MINISTRY OF INDUSTRIALISATION,
TRADE AND SME DEVELOPMENT

Growth Strategy for the Namibian Wood Charcoal Industry and Associated Value Chains

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FOREWORD

The Industry Growth Programme is part of the ongoing efforts to reinforce Namibia's economic growth, to reduce income inequality and to increase employment for its citizens. This Industry Growth Strategy forms part of the support to selected manufacturing industries envisaged by the Growth at Home strategy, which promotes Namibia's competitive advantages and opportunities. This is envisaged through the Special Industrialisation Programme whose aim is to provide targeted support for value chain analyses and feasibility studies.

It is through the implementation of this and other strategies that the Ministry of Industrialisation, Trade and SME Development, in close cooperation with other line ministries, will support local value addition, upgrading and economic diversification. The efforts will help to structurally transform Namibia's economy favouring the most productive and efficient economic activities, and local industries will be provided with improved market access at home and abroad.

The Industry Growth Programme is an important element of the war against poverty and a further step on Namibia's path towards becoming a highly competitive, industrialised nation with sustainable economic growth as depicted in Vision 2030. As such, this strategy's implementation through 2020 is geared towards strengthening forward and backward linkages within the Namibian economy as envisaged in the Harambee Prosperity Plan.

Wood charcoal is a strategic industry that has, in agreement with the fourth National Development Plan, been selected for a more specific focus on its economic development. Key stakeholders from the business community and public administration who have a vested interest in the Namibian industry's prosperity for the benefit of all have engaged in extensive consultations and substantially contributed to this programme. They are now eager to implement interventions along the value chain effectively. Many of the suggestions and concerns raised by entrepreneurs and civil servants in extensive discussions have been distilled into this document. This interactive process has once more demonstrated that Namibians together can shape an enabling environment in which the manufacturing sector can thrive and the wellbeing of the Namibian people be advanced.

I am sure that the Industry Growth Strategies have the potential to remove challenges and accelerate economic development in the prioritised areas. The interventions planned for 2016 onwards will allow the targeted industries to prosper according to their inherent abilities. This strategy is a living document. As such, additional comments or remarks from stakeholders are welcome and can be addressed to the Ministry of Industrialisation, Trade and SME Development.

I am confident that, in the vein of the Harambee Prosperity Plan, all stakeholders involved will pull in the same direction in the upcoming implementation phase – as they have done in strategy building – for the advantage of a thriving Namibian economy that creates jobs, incomes and sustainable growth.

Hon. Immanuel Ngatjizeko
Minister of Industrialisation, Trade and SME Development

The Industry Growth Programme is an important element of the war against poverty and a further step on Namibia's path towards becoming a highly competitive, industrialised nation with sustainable economic growth as depicted in Vision 2030.

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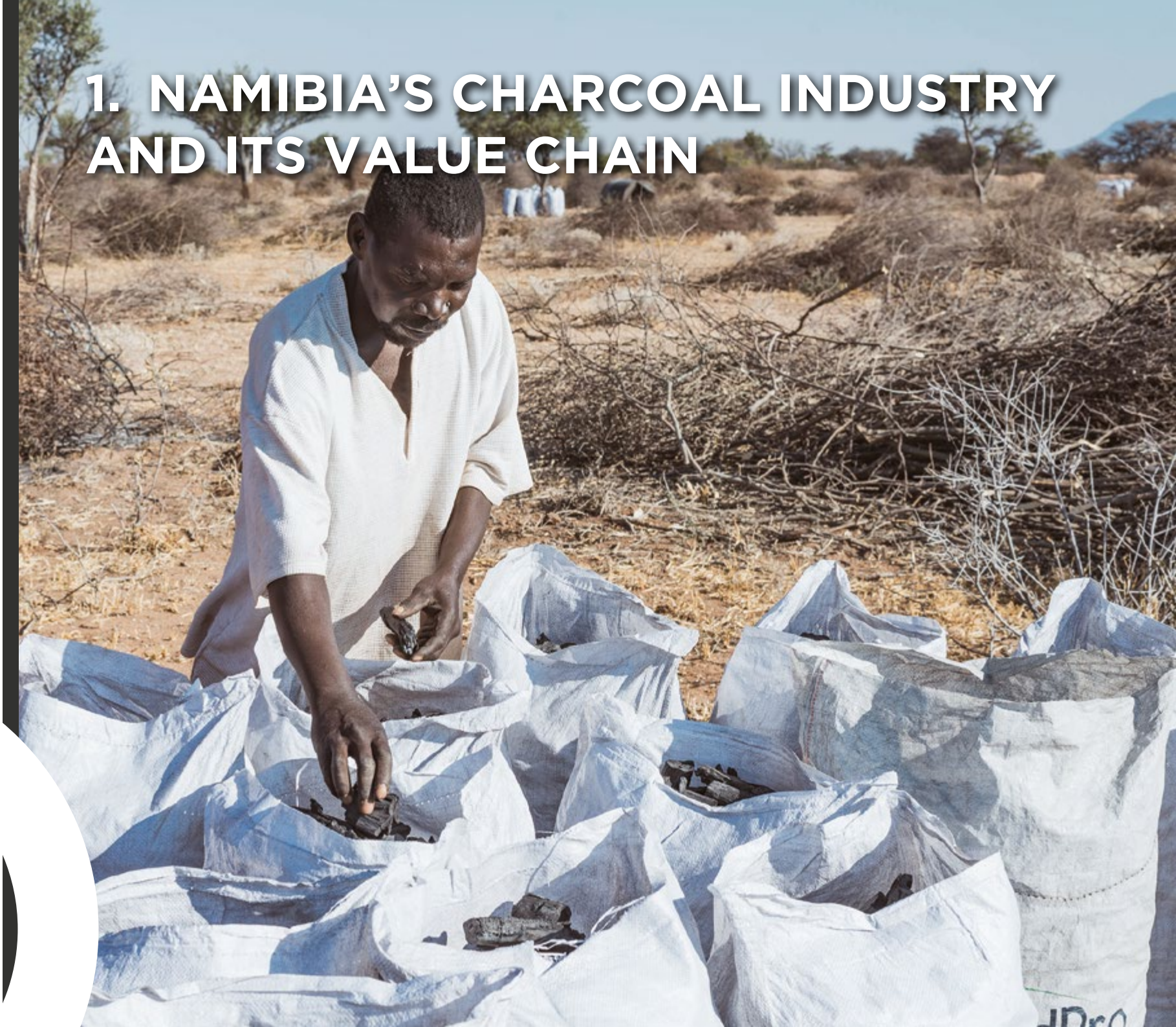
ACRONYMS AND ABBREVIATIONS

DAS	De-bushing Advisory Service
DID	Directorate of Industrial Development
DoF	Department/Directorate of Forestry
EUTR	EU Timber Regulation
FAO	Food and Agricultural Organization
FSC	Forest Stewardship Council
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für internationale Zusammenarbeit
HS	Harmonized Commodity Description and Coding System
ISIC	International Standard Industrial Classification of All Economic Activities
ITC	International Trade Center
IUMP	Industrial Upgrading and Modernization Programme
MAWF	Ministry of Agriculture, Water and Forestry
MITSMED	Ministry of Industrialization, Trade and SME Development
MLIREC	Ministry of Labour, Industrial Relations and Employment Creation
MSME	Micro, Small and Medium sized Enterprise
NAFWU	Namibian Farm Workers Union
NAU	National Agricultural Union
NCA	Namibian Charcoal Association
N-BiG	Namibia Biomass Industry Group
NIC	Namibia Investment Centre
NSA	Namibia Statistics Agency
NSI	Namibian Standards Institution
NTF	Namibia Trade Forum
PPD	Public Private Dialogue
RSA	Republic of South Africa
SMEs	Small and Medium Enterprises
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
VC	Value Chain

1. NAMIBIA'S CHARCOAL INDUSTRY AND ITS VALUE CHAIN



1. NAMIBIA'S CHARCOAL INDUSTRY AND ITS VALUE CHAIN

Wood charcoal production and further processing was selected as one of the promising agro-processing industries for which to conduct an in-depth value-chain analysis. Experience with industrial upgrading processes around the world has shown that value-chain analysis is a useful tool that can help identify constraints to and opportunities for industrial growth and competitiveness. The detected opportunities and constraints within Namibia's charcoal industry and associated product value chains were the departure point for an industry growth strategy, the implementation of which is expected to make a significant contribution to achieving the overall goals and targets of Growth at Home – Namibia's Execution Strategy for Industrialisation.

