

Conference Proceedings of the  
1st National Conference on

# **THE FUTURE OF NAMIBIA'S FORESTS**

*Sustainable Forest  
Management as Key to  
Unlock its Potential*



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# PREFACE

On 20 July 2022, various national and international experts met for the first national conference on the future of Namibia's forests in Windhoek. The objective of the conference titled '*The Future of Namibia's Forests – Sustainable Forest Management as Key to Unlock its Potential*' was to discuss the current state of forest management in Namibia, as well as to identify potential pathways for a bioeconomy-based value chain for Namibia. Against the backdrop of Sustainable Forest Management, the conference aimed at providing decision-makers of the public and private sector with a better understanding, as well as with ideas on how to tackle the economic, social and environmental challenges of today and tomorrow. In order to strengthen local knowledge, skills, and capacities for sustainable management of forests, various experts from Namibia, South Africa, Ghana, the UK and Germany presented on two guiding topics, namely (i) '*Sustainable Development, Management and Conservation of Forests*' and (ii) '*Adding Value to Namibia's Forest Products*'.

The three keynote speeches as part of the opening session shed light on the conferences' topic from a government perspective as well as global perspective. The Namibian Minister of Environment, Forestry and Tourism (MEFT), Hon. Pohamba Shifeta, elaborated on the contribution of the Ministry towards Sustainable Forest Management. Furthermore, Mr Gift Kamupingene and Mr Fritjof Boerstler representing the Food and Agricultural Organization of the United Nations (FAO) presented on the FAO's contribution towards Sustainable Forest Management from a national and regional perspective. Moreover, the keynote speeches were rounded off by a talk of Mr Lorenz Klein von Wisenberg, International Family Forestry Alliance (IFFA), on the concept of sustainability in forests.

A further component of the conference was the poster exhibition. Various stakeholders such as scientific researchers of the Namibian University of Science and Technology (NUST), representatives of community forests from the Kavango and Zambezi regions and civil society organisations presented on forestry related topics.

Each session of the conference was complemented by a panel discussion. The first panel discussion dealt with the question '*What do we need to make Namibia's forests great again?*'. This question was discussed by Mr Fillemon Kayofa, Deputy Director of Forestry, Mr Steven Germishuizen, Sustainable African Forest Assurance Scheme (SAFAS), Dr Chris Brown, Namibian Chamber of Environment (NCE), Ms Albertina Phillipus, International University of Management (IUM), and Dr Harrison Kojwang, Forest Stewardship Council (FSC). The topic of the second panel discussion was '*I have a Dream – Using Namibia's Forests for Sustainable Development*'. Experts who discussed this topic included Mr David Hopkins, UK Timber Trade Federation (TTF), Mr Leroy Diocotlhe, Miombo Forestry Products, Mr Chris Beeko, Ghana Forestry Commission, as well as Mr Raphael Scriba, Waldzertifikate INT.

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

Windhoek, August 2022

The organisers of the national conference on the future of Namibia's forests on 20 July 2022: The NSFM-Project team of HSF and DRFN.

# KEYNOTE ADDRESS: THE CONTRIBUTION OF THE MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM TOWARDS SUSTAINABLE FOREST MANAGEMENT

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Honourable Pohamba Shifeta<sup>1</sup>

<sup>1</sup>Minister of Environment, Forestry and Tourism, Republic of Namibia

Director of proceedings;

Your Excellency Sinikka Antila, Ambassador of the European Union to Namibia;

Senior Ministry of Environment, Forestry and Tourism Staff present here;

Dr Clemens von Doderer, Resident Representative, Hanns Seidel Foundation;

Distinguished invited guests;

Members of the media;

Ladies and gentlemen.

I am incredibly honoured by the invitation from the Hanns Seidel Foundation (HSF) and the Desert Research Foundation of Namibia (DRFN) to deliver a keynote address at this very important conference under the Theme The future of Namibia's Forests – Sustainable Forest Management as Key to Unlock its Potential. This gathering has come at an opportune time as Namibia is sharply focusing on the protection of our forests, which is central to our sustainability and economic development.

Permit me to begin by citing the Namibian Constitution, which is one of the most progressive constitutions in the world regarding the protection of environment. Article 95 states and I quote:

“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 guides the Ministry of Environment, Forestry and Tourism in its mandate to protect the environment, promote biodiversity conservation, ensure sustainable utilisation of natural resources and tourism development for the maximum social and economic benefit of its citizens now and in future.

The concept of sustainability is no longer on the margins but has moved into the mainstream and has done so at a lightning speed. It is now at the heart of not only the Ministry of Environment, Forestry and Tourism; but also, at the heart of policy, business, and social life.

Today's event is pulling together in a coherent way the next steps towards the future of our forests. Namibia has lost nearly 20% of its forest area during the past 30 years as a result of unsustainable use of our resources. However, Namibia remains committed to reverse this concerning trend by reducing deforestation and promote tree planting. To this end, the Ministry is strongly pondering to introduce a provision in our law that will compel everyone who harvest vegetation to plant more trees and care for them. With only 8 years remaining to reach our 2030 target as set out in the revised 'Nationally Determined Contribution (NDC)', Namibia is taking concrete actions to reduce the impacts of climate change. This noble endeavour cannot be left to the government alone and I therefore implore all stakeholders to join us in meeting this target.

Director of Proceedings,

Ladies and gentlemen,

Forests do not only play a major role in mitigating climate change. Many people in Southern Africa, and of course in the rest of the African continent and the developing world, depend on forests and forest products for their livelihoods. Sustainable forest management is thus essential to the alleviation of poverty. Forests also play a vital role in the vitality and growth of our respective national and regional economies. Forests are generally located in rural areas and are often the main source of jobs, building materials, energy, infrastructure, skills development, and business opportunities for these communities. The subject matter is therefore of great importance to all of us. It is imperative that we work together in dealing with the challenges of developing and protecting our forestry resources.

We must, therefore, take urgent actions to reverse the rate at which deforestation is taking place and aggressively embark on reforestation and afforestation programs. Now, more than ever, we need to pool our collective knowledge and experience, and commit to accelerating action towards better management of forest resources.

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 the implementation of the NDCs we set ourselves. 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 diseases. During the COVID-19 pandemic, forests provided us with essential health products – from masks, to cleaning supplies, and ethanol for sanitizers.

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

Director of Proceedings,

Ladies and Gentlemen,

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

In closing, Ladies and Gentlemen,

I would like to commend the Hanns Seidel Foundation (HSF) and the Desert Research Foundation of Namibia (DRFN) for bringing us together today to discuss this important subject of sustainable forest management. I wish you successful deliberations and it is my hope that this conference becomes part of an ongoing 'learning through sharing process' that will propel Namibia to promote a vibrant, sustainable, and socially conscious forestry sector.

I thank you.

# THE CONCEPT OF SUSTAINABILITY: SUSTAINABLE FOREST MANAGEMENT FROM A GERMAN PRIVATE FOREST LANDOWNER PERSPECTIVE

Lorenz Freiherr Klein von Wisenberg<sup>1</sup>

<sup>1</sup>International Family Forestry Alliance (IFFA)

Forestry is the cradle of sustainability - in the year 1713 Hanns Carl von Carlowitz, a forest landowner and an engineer of mining of the King of Saxony Germany, published a corner stone book called "sylvicultura oeconomica". Driven by an increasing scarcity of wooden materials for mining purposes von Carlowitz realised a sustainable forest management was needed to secure timber supply. "Do not use more than nature offers you on an annually basis" was the credo of land use at that time and is more actual than ever. 100 years earlier the head of a noble family called von Alvensleben faced a scarcity of acorns for feeding their pigs and a scarcity of timber for firewood use by an increasing number of family members. Thus, a regulation of land use for the family community was released 1619. The appreciation of benefitting from a viable forest for sustaining livelihood leads to a common understanding for a sustainable land management. Approximately 270 years later in 1987 the so called Bundtland report „Our common future“ picked up the topic and inflame a public discussion about sustainable development. At that time Mr. Bundtland was chair of the World Commission on Environment and Development UN. Later on, in the year 1992 the Conference on Environment and Development in Rio de Janeiro further defined the term sustainability more detailed in 3 pillars: economy, environment and society. Whilst referring to a viable sustainability the most important fact is not to outweigh or manipulate one of the pillars at the cost of the other - the pillars must be in balance given to the existing natural resources. But in order to finance maintaining the environmental and societal side sufficient financial revenue is literally required from the economic side. Therefore, the economical pillar carries a crucial role in balancing this system of sustainability.

