets. Reforestation and afforestation would promote habitat conservation hence the conservation of other species that forests inhabit, e.g., arboreal and tree cavity organisms. Sustainable forest management can contribute to the achievement of the UN Sustainable Development Goals, especially, SDG 1 –

No poverty, the decent income from the jobs in the sector contributes to the local economy. As the green economy is aimed at capacity building and training, SDG – 4 Quality education is addressed through forest conservation awareness campaigns to educate the public and key stakeholders. The jobs created through the green economy are regarded as decent because environmental vitality and social equity are ensured while promoting economic growth hence SDG – 8.

2.2 What is the way forward?

Policymaking is fundamental to government actions toward green economic growth. Such actions include promoting investment and spending in areas that stimulate a green economy; addressing environmental externalities and market failures; limiting government spending in areas that deplete natural capital; establishing sound governing frameworks; investing in capacity building and training; and strengthening international governance. As a wide range of skills in the context of the green economy are in high demand in Namibia and globally, a projected move in government policy towards the green economy will surely provide new chances for enterprises and careers (Lubinda, 2015).

3 Conclusion

Finally, the green economy is a critical vehicle for sustainable development as majority of the Namibians derive their livelihoods from natural resources. Therefore, it is essential to ensure that such livelihoods are sustainable for the continued well-being of Namibia's ecosystems and people. A call for a shift in policymaking is key to successfully implementing green economic practices, hence government action is essential to coordinating all the relevant stakeholders.

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THE ROLE OF FORESTS IN SUSTAINABLE DEVELOPMENT

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ABSTRACT: **In Namibia, sustainable forest management is the main tool used to maintain natural forests. Goal 15 asks for the protection, restoration, and promotion of the sustainable use of terrestrial ecosystems, the sustainable management of forests, the fight against desertification, the halt and reversal of land degradation, and the halting of biodiversity loss. This goal specifically highlights the importance of biodiversity in a sustainable future. It is significant to notice that this aim under Goal 15 also emphasizes restoration: stopping the harm is not sufficient; what has been damaged must also be restored.**

1 Introduction

A worldwide framework for sustainable development was adopted at the United Nations Sustainable Development Summit in September 2015. The framework is made up of 17 SDGs that address a wide range of problems, from "classical" development issues like poverty and food security to infrastructure and economic development to environmental concerns and climate change. The SDGs replace the Millennium Development Goals, which covered the years 2000–2015, and are in effect until 2030. 169 targets and 241 indicators make up the SDGs (United Nations, 2016). The SDGs offer a comprehensive plan of action for social inclusion, environmental sustainability, and economic prosperity. Collaboration and extensive cooperation are required across all sectors and stakeholders (i.e., governments, businesses, and communities) in order to achieve the SDGs by 2030.

Globally, forests and their sustainable management are receiving more political attention as a result of Agenda 2030 and its Sustainable Development Goals (SDGs). Living in a healthy environment is essential, and many SDGs have a significant environmental component. Despite the fact that there isn't a single SDG for "forests," SDG 15 is a good example because it covers forestry broadly. As a result, many of the other SDGs are related to the topic of forests, and achieving some of them will have an immediate or long-term effect on forests. The SDGs offer the modern era's most significant framework for sustainable development. The relationship between forests and the SDGs has been better understood in recent years (Swamy et al., 2017; Timko et al., 2018; Laporte and Vandenhaute, 2016), as well as in relation to SFM arrangements like community and smallholder forestry (de Jong et al., 2018; Katila et al., 2017). This synthesis aims to investigate the connection between sustainable forest management and the SDGs. This connection may make it easier to match sustainable forest management practices with the SDGs.

2 Trends of forests in Namibia

Figure 1 shows that other wooded lands in Namibia, comprising of bushes and shrubs have remained stable from 1990 to 2020. However, the forest has shown a steady decline during the same period (FAO, 2020).

