



Contrast between rangeland with regular bush control (front) and intense bush encroachment by woody species (back) in central Namibia.

Photo: Otjiwa Safari Lodge

Namibia's bush business

Bush encroachment has negative effects on ecosystem services and reduces agricultural productivity. However, the bush biomass can be used for economic gain. In Namibia, farmers, entrepreneurs and technology companies are now buying into the enormous potential of this biomass. A joint project of the Namibian Ministry of Agriculture, Water and Forestry and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is translating the problem of bush encroachment into an opportunity.

By Ina Wilkie and Asellah David

Namibia's national anthem tells a story of freedom fight, love and loyalty. It praises the "contrasting beautiful" country and the "beloved land of savannahs". Sadly, many areas in Namibia are not open expanses of grassland anymore. They have turned into thickets of thorny bush. The phenomenon is called bush encroachment and occurs across the savannah biome globally. Bushes, in Namibia predominantly indigenous acacia species, spread and form impenetrable thickets.

More than 30 million hectares are considered to be bush encroached in Namibia. This is a third of the country – an area roughly the size of Italy. Bush encroachment is largely anthropogenic. Inappropriate rangeland management practices such as overgrazing and the suppression of fires have been identified as the main causes. Further ones include the increase of CO₂ in the atmosphere and changes in precipitation patterns due to climate change.

Bush encroachment creates a number of environmental and economic challenges, and the quality and quantity of grass decreases. In extreme cases, the carrying capacity of farmland is reduced to one-tenth. Bush encroachment has resulted in a decline in Namibia's agricultural productivity by two-thirds in recent decades. The landscape looks monotonous, biodiversity decreases, and it becomes difficult to spot wildlife. This potentially has a negative impact on tourism, which is a very important industry for the country. Hydrological studies also show that bush encroachment has a negative effect on groundwater recharge as bushes evaporate significantly more water than grass.

Turning a challenge into an opportunity

Controlling bush on rangeland is a huge challenge. The vast lands are difficult to access,

thorny bushes are hard to handle, and most species are known to coppice stubbornly after felling. However, today in Namibia, the tide is turning. Namibians are starting to see the land – and the bush – with new eyes: Encroacher bush can be high quality biomass for a number of value chains. Farmers, entrepreneurs, technology companies and financiers are buying into the biomass opportunity. Academia and government are starting to realise the value of a bioeconomy for Namibia.

The Namibian government is in the process of creating an enabling policy environment for bush control and biomass utilisation. In the current National Development Plan (NDP5, 2017–2022), bush control is a national priority. The plan is part of the Namibian "Vision 2030" and identifies steps for economic progress, social transformation, environmental sustainability and good governance. Through sustainable land management practices, the



In-field training by the De-bushing Advisory Service on bush-based animal feed production from encroacher bush.

Photo: DAS

country strives to achieve land degradation neutrality and optimal land productivity. Restoration of bush encroached lands and the sustainable management of rangelands are the main priority programmes under this strategy.

Owing to the multi-sectoral relevance of the topic, a project steering committee led by the National Planning Commission was convened already in 2014. The committee comprises government and private players, including the Ministry of Agriculture, Water and Forestry, the Ministry of Environment and Tourism, the Ministry of Mines and Energy, the Ministry of Industrialisation, Trade and SME Development, the national energy supplier NamPower, as well as the newly formed Namibia Biomass Industry Group (N-BiG).

To control bush in the long term, a sustainable approach to land management is critical. With its National Rangeland Management Policy and Strategy (2012), Namibia has introduced a policy based on principles of good rangeland management which provides for long-term sustainability. The policy has received international recognition for its holistic approach. Farmers were involved in the development and are at the core of implementation, through farmers' associations and under the umbrella of the Namibian Agricultural Union.

The promotion of bush control and of biomass value chains is also a central component

of development cooperation between Namibia and Germany. A "Bush Control and Biomass Utilisation" project (BCBU, 2014–2021) of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in cooperation with the Namibian Ministry of Agriculture, Water and Forestry has been established. Within this cooperation, political framework conditions and approval processes for sustainable bush harvesting and utilisation are continuously being developed and implemented. Furthermore, support organisations for farmers and industry have been set up: The "De-bushing Advisory Service" is a knowledge centre for farmers and entrepreneurs; the above N-BiG is an industry association representing Namibian biomass producers.

Namibia has created regulations to ensure the sustainability of harvesting operations, including a set of approval processes for harvesting permits and environmental clearance. The Forestry Directorate of the Ministry of Agriculture, Water and Forestry and the Environmental Affairs Directorate of the Ministry of Environment and Tourism manage these approval processes.