Forests provide multi-functional values to our living on earth. They are home of rich biological biodiversity, protect soil and provide clean water and air. Also, from a socio-economic view, forests are of eminent importance especially in the rural areas by delivering building materials, fuel wood, medicine and providing food for human being and their animals. However, when we talk about forest we also talk about people. People living in and from forest are a very important asset for unfolding sustainable management. Sustainable management has to be understood, be practiced and be lived by people in line with given legal environmental and socio-economic circumstances. Three core preconditions such as knowledge about and understanding of sustainable forest management (SFM) as well an economically friendly environment of policy should be in place for strengthening the full power locally controlled forestry.

To the overall understanding an economically friendly policy can be characterised by

1. an appreciation of value of land as an asset as well the benefits of a multi-functional forest;
2. reliable, balanced and future orientated legal frameworks;



3. secured tenure and ownership rights;
4. guaranteed barrier free access to markets;
5. offering free education and advisory by government;
6. providing subsidy system as a steering instrument by government;
7. enabling and supporting establishment of locally controlled forestry and producer organisations.

All these aspects lead to promoting trust building process in reliable forest policy by stakeholders of SFM. This is in line with the Harambee Prosperity Plan focuses on public trust building.

In order to practise and maintain SFM three major aspects such as “appreciation, motivation and innovation” shall be developed by

1. appreciating the land value as an asset and its benefitting multi-functionality character to society;
2. rewarding efforts in growth and crop yield;
3. receiving fair prices for produce;
4. sustaining livelihood by own hands and from own land;
5. motivation and innovation by knowledge transfer and experience sharing;
6. promoting grass root and light tower projects by telling stories;
7. establishing producer organizations as self-helping bodies ;
8. enabling and enhancing locally controlled forestry;
9. adjusting and improving management to changing environmental and socio-economically conditions.

All these points and their interaction promote unfolding “responsibility, pride and passion” by stakeholder of SFM.

Since decades family forests practice the legacy of family forests by living the so called “contract of generations” which states “inherit land to possess it and manage it wisely as a trustee and give it to the next generation at least in the same condition but even better in an improved condition than you received it.” This is the secret behind long term possession within the same family – some families in Germany already over 800 years.

The core messages for unlocking the full potential of a viable SFM sum up in

- appreciation in what you own;
- responsibility and passion in what you do;
- pride in what you have achieved;
- trust in a reliable friendly economically environment of policies.

In order to protect nature, support eradicating poverty, sustaining livelihood and create perspectives for population in rural areas.

***“When we talk about sustainability in forests than we also talk about our future on earth!”***

# NAMIBIA'S FORESTS AT A GLANCE

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**ABSTRACT:** A forest is an area dominated by woody vegetation. Namibia's forests are found in the north-eastern part of the country and are estimated to be 8.1%. This forest cover is gradually reducing. Climate change, uncontrolled fires and illegal wood harvesting are some of the factors that are threatening our forests. Local communities, government and NGOs need to collaboratively manage these remaining forests. Empowering the community through livelihood enhancement can ensure sustainable forest management. Reforestation and fire management are also important for increasing the carbon sink which can act as climate change mitigation and adaptation.

## 1 Introduction to Forestry in Namibia

A biological community dominated by trees and other vegetation is referred to as a forest. Climate, geology, and human activity all influence the forest cover, which ranges from thick to dispersed vegetation. Forests provide vital ecosystem goods and services that are of international and local importance. Although Namibia is regarded as the driest country in sub-Saharan Africa, its woodlands provide consumptive and non-consumptive benefits. However, for these benefits to straddle over to the future generation, there is a need to enforce sustainable forest management.

## 2 The Status of Namibia's Forests

There are five vegetation biomes in Namibia [Figure 1]. The western and southern regions of Namibia, which are desert and semi-desert, are primarily covered by grasslands and shrublands. However, there are forests in the north-eastern region of the country [Figure 2]. These dry woodlands' size is only hazily understood. Namibian forests are referred to as tree savanna or woodlands on local vegetation maps [Geiss, 1998 & Burke et. al., 2002]. Overall, Namibia's forest cover has been gradually reducing over the past decades. The country's forest cover is anticipated by FAO [2020] to be 8.1% of the total land area, down from 9.7% in 2001.

