



Success Stories from the Field

Bush Control and Biomass Utilisation in Namibia



MINISTRY OF ENVIRONMENT,
FORESTRY AND TOURISM



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De-bushing
Advisory Service

Success Stories from the Field

Bush Control and Biomass Utilisation in Namibia –
Pocket Version

This collection of stories represents a snapshot of bush control and biomass utilisation practices in Namibia, as seen through the eyes of people working in this growing sector.

Bush encroachment in Namibia has a negative impact on biodiversity and groundwater recharge, amongst others. Despite this, encroacher species are a phenomenal natural resource with great potential for economic growth, poverty alleviation, employment and energy security. Through the sustainable utilisation of bush biomass, rangelands are being restored and habitats are recovering.

The information contained in this pocket guide highlights some of the benefits, successes and sustainable practices applied in the biomass sector. It guides users on what has worked through trial and error on a case-by-case.

A quick reference of the common encroacher species in Namibia is included in the guide.

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About Bush Control and Biomass Utilisation Project

Woody plant proliferation is one of the longstanding rangeland management concerns since the 1950s in Namibia. This phenomenon is commonly known as bush encroachment across the globe. It affects about 45 million hectares of the total land area or close to half of the country.

On behalf of the *German Federal Ministry for Economic Cooperation and Development (BMZ)*, *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH* supports the *Namibian Ministry of Environment, Forestry and Tourism's* effort to promote the sustainable economic utilisation of bush biomass. Bush is harvested selectively and processed into various biomass products, such as animal fodder, charcoal, biochar, building material and wood chips. The *Bush Control and Biomass Utilisation Project* work with the public and private sector on national cross-sectoral frameworks and regulatory capacities for sustainable bush control, advisory services for farmers and small enterprises, sustainable supply schemes for bush biomass and technologies for harvesting and processing.

Selected results in numbers*:



1,600,000

hectares FSC certified



300,000

hectares bush controlled annually



11,000

jobs in harvesting and processing



650

Farmers and SMEs trained in harvesting and processing

Fair and Equitable
Benefit-sharing



Paulina Sakaria
GARDENER



One of our customers is Fairtrade certified. So, every bag of charcoal we sell to them, we get a little bit of money back. That money comes into a bank account, that is managed by a Worker's Committee, elected by the workers. They decide what to spend the money on.



Ian Galloway
MANAGING DIRECTOR OF
JUMBO CHARCOAL



Fairtrade is about tackling the injustices of conventional trade, which traditionally discriminates against the most vulnerable. Here in Namibia, a group of charcoal harvesters have seen first-hand the benefit of being associated with such a certification scheme, especially during a global COVID-19 pandemic.

Jumbo Charcoal, with operations just outside of Okahandja, were one of the first in the country to become certified with the *Forest Stewardship Council (FSC)*. As Ian Galloway, the Managing Director of *Jumbo Charcoal*, explains, "It is a prerequisite for *Fairtrade* that our farmers are *FSC* certified."

Fairtrade is driven by consumer buying power, and according to Ian, "One of our customers is *Fairtrade* certified, and the co-op is in England. So, every bag of charcoal we sell to them, we get a little bit of money back. That money comes into a bank account, which is managed by a Worker's Committee, elected by the workers themselves. They decide what to spend the money on."