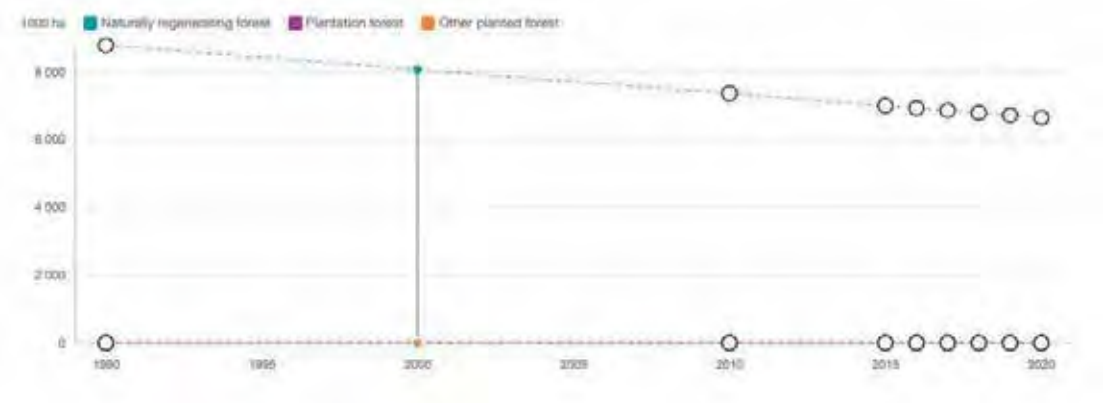

Figure 1: Trends of other wooded lands and forests in Namibia between 1990 and 2020

Figure 2 shows that there has been a steady decline in naturally generating forest. Planted forest and other planted forest remained constant and insignificant.

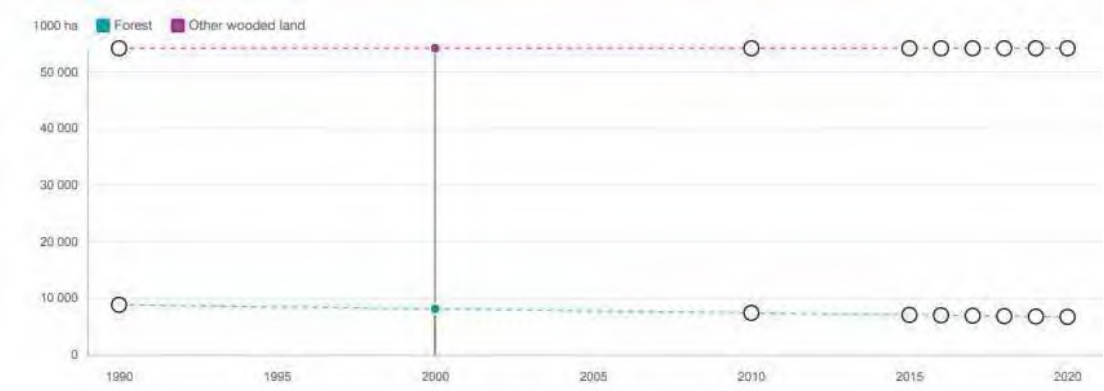

Figure 2: Trends of Naturally regenerating forest, plantation forest and other planted forests in Namibia between 1990 and 2020

3 The importance of forests

Forests are living, breathing ecosystems. For a wide variety of animals, plants, and other living things, they offer a natural habitat that enables them to flourish. Forests naturally incorporate the circularity principle into their operation. They produce reusable wood products and materials with high commercial value, control important global cycles (particularly the oxygen, nitrogen, carbon, and water cycles), and are crucial to soil preservation. Additionally, woods serve numerous essential functions in protecting the ecosystem, the climate, and the biodiversity. In addition to clean air, they regulate water flow, prevent flooding, store carbon, protect soil from wind and water erosion, and have a built-in ability to withstand the consequences of climate change. Livelihoods, communities, and infrastructure are all protected by forests. They support integrated territorial development, economic and social integration, and rural communities' overall well-being by helping rural economies grow sustainably. About 25% of the world's population relies on forests for income, work opportunities, and subsistence. High recreational and amenity value can be found in forests. This is obtained via non-timber forest products like mushrooms and wild berries, outdoor leisure activities and culture like sports, and various forms of tourism, all of which promote the health, happiness, and enjoyment of people as well as biodiversity and social and economic advantages for communities.