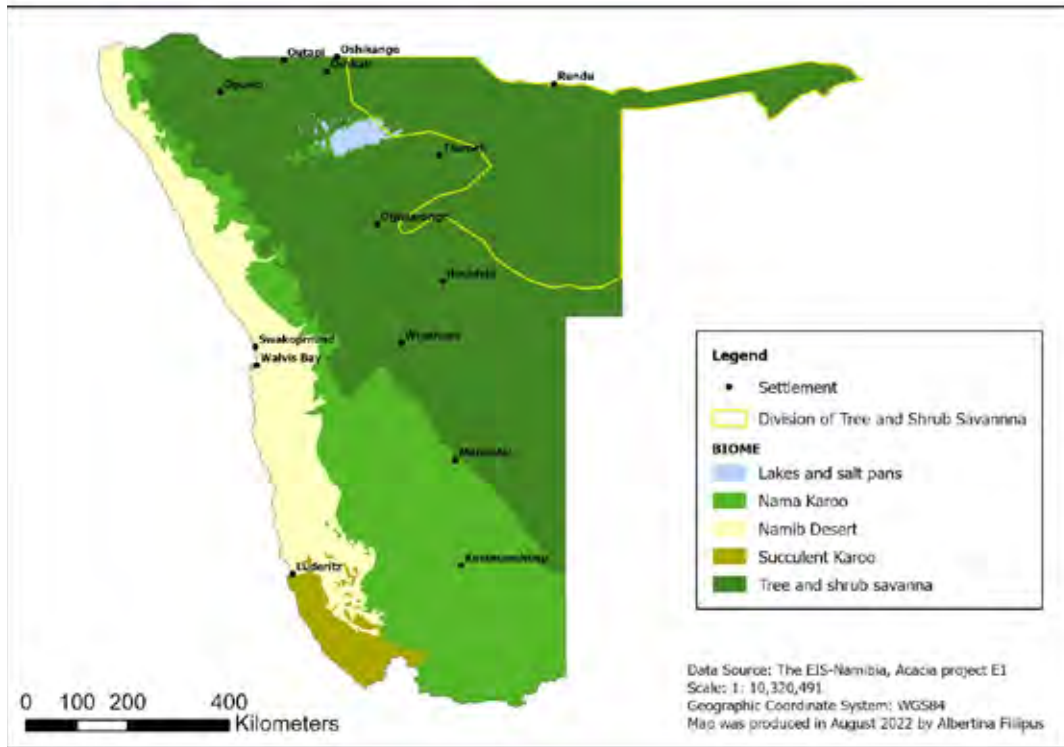


Figure 1: Biomes in Namibia

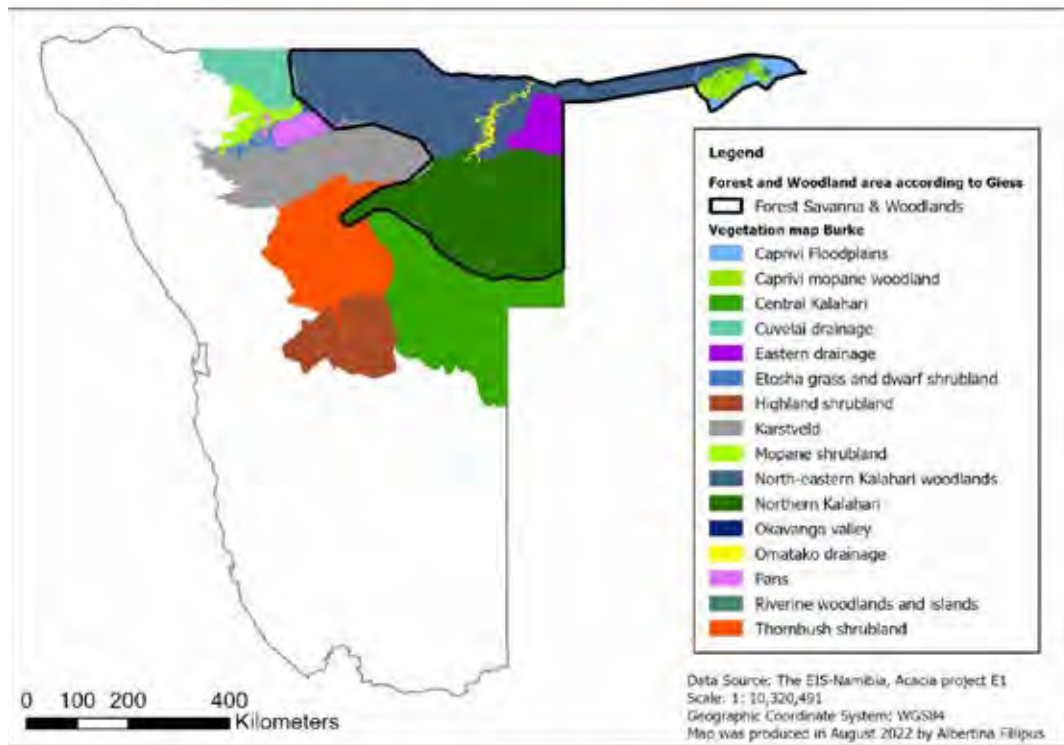


Figure 2: Forest and woodland in Namibia based on the vegetation maps of Giess [1998] and Burke [2002]

The Namibian forests are protected under the Forestry act 2001 (currently under review) and Regulations 2015. Figure 3 shows that there are 14 protected areas of which 7 national parks fall within the forested part of the country, 43 registered community forests (CFs) - with 2 recently gazetted CFs - bringing the total to 45 CFs. The three state forests are yet to be gazetted following the review of the Forestry Act of 2001.

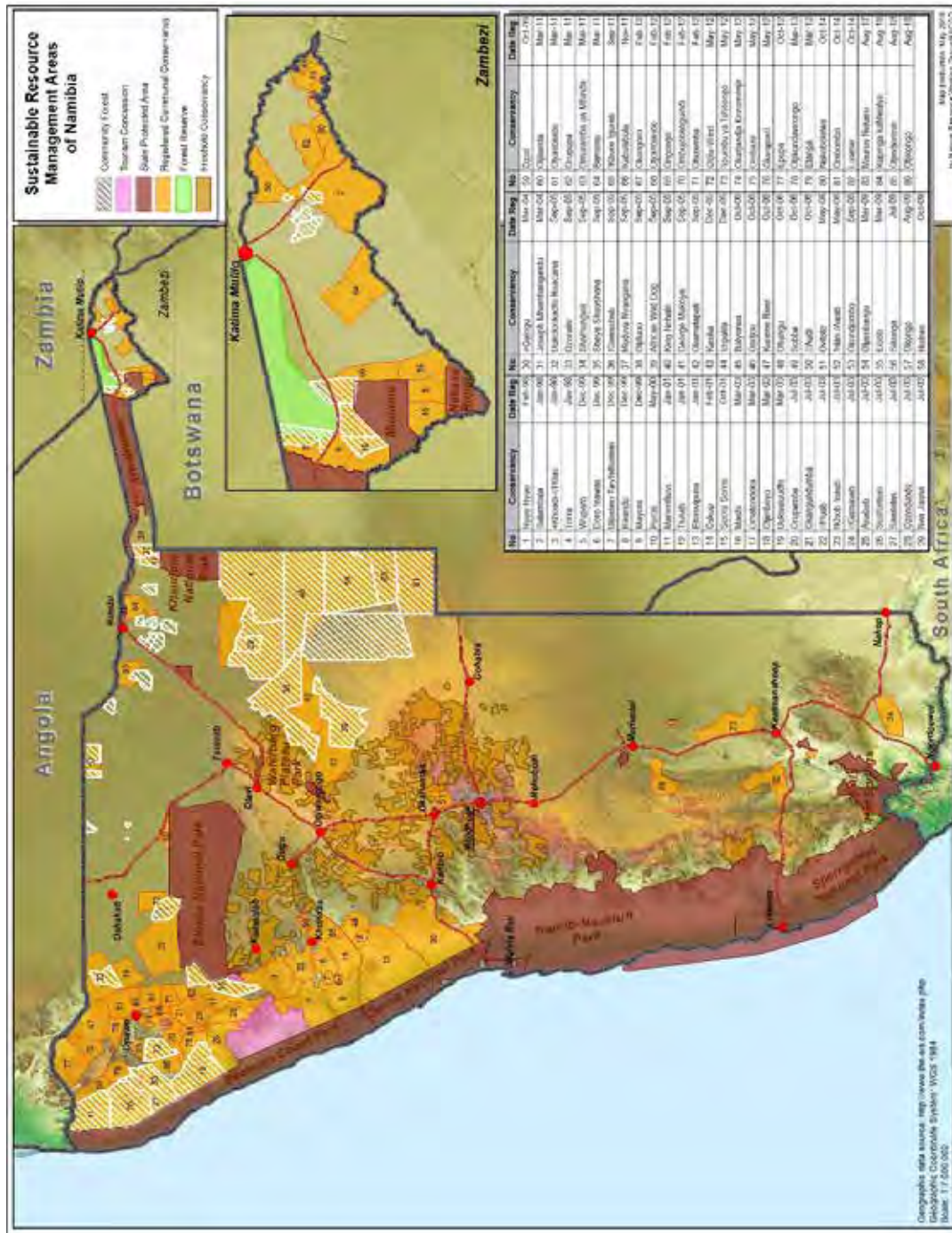


Figure 3: The sustainable resource management areas of Namibia. [Source: Namibian Association of CBNRM Support Organizations - NACSO]

### 3 Sustainable Forest Management

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Sustainable forest management advocates for environmental vitality, social welfare, and economic growth for both current and future generations. For us to better manage our forestry resources, there is a need for collaboration amongst relevant stakeholders and institutions. Local communities depend on natural resources for their day-to-day needs such as firewood and poles for building their rural homesteads. It is against this background that local communities could use resources unsustainably and that can contribute to the decline of our forest cover. Additionally, illegal harvesting of timber, uncontrolled veld fires and climate are some of the factors that pose threats to the ecological vitality of our forests. There is little to no natural regeneration of our forests because of climate change as well the uncontrolled and frequent fires.