1.1 Industry Definition

According to ISIC, Rev. 4, charcoal production is part of Division 02 (Forestry and logging) which includes, along with the production of timber, all forestry activities that "result in products that undergo little processing, such as firewood, charcoal, wood chips and roundwood used in unprocessed form"; such activities can be carried out in natural forests (as in Namibia) or planted forests. "Charcoal production in the forest (using traditional methods)" is included in Class 0220 (Logging). However, when carried out outside the forest, charcoal production is considered part of Class 2011 (Manufacture of basic chemicals), as the latter class also includes "manufacture of basic organic chemicals, other organic compounds, including wood distillation products (e.g. charcoal)". Moreover, when charcoal is further processed and packaged outside the harvesting site, as in the case of briquette production, such end products are classified within Manufacturing Division 16 (Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials). Under the Harmonized System (HS), wood charcoal, including shell or nut charcoal, whether agglomerate or not, is classified under Codes 4402 (four digit) and 440200 (six digit). Hence, Namibia's charcoal industry can be considered a basic industry suitable for industrial upgrading efforts, particularly technological, to facilitate its transition into an internationally competitive manufacturing industry.

1.2 Global and Regional Industry Performance

The high percentage of informal production and trade is one reason why statistical data on wood charcoal is fairly unreliable in many countries. This also applies to the international statistical data provided by the FAO on production and by ITC and UNCTAD on trade. According to FAOSTAT data, the global production of wood charcoal reached 52 million metric tonnes in 2013. It has increased by 21% since 2003 and by 72% since 1993 (see Figure 1).

Namibia's charcoal industry can be considered a basic industry suitable for industrial upgrading efforts, particularly technological, to facilitate its transition into an internationally competitive manufacturing industry.

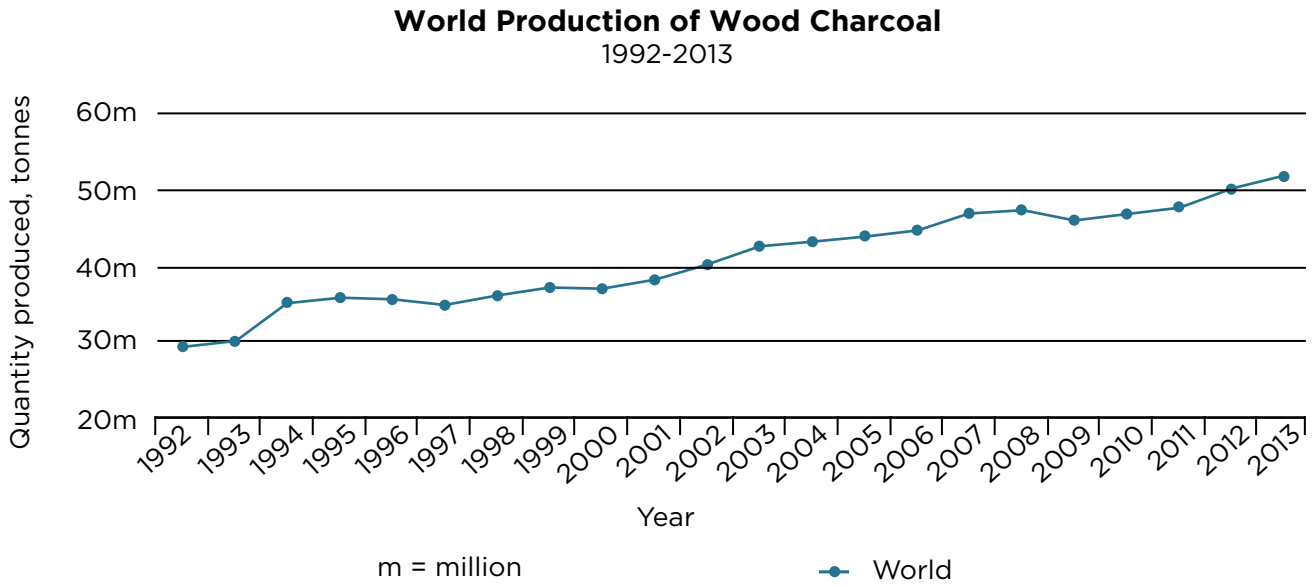


Figure 1: World production of wood charcoal
Source: FAOSTAT

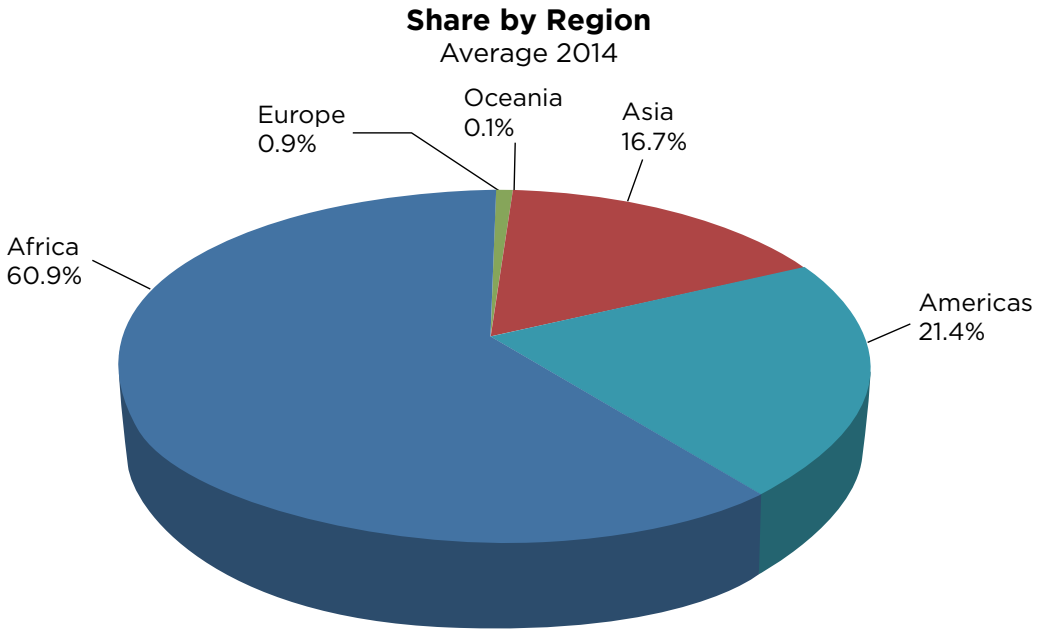


Figure 2: World wood charcoal production by region
Source: FAOSTAT

This rapid growth has been strongly influenced by Africa, which now accounts for 61% of global production. Charcoal production has increased in Africa over the last two decades, gradually extending Africa's global lead (1994: 48.1% of global production; 2004: 55.1%). Brazil, where charcoal is mainly used as an energy source for domestic pig iron production, remains the world's biggest single wood charcoal producer (7.25 million metric tonnes in 2014). Compared to the huge amounts of charcoal production in Africa, Latin America and Asia, charcoal production in Europe, North America and Oceania is almost insignificant (see Figure 2).