Certified charcoal from high quality hardwood

To date, the largest demand for biomass is created by the oldest value chain, the charcoal

sector. The Namibian government has identified charcoal as one of the ten strategic industries for Namibia's Growth at Home Strategy. The support is facilitated by the Ministry of Industrialisation, Trade and SME Development with various public and private sector stakeholders. Globally, Namibia ranks fifth in the export of charcoal and exported close to 200,000 tonnes in 2019. The charcoal is thriving on international markets as consumers are increasingly environmentally conscious. Charcoal made from Namibian hardwood is not only a high quality product, it is definitely not made from tropical wood and not connected to harmful deforestation. Rather, it contributes to rangeland restoration. In addition, there are positive social aspects as charcoal production also has an enormous employment potential for the country. The sector already employs more than 7,000 people, especially in rural areas where jobs are scarce. This adds up to at least six per cent of the total labour force of the agricultural sector.

Certification by the Forest Stewardship Council (FSC) is rapidly increasing in popularity in Namibia. The area certified by FSC has increased by a factor of three in the last three years. An FSC standard suited to Namibian conditions has been formalised. "The guidelines are now specifically adapted to the Namibian bush and environment. This will make it much easier for farmers to achieve FSC certification," says Michael Degé, manager of the Namibian Charcoal Association. "We are ready to upscale considerably".

Big biomass business

Upscaling is also one of the focus areas of the GIZ BCBU project. Currently, only 1.36 million tonnes per year of bush biomass are utilised. The annual spread of bush is estimated at 3 per cent which adds up to 9 million tonnes. This amount would have to be harvested annually to hold the status quo. For upscaling, an estimated minimum of 300 million tonnes of biomass is available for sustainable harvest within the scope of rangeland restoration. This calls for international cooperation and partnerships on technology, business and market development. In this context, N-BiG signed an agreement with the German National Association for Bio Energy on cooperation in



Photo: Ina Wilkie

Windhoek Lager is one of Africa's favourite beer brands. Two years ago, Namibia Breweries installed a biomass boiler and now utilises native encroacher bush for process heat production, subsidising imported heavy fuel oil. "For the brewing process, we heat water to 90 to 100 degrees," Bernd Esslinger (Photo, right), chief engineer of the brewery, explains. "Today, we use 90 per cent of the heat for brewing, pasteur-

isation and rinsing stems from biomass." This has a positive effect on the brewery's carbon footprint and reduced costs by 40 per cent. "Furthermore, we are now less dependent on the fluctuation of the oil price," Esslinger adds. "We are proud to utilise a local raw material, thereby investing into the local economy. That is also great for our image. We brew Namibian beer, and our energy stems from Namibian bushes."



Photo: GIZ/ Johannes Laufs



Photo: Ina Wilkie

"I have learned that we can actually use our bushes to produce animal feed," says Ndapunikwa Pahangwashimwe (Photo). She is a member of a farmers' cooperative and attended a training workshop of the De-bushing Advisory Service (DAS) in Okongo, in the north of Namibia. "We were shown which bushes to use and how to mix different supplements with the fibre so that we can feed it to our animals to survive the drought. As a cooperative, we are now planning to buy a machine so that we will be able to produce this type of feed."

mobilising know-how and resources as well as sharing networks and opportunities.

Utilising bush for energy production would be a big step forward for Namibia. Two industries, Namibia Breweries and Ohorongo Cement, are already using wood chips for heat production. NamPower, the national energy supplier, is in the process of planning a 40 megawatt (MW) biomass-fuelled power plant over the next four years as part of its strategic plan.

Ensuring sustainable supply structures for biomass, especially for large off-takers such as biomass power plants, is crucial for upscaling. The GIZ BCBU project has therefore launched a partnership with the Institute for Applied Material Flow Management (IfaS) of Trier University, Germany, to develop a strategy for a so-called Biomass Industry Park (BIP). Such a hub would bring together different bush-based industries at one location. The hub would move biomass in large quantities. It would trigger technological advancement in clean biomass production and synergies between different production processes. For the participating industries, economies of scale would lower costs for a number of reasons, including

specialisation of labour, lower cost of capital, and spreading of internal function costs across more units sold. In addition, a BIP would be a leading player in the bush-to-value industry, and its trigger effect would attract other players such as logistics companies or independent energy producers.

Bush-based animal feed

Out on the farms, as Namibia is experiencing extreme drought, one bush-based product is booming particularly: animal feed. A range of scientific studies initiated by the project has shown that bush can be fed to cattle and small stock. However, bush-based animal feed must be produced and fed based on certain rules. Bushes need to be harvested in a specific way and at a specific time, the fibre needs to be milled, and supplements need to be added.

If produced correctly, bush-based animal feed can provide affordable fodder during emergency situations, such as droughts, but also as supplementary feed throughout the year. Bush-based animal feed can be an option for small-scale farmers who can start produc-

ing with a small set-up consisting of a panga (machete), axe and a hammer mill. On larger commercial farms, bigger set-ups including a chipper and a pelleting machine can be viable. Consequently, the demand for information and training is enormous, especially on bush-based animal feed, but also on harvesting techniques in general. The De-bushing Advisory Service (DAS) rolls out capacity development programmes for farmers, workers, contractors and SMEs. In addition, DAS is developing three career qualifications for technical and vocational education and training in line with the guidelines and frameworks of the Namibia Training Authority.

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