#### 3.1 *Livelihoods Diversification in Community Forests*

Unlocking the potential of forests to enhance the livelihoods of rural communities is important to try and combat illegal timber harvesting. Communities in community forests can venture into botanical tourism such as guided ethnobotanical walks for plant enthusiasts. On those walks, the guide will talk about the plants, uses, ecology and any other cultural fascinating stories about the vegetation of that area and its species composition over time. This would form part of plant cultural heritage and plant awareness creation that may help people to appreciate the inherent value of plants. They can also generate income through the sustainable harvest of non-timber forestry products such as the sour plum seed for cosmetic products. They could investigate utilizing other species such as the Silver-cluster Terminalia [*Terminalia sericea*] for poles and sell to the local consumers, this species is fast growing, and it is regarded as an encroacher species in some parts of north-eastern Namibia. That is to divert them away from harvesting the slow-growing Timber species such as the Kiaat which could negatively affect the ecosystem and the species' existence in our woodlands.

#### 3.2 *Forest Rehabilitation*

While there is a perception that a forest can take for itself – the rate at which the forests are used does not allow natural forest recovery processes to take place. More trees are cut down with less planting, hence the need to assist forests to recover through reforestation and afforestation. Planting more trees can help increase the forest cover in return can serve as a climate change mitigation measure. There is a growing need to assist forests to regenerate and active management of veld fires to lower the mortalities for those tree species that cannot tolerate too much fire.

### 4 Conclusion

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In conclusion, the extent of the Namibian forests is vaguely known. However, the estimation of forest cover from general monitoring institutions are showing a gradual loss of forests. Forests form a very important part of many Namibians hence the need for sustainable forest management to ensure that these forestry resources do not run out. Diversifying income streams to communities that live in the forested areas could help communities to manage and benefit from the natural resources associated with forests. The planting of trees is necessary for increasing the carbon sink to mitigate climate change.

## Acknowledgement

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The author would like to thank the NSFM project team as well as the EU for pulling all the necessary resources together to make Namibia's forests great again.

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# THE FUTURE OF FORESTS: GHANA'S EU-FLEGT EXPERIENCE AS A TOOL FOR SUSTAINABLE FOREST MANAGEMENT

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**ABSTRACT:** The paper examines Ghana's experience with the implementation of the European Union's Forest Law Enforcement, Governance and Trade (FLEGT) initiative and its emerging impact on forest management. The study was conducted against the backdrop of swirling critical views on the impact of FLEGT and its effectiveness in addressing forest governance challenges. Given the limited scope within the context of the stated conference objective, this paper looked at some key forest management interventions, their outcomes and further examined technical reports, published articles and departmental papers. The paper further looks at the state of play of forest regulation and governance by interrogating data from the timber legality assurance technical systems as well as emerging information from the VPA impact-monitoring framework. The paper revealed that Ghana now has the necessary technical systems and institutions to deliver timber legality licenses and provide useful discussion points for timber-producing countries to leverage timber legality assurance systems deployed at the national scale to contribute to sustainable forest management. The paper concludes that given the benefits of an effectively implemented timber legality assurance system, FLEGT/VPA is more than a mere fad and has the potential to address key forest management, sustainability, and governance challenges.

## 1 Introduction

Realising its alignment with national forest policy aspirations, Ghana engaged in the European Union's Forest Law Enforcement, Governance and Trade (FLEGT) initiative in 2006 [MLFM, 2005; Beeko & Arts, 2010] and was the first country to complete negotiations and sign the Voluntary Partnership Agreement (VPA) in 2009. The high point of Ghana's attraction was founded on the construct of the initiative's stated purpose to reduce illegal logging and its associated trade in timber by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber [EU, 2003]. To achieve this purpose, countries entering into the agreement must be able to deliver or trade timber under legality licenses or FLEGT licenses.

A rather elaborate technical and institutional architecture must be put in place to enable a partner country to deliver these FLEGT licenses. First, an agreed definition of what constitutes legal timber as enshrined in country laws for which timber legality will systematically seek evidence. This will normally be a subset of the country laws and will include allocation of timber/logging rights through processing and transport, fiscal obligations as well as benefits sharing. Second, a system that checks that all the requirements of the legality definition have been met by all actors in the supply chain. This is the verification system. Third, a chain of custody system that enables the tracking of timber and timber products from a forest or point of import to a point of export. This should normally enable the identification and reconciliation of wood flows accompanied by the relevant documentation



throughout the supply chain. Fourth, a licensing authority that issues licenses acting on the reports of the verification of legality and last, an independent auditor that reviews and provides independent reports on the working of the entire institutional and technical systems delivering the legality licenses.

Since the inception of the FLEGT VPAs, twelve (12) other timber producing countries have followed Ghana into negotiating and/or signing the agreement with the EU [Thai-EU FLEGT, 2020]. To date, however, only Indonesia has been able to complete all processes to issue a FLEGT license. The seeming slow-paced approach by countries to reach the license completion point because of challenging in-country governance reform processes has attracted a rather enthusiastic army of critics of the initiative [Hansen et. al., 2018; Rutt et al., 2018]. Other researchers take a more lenient approach in analysing the efficacy of the initiative towards impacting illegal logging, forest governance and administration [Overdeest and Zeitlin, 2018; Cerutti et al., 2021].

This paper presents Ghana's experience with the FLEGT process after some thirteen years of implementing the agreement. It must however be noted that the limited scope of this article makes it impossible to address all the critical views that have swirled around the process. Given that the paper was delivered within the setting of a stated conference objective, it only seeks to highlight some forest policy interventions from a historical perspective in the context of Ghana's forest sector governance reforms under the VPA. It is anticipated that the paper will contribute to stimulating discussions on how timber-producing countries can use trade policy instruments such as the FLEGT VPA in a coherent and integrated manner to ensure sustainable forest management.

## 2 Material and Methods

### 2.1 The Study Area

Ghana's permanent forest estates consist of 266 forest reserves and 15 wildlife reserves distributed across the country in the form of government-controlled forest and wildlife reserves set up by the colonial administration between 1930 and 1950 and cover an approximate area of 3.5 million ha [FAO, 2003].

Between 1990 and 2010, Ghana lost an average of 135,000 ha of forest per year, corresponding to 1.9% per year [FAO 2010a, FAO 2010b]. This loss of forest cover in Ghana has been attributed to over-exploitation of timber, illegal logging, illegal farming, the complex nature of Ghana's land tenure system, illegal mining, unequal benefits-sharing system, weak institutions, inefficiency of the timber industry, and a lack of political will and commitment by governments [Tropenbos International-Ghana, 2007]. Still, others blame it on an inappropriate tree tenure system amongst others (Hansen, 2022).

This alarming trend in deforestation has prompted successive forest administrations and governments in Ghana to launch massive forest management interventions to reduce pressure on the natural forests which also serve as gene banks [Forest Resource Assessment, 2010]. The key policy interventions are discussed in the succeeding sessions.

### 2.2 Data Sources

A desk study approach was used to gather data and information on Ghana's forest policy interventions, management prescriptions, and forest law enforcement. The study also examined technical reports, published and unpublished articles by the Ghana Forestry Commission, departmental papers, forest policy documents, sustainable forest management practices, and forest regulatory frameworks and

compliances. This was done to, as best as possible, present an accurate historical context of the Ghana Forest Sector Policy Interventions undertaken to ensure sustainable forest management through the management, regulation and control of timber harvesting in Ghana. An interrogation of data from the timber legality assurance systems as well as information from the VPA impact monitoring framework was conducted to determine the state of play of forest management, regulation and governance as a whole.

### 3 Ghana Forest Sector Policy Interventions on Timber Exploitation

Some of the key forest management policy interventions in Ghana can be listed as the introduction of minimum felling diameters, felling cycle lengths, application of a reduce formula for harvesting (selective logging). Furthermore, forest policy controls such as log export ban, export levy were introduced to prevent overexploitation of certain species. These national regulatory reforms [Asamoah-Adam et al., 2006] could be classified as both technical and policy-related.