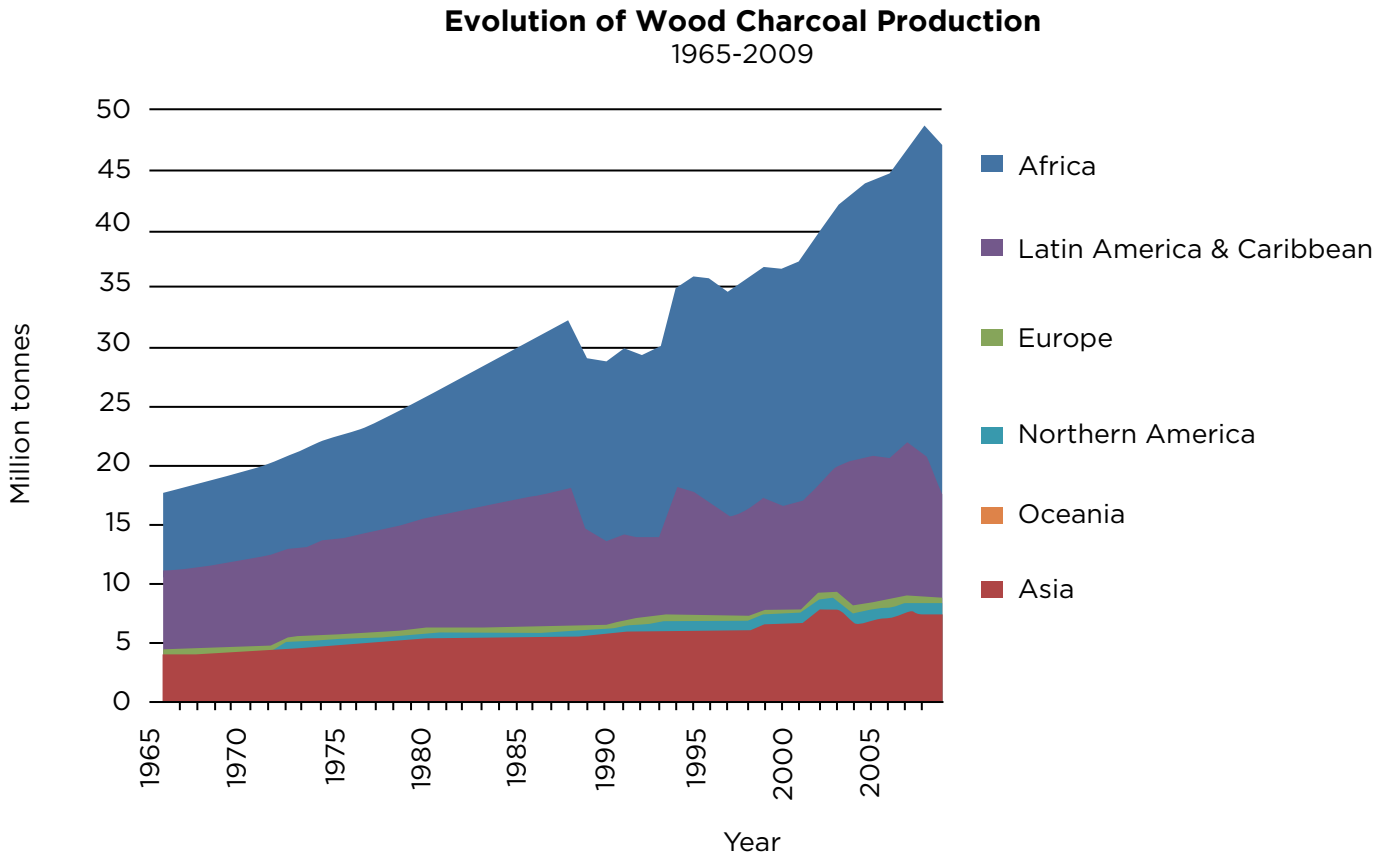


Figure 3: Regional long-term production trends
Source: FAOSTAT

Figure 3 provides an overview on the long-term development of global charcoal production during the last five decades and shows that Africa is clearly the region with the biggest increase over the entire period.

The FAO further estimates that global production of charcoal represents about 310 million m3 in roundwood (wood fuel) equivalents. More than 15% of global wood fuel production is converted to charcoal; the share of wood fuel converted to charcoal has been increasing continuously. In Africa, as much as 30% of the wood fuel is being used for charcoal production, mainly for the following reasons:

- In countries with a highly developed wood processing industry, charcoal production is often an integral part of the wood processing value chain and based on residues, which are carbonised using modern industrial retort kilns with high efficiencies. This industrial wood charcoal is then used for chemical appliances and steel production and only to a lesser extent as a cooking fuel.
- At the same time, charcoal is the cooking fuel of many urban dwellers in developing countries, rather than fuelwood. Increasing urbanisation rates could therefore explain the notable steep increase in wood fuel conversion to charcoal in Africa, where traditional earth kilns, which tend to be less efficient in terms of conversion ratios, are often used for charcoal production.

In 2013, seven of the top ten charcoal-producing countries were from the African region. Brazil, India and China were the three exceptions, and they strongly influence the statistics on charcoal production in their individual regions (see Figure 4). In terms of overall production, Namibia is a rather small player on the global and even the regional scale (ranking 51 out of 200 countries).

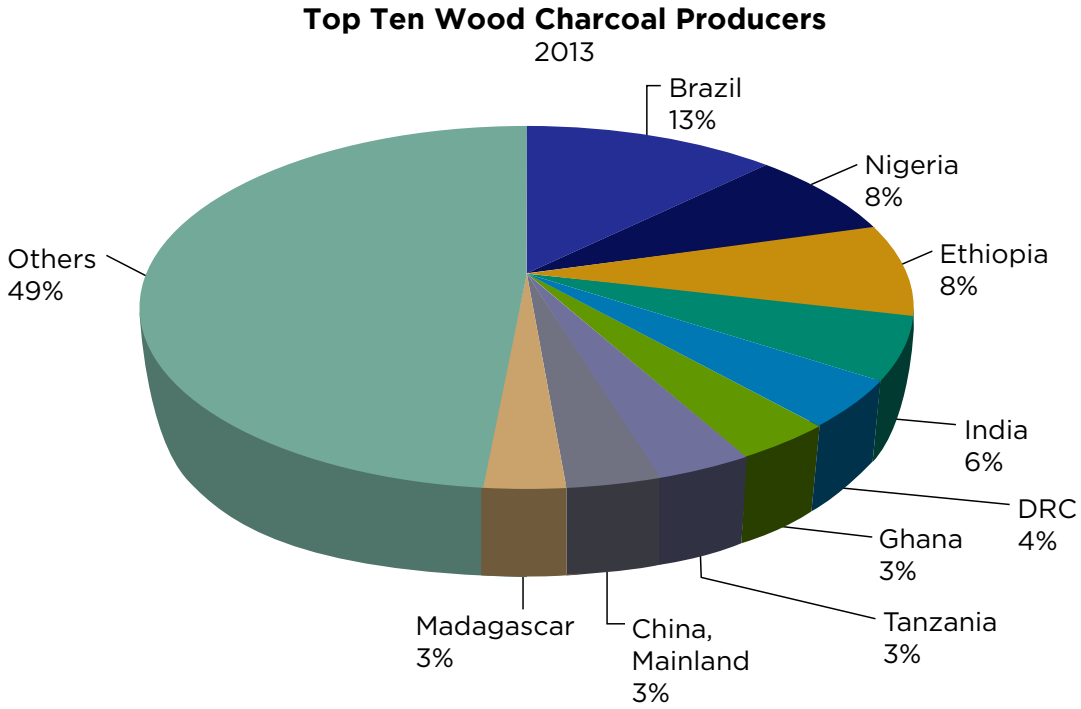


Figure 4: Top ten wood-charcoal-producing countries (2013)
Source: FAOSTAT

However, the picture changes when the focus is on **international trade in wood charcoal:** in 2013, according to ITC calculations based on UN Comtrade statistics, wood charcoal exports totalled about **2 million tonnes, or 4% of global charcoal production.** This shows that the lion's share of global charcoal output is locally consumed, especially in Africa; interestingly, four non-African countries (Indonesia, Myanmar, Paraguay and Poland) account for one third of global wood charcoal exports. Namibia ranked fifth in 2013 in terms of export volume, with a 5% share in world exports (see Figure 5), based on a reported export volume of 100,376 tonnes – which clearly makes it the **regional export champion.**