4 Sustainability of the forestry sector

The key idea in guaranteeing the long-term and sustainable growth of a bio economy based on forests is sustainable forest management. The use of sustainable forest management practices is confirmed by independent, globally recognized voluntary forest certification programs. The idea of sustainable forest management has been increasingly imposed over the last three decades, and legal frameworks backing it have been extensively embraced globally. This is in favour of maintaining a balance among social, environmental, biological, and economic elements. The forestry industry reduces climate change through sustainable forest management by improving carbon storage in growing trees and soils and by expanding the sustainable supply of renewable raw materials. These substances can take the place of fossil fuel-based and other carbon-intensive substitutes by storing carbon for a very long time. By making forest ecosystems more resistant to future climatic risks and lowering the likelihood of further land degradation, sustainable forest management also aids in the adaptation to climate change. This is done by repairing and stabilizing soils and increasing their water-retention capabilities. Additionally, sustainable forest management contributes to the provision of various essential ecosystem services and biodiversity preservation, including the provision of wildlife habitats, recreational amenity values, and a variety of non-timber forest products. Additionally, particularly created agroforestry systems play a significant role in ensuring food security. Multipurpose forests are managed to meet increasing demand for forest products, ecosystem services and public goods.

In o maximize the financial, economic, social, and environmental potential of their natural capital, forests must be actively managed, restored, and conserved using a consistent strategy. All of these factors are connected and dependent on one another. The long-term goal of the forest landscape restoration strategy is to produce productive forest landscapes that are resilient and sustainable through rehabilitating landscapes and restoring marginal and degraded lands. It aims to ensure that various ecological and land-use functions are long-term restored, safeguarded, and maintained. The UN Strategic Plan for Forests 2030 includes two key objectives: increasing the area of protected, preserved, and sustainably managed forests (via long-term forest management plans) and increasing the amount of forest-based goods and materials produced from sustainably managed forests.

5 Forest certification

Forest certification and accompanying labelling is a way of educating consumers about the sustainability of the forests from which timber and other forest products are grown. Forest certification is an internationally recognized mechanism to promote sustainable forest management and ensure that forest-based products are produced from sustainably managed forests.

6 Conclusion

The 2030 Agenda and its SDGs aim to make a difference and bring about change in all areas of life and society. Achieving the SDGs will require cross-sectoral multi-stakeholder collaboration, as they are ultimately interconnected and aim to "leave no one behind" (United Nations, 2016). Stakeholders can take a common approach to implement the many aspects of SDG 12, SDG 13 and SDG 15. For example, addressing production processes that because pollution can support aspects of sustainability such as economic development, health, poverty reduction and nature conservation. Strong legal frameworks and procurement policies need to stop deforestation and habitat conversion while allowing better production and consumption patterns. We also need to promote credible sustainability standards for stakeholders that support SDG 12, SDG 13 and SDG 15 alike. Agro-ecological cultivation methods

should be adopted that increase productivity, efficiency and climate protection in food production. None of this is possible without close cooperation and cooperation between governments, civil society, local communities and the private sector, and the rights and livelihoods of small producers should always be protected.

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CAN BIOCHAR BE NAMIBIA'S BLACK GOLD?

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ABSTRACT: **Namibia could produce 10 million tonnes of biochar per annum sustainably to combat two problems: bush encroachment and infertile soils. Several uses and positive effects of biochar application have been documented, including carbon sequestration to help mitigate climate change. GIZ, together with its national partners, seeks to overcome the obstacles of establishing a biochar market in Namibia. Carbon credits can reduce the retail price of biochar, making it more accessible to farmers, and practical knowledge on the use of biochar is showcased and investigated through field trials.**

1 Woody biomass from bush is the main feedstock for the locally produced biochar

The Bush Control and Biomass Utilisation project (BCBU) aims to foster biomass value chains to counter bush encroachment through rangeland restoration in Namibia. It is estimated that more than 45 million hectares of Namibia's previously open grass- and shrub land is bush encroached, entailing detrimental effects on the country's groundwater recharge, biodiversity and agricultural productivity. The phenomenon, provoked amongst others by poor rangeland management and climate change, has grown into an impediment that causes an estimated annual loss of EUR 100 million for the Namibian economy.