#### 3.1 Technical Reforms and Interventions

The application of felling diameter limits in Ghana commenced with the introduction of the Timber Protection Ordinance in 1907. Logging was mainly controlled through application of minimum felling diameters to prevent and protect the felling of immature trees [Taylor 1960]. These felling limits were revised in 1910, 1958, 1972, 1989, 1997 and 2019 [Ghartey, 1992; Ofosu-Asiedu et al., 1997; FC, 2019].

In the early 1990s, a 40-year felling cycle in forest reserves replaced the 15-year cycle implemented from 1971 [Baidoe 1970, Parren and de Graaf, 1995], which has since been revised to 30-year cycle for forests where total basal area of all stem greater than 10 cm is  $>20 \text{ m}^2/\text{ha}$  and 40 year cycle in forests where total basal area of all stem greater than 10 cm is  $>15 \text{ m}^2/\text{ha}$  [FC, 2019]. In 1994, a framework of “large-grained” and “small-grained” protection was introduced for the forest reserves [Hawthorne and Abu-Juam 1995, FIMP 1994a]. The former defines various area types (hills, swamps, etc.) within reserves that are under protection, and hence should not be logged. The reform significantly increased the area under permanent protection in the forest reserves. “Small-grained” protection measures encompasses restrictions on logging along watercourses, on steep slopes, in swamps and a maximum number of trees to be logged per hectare, depending on ecological zone [Planning Branch, 1995].

In ensuring sustainable forest management, a Star Rating system was developed to guide the exploitation and use of plant genetic resources in Ghana on a species-by-species basis. As a result, all species were classified along a gradient of abundance via rarity and endemism [Hawthorne, 1993]. In this regard, the Interim Yield Formula was developed to calculate the species-specific yield (maximum allowed harvest) in felling compartments of 128 ha within forest reserves. The star classification defined pink stars as species for which the recorded average harvest in 1989–94 is less than 50% of the estimated annual quota (calculated by applying the Interim Yield Formula on the national inventory results), red stars as species for which the extraction is between 50 and 200%, and scarlet stars as species for which the average harvest 1989–94 exceeds the annual quota by more than 200% [FSD, 1998]. As a control measure for star-rated species, any black star species cannot be felled under any circumstances, whereas gold, blue, and scarlet are restricted species that require a special permit from the sector minister to fell [TRMLLR, 2017]. The star classification is shown in Table 1.

*Table 1: Star rating of species in Ghana*

RATING	COMMENT
<b>BLACK</b>	Urgent attention to conservation of populations needed. Rare internationally, and at least uncommon in Ghana.
<b>GOLD</b>	Fairly rare internationally and or locally. Ghana has some inescapable responsibility for maintaining these species
<b>BLUE</b>	Widespread internationally but rare in Ghana, or vice versa
<b>SCARLET</b>	Common, but under pressure from exploitation. Exploitation needs to be curtailed if usage is to be sustainable. Protection on all scales vital.
<b>RED</b>	Common but under pressure from exploitation. Need careful control and some tree-by-tree area protection.
<b>PINK</b>	Common and moderately exploited. Also, non-abundant species of high potential value.
<b>GREEN</b>	No particular conservation concern

*Adapted from Hawthorne and Abu-Juam (1995); Hawthorne [1996]*

For off-reserve areas, District Felling Quotas were introduced, specifying the maximum number of trees per species that may be felled annually within a given administrative unit (forest district) [Planning Branch, 1999]. Based on this regulatory framework and the results of the first national on-reserve and off-reserve timber inventories carried out in the same period, FIP [1989] and FIMP [1997], a national regulated harvest level, the Annual Allowable Cut (AAC) of 1 million m<sup>3</sup> (500,000 m<sup>3</sup> each for on and off-reserve) was calculated and endorsed in 1995 [Planning Branch, 1999].

### **3.2 Forest Policy Controls on Timber Harvesting**

Ghana launched aggressive economic development policies in the mid-1990s with the goal of prioritizing the processing of secondary and tertiary wood products for export. The implementation of these policies resulted in the ban of round log exports. The rationale for the ban was to stimulate growth in the secondary and tertiary sectors of wood processing firms in order to generate more revenue from timber product exports while also reducing the rate of over-exploitation of timber. Through the Economic Recovery Programme (ERP), soft loans in the amount of US\$140 million were made available to some-identified timber companies in order for them to purchase new equipment and materials [Birikorang et al., 2001; Hansen et al., 2009]. The wood industry was back on its feet, the number of log exporters grew from 90 to 300 at the end of the 1990s. The industry remained mainly export-oriented with the local market virtually neglected leading to wood supply deficit on the domestic market [Agyeman et al., 2007].

In filling the demand supply gap on the domestic market, legal backing was given to chainsaw lumber production in 1991 by the Trees and Timber Regulations (LI 1518). This was an attempt to satisfy the increased demand for lumber through a permit system and to ensure that social responsibility agreements, environmental and ecological issues were implemented in order to ensure sustainability of wood supplies from off-reserve areas. However, this was abused, and Chain-sawing

was consequently outlawed in 1997, LI 1518 was repealed by the Timber Resources Management Regulation (TRMR), LI 1649 of 1997 enacted to ban chain-sawing. In accordance with the TRMR, saw-millers have been directed to supply domestic markets with 20% of their production. Yet, this regulation is not effectively enforced as international market prices are higher than domestic prices, the large majority of sawmill production is exported [Carlsen, 2014].

#### **4 The Regulatory & Governance Environment – Pre FLEGT:**

This section gives a quick overview of the state of play of forest management prescriptions pre FLEGT VPA. While the policy interventions succeeded in delivering the short to medium terms objectives, some far reaching unintended impacts were also introduced into forest sector environment. The ban on export of round logs, for instance, not only brought windfall profits to the secondary and tertiary product exporters but created a shortage in supply of industrial timber to the domestic market [Birikorang et al., 2001]. This vacuum had to be filled. This was the beginning of the upsurge in supply of timber to the domestic market through illegal logging. At the time of introduction of the VPA in 2006, over 80% of lumber supplied to the domestic market was illegally sourced [Marfo, Adam and Obiri, 2009; TIDD/FORIG, 2009]. The law requiring exporters to place 20% of their production on the domestic market could not be implemented effectively and therefore had negligible impact on the supply deficit on the domestic market.

The forest regulatory authorities were saddled with the challenge of controlling illegal logging, an unexpected outcome of an otherwise well-intentioned policy intervention. The corollary of this was the potential of mixing of legal and illegally sourced timber which watered down legality claims. Additionally, consistent year to year over-harvesting that was determined to be some 300% of the annual determined cut [Hansen et al., 2012; Marfo, 2010] was militating against the policy aspiration of sustainable forest management. The absence of a robust chain of custody and verification system also meant that the monitoring of restricted species which protection is backed by law was weak in its enforcement. As a result, the well-intentioned objective of guiding the exploitation and use of plant genetic resources in Ghana on a species-by-species basis was also under threat. Species substitution, felling below the felling limit and felling outside the yield were other practices that militated against sustainability. With these resulting gaps in wood flow data capture, loss in revenue was another obvious consequence of the inadequacy regulatory controls.

Command and control measures by the task force teams to control movement of illegal timber at the forest gate and on the road became common place. This was within a policy-making regime that lacked adequate participation by non-state actors. Consequently, challenging governance issues such as timber rights allocating still retained open ended governance questions. This was the state of play as Ghana entered into the initiative.

With exports from Ghana to the EU topping sixty percent in volume and value [Beeko and Arts, 2010; Oduro, 2016], it was important to address the roadblocks to achieving legality of consignments to that market. In doing this, it was anticipated that given the construct of the initiative, the regulatory and governance challenges confronting the forest sector could be addressed.