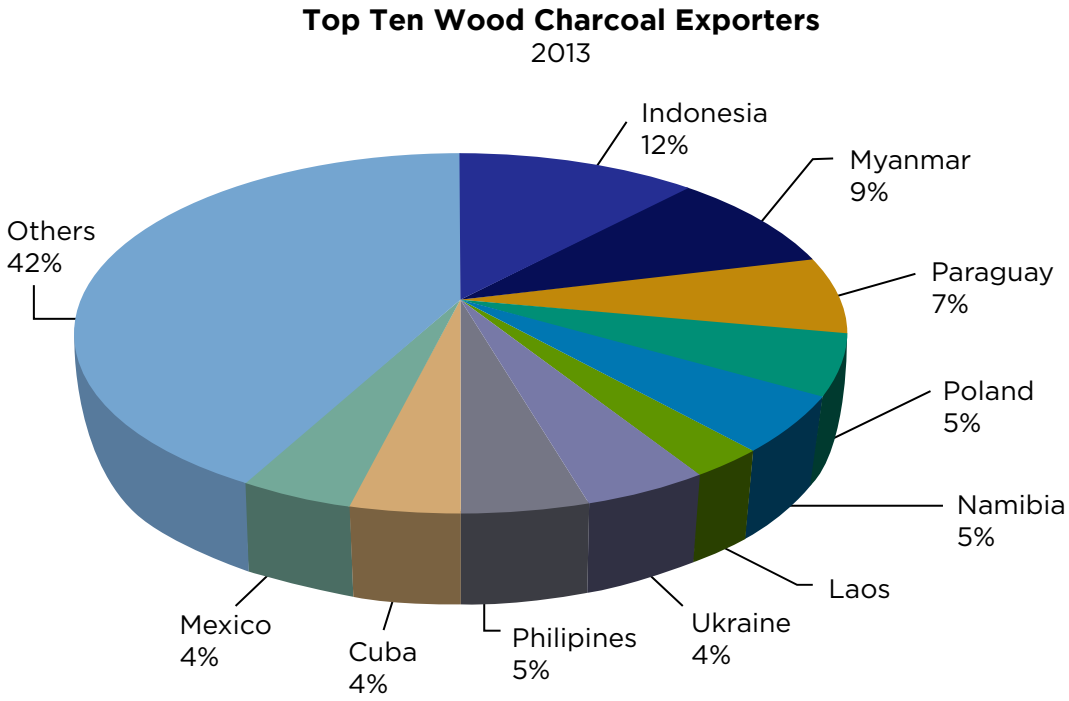


Figure 5: Top ten wood-charcoal-exporting countries (2013) by export volumes
Source: ITC calculations based on UN Comtrade

Namibia ranked fifth in 2013 in terms of export volume, with a 5% share in world exports based on a reported export volume of 100,376 tonnes – which clearly makes it the regional export champion.

Charcoal production has existed as an industry in Namibia for about 30 years and operates mainly on farms in the country's central and northern regions. The charcoal value chain is commercially viable, successful and widespread.

1.3 Industry Background and Evolution in Namibia

Namibia's farmland is burdened by a massive encroachment of bush species. It was estimated in 2008 that approximately 26 million hectares of Namibian farmland is moderately to highly affected by bush encroachment. More recent unofficial research places this figure closer to 40 million hectares (GIZ 2016 Strategic Environmental Assessment), but this has yet to be confirmed by a GIS mapping exercise. Bush encroachment coupled with overgrazing and poor rangeland practices has caused extensive land degradation in Namibia. The biodiversity level has dropped considerably as bush encroachment has increased. Since the beginning of the last century, a significant decrease in agricultural productivity due to the land's reduced carrying capacity has been observed. A combination of charcoal and wood production can be implemented as a bush-encroachment mitigation strategy. At the same time, more and more farmers are turning to charcoal production to compensate for the loss of farming income. Deemed a national challenge, bush encroachment has begun to mobilise both public- and private-sector responses.

Production of lump charcoal is Namibia's oldest wood-based value chain. At the same time, it is the single most important product value chain from a debushing point of view, as it currently generates a demand for biomass input of approximately 350,000 to 500,000 tonnes p.a., thus contributing to the debushing of 35,000 to 50,000 hectares of land each year.

Charcoal production has existed as an industry in Namibia for about 30 years and operates mainly on farms in the country's central and northern regions. The charcoal value chain is commercially viable, successful and widespread. Despite the fact that charcoal production is regulated by the Department of Forestry (DoF) and organised by the Namibian Charcoal Association (NCA), exact figures pertaining to the value chain, from production to exports, are not readily available.

1.4 Characterisation of Value Chain Actors and Their Functions

A charcoal **producer** in Namibia is an individual who buys charcoal by the tonne from a worker/subcontractor and sells it on to a processor/trader. There are currently about 500 charcoal producers in the country, 350 of whom are registered and the remainder unregistered. Most of the registered producers are commercial and emerging farmers who are facing the enormous bush-encroachment problem and subsequent loss of potential grazing land for cattle. Wood for charcoal is harvested mainly from the acacia-dominated commercial livestock farms in much of central and northern Namibia, the major production clusters being Outjo, Grootfontein, Otjiwarongo and Okahandja. There are also a very small number of producers who pay farm owners to use their bush for charcoal production. The industry has successfully moved away from being a 'whites only' affair, as roughly half of the present producers are emerging farmers from previously disadvantaged backgrounds who are trying to diversify their income sources while fighting bush encroachment. However, their contribution to overall production is still lower than the commercial farmers'. In Namibia, wood for charcoal production is sourced primarily through legal means. Only a small portion of total charcoal output is traded informally. The majority of the trees used come from producers' own farms and from private land, including ranches that were converted to agriculture or cleared to make way for grazing. Less is obtained from government lands; government forests contribute about 13% of total charcoal production. Recently, the DoF stopped issuing permits for charcoal production on communal land.

Harvesters and burners perform the actual key operational tasks related to charcoal production on a subcontractor base. It is estimated that there are approximately 6,000 subcontractors working in Namibia's charcoal industry, most of whom are low-skilled migrant labourers primarily from the Kavango and North-Central regions who are informally trained in producing charcoal and are usually living in temporary accommodation on the farms where

they are working. Farmers attract the subcontractors through informal means, mostly when the subcontractors ask for employment. The contracting process tends to be highly informal, often without written agreements signed between producers and subcontractors. Although the harvesters and burners are not formally employed, many charcoal producers register them for social benefits. The heavy duties related to harvesting (primary production) and burning (first-stage processing) are normally carried out by the same subcontractors and not by separate teams. Only rarely do the producers assign groups of workers to different tasks within the production process.

Individual **harvesters (or cutters)** usually work in their own areas to clear the bush there, but producers often organise groups of workers into teams that cover farm camps together. In the major production areas, biomass stock differs in species, tree density and tree diameter. The species of tree to be harvested needs to be addressed accordingly to ensure uniformity and protection of the resource base. Individual trees are selected by the harvesters, felled with axes and thereafter cut into manageable lengths for carrying to the kilns. The wood is then further chopped with axes in sizes that suit the production capacities of the kilns. In most cases, wood with 5–30 cm diameter is manually cut to length and transported, also manually, to the kilns, i.e. the majority of the biomass remains on the farmland. The workers are required to cut the wood into lengths of 750–1,000 mm and stack the logs in heaps of 3 m x 1 m x 1 m (approximately 1 tonne). They are left to dry for at least two weeks before they are carbonised. The value of the biomass is calculated at NAD 120–180 per tonne depending on tree density, species and distance from markets.

The average farmer is estimated to contract ten **burners,** each operating three production kilns, but this varies. Kilns are mobile and are typically rolled manually or carried to new production sites in close proximity to the bush to be harvested. Producers assist in this process with pickups when distances are excessive. Approximately 5 tonnes of biomass are needed to produce 1 tonne of charcoal; however, the conversion ratio depends on the biomass species, the degree of moisture in the wood and the skills of the charcoal burners. The kiln is filled with wood through the top opening and then lit to start a fire. The lid is then placed over the top opening in a half-open position, as the wood should smoke at all times (an open fire would burn the wood to ash). The lid must be adjusted at times to allow the fire to smoulder. As the wood is carbonised, it collapses into a pile of coals in the bottom of the kiln. More wood can be fed into the kiln throughout the day. When the smoke changes from dirty white to blue-grey, the lid must be closed and sealed with mud or clay. By the next morning, the charcoal should be cold, and the procedure begins afresh with the next heap of wood.

The subcontractors are remunerated according to the quantity of charcoal they produce, in cycles of four to six weeks. Landowners are responsible for getting charcoal production and transport permits and complying with regulations. They also provide the charcoal kilns, which remain the property of the producer, as well as hand equipment (axe, machete) and food rations (maize meal) for the workers to the value of NAD 550 on account when work is initiated. This is later offset against the workers' charcoal production.

The average charcoal output is about 2 tonnes per kiln per month. The average charcoal produced per burner is approximately 800 kg–1 tonne per week. However, producers report a significant range of production capacities among charcoal burners, with some burners producing up to 8 tonnes per month.