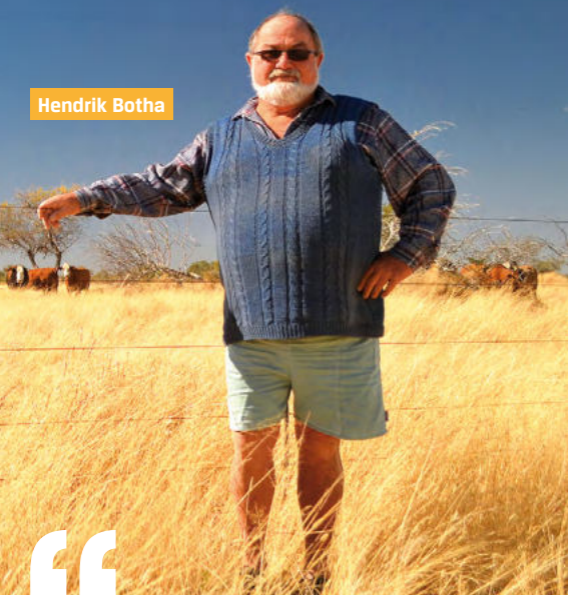
The money collected through this initiative is intended for projects that will uplift the socio-economic conditions of the charcoal harvesters and is therefore driven by the needs of the harvesters themselves. Listing some of the tangible benefits the workers at the *Jumbo Charcoal* packing plant have received, Ian includes, "They are doing adult literacy classes in Walvis Bay. We've got 70 people in the packing plant there and they are doing adult literacy. Here at the packing plant (outside Okahandja), we have a kindergarten; bicycles for the workers; a vegetable garden. It's a very nice garden, and the workers get lunch from it every day."

Paulina Sakaria, the woman in charge of the garden at *Jumbo Charcoal*, proudly shows us around her productive vegetable site, and adds that the workers will be eating fresh spinach today.

As Ian explains, "During the COVID-19 lockdown, the farmers had many workers on the farms, and they weren't producing, so the committee gave money to keep the rations going. That helped to strengthen their resilience, and also to ensure that the workers didn't have to build up too much debt."



Hendrik Botha



“

Holistic rangeland management in combination with bush thinning can lead to productivity for cattle farming.

”



When Hendrik began addressing bush encroachment in 1996, his farm could only stock 670 head of cattle, whereas now that same farm has the capacity to carry 1400 head of cattle, and as Hendrik explains, "more cattle means higher profit margins." Using a combination of rangeland management together with bush thinning, Hendrik has increased his farm stocking rate from 25kg/ha to 45 kg/ha of live weight.

Standing among wide stretches of tall grasses, interspersed with indigenous trees on farm Agagia, Hendrik explains, "I win the *Meatco Producer of the Year Award*, every year in March and April. This is because I still have grass on my farm in these months when other farmers do not."

As Hendrik adds, "you do not just need grass, you need palatable grass," as cattle are selective grazers that prefer the annual to the perennial grasses, but they also need grazing during the annual grasses dormant phases.

Hendrik uses two key strategies, bush thinning and a four to six camp rotation to allow for recovery of the land. "The holistic management of land is a process, it does not happen overnight," says Hendrik. It requires proper monitoring over time.

Hendrik advice other farmers to "evaluate grazing regularly, know the rangeland management principles, apply them consistently and implement aspects in maintaining a balance between rangeland and livestock management." He echoes that "to succeed in livestock farming, you need a long-term vision for what you want your farm to look like. To realise the vision, you need a long-term plan that is constantly reviewed. It takes hard work to be successful."





Johanna Itamba

If I compare to the years when we did not utilise the biomass, I see progress. Now we have different projects on the farm, and at the same time we are creating employment.



Johanna Intamba and her husband had a dream of becoming farmers and so they applied for the resettlement programme, a Namibian land reform initiative for the benefit of the landless and the previously disadvantaged. Initially, they only found land that they could rent, and just when the land became available for purchase, tragedy struck as Johanna's husband passed away. Johanna decided to continue with their dream and purchased the farm with a loan from *Agribank*. She had to ensure she repaid this loan. It was her son's idea to diversify into charcoal, that likely saved their family farm from severe drought. "In 2019, we lost about seventy cattle due to drought. There was no rain, and again in 2020, the COVID-19 pandemic started."

Matti Intamba explains, "I was a student when my dad passed away. So, I decided to leave my studies and go to the farm. In the beginning, I used *Google* to find out what to do on the farm, and then I started visiting and talking to my neighbours. I was finding out what type of projects they are doing since we have a similar type of soil. The majority of them were talking about charcoal."