#### **5 Discussion**

Thirteen years after signing the agreement, Ghana now has the requisite technical systems and institutions to deliver timber legality licenses. A 2020 report [MLNR, 2020] of the joint assessment of Ghana Legality Assurance System (GhLAS) lists some five major non-compliances. This list of five

has now been effectively whittled down to one, namely, the completion of the conversion of extant leases and permits to timber utilization contracts. The leases are administratively allocated and sits under an old legal regime while the contracts are given under open competitive procedures. Without presenting the FLEGT VPA as a panacea for all forestry ills, as has been argued by some authors [Hansen, 2022; Hansen, Rutt and Acheampong, 2018], a modest attempt can be made at examining the regulatory and governance challenges of the forest sector in the light of the newly established timber legality assurance system. This examination is done within the confines of the scope of this paper.

The implementation of the chain of custody system, the Ghana Wood Tracking and Decision Support System (GWT-DSS), as well as the introduction of the legality verification system gives the opportunity to not only trace timber and timber product consignments from point of sale to point of harvest but also determines whether the consignment has complied with all relevant legal provisions. Meeting due diligence information requirements of external markets, EU not least, is now a possibility. In addition to these new derivatives, the systematic accumulation of forest management and legality data in an online electronic database opens new opportunities for understanding the dynamics of forest management information that had been hitherto hidden in plain sight. The annual allowable cut, for instance, can be tracked throughout the year in real time giving the opportunity to the forest administration to make the relevant adjustments. These forest management and business analytics are made easy using dashboards in the GWT-DSS. Interrogation of harvest data easily distinguishes the rate of exploitation of the species. It is therefore possible to now obtain management information on the status of compliance to the exploitation of the restricted species, the control of the use of plant genetic resources.

The near real time capture of wood flow data combines with the legality audits to bring out the status of compliance of loggers with their stumpage payment obligations. Between 2019 and 2021, a total of GHC 12,275,574.11 (equivalent of USD 2,189,627.34) was detected and reported as corrective action requirements (CARs). Out of this, GHC 11,861,995.07 (USD 1,873,065.07) was eventually paid, accounting for 85.5%. The impact on revenue collection is expected to improve as transparency in the operation of field offices is sustained.

The opportunity to make intelligent interventions with the benefit of the electronic tracking and decision support system make the rather blind application of command-and-control measures less and less relevant. Going forward more resources can be channelled to direct forest management activities instead of expensive constant 'blind' road surveillance.

In addition to the technical narrative above, it is worthy of mention that a 2021 multi-stakeholder survey and desk study conducted under the impact monitoring framework of the VPA [FC, 2021] reported interesting shifts in the governance environment. Respondents, cutting across state actors, civil society and industry/private sector operatives comparing a 2008 scenario to 2021 concluded that besides the practice of timber right allocation and the capacity of the adjudicating body (the Timber Validation Committee, TVC), all other indicators showed positive movement in governance. These indicators were the monitoring of the supply chain, monitoring of forest management, quality of forest management, effectiveness of decisions, accessibility of complaints resolution services and the legal basis for forest transparency among others with the latter two scoring the highest.

## 6 Conclusion

Viewed within the confines of the objective for its introduction, to wit: reduce illegal logging and its associated trade in timber by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber, the outcome so far of the FLEGT VPA makes a compelling case for consideration. The introduction of an elaborate timber legality assurance technical system as pertains under the FLEGT VPA certainly opens new opportunities for improved regulation and management of the forest resource. As the system is laid down and operated with continuous improvement in quality, new possibilities show up all of which add to insights for better forms of forest regulation and governance. With the benefit of past and/or pre-existing forest sector initiatives such as tropical forest action plan, forest resource accounting, and forest certification among others, an examination of the shift in the governance environment makes the FLEGT VPA no fad [Rutt et al., 2018]. Given the dynamism of management systems enabled by exponential growth in knowledge, FLEGT will certainly will not be the last of such forest sector initiatives.

The benefits of an effectively implemented timber legality assurance system (TLAS) goes way beyond the delivery of legality licenses. When well implemented, it has the potential to address key forest management, sustainability and governance challenges.

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# HOW TO CREATE ADDITIONAL INCOME THROUGH CO<sub>2</sub>-CERTIFICATION?

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**Abstract:** True climate neutrality, which has been set for 2045 at the latest, will not be achievable without compensation of so far unavoidable emissions. About 1/3 of the forests in Northern Namibia is diminished since 1990. Deforestation and severe degradation continue!

Namibia got the unique chance to protect its endangered dry-forest yet financed through international traded CO<sub>2</sub>-certificates at no own costs but additionally gain a remarkable income for its own communities e.g. conservancies!

## 1 Worldwide Climate Crisis is a Fact – Our Planet Earth is Heating Up!

True climate neutrality, which has been set for 2045 at the latest, will not be achievable without compensation of so far unavoidable emissions.

This is widely realised and accumulates in the international agreements from Kyoto to Paris. Their extended protocols demand drastically steps towards climate neutrality as soon as 2045.

How can we reach this ambitious goal?

FIRST + most important: avoid any emissions!

SECOND – Worldwide pollution issuers will be forced to “compensate” unavoidable emissions by buying CO<sub>2</sub>-Certificates on the international market. The aim is to avoid emitting CO<sub>2</sub> and motivating emitters to clean up their production processes!

OUR FOREST is our most successful tool to archive climate neutrality! Forest carbon removal by CO<sub>2</sub> sequestration and Green House Gas removal performance is the most important sink under human management! From now on this will be honoured + can literally be cashed in by CO<sub>2</sub>-certificates!

## 2 Namibian Forest

About 1/3 of the forests in Northern Namibia is diminished since 1990. Deforestation and severe degradation continue!

OUR FORESTS play a fundamental role in the fight against CLIMATE CHANGE!

The protection of the remaining forests and the improvement of ecosystem services is of paramount importance both regionally and nationally.

The influence on the precipitation regime and the threat of warming in Central and Southern Namibia with progressive desertification as a result cannot be denied.

This negative scenario has to be turned around immediately!

### 3 A Huge Chance for Namibia

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Namibia got the unique chance to protect its endangered dry-forest yet financed through international traded CO<sub>2</sub>-certificates at no own costs but additionally gain a remarkable income for its own communities, e.g., conservancies!

Looking at our - at least partly still original - Dry-Forest in Northern Namibia as a unique and sensitive ecosystem => it might be difficult to enable sufficient funds for the management, protection and especially rehabilitation of forest with forest products alone.

Non-wood forest products and cultural and environmental services, as well as carefully and sensitive managed eco-tourism are of great importance and should not be declined but have as well limited markets.

CLIMATE PROTECTION SERVICES, i.e., the function of forest as carbon reservoir and Green House Gas (GHG) sink, plays a central role in the fight against climate change and is therefore internationally sought after and PAID FOR!

### 4 Basic Idea: Carbon Conservancies

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CO<sub>2</sub>-removal certificates provide a new income opportunity for forest custodians!

CARBON CONSERVANCIES will generate a long-term income only by taking care of their own forest - they are becoming custodians of their trees! Even degraded forest areas of the Dry Forests can still achieve an increased sink capacity of estimated 1 - 2 t biomass per ha and year:

- 1 t for reduced emission from deforestation and degradation
- 1 t for growing biomass

Market value of this increase via corresponding certificates is currently at least € 20 - 50 and much higher on the regulated market (ETS) with up to € 80 - 100. In this respect, such a CARBON CONSERVANCY can generate an income of € 20,000 - 50,000 annually (!) on an area of 1,000 hectares. Through direct participation, the community experiences a monetary improvement. A higher sum can be called up with each tree protected or planted or a proportionate loss with each felled tree!