After carbonisation and cooling, normally very big pieces of charcoal, non-carbonised wood and larger stones are separated manually, and the remains are then sieved. Most burners use simple sieves to separate sand, ash and small charcoal pieces (under 13 mm) from the two saleable qualities (13 mm–20 mm, above 20 mm). A very few producers use semiautomatic sieves. These are much more effective and can separate large charcoal from fine, thus allowing separate sales of the two qualities. Then the charcoal is packed on the spot into 50 kg bags, which are normally stored at central collection points on plastic

sheets to avoid humidity seeping up from the soil and also covered with such material. Protection against humidity is essential, because processors do not accept wet charcoal. The workers' spouses often help with packing and sewing the bags. The bags are then transported from the burning site to a storage area on the farm, where the truck will be loaded. This is usually carried out with a tractor-trailer unit or pickup (average collection costs: NAD 50 per tonne). Each worker's charcoal is weighed either before or after its transport to the storage site. Some producers pay the charcoal workers for loading the truck, either in cash or in kind.

The quantity of charcoal varies greatly from producer to producer, as do the frequency and regularity with which the producer orders a truck for charcoal to be loaded onto. The average producer is estimated to produce 30 tonnes per month. Once critical mass (usually a 30 tonne super link) has been reached, producers sell the charcoal by contacting the processor, who arranges to collect it either by transport contractors or by vehicles belonging to the processing company itself. The producer thus receives an ex-works price for his charcoal. Mostly, product quality is controlled by the processor, after which the producer is paid. The producer then pays the workers NAD 700–800 per tonne, usually a week after the truck has been loaded. However, some workers are compensated up to 14 days later due to cash-flow constraints and payment terms from the processors and traders.

As mentioned, subcontractors can produce up to 8 tonnes per month should they work very efficiently, generating a monthly income of up to NAD 6,400 (however, with an average output of 800 kg per week, only half of this monthly income will ultimately be paid to the worker). The ex farm sales price averages between NAD 1,500 and NAD 1,650 per tonne depending on the product quality (sieved or unsieved, i.e. presence or absence of dust, soil particles and unburnt wood and twigs; FSC and non-FSC rates; species, e.g. charcoal from acacia species fetches higher prices owing to perceived superior quality), distance to the processor and season of the year; during the wet and planting seasons, most producers halt production and prepare their land for agriculture, which leads to low supply and higher ex farm prices. Fines come to approximately NAD 950 per tonne. This translates to an average gross producer profit of NAD 800 per ton, which needs to cover the producer's on-farm costs and initial capital outlay. With an average production of 30 tonnes, the average producer income totals NAD 24,000 per month.

Charcoal is transported to large-scale **processors and traders/exporters,** who usually cover the related transport costs (approximately NAD 1.10/tonne/km) or alternatively pay producers a similar amount for charcoal to be delivered to their premises. There, they receive the charcoal in bulk and refine the product according to the technical parameters agreed with their foreign clients; parameters like carbon fixation, ash content, volatile matter and moisture content must meet buyer specifications. For example, Namibian processors have to subscribe to the DIN norm to market their charcoal in the UK and many other European countries. Hence, charcoal buyers set certain product-standard requirements to be met in exports. Some buyers use local agents in Namibia to inspect the charcoal during loading. Others request a product sample before shipment. Weathering certificates and other certifications are required by the shipping lines from a safety perspective.

Currently, there are 10 charcoal processors who purchase charcoal, process it (up to 20,000 tonnes per annum) and distribute it to different clients and markets. These processors have large-scale screens and bagging facilities to pack the charcoal. So far, the degree of vertical integration in the value chain tends to be low: only a few Namibian charcoal producers are involved in retail packaging for the end consumer. Similarly, only a few of the larger processors have become involved in both first- and second-stage processing. Whereas some larger Namibian trading companies are involved in retail packaging for direct exports to overseas markets, almost half of the charcoal is currently exported in 50 kg bags to the RSA.

Table 1: List of Namibian charcoal processors

Jumbo Charcoal	Ian Galloway	jumboch@iway.na 062-503838/0811281711
Carbo Namibia	Hans Steyn	wildevy@iway.na 067-242386/0812791599
Etosha Charcoal	Maans Robberts	etoschar@iway.na 067-313797/0812381915
Superbraai	Patat du Toit	patat@mweb.com.na 067-235016/0812887763
Namibia Invaderbush Charcoal	Jannie Loots	info@iusnam.com 0811292174
ENC & Blaze	Kokkie Prinsloo	kenprinsloo@gmail.com 0812922442
Kilo 40 (Ignite)	Gerhard Steyn	kilo40@mweb.com.na 067-304789 / 0812338795
Oshakati Charcoal	Pieter Smeer	pphoenix@mweb.com.na
Makara Bush Products	Michael von Hacht and Wolfhart Diekmann	mabupro@iway 067-307209/0813574056
Fire and Flame	Piet & Magda Prinsloo	067-313857/0812780408

Source: Compilation by OABS (2015)

Processors have relationships with producers based on annual informal supply agreements. Generally, the price paid per tonne of charcoal supplied by the producers is uniform across the industry; thus, geographic location (and related transport cost) is the key driver on supply relationships rather than product price. Processing exporters enter into annual supply agreements with foreign buyers in August/September for supply during the following 12-month period. Due to the rainy season stretching from January to April, processors build up considerable stock in the ramp-up to December to be able to supply through the rainy season, as this is a requirement from the buyers both in Europe and South Africa. The contracts are binding, and penalties can be significant, as the foreign buyers tend to enforce the contractual obligations; in the event of short supply, they purchase charcoal from other suppliers, and the Namibian processors are held liable for the additional costs incurred.

Namibian barbecue charcoal enters the consumer market under more than 15 different brand names, only a few of which are registered in Namibia (e.g. Jumbo, Etosha and Savannah). The Namibian trademarks are owned by the processors, which are usually located close to the production areas. The remainder enters the market through foreign brand names. The charcoal is transported by road, rail and sea from Namibia to the destination countries.

Importers (agents and distributors) in buyer countries play an important role in marketing Namibian charcoal. South African agents usually pay to transport charcoal from Namibia to a distribution point in South Africa. Most importers warehouse Namibian charcoal and distribute it to retail outlets accordingly. In certain instances, agents in foreign countries (particularly South Africa) prescribe a 5% marketing fee to processors for marketing their charcoal. Agents facilitate sales and are mostly active in the bulk markets. South African trading companies pack Namibian barbecue charcoal in small bags (normally 4 kg or 5 kg), as ultimately required by the end consumers, and sell some of them locally but in most cases export them on to overseas countries. South African traders estimate that up to 70% of the wood charcoal locally consumed in and exported from the RSA originates in Namibia.

The important **indirect stakeholders** in terms of essential industry and value-chain support and regulatory functions are described below.

The majority of wood charcoal producers are organised into the **Namibian Charcoal Association (NCA),** which is affiliated with the NAU and currently has more than 350 registered members. The association acts as the producers' and processors' mouthpiece, though there are about 150 producers who are neither registered, nor active members of the organisation.

Concerning the provision of operational services, transport brokers and operators, freight forwarders and clearing agents (mostly Namibian), TransNamib (rail transport), Namport (port facilities at Walvis Bay) and international shipping lines are relevant indirect stakeholders; financial service providers (credits and loans to producers) are also relevant for proper value-chain function; the major non-financial service providers include laboratory services for quality controls and certifications (mostly based in Europe) and auditors for Forest Stewardship Council certification (mostly based in South Africa). Furthermore, the analysis of the charcoal value chain identified **local authorities** and the **Directorate of Forestry (DoF) of the Ministry of Agriculture, Water and Forestry (MAWF)** as the most relevant indirect macro level stakeholders (see Figure 6).