On the other hand, bush encroachment has created a standing resource base of more than 400 million tonnes, that can be harvested sustainably, with an annual increase exceeding 10 million tonnes. Therefore, the BCBU Project adopts a value addition approach, which enables farmers to turn the problem into an opportunity by utilising the accumulating biomass and diversifying income streams.

This bilateral project is implemented by GIZ since 2014 on behalf of the German Federation Ministry for Economic Cooperation and Development (BMZ) and the Namibian Ministry of Environment, Forestry and Tourism (MEFT).

Figure 1: Looks like charcoal – but it's something more: biochar

1.1 Biochar from bush – a promising product

In collaboration with local and international partners, biochar has been identified as a promising bush-based product for Namibia thanks to several socio-economic and ecological factors. For instance, biochar works best for soil application under the environmental conditions that are encountered in Namibia:

- Sandy soils with low water and nutrient holding capacities
- Low rainfall
- High risk of extreme weather phenomena such as floods and droughts

Therefore, Namibia does not only have the resource base to produce biochar but also the possible demand in the country's large agricultural sector.

2 Application potential of biochar in Namibia

Biochar is seen as a high potential product in Namibia, where there is a growing biomass industry with about 1,500 charcoal producers. The value of biochar is even higher as compared to charcoal when considered as a local application that promotes the circular economy approach. There are several options for utilisation on that front:

- Firstly, it could be applied to horticultural and staple food crop fields – maize and pearl millet are very common in Namibia – in order to improve soil properties, increase the soil's climate resistance and thereby increase the overall yield at the same time as sequestering CO_2 into the soil.
- Secondly, biochar could be used in the country's livestock industry as a food supplement. It has positive effects on the health, growth rate and methane emissions of animals if offered on a free-choice basis, as it absorbs pathogens from the animal's stomach.
- In both cases, biochar is not only suitable for subsistence farming set-ups, but also for many commercial farmers.
- Thirdly, biochar could be combined with building materials and be a substitute for cement (green building materials).

So far, there is limited experience among Namibian farmers with the application of biochar as a soil amendment and the demand for biochar in the country is low. Consequently, the establishment of a biochar industry requires additional support.

Therefore, external funding in the form of international climate financing could be a game changer to unlock the enormous potential of biochar for Namibian stakeholders and to overcome the challenges of farmers' financial capacities by supporting the use of biochar with CO2 sequestration payments. A prerequisite for this is sound scientific evidence of the positive impacts of biochar. We present such data in section 4.

3 Biochar-driven carbon credits: local circular economy and climate mitigation

Despite the apparent benefits of bush utilisation to the Namibian economy, agriculture and ecology, the upscaling of bush control, including harvesting and aftercare, remains a challenge due to the relatively high costs. Therefore, external financing opportunities and incentives are needed to

overcome the problem. Contrary to the general economic trend in the country, the biomass sector is growing significantly and now provides 11,000 jobs, especially in rural areas. Even though various existing value chains are profitable and can cover costs for harvesting and aftercare, the stability of the sector in terms of current products and the expansion of the sector towards new value chains would benefit from diversified income opportunities beyond the income generated from the sale of products.

Thus, climate and environmental financing schemes, such as Payment for Ecosystem Services (PES) and carbon credits could pose a leverage to further unlock the potential of the Namibian bush biomass sector. Access to such schemes would furthermore promote a circular economy, with waste biomass not being burned (e.g. biomass-to-electricity or charcoal), but remaining in the ecosystem as long-term humus made of biochar (Terra Preta). This contributes to increased soil health, land productivity and carbon removal.

To date, no PES schemes or similar financing mechanisms are available for bush control activities in Namibia due to a lack of dedicated business models, monitoring systems and institutional anchoring among other factors. Biochar is one of the most promising technologies for climate change mitigation due to its long-term persistence in soils or industrial products. Carbon removal credits for biochar production and application bear potential to render an otherwise unprofitable value chain feasible. Since Namibian farmers are unable to commercially procure biochar and apply it on agricultural land, the biochar value chain currently does not develop beyond research projects and externally funded pilot projects.