### 5 Alternative Approach: External Investor

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An investor "takes a lease" for a corresponding forest area and runs and finances afforestation initiatives - in cooperation with the forest administration and the local population. In return, the investor can credit the associated sink service to himself/his company over an agreed period of time.

Such a model is widely implemented in Europe in order to reforest large areas on calamity areas at no cost to the owner. For Namibia, this could result in scalable financing for afforestation projects.

### 6 Requirements - Way Forward

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Up to date a FOREST INVENTORY is urgently needed!

All of the financing options mentioned above are based on current FOREST INVENTORY adjusted to the desired certification on the international market. Only the latest, reliable forest data enable a reliable baseline for further calculations and successful planning.

Modern data collection - REMOTE SENSING METHOD - e.g., based on micro light, drones or satellite, can also reliably map large areas. The latest techniques and programs should be made available to the Namibian partners in order to support them in future-orientated forest data collection.

The CARBON CONSERVANCY project can be taken over by Namibian partners at relatively short time. In addition, the project would have a significant role model function and radiance into regions with comparable conditions. Similar projects are already launched in e.g., Zambia, Ethiopia, Kenya.

## **7 Summary - Why CO<sub>2</sub>- Certificates?**

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The positive reverse of degradation and destruction of the Namibian dry forests only through external financing via international certificates for the benefit of Namibia and it's people!

Large-scale afforestation projects - the most efficient option to increase Green House Gas (GHG) removals - can be financed externally via certificate trading.

Both the protection of existing forests and reforestation projects, help the Namibian state to fulfil the Nationally Determined Contributions (NDC) on how to fight climate change by reducing emissions - and increasing GHG removal.

We have a steadily growing CO<sub>2</sub> market, ranging up to currently average of 85 €/Certificate. (1 certificate equals to 1 removed tonnes CO<sub>2</sub>, equals roughly to 1 m<sup>3</sup> timber).

## **8 About WALDZERTIFIKATE INT. GmbH (Forest Certificates Int. GmbH)**

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Waldzertifikate Int. GmbH was founded by Dr Forest. Joachim Krug and Dipl. Des. Raphael Scriba as a scientifically and internationally operating service provider for sustainable forest management for forest owners, enterprises and investors.

Dr Forest. Joachim Krug has been working for over two decades as a scientific advisor on the protection and sustainable management of forests worldwide with main focus in evaluation of forests especially in the changing importance of forests in the context of climate change, taking into account ecological and economic interests. On behalf of the Federal Ministry of Food and Agriculture in Germany he was scientific advisor to the delegation at the climate negotiations (COP 7 to COP 13) from 2007 to 2013 and is appointed by TÜV Nord - the only verifying validing body (VVB) in Germany - as an external technical expert and responsible for all verifying certification processes.

Dipl. Des. Raphael Scriba has been living and working parallel in Namibia and Germany for 30 years and looks back on an extensive expertise in project management. His portfolio includes long-term cooperation with many NGOs such as Medicines Sans Frontiere, WHO, GIZ, Goethe Institut, Misereor, Menschen gegen Minen e.V., etc. and has been working in all areas of creative, strategic communication and investigative journalism for international media and television stations.

# EFFECTS OF SEED PRE-TREATMENTS AND LOW-COST TISSUE CULTURE ON GERMINATION OF *PTEROCARPUS ANGOLENSIS*, *STRYCHNOS COCCULOIDES* AND *GUIBOURTIA COLEOSPERMA* FOREST TREES

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**ABSTRACT:** *Pterocarpus angolensis* (Kiaat), *Strychnos cocculoides* (Monkey orange) and *Guibourtia coleosperma* (False mopane) are three socio-economically important indigenous species for rural communities in the northern regions of Namibia. The exploitation of these indigenous species is causing rapid declines in the goods and services produced. In addition, nursery experiments to assist the germination of these indigenous woodland trees are limited. This study aimed at investigating the impact of six pre-treatments (control, cold water (15 °C), warm water (50 °C), hot water (90 °C), scarification and chemical with 32 % HCl) and tissue culture technique on the seed germination of both species. Germination results indicated a significant difference between the six pre-treatments but were more pronounced for *S. cocculoides*. Tissue culture results indicated a higher seed germination percentage (80 %) than traditional nursery (23 %). The number of days from incubation to germination also decreased (from 30 to 6 days) with the tissue culture techniques for both species.

## 1 Introduction

The Namibian woodland indigenous tree species are important to rural communities in the country. They provide woody and non-timber forest resources such as vegetables, fruits, and traditional medicines. *Pterocarpus angolensis*, *Guibourtia coleosperma* and *Strychnos cocculoides* are examples of indigenous tree species found in Namibian woodlands. These trees are preferred for their wood products (timber and firewood), and fruits. However, these species are reported to be depleting due to over exploitation in many parts of the Namibian woodland [Botzat et al., 2015; Akinnifesi et al., 2008; Moses, 2013]. The regeneration of these species is hampered by poor and erratic seed germination and slow growth rates in the country [Moses, 2013]. In addition, animal browsing, fire and land clearing for agricultural purposes have equally contributed to indigenous tree

species exploitation. The Namibian government is committed to natural and artificial regeneration (tree propagation methods) of commercially important indigenous species [DoF, 2011] through research and conservation of genetic resources (*in situ* and *ex-situ*) [Sweet and Burke, 2006].

Conservation and restoration measures in natural forests and woodlands are essential for sustainable resource use and socio-economic development of rural communities in countries like Namibia. Previous experiments for improving the seed germination of *P. angolensis*, *G. coleosperma* and *S. cocculoides* with conventional/traditional nursery methods showed little success [Moses 2012; Mojeremane et al., 2016]. The seeds are reported to be difficult and take longer to germinate in the nursery. Thus, there is a need for more studies on this area to expand the inadequate pool of results available. There is also a need to establish germination protocols for the indigenous species and to provide well-documented information on germination techniques that can be applied and eventually assist safeguard these species. Furthermore, re-introduction of indigenous species back to their natural habitat is essential for the conservation of indigenous species, especially for species with a small remaining population [Hartmann et al., 2011].

This study investigated six pre-treatments (control, cold water, warm water, hot water, scarification and chemical) to improve the germination of two indigenous species (*S. cocculoides* and *G. coleosperma*) from Namibia. It further investigated tissue culture as an alternative method, not only to improve seed germination but also to reduce the germination period for these important species. The objectives of the study were: (1) evaluate the impact of pre-treatments on the percentage of seed germination of *S. cocculoides* and *G. coleosperma* and (3) determined whether tissue culture technique improved germination potential in both species, as compared to the traditional nursery germination method.

## 2 Methods

### 2.1 Pre-Treatment Experiments

In total, 360 seeds (180 per species) were used in the pre-treatment experiments after the viability tests. The pre-treatments were divided into four groups: mechanical (rubbing the seeds between two sheets of medium-grained sand paper to remove the outer coat or test without injuring the embryo) also referred to scarification; soaking seeds in cold (15 °C), warm (50 °C) and hot (90°C) distilled water for 24 hours; chemical (immerse seed in 32% HCl for five, 10 and 20 minutes respectively); and control (no treatment). After each treatment, the seeds were rinsed thoroughly for about 5 minutes with cold distilled water to remove all the acid.

The seeds were sown and germinated in a normal nursery soil (sand and clay soil ratio of 1:2) under controlled laboratory conditions (*in vitro*) in an incubator (LTIS 1400). The temperature was kept at 25 °C based on previous studies [Hines and Eckman, 1993; Rasheed et al., 2015; Mwamba, 2006]. Growth lights were kept under photoperiods of 12 hours light and 12 hours dark, while seeds were watered daily to keep moist. The number of germinated seeds were documented weekly for seven weeks. The seeds were considered germinated when the embryonic plant began to grow, and the seed coat emerged from the normal nursery soil substrate [Hartmann et al., 2011].