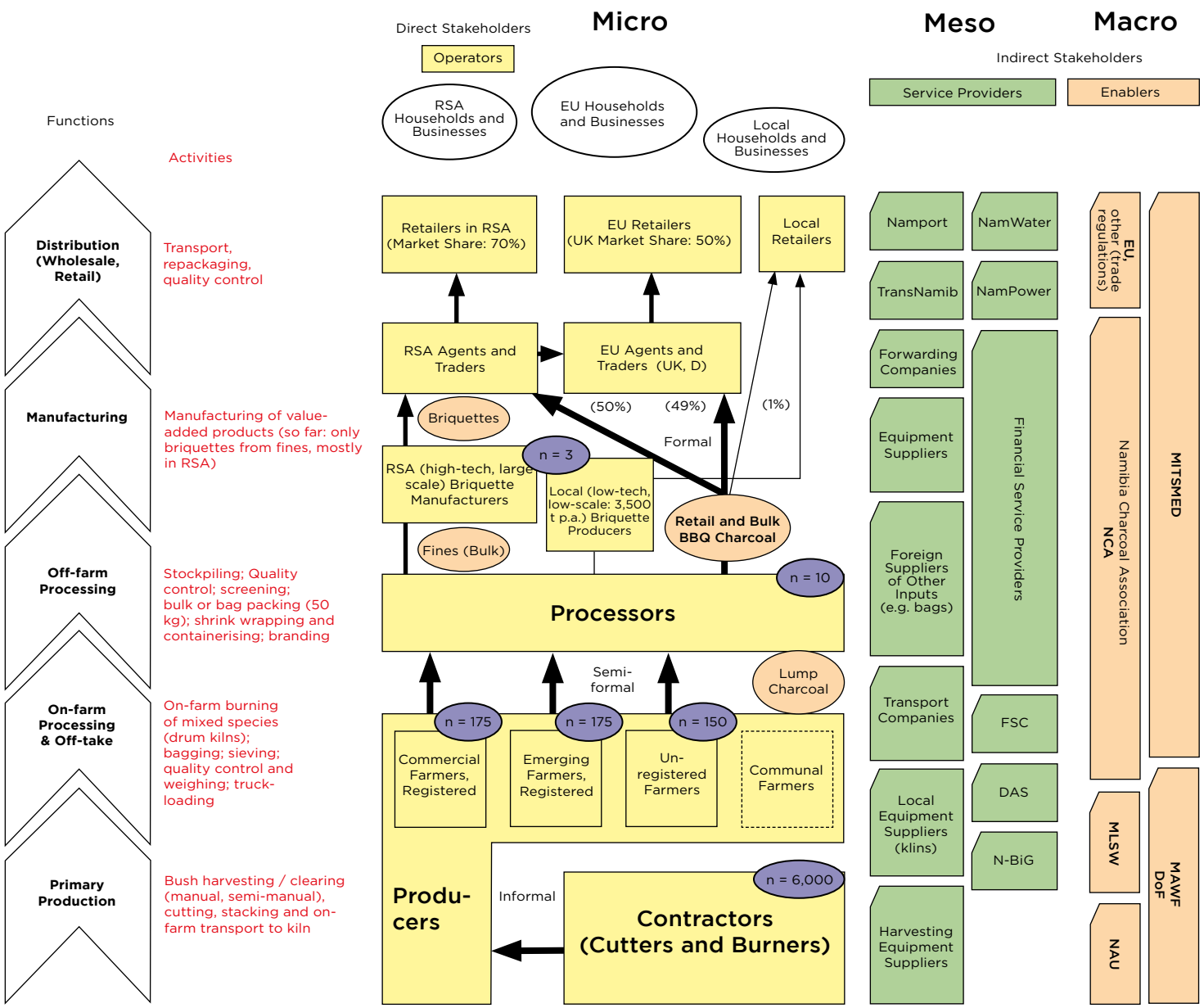


Figure 6: Value chain map wood charcoal
Source: GIZ ProCOM, based on data from OABS 2016

1.5 Classification of Namibian Products

Wood charcoal is a solid product of the pyrolysis of biomass carried out at temperatures above 400ºC. Namibian wood charcoal is produced by burning a carbon-rich material in a low-oxygen atmosphere. This process removes the moisture and volatile gases present in the original fuel. The resulting charred material not only burns longer and more steadily than whole wood, but it is much lighter (one-fifth to one-third of its original weight). Charcoal is produced from solid wood of different dimensions. The wood is heated, resulting in partial combustion, whereby in addition to charcoal, a variety of volatile substances such as wood gas, acetic acid (wood vinegar) and wood tar can be obtained, depending on the technology applied in the process. For instance, the combustion by-product wood vinegar can be used in the manufacturing of antibacterial agents, agricultural insecticides, deodorants, bath additives and other cosmetic products. Wood charcoal is attracting increasing attention because of its unique characteristics, which open it to many different uses. The tiny cavities in its surface can absorb different substances, such as moisture from humid air, and release them again in dry conditions, making wood charcoal an excellent humidity regulator. They can also absorb unpleasant room odours and harmful substances, so charcoal can be used as a water purifier and in room deodorants.

Wood charcoal is 100% natural with no fillers. It is heated under controlled conditions to remove impurities, resulting in **pure lump charcoal.** Natural wood charcoal is black, burns cleanly and produces very little ash. The fire from natural wood charcoal lights quickly and easily and reaches cooking temperature rapidly. It burns very hot to impart a woodsy flavour to food. Charcoal does not perish or have a shelf life, provided it is not handled excessively, which tends to make its surfaces crumble into dust-like particles. Up to 15% product loss can be attributed to excessive handling.

With the emergence of industrial society, new uses for wood charcoal in industry opened up, at the same time as traditional industrial uses such as iron smelting began to decline with the widespread use of coke from coal as the principal reductant of the iron and steel industry. Nowadays, the vast majority of the charcoal traded internationally is used for **food preparation.** While in some developing countries charcoal is still the principal fuel for food preparation, in emerging and industrial countries it is no longer the main domestic cooking fuel but a symbol of an affluent lifestyle through its use as a fuel in open-air barbecues. Ordinary lump charcoal is still the consumers' preferred form of charcoal, since it is easy to handle and to ignite. It is sold by weight, with price traditionally the most important criterion in buying decisions. However, this has begun to change over time, as consumers are becoming more aware of differences in calorific value, ease of combustion and other quality-related differences between various types of lump charcoal, as well as more sensitive to environmental and social issues related to wood charcoal production and trade.

Charcoal briquettes appeared on the market as an alternative to lump charcoal in the early 1950s due to new methods for large-scale production of fine charcoal from sawdust and bark and as an attempt to add value to residual fines from conventional wood charcoal production. Since then, briquette production has gradually become the most prominent commercial use of charcoal fines, which had traditionally been regarded as an undesirable yet unavoidable residue from charcoal making and handling. Charcoal briquettes are basically composed of three inputs: charcoal fines (pulverised and screened), a binder (usually starch from any cheap source) and a low-cost filler or burn-rate controller (e.g. calcium carbonate in powder form from ground limestone, chalk or shells).
The use of fillers lowers production costs and slows the burning rate compared to that of lump charcoal, which is considered advantageous for some forms of food preparation. Net heat depends on the amount of charcoal the briquette contains. As a part of product differentiation efforts, flame colourants and odour-producing materials (e.g. hardwood sawdust) may be added. The most important advantages of the charcoal briquette in food preparation are its relative freedom from dust and its ease of handling. Briquettes are marketed in a wide range of shapes and sizes: oblong, egg shaped, hexagonal and pillow shaped, among others.

While in the barbecue fuel market lump wood charcoal has little competition from substitute products other than briquettes, in almost all industrial applications charcoal

could eventually be replaced by coal, coke, petroleum coke or lignite. However, there are some inherent properties of wood charcoal that keep it in use in other industries, namely its low sulphur content, high ratio of carbon to ash, low content of inorganic impurities, stable pore structure with extremely high surface area and good reduction ability and the fact that it burns almost smokeless.

As a stronger reductant than coke, when heated with metallic ores containing oxides and sulphides, wood charcoal combines readily with oxygen and sulphur, facilitating metal extraction. Industrial use of wood charcoal for **heat generation** is only important in a limited number of countries, such as China and Brazil, namely in the production of pig iron in very large blast furnaces. This was also relevant until recently in the RSA, e.g. in silicon smelters and as a fuel in the cement industry. However, it is only in countries with extensive forests and insufficient coking coal resources that the use of charcoal for iron smelting tends to be profitable. Industrial uses other than metallurgy include the chemical industry (manufacturing of carbon disulphide, sodium cyanide and carbides) and the activated carbon and filter industry (water purification, dechlorination, waste water treatment, etc.). The chemical and activated carbon industries prefer lump charcoal to fines, as fines usually have a higher ash content than lump charcoal and tend to be more contaminated.