Johanna and Matti joined the *Carbo Namibia Group Scheme* in 2020. This meant that they had a local buyer for their product, as Johanna explains, "When I started to sell charcoal, it was a challenge. Even the payment was a challenge. Now we are with *Carbo*, and it's going well. Local is better."

Joining the *Carbo Namibia Group Scheme* also meant that Johanna and Matti had to become *Forest Stewardship Council (FSC)* certified. According to Johanna, "There are regulations in place and it is important to comply with them. You need houses for the workers, you need toilets and showers for the workers, you need first aid kits and lots of things like that. It might cost money, but it is a good idea. Since I've become *FSC* certified, I am no longer struggling to find a buyer for my charcoal."

Matti adds that "If I compare to the years when we did not utilise the biomass, I see progress. Now we have different projects on the farm and at the same time we are creating employment."



David Shipingana and
Matti T. Nghikembua

“

Data has shown that if you restore your habitat you will increase your wildlife or cattle carrying capacity. But there are also other benefits for biodiversity.

”



CCF classify scientific research as the backbone of their conservation activities. "We study everything from soils, reptiles, small mammals to predators. It's about understanding the ecosystem in which cheetahs live," says Matti Nghikembua, a Senior Ecologist and Forest Steward at the *Cheetah Conservation Fund (CCF)*.

David Shipingana, a Forest and Safety Officer at *CCF*, and a former student at the *Namibia University of Science and Technology (NUST)* worked on the soil research projects at *CCF*, and explains, "We started studying the soil at the *CCF* in 2017 by assessing the impact of bush thinning on the overall fertility of the soil."

Soil provides a home for nutrients, beneficial bacteria, fungi and more. What the team at *CCF* found in their research is that the "soil community changes and you find much richer microbial activity after you have thinned," Matti says. He adds that initially there will be a dip in soil activity, however after the short dip, the activity will improve to a state better than before thinning was done. Matti notes that you would then "start finding more species and increased microbial diversity. This is what grasses are looking for in their habitat because each species provides a service in the soil, and the more diversity, the more services you have in the soil."

David adds that they also found that there is a balance point, that brings "optimal productivity on your land, but this means the habitat needs to be thinned moderately, not cleared, leaving some bushes behind. As soon as you do bush clearing, you disrupt the soil composition, and there will be an imbalance in the chemical composition of the soil."

As Matti explains, productivity of the land is the key. "If you restore the habitat, there can be enough room for wildlife to come back. Wildlife will go where the habitat is productive. At *CCF*, our research strives to provide solutions for people, animals and the ecosystem."



Mbati Tjiho



The real driver of the charcoal industry today is the demand for quality products.



Success Stories from the Field



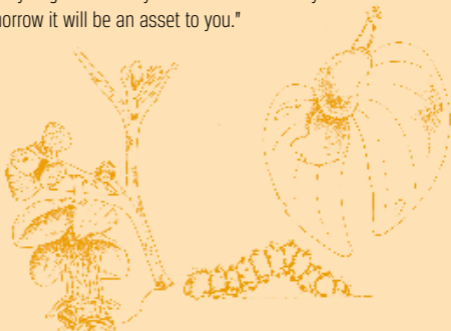
THEME Sound Environmental Practices

Mbati Tjiho, is a generational farmer who traded in his twenty-five-year office job to explore his passion for farming in 2017. Mbati's farm, which was a predominant livestock farm, is found close to the town of Outjo, in the Kunene Region of Namibia, and has felt the impact of the bush encroachment and overgrazing.

"When I started farming my father was doing some charcoal production, but I didn't know how big the production should be for it to be profitable. With the help of the industry associations, an assessment was done on Mbati's farm. When I took over from my father, the production was very small. My father had twelve kilns. I used my savings to acquire more and push our numbers to thirty kilns."