GIZ BCBU is currently conducting a scoping study on the readiness of Namibian biomass stakeholders for international climate financing, with a focus on the potential of biochar for carbon removal credits. Carbon removal credits will provide sufficient incentive for land users across Namibia to sustainably harvest encroacher bushes (bush thinning) in degraded areas and produce biochar for soil application, for example.

4 Scientific evidence of the positive effect of biochar on horticultural production in Namibia

GIZ Farming for Resilience (F4R), together with its partners from the Ministry of Agriculture, Water and Land Reform (MAWLR), the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST), has conducted soil fertility trials to investigate – amongst other soil conditioners – the effect of biochar on cabbage (*Brassica oleracea*) and cowpea (*Vigna unguiculata*) in four different locations in Namibia. The results will be published by the scientists from UNAM, and some relevant data on biochar are summarised below.

Biochar was applied once at a rate of 20 tonnes/hectare, charged with nutrients (NPK fertilizer). The effect was studied and compared with plots without biochar (NPK only) and without any soil amendment. The split-plot design of the trials had two different intensities of irrigation: I 1 was with full irrigation and I 2 was with reduced irrigation.

The **Cation Exchange Capacity (CEC)** is one parameter that measures soil fertility and is typically low in sandy soils. Low CEC leads to poor nutrient holding capacity of the soil, and consequently, insufficient plant nutrition and low yields. Biochar increases CEC in sandy soils, as shown in Figure 3 (Haruwodi 2023). In clayey soils that already have a high CEC, we could not observe a further increase after biochar application.