Table 2 provides a synopsis of international industrial usages for wood charcoal and the by-products of the carbonisation process (if retort technology is applied):

Table 2: International industrial usages for wood charcoal

Product	Raw Material	Application
Charcoal, lump	hard wood,soft wood	activated carbon, ferro-silicon, cooking, metal working, sodium cyanide, carbon disulfide, iron and steel, silicon.
Charcoal, granular	Charcoal, lump	activated carbon, addictive to animal food, filling compound for bottled gas, steel hardening compound.
Charcoal dust	Charcoal, lump	activated carbon, lining of moulds in metal foundries, production of briquettes, cementation granulate, pyrotechnics.
Soluble or pyrolytic tars	hard wood, soft wood, agricultural wastes	fuel for steam boiler, furnaces, metallurgy, fire brick making, raw material for chemical industry, electrodes.
Wood gas	hard wood, soft wood, agricultural wastes	heating gas for all types of operations, gas engines.
Wood vinegar	hard wood	food presevation and flavouring of meat and smoked fish, perfume and aroma industry.
Wood tar	haed wood	rope industry, veterinary medicine, pitch, creoste.
Crude methanol	wood alcohol	methyl acetate, solvent, denaturant.
Solvent	wood alcohol	cellulose esters and agglutinants, synthetics, lacquers.
Methyl formate	crude wood vinegar and crude methol	cellulose esters and agglutinants, synthetics, lacquers.
Methyl acetate	crude wood vinegar and crude methol	cellulose esters and agglutinants, synthetics, lacquers.
Acetic acid	crude wood acid	chemical, pharmaceutical, food, rayon, textile and fil industries, vinegar.
Propionic acid	crude wood acid	pharmaceutical, flavour and fragrances.
Butyric acid	crude wood acid	pharmaceutical and perfume industries.

Source: FAO

International trade of **speciality charcoal** produced in retort kilns and other **by-products of the retort process** plays only a minor role in most producer countries but can be very profitable, as exemplified by the Japanese *shiro-zumi* ("white" charcoal). This is produced by charring hardwood at a relatively low temperature for some time and then, near the end of the combustion process, raising the kiln temperature to about 1000ºC. The wood turns red hot and the bark incinerates, leaving a smooth and extremely hard surface. After being pulled out, the charcoal is quickly smothered with a powder consisting of earth, sand and ash that gives this specialty charcoal a whitish hue and a characteristic metallic sound when its extremely hard surface is touched. The variety produced in the southern Kishu region, called *Kishu binchō-tan*, is made from the extremely hard holm oak wood and considered to be the best barbecue charcoal by the most discerning Japanese restaurants, which advertise that they use this type of charcoal in the preparation of traditional grilled dishes such as eel and yakitori chicken.

Namibian lump charcoal is used primarily for **food preparation,** while **charcoal fines** are used for **briquette production,** mainly in South Africa. As a general rule, smaller charcoal of lower quality and price is used in the RSA for further processing into briquettes, while first-grade recreational charcoal has to be bigger and of higher quality. The processors screen the bulk charcoal supplied by the producers into acceptable grades and package it into specific charcoal bags ranging from 4 kg to 50 kg depending on the end-market requirements. Approximately 35% of charcoal delivered to processors is screened out as fines. Fines are packaged primarily into bulk bags (500 kg–1000 kg), which are supplied to briquette manufacturers in South Africa.

Charcoal briquette production is also taking place in Namibia, but so far on a very small scale, and it is not well documented; processors estimate that approximately 300 tonnes of charcoal briquettes are produced per month in Namibia. Similar to charcoal production, local briquette production is characterised by the application of traditional techniques, with most briquette producers still operating with manual presses and traditional drying techniques such as agricultural tunnels. An estimated 2,500 tonnes of briquettes are exported annually. Namibian briquettes (pillow shaped) contain only Namibian encroacher bush charcoal and a maize starch binder, making them clean burning with a unique smoke flavour. A rather insignificant amount of triquettes (triangular shaped) is produced annually and is perfect for heat distribution. As mentioned, briquettes are also produced from Namibian charcoal fines in South Africa in modern manufacturing plants; quality-control measures in those plants ensure that there are limited amounts of small pieces, for easier barbecuing with less waste and two to three times the burning time. However, the image of briquettes in the consumer end market is still negative, as in some cases non-natural additives are used, allegedly with harmful health effects.

Future changes in charcoal-processing technology (adoption of retort kilns) may have an impact on the industry's product range, as marketable quantities of by-products from the carbonisation process will be produced, such as pyrolytic tars, wood gas and wood vinegar, among others.

1.6 Local Industry Performance

The annual wood charcoal production in Namibia has ranged between 100,000 and 120,000 tonnes in recent years, almost all of which is exported. In 2014, official statistics reported that 118,000 tonnes of charcoal had been exported from Namibia, while the most recent mirror data for 2015 provided by UN Comtrade stipulate total exports as high as 133,000 tonnes. In contrast to other African producer countries, domestic demand and consumption is very low, estimated at only 1,000 tonnes, less than 1% of current production.

According to ITC calculations based on UN Comtrade statistics data, Namibia's wood charcoal exports have been steadily growing in recent years in terms of volume (see Figure 7). The country's charcoal export performance between 2011 and 2014 was similar to Poland's; Paraguay,

one of Namibia's major competitors on the world market, has lost ground in recent years, while Myanmar has stalled at a high level, maintaining its second rank; Indonesia, the global charcoal export champion, with its highly developed wood-processing industry, could drastically increase its market share. Other fast-growing charcoal exporters have been Laos and Cuba. In terms of export quantities and quantity growth rates, Namibia is currently ranking fifth worldwide (according to 2015 mirror data, fourth); however, in terms of overall export value and value growth rates, the country is only ranking 13th (according to 2015 mirror data, 12th, with a total export value of USD 28.3 million). For example, Poland, with slightly lower overall exports, obtained export earnings of USD 73 million, i.e. a unit value of USD 569 per tonne compared to a unit value of USD 213 per tonne for Namibian charcoal (including fines). In the group of major wood-charcoal-exporting countries, Namibia, Paraguay and Myanmar hold the lowest unit values (ranging between USD 150 and 250/tonne), an indicator that their international competitiveness is to some extent based on offering "value for money".

Mainly due to the labour-intensiveness of the harvesting and carbonisation processes, it is estimated that approximately 6,500 persons are directly and indirectly employed along the charcoal value chain in Namibia, which makes the charcoal industry a relevant income and employment source in rural Namibia.

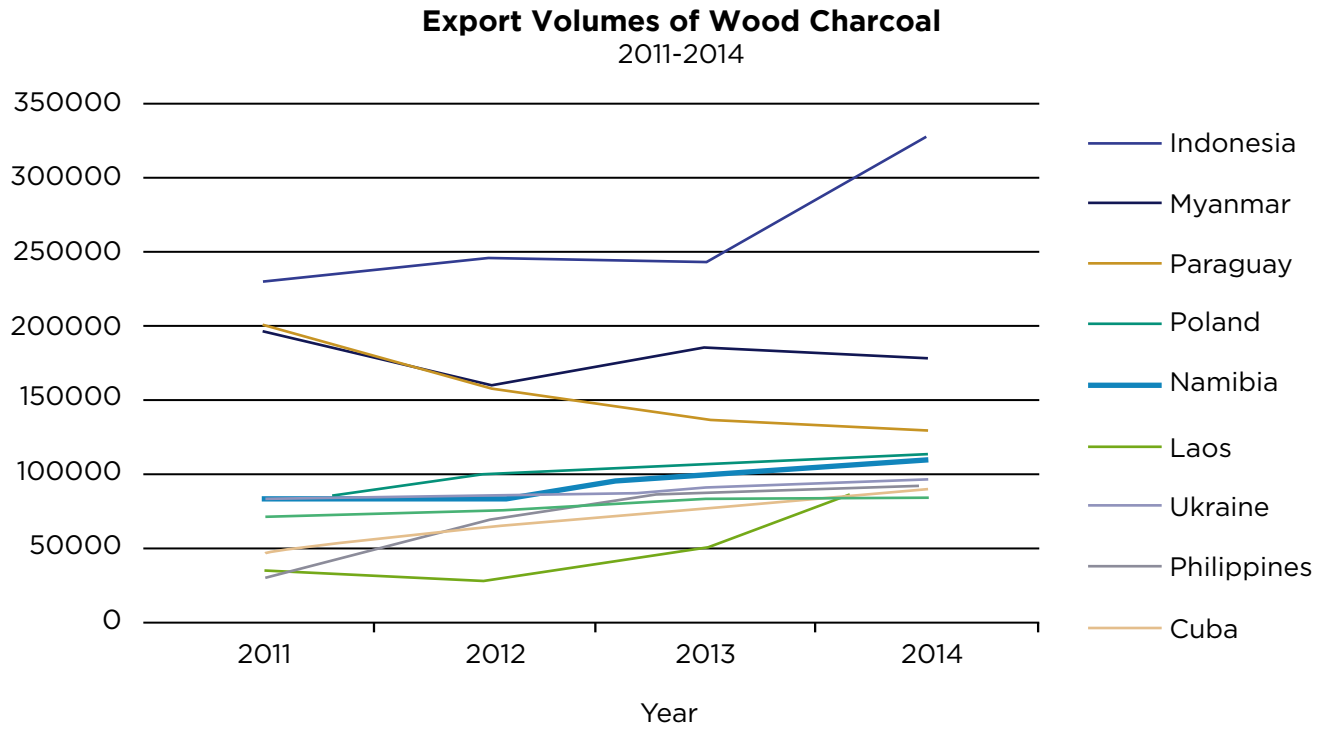


Figure 7: Export performance of top ten wood-charcoal-exporting countries (2011–2014; by export volumes)
Source: ITC calculations based on UN Comtrade data