### 2.2 Tissue Culture Experiment

*In vitro* tissue culture experiments were performed under controlled laboratory conditions. To establish a robust tissue culture recipe for micro-propagation of the two species, four factors which are expected to influence germination success [Hartmann et al., 2011] were considered. These include

different explants in *P. angolensis* (buds, embryo, seeds with and without coats) and in *S. cocculoides* (buds, embryo, fresh and dry embryo), two pH levels (5.5 and 5.8) of the agar medium, and agar medium (with or without added growth hormones). Surface sterilisation of explants with different methods (using distilled water, NaOCl, ethanol and flame), was compared.

### 3 Results and Discussions

#### 3.1 Pre-Treatment

Germination results indicated a significant difference between the six pre-treatments but were more pronounced for *S. cocculoides* than for *G. coleosperma*. For *Strychnos cocculoides* seeds, warm water (80%), cold water (70%) and untreated (control) seeds (63%) yielded a greater percentage germination than hot water (40%), scarification (3%) and HCl-chemical (0%) after seven weeks of germination. For *G. coleosperma* seed, warm water (83%), cold water (80%), untreated seed (80%) and hot water (70%) produced the highest percentage germination; somewhat different from chemical (67%) and scarification (67%) pre-treatments.

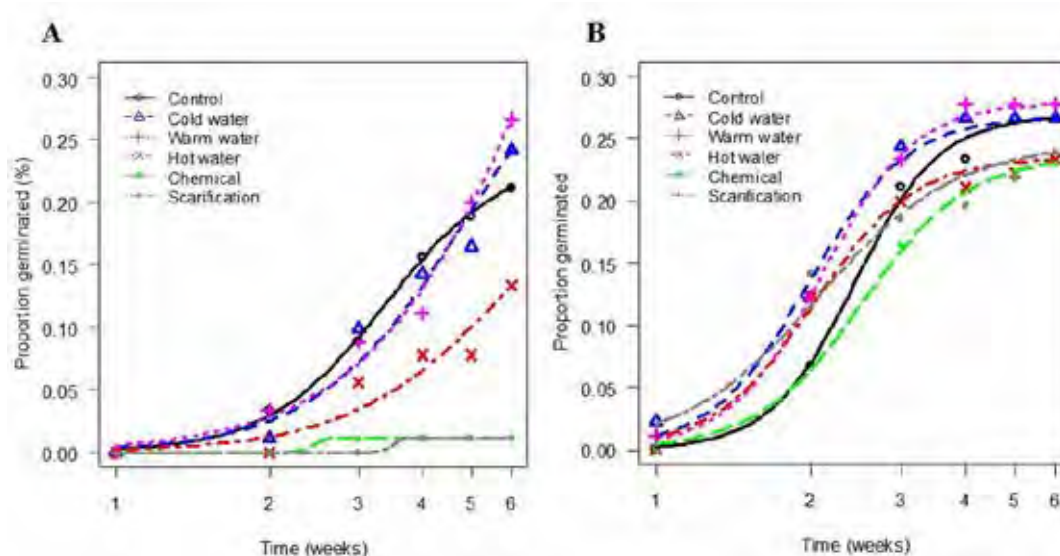


Figure 1: Observed germination (points) and fitted germination curve of *Strychnos cocculoides* (A) and *Guibourtia coleosperma* (B) seeds. Trends in the observed fraction of seeds that germinated as a function of time for the six pre-treatments used in this study are shown with a log scale for time.

The study findings have shown that the soaking seeds in water for 24 hours was the more effective mean to obtain rapid germination, with high number of seeds germinating compared to the chemical and scarification pre-treatments.

#### 3.2 Tissue Culture

The results indicated that tissue culture had a higher seed germination percentage (80%) than traditional nursery (23%). The number of days from incubation to germination also decreased (from 30 to 6 days) with the tissue culture techniques. For both species, the highest plantlet length was observed with explants extracted from seeds (i.e., embryo and seeds without coats), agar media without hormones and with pH 5.8.

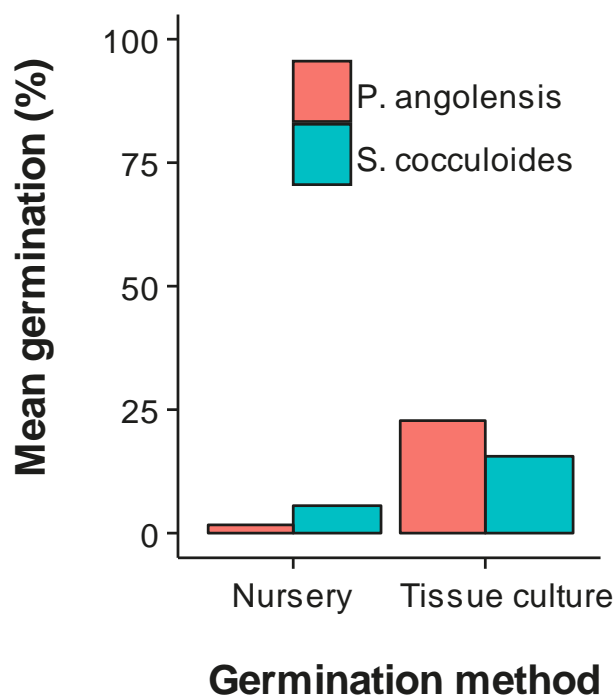


Figure 2: Mean germination percentage recorded per week over 10 weeks period from the nursery and tissue culture methods for *Pterocarpus angolensis* and *Strychnos cocculoides* seeds

Tissue culture techniques increased the germination percentage in both *P. angolensis* and *S. cocculoides* compared to traditional nursery techniques. *P. angolensis* had a germination percentage of 80% and 7%, while *S. cocculoides* had 80% and 23% for tissue culture and nursery experiments respectively. Furthermore, an average of 15 *S. cocculoides* and *P. angolensis* plantlets were produced on a weekly interval with the newly developed tissue culture protocol. The higher germination percentage obtained with the tissue culture experiments, was consistent with findings from previous studies which obtained 47.2 and 48 germination percentages respectively [Van der Heyden, 2014; Chisha-Kasumu et al., 2006].

## 4 Conclusions

Pre-treatment of the seeds is essential for promoting and shortening the germination period in many indigenous tree species. The current work explored and investigated different pre-treatments during germination of *S. cocculoides* and *G. coleosperma* species from the Namibian woodland. Based on the results, there was no pronounced significant difference in germination between no treated (control) and pre-treated with cold and warm water seeds in both species. Although the latter may imply that germination can still occur even when the seed are not pre-treated, pre-treatments can improve high and fast germination rate and can avoid uneven germination distribution.

In contrast, both sexual (nursery germination) and vegetative propagation (tissue culture) for *P. angolensis* and *S. cocculoides* were evaluated. *P. angolensis* and *S. cocculoides* were being propagated with standard nursery propagation techniques, which continuously reported to yield



limited germination rate. Therefore, a robust tissue culture protocol which was developed during the study is crucial to improve the germination percentage of both species under in vitro conditions as an alternative method.

## 5 Acknowledgement

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

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## Project Background

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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 ....

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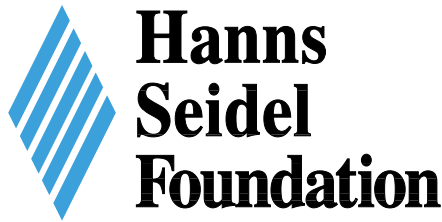
- Expand public understanding of the concept and benefits of SFM, particularly amongst core target groups including Civil Society Organisations (CSOs), political and traditional decision-makers, Community Forest members, and youth representatives, the latter who may serve as multipliers.
- Strengthen 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



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 adaptation. 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.