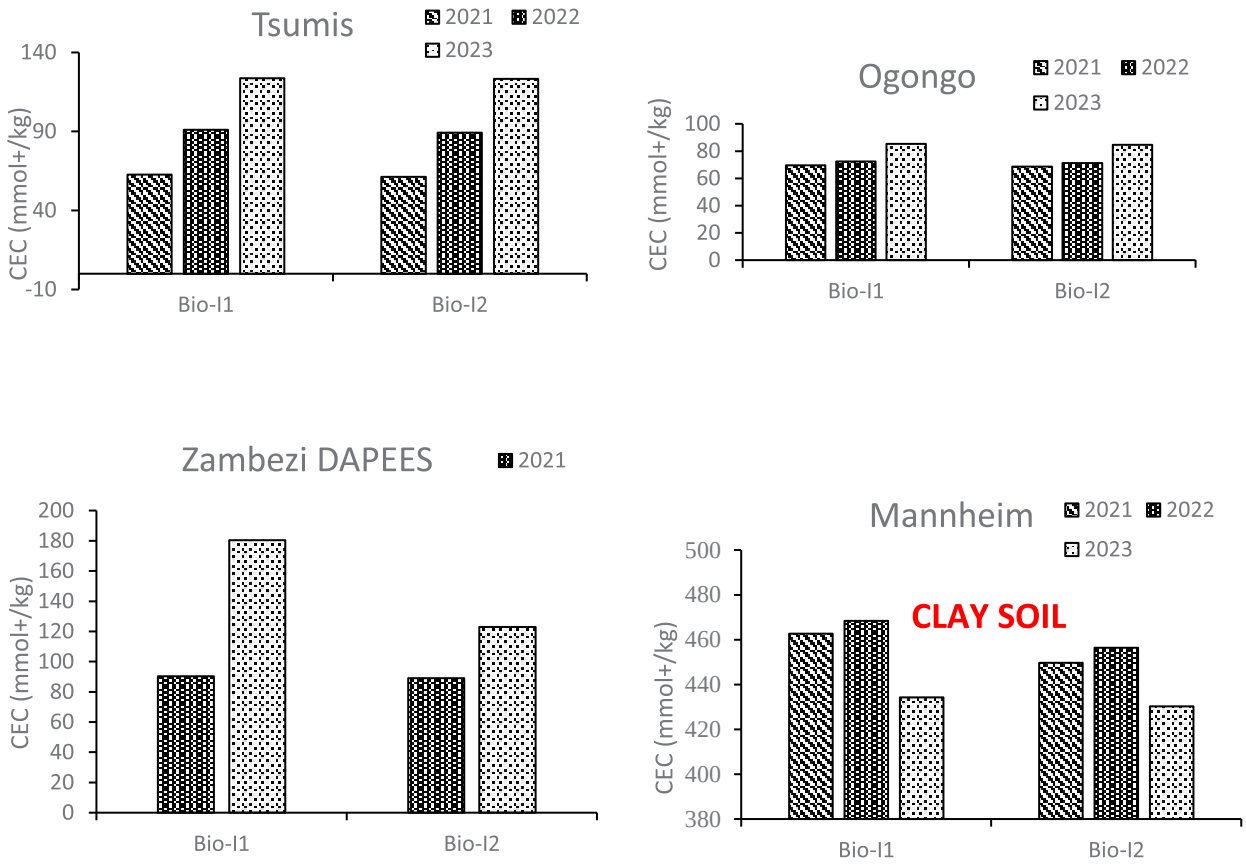

Figure 3: The effect of biochar on the cation exchange Capacity (CEC) in different soils (Haruwodi 2023)

The application of biochar can result in **yield increases** from 10 to 29 percent (GIZ, 2022). In our field trials, we found scientific evidence that this is also true for Namibia (Petrus, 2023).

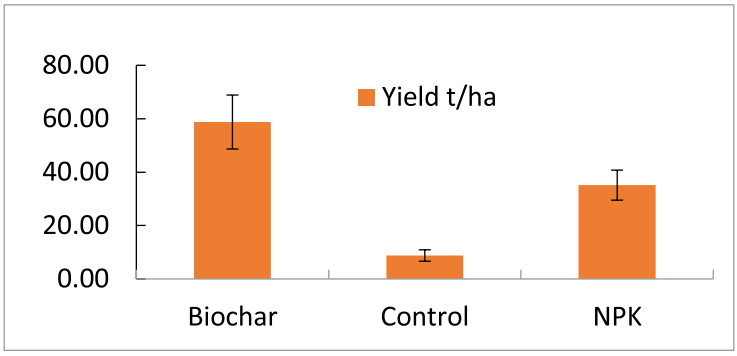

Figure 4: Biochar increased the cabbage yield. Evidence from the field trial in Ogongo UNAM campus. (Petrus, 2023)

However, biochar is not always able to compete economically with cheaper soil amendments like mineral NPK fertilizer. The **Benefit/Cost** Ratio (BCR) for biochar (charged with NPK) was not statistically different from NPK alone in Ogongo and lower in Tsumis. This would change if the positive effects of biochar on bush encroached ecosystems and climate change mitigation are reflected in a lower price of biochar for farmers.

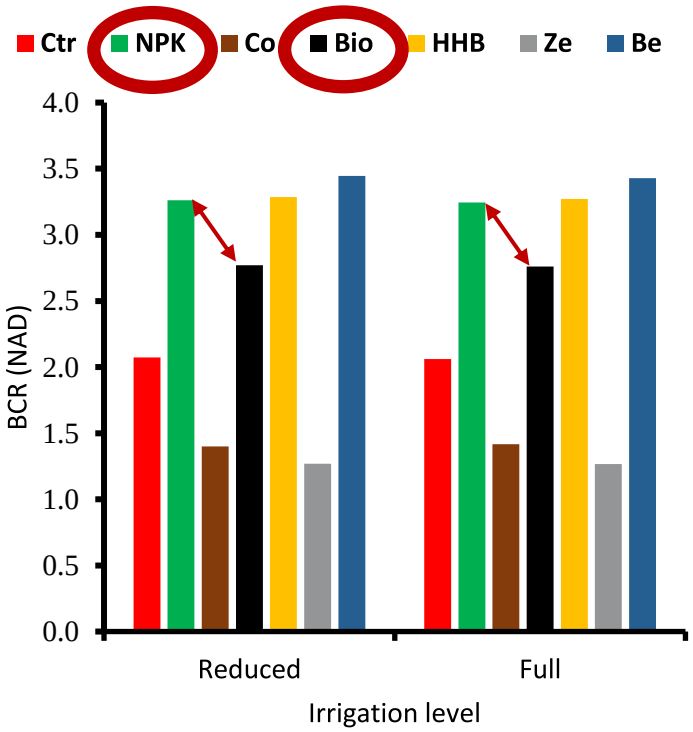

Figure 5: The Benefit Cost Ratio (BCR) for charged biochar is lower than for NPK fertilizer (Petrus, 2023)