"The customers are conscious about their products, especially in Europe. They need to meet environmental and social standards. This was when I first heard about *FSC*," explains Mbati. The *Forest Stewardship Council (FSC)* promotes responsible management of the world's forests. For a supplier to become *FSC* certified, they would need to meet various principles and requirements including social aspects by providing quality living and safe workspaces, as well as sound environmental practices, ensuring only encroacher species are removed or harvested, and that this is done in a sustainable manner.

Mbati explains that "I am on the production side, I don't process, I sell in bulk to processors who package the charcoal. Most of the processors and buyers are *FSC* certified, and of course, the rate for *FSC* suppliers is higher than non-*FSC*. I'll tell everybody to go for *FSC*. My observation is that if you invest today, tomorrow it will be an asset to you."





Miya Kabajani

“

Creating a functional ecosystem requires a holistic approach to rehabilitating land. Bush control is a core part of this.

”



For us, bush thinning is very important to get this area back to a functional ecosystem. The main reason we want to make it functional is to ensure that wildlife have sufficient space and grazing. We inherited a system that wasn't functional, so we are rewilding and aligning it to the vision that the company has for the Reserve," says Miya Kabajani, a Research Coordinator for *B2Gold*, based at their *Otjikoto Mine* in Central Namibia.

The mine is situated on what was previously cattle farmlands, and as Miya points out there was "a lot of overgrazing and bush encroachment" on the land. "It affected the way the animals moved, and what they ate. It also affected the type of plant species found on the land."

The reserve started bush thinning in 2013 using manual and mechanised methods in consideration of the diverse terrains. "We look at different options and devise a balance by assessing the habitat and following the forest regulations." Miya explains that concentrating on land use in combination with bush control has not only been a successful endeavour but an important one. "Our wildlife numbers are increasing and with that, we need to increase the available habitat space for them."

This is all part of vision to rewild the area after the mine closes. "Our vision is to merge the *B2Gold* farms with neighbouring farms through a corridor all the way to the *Waterberg National Park*. One big park, a people's park, an open system with free roaming wildlife."





Dr Rudie van Vuuren
& Marlice van Vuuren



There is
commercial value
for tourism in
selective and
sustainable bush
thinning.



Dr Rudie
van Vuuren



Naankuse was founded in 2006 by Dr Rudie and Marlice van Vuuren. It's a conservation organisation that sustains its projects through non-governmental funding and responsible conservation tourism. The *Naankuse Foundation Wildlife Sanctuary* is located East of Windhoek on a 3,200 hectare nature reserve. According to Dr. Van Vuuren, "We started doing bush thinning at *Naankuse* specifically because of human-carnivore-conflict. With cheetahs especially, there are many problems when there is bush encroachment. Cheetahs are not stalkers; they need space and speed to kill their prey. If you have bush encroachment the easiest prey to kill is then your small stock, like your sheep or goats. Also in Namibia, the cheetah numbers are declining and leopards are taking over. Leopards are stalkers, they hunt by ambushing their prey. This is easier to do in a bush encroached area. Cheetahs, who hunt at high speeds, also often get eye injuries in a space that is bush encroached."

Rudie states that, "another benefit of bush thinning is tourism." "It increases your tourism value. Tourists want to come here to see our wildlife, and if an area is bush encroached they can't. So there is commercial value in bush thinning as well."

Rudie explains "underground water is affected by bush encroachment, and we rely heavily on underground water in the field to give water to the animals." "The species that we thin are non-indigenous, and they use more underground water than indigenous trees. Bush thinning also helps reduce biodiversity loss and helps us adapt to climate change and ensure food security, by creating more grasslands for agriculture. Many areas in Namibia are overgrazed due to bush encroachment, and this leads to land degradation."



Biomass
Business



Philipus Alugodhi

“

There is a business case in biomass. It's profitable. It's a challenge to get the startup capital, but you can make it back very quickly.

”



Philipus Alugodhi, based in Otavi, is proving his entrepreneurial prowess through his charcoal business, which he has grown in a short space of time to be a choice employer for charcoal workers. "I started quite small, with six guys and twelve kilns on my mother's farm near Tsumeb. Then I started renting at other farms. I now have twenty workers and sixty kilns, and I did that in two years."

To get to where he is today, Philipus is constantly re-investing in his business and his skills. When asked why he thinks biomass is a good business model, Philipus explains, "it's profitable". "It's a challenge to get the startup capital, but you can make it back very quickly. If you start correctly, with the right amount of people, within six months, you would have recouped your startup capital already."

"I think the biomass sector is going to be huge, especially with the projects in progress such as the *NamPower* biomass power plant in Tsumeb. These are promising developments for the sector. Maybe one day I will diversify into wood chipping, but for now, my focus on growing the charcoal business."

Philipus has chosen an inclusive and empowering approach to his management style. His team is organised and takes pride in their work. "My workers will tell you that I care for them. If one of them gets sick, I will drive to get the medicine. It's not easy being in the field with an axe the whole day. The work that they do is very intensive, so it's important to look after them." Taking on board the knowledge acquired from various training courses, Philipus recommends the labour-based harvesting guidelines for bush control. He applies the SHE (safety, health and environmental) principles and ensures quality control of his production.





Sakeus Kafula

“ People see yields going down or longer dry spells, and they think it is just the norm, but this is where biochar comes into play. ”

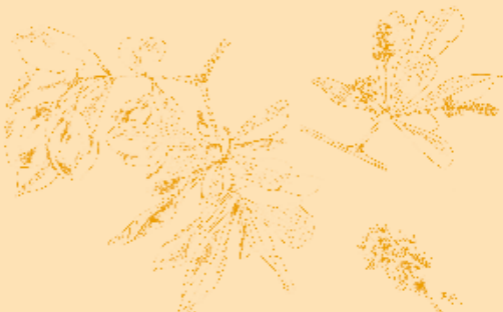


P **rime Biochar** is made using encroacher species of bush biomass, but with parts too small to be used in charcoal production. Biochar is combined with microbial fungus and thus forms microbial biochar. The product, made by Sakeus and Joel Kafula, can improve the quality of soil for centuries to come.

Sakeus grew up watching common agricultural practices that result in degradation of the land. This is what drove his passion for restoration solutions. "I saw from a young age how our practices were degrading the environment, and I knew this was what I needed to do, to be in a space that can help rectify some of these things."

"People see yields going down or longer dry spells and they think it is just the norm, but this is where biochar comes into play." It can help your crop survive these dry spells, notes Sakeus, who adds that the benefits of biochar are not only available to crop farmers. Biochar can also be safely added to livestock licks and feeds, and in doing this, animals are more easily able to utilise and digest poor quality feed.

While Biochar is new in Namibia, it shows great potential for a myriad of applications. In addition, it shows great potential to contribute to climate change adaptation. The *Namibia Charcoal Association (NCA)*, *University of Namibia (UNAM)* and *Namibia University of Science and Technology (NUST)* are championing a number of research activities and training for production and application in various parts of the country.





Salomo Kauari

“

If I did not learn about using bush to produce feed, I could have lost everything - even the bull itself.

”



Salomo Kauari, like his father before him, is a full-time farmer. He is a communal farmer and a member of the *African Wild Dog Communal Conservancy*.

Salomo attended as many training courses as he could over the years, especially those on the topic of rangeland management. This is where he first heard about bush-based animal feed. Shortly thereafter, Salomo purchased a hammer mill machine, which is used to grind bush material into smaller pieces. What he didn't know then, was that by investing in his bush feed production, he was ensuring a lifeline for his family farm.

When the country faced an extended drought, Salomo put his learning to practice. "I knew I had to make a plan. I used the bushes. I made different recipes, for survival or maintenance feed." This was how my twelve calves survived the drought, and they are big now, says Salomo who goes on to explain, "the mothers of the calves died in the drought, so I had to try help the calves survive." Salomo uses biomass for his animal feed, from encroacher species. "I used a mixture of bush, bran, molasses syrup and salt."