5 Conclusion

Although biochar from bush biomass has several positive effects on Namibian soils, widespread adoption would not take place without external funding sources such as carbon removal credits, as the high short-term implementation costs (i.e. biochar production and application) and long-term returns (e.g. the benefits of thinned bush and improved soils) are not compatible.

International climate financing can support biochar production and trade for Namibian farmers if current challenges, namely low awareness among farmers of the benefits of biochar and a lack of regulations for the trade with biochar, are addressed and resolved.

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ABOUT THE 'PROMOTING SUSTAINABLE FOREST MANAGEMENT IN THE KAVANGO-ZAMBEZI-REGION IN NAMIBIA' PROJECT

Project Background

Namibia is endowed with an abundance of natural resources. The north and north-eastern regions of the country contain large plains of, inter alia, hardwood forests. Over the past decade, Sub-Saharan Africa has experienced a significantly increasing demand for timber, especially from Asian countries. However, the profits accumulated from Namibia's yearly timber harvest have been limited due to the undervaluing of domestic wood prices compared to international price trends. Moreover, Namibia does not possess the infrastructure needed to organise a value chain to correct this pricing discrepancy and retain the overall value of its hardwood. Instead, the wood is mostly exported as a raw material, limiting the revenue that can be raised from Namibia's timber resources.

In recent years, a growing number of media reports and related public discussions have sought to address how Namibia's hardwood resources are being harvested, in many instances, unsustainably. To assist in the resolution of this concerning trend, the HSF and the DRFN have joined forces to support the Namibian government in its efforts to safeguard against the environmental and economic threats posed by unsustainable timber usage and uncontrolled deforestation. The contribution of the project is to support an active, multi-stakeholder dialogue on sustainable forest management (SFM) to improve its implementation in the affected regions.

The Project Aims to ....

- Expand public understanding of the concept and benefits of SFM, particularly amongst core target groups including Civil Society Organisations (CSOs), political and traditional decision-makers, Community Forest members, and youth representatives, the latter who may serve as multipliers.
- Strengthen knowledge, skills, and capacities to implement SFM amongst target groups.
- Improve sensitivity to and appreciation of diverging views and perspectives on SFM between target groups.

Key strategies to achieve these goals include an information campaign and publications, conferences, educational programming, study trips, and public dialogue events.

TH!NK Namibia Sustainable Forest Management Information Campaign

TH!NK NAMIBIA
Sustainable Forest Management

The project further aims to harness its public information campaigns to create supportive platforms for all interested individuals to share their research findings, achievements and knowledge projects related to SFM in Namibia.

The Hanns Seidel Foundation (HSF) is a German non-profit organisation currently implementing roughly 100 projects in 70 countries worldwide.

The HSF Namibia office was established in 1978. In collaboration with its local project partners, HSF Namibia is committed to the promotion of democracy and good governance, the rule of law and anti-corruption, sustainable development, and environmental sustainability as well as climate change mitigation and adaption. Through each of its respective projects, the organisation seeks to facilitate information-sharing and active civic engagement in all facets of society.

The Desert Research Foundation of Namibia (DRFN) is a Namibian NGO which has served both communities and government in the building of capacities for sustainable development since Independence. DRFN projects are implemented across several key thematic areas including energy, land and water for which a combination of institutional knowledge, field research and experience as well as local and national relationships are utilised. The DRFN also provides support to multiple stakeholders ranging from government, traditional decision-makers, community members, local authorities, and private sector actors in the development, planning and implementation of policies to support Namibia's sustainable development.

The Member States of the **European Union** have decided to link together their know-how, resources and destinies. Together, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.

EUROPEAN UNION