"If I did not learn about using bush to produce feed, I could have lost everything – even the bull itself."

His expansion includes an invention of a barrel mixer that efficiently mixes the feed with little effort and at no cost. Salomo also uses his hammer mill to produce activated charcoal powder, which he sells to other farmers. It is added to the livestock drinking water and absorbs toxins from poisonous plants found in this area. As an aftercare program, Salomo has goats on the land to keep regrowth of encroacher species in check.





Taimi Ndilimani

“

I am the breadwinner of my family. ”

Success Stories from the Field



THEME Women Empowerment

Taimi Ndilimani grew up in the North of Namibia, but when her mother passed away while Taimi was writing her Matric exams, she moved to Okahandja to be closer to her father. Her career path started in a time of personal anguish, but with dedication, it has grown to where she now supports her father, her five siblings and her children. This family breadwinner started as a charcoal packer, and today she is the Stock and Quality Control Manager at *Jumbo Charcoal*.

While the sector is often thought of as being a male orientated industry, women are taking on greater roles in the charcoal production value chain. Behind the masks and gloves, in the dust of a charcoal packing plant, women hold most of the team leader positions at *Jumbo Charcoal*. Their pride is palpable, their passion paramount.

"I feel very proud. Working for *Jumbo Charcoal*, it's like a family company so I can say I'm the lucky one", explains Taimi, who goes on to say that "there's no discrimination among the men and women here. The work can be done by both women and men."

Last year Taimi was recognised for her achievements and awarded the *Shooting Star Employee Award* at the *Women in Biomass Industry Awards 2020*.

As Progress Kashandula, the Chief Executive Officer of *Namibia Biomass Industry Group (N-BiG)* stated at the *Women in Biomass Industry Awards 2020*, "the Namibian biomass industry has almost doubled its employment from 6,000 to 11,000 within the past five years and creates diversified opportunities for both men and women. Beyond this initiative, more than 200 women have already benefited from our technical support in sustainable bush control and biomass utilisation. Women can contribute at every stage of the biomass value chains."





Wayne Hanssen

CO-OWNER OF
AFRICAT FOUNDATION

“

I have learnt the hard way at times, it is very sad to see the effects of the incorrect ways of doing bush thinning.

”



The **AfriCat Foundation** is based on the *Okonjima Nature Reserve* and was founded in 1991. The foundation does ecological research focusing on rare and endangered species. Over the years, this nature reserve has been practicing bush thinning for conservation and tourism and has perfected its process for maximum results and minimum environmental impact.

Wayne Hanssen, the co-owner of *Okonjima & AfriCat*, explains that at *AfriCat* a combination of methods are used for maximum results. Wayne uses a combination of using a tyre dozer and bush roller. "With bush rolling you selectively drive over the bush, roll it flat and then leave it right there in the field. When you roll flat, you protect the soil and allow the grass to germinate where no animals can get to it. It also prevents soil erosion, by providing shade for the soil, and guides rainwater into the ground."

Wayne, an avid researcher, explains the added benefits of his methods, to the ecosystem. "*Acacia mellifera* (Black thorn) and sickle bush are the two biggest problem species with bush encroachment, but I was amazed to learn that the acacia tree is actually a legume, and so it has the ability to take nitrogen out of the air and through bacteria in the soil, can put nitrogen back into the soil. When an *acacia mellifera* is flattened, you will find a burst of regrowth in the vegetation around the rolled bush, as the roots release nitrogen into the soil, and you'll have a burst of growth in grass species around the area that you have rolled. Nitrogen, Phosphorous and Potassium are the three most important nutrients for plants", says Wayne.

As Wayne adds, "depending on the thickness of your bush, you want to leave all the trees but take out about 60% of your *acacia mellifera* species. *Acacia mellifera* has a shallow root system with a high extraction of water out of the soil, but don't take everything out, because you destroy the soil."

Wayne is also vehemently against using poisons, because of their long-term negative effects. "The rain takes the poisons into the root systems of your big camel thorns and they die off years later. Their root system are so widely spread. It was devastating for us to lose these trees, so I am against herbicide for bush thinning."



**Key
encroacher
species in
Namibia**



Key encroacher species in Namibia

In this section, you will get to know some of the encroacher species characteristics.

For a detailed botanical description of woody plant species, please refer to the *Tree Atlas of Namibia* botanical book by Curtis, B and Mannheimer, C (2005).

The Bush Control Manual by De-bushing Advisory Service (2017) is also a quick reference guide.

Key encroacher species
in Namibia



***Acacia mellifera* (*Senegalia mellifera*)**

Black thorn · Swarthaak · Omunkono · Omusaona

Habitat: Central highlands, Thornbush savanna, South-eastern Karstveld, Kalahari

Most common & widely distributed encroacher species throughout the country. A hardy, spiny shrub (3 m) or small tree (8 m) with a rounded canopy, recurved black thorns and feathery leaves with 1-2 rounded leaflet pairs.



Dichrostachys cinerea

Sickle bush · Sekelbos · Ongete · Omutjete

Habitat: North-central plateau, Central highlands, South-eastern Karstveld

A spiny, deciduous shrub (3 m) or small tree (8 m) with very small leaflets. Another widespread species, mainly in central, northern and north-eastern parts of Namibia. Common to abundant on plains and hill slopes.

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Key encroacher species
in Namibia



Terminalia sericea

Silver cluster-leaf · Geelhout · Omugolo · Omuseasetu

Habitat: Savanna woodland

A medium-sized species grows up to 8 m or shrub up to 3 m high, common to abundant in the sandy eastern, northern and north eastern parts of Namibia. Mostly on plains and dunes, often along dry watercourses in the north-east.



Acacia reficiens (Vachellia reficiens)

False umbrella thorn · Rooihaak · Omutsiyamatsi · Omugondo

Habitat: Karstveld, North-central Plateau, Central highlands

Difficult to distinct from *Acacia luederitzii*. Found in north-western and central-western Namibia and occurs mostly on plains. A V-shaped shrub 3 m or tree up to 8 m high.

Key encroacher species
in Namibia



Colophospermum mopane

Mopane · Mopanie · Omusati · Omutati

Habitat: Savanna bushveld, **Legal status:** Protected plant species, maybe controlled with a permit from Directorate of Forestry

A semi-deciduous tree (>8 m) or monotonous shrub (up to 2 m) predominant in north-western and occasionally in eastern Namibia. Leaves with two sessile leaflets resembling butterfly wings. Most abundant on plains and sandy soils.



Acacia luederitzii (*Vachellia luederitzii*)

Kalahari Acacia · Baster haak-en-steek · Omushu

Habitat: North-central plateau

A medium-sized tree (3-8 m) with a flattened to rounded canopy. Dark bark, reddish on young trees. Hooked or straight thorns in pairs. Common in north-eastern Namibia on sandy soils, and often in dry rivers.

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Key encroacher species
in Namibia



Rhigozum trichotomum

Three-thorn · Driedoring · Okatakambindu

Habitat: Namib Desert, Nama-Karoo, Southern kalahari

Rigid, deciduous shrub (<1 m or between 1-3 m) commonly found in the southern and south-central parts of Namibia, most often on plains, along dry watercourses and on hill slopes.



Acacia erubescens (Senegalia erubescens)

Yellow-bark acacia · Withaak · Omunkono · Omungongomui

Habitat: Central highland, North-central plateau

A multi-stemmed shrub (3 m) or tree (8 m). Occasional in the north-west and Karstveld; common in scattered localities in north-eastern Namibia. Grows in poor rocky soils and plains.



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