1.7 Global and Regional Demand for Products of the Industry

World market demand for wood charcoal has been constantly increasing over the last 15 years: in terms of volume, world imports climbed from barely 1 million tonnes in 2000 to over 2.5 million tonnes in 2014.

As evidenced in Figures 8 and 9, world market demand for wood charcoal has been constantly increasing over the last 15 years: in terms of volume, world imports climbed from barely 1 million tonnes in 2000 to over 2.5 million tonnes in 2014. In terms of value, the increase has been even more pronounced: whereas in 2000 global imports totalled USD 267 million, in 2014 they had reached USD 1.17 billion, a fourfold increase. In the same period, Namibia was able to grow the value of its charcoal exports from barely USD 2.5 million in 2000 to more than USD 25 million in 2014 (28.3 million in 2015, according to preliminary mirror data).

Lately, global and regional demand for Namibian wood charcoal has increased even faster, and the industry has not been able to meet all requests. The major reasons for the accelerated demand are:

- The fact that Namibian charcoal is very competitively priced on the global market, which can be linked to the abundantly available low-cost resource base (encroacher bush) and possibly lower overall production costs compared to other countries that rely on more capital-intensive technologies for harvesting and processing;
- Growing demand from South Africa, because firewood is becoming scarce there, amongst other reasons because the Working for Water campaign successfully eradicated the alien invasive bush species in South Africa that used to supply firewood for recreational purposes;
- Rising demand from South Africa and other emerging countries due to an increasingly affluent urban population;
- The RSA's re-export of a relevant share of Namibian wood charcoal to other, mainly European markets, where demand has also been growing constantly over time, as barbecue is becoming a more and more popular leisure activity.

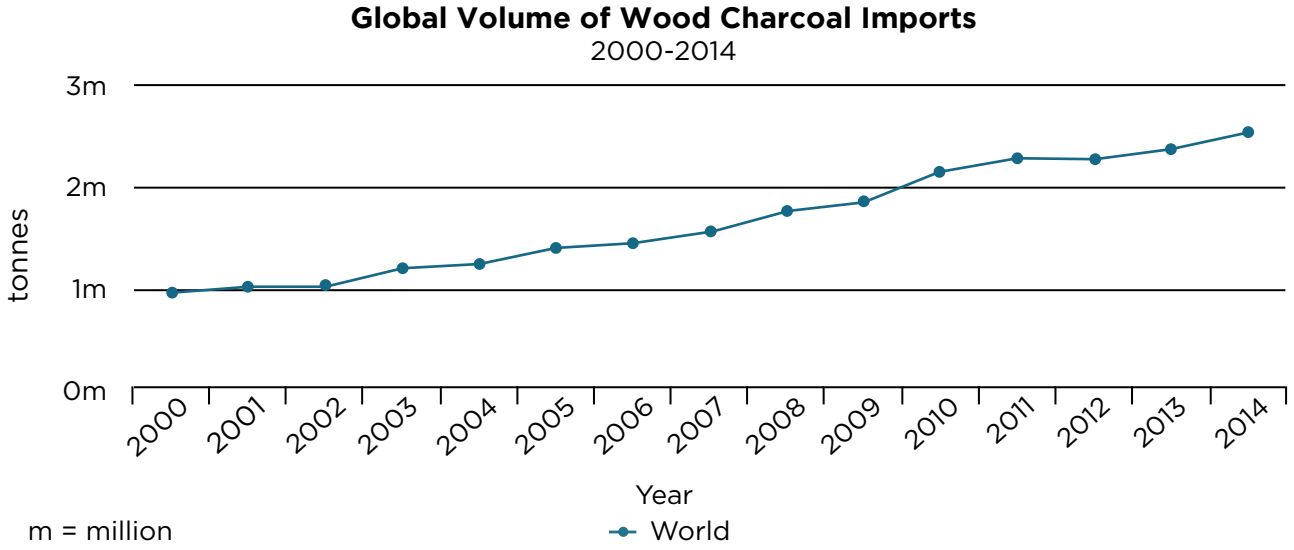


Figure 8: Global volume of wood charcoal imports (2000–2014)
Source: FAOSTAT

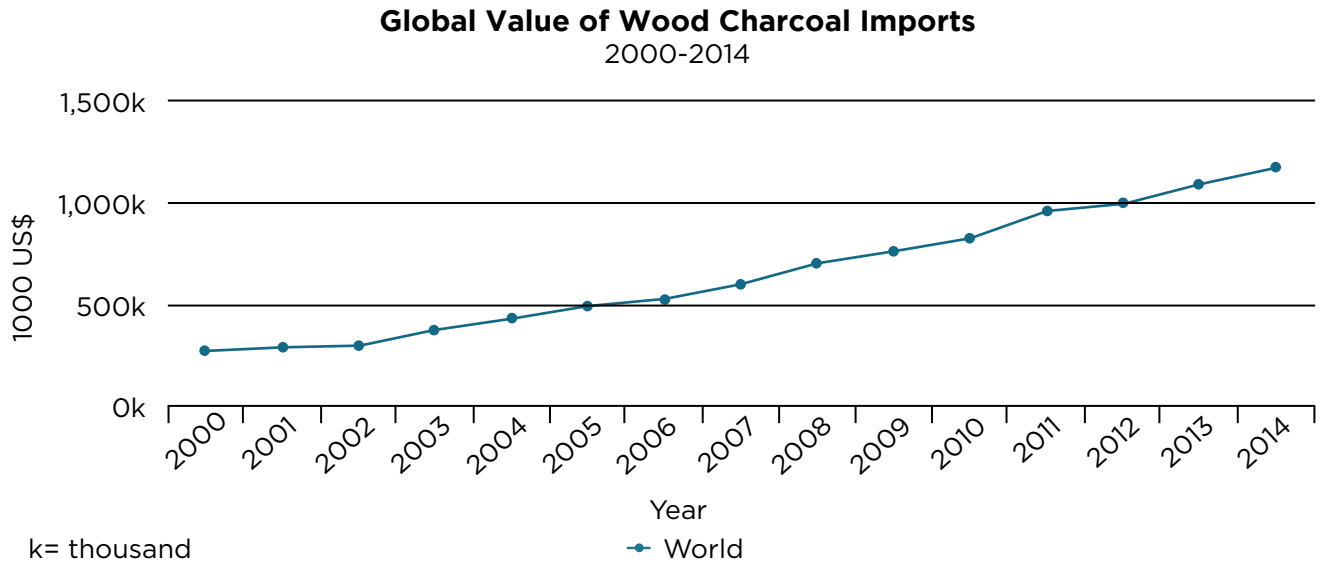


Figure 9: Global value of wood charcoal imports (2000–2014)
Source: FAOSTAT

The United Kingdom alone consumes more than 80,000 tonnes of wood charcoal annually for recreational purposes, of which Namibia is by far the biggest supplier (when taking into account re-exports from the RSA), with an estimated 50% market share. The UK is currently also the most important market for Namibian wood charcoal certified by the Forest Stewardship Council (FSC), as British supermarkets and major retail chains only sell FSC charcoal. Much of the barbecue fuel is still sold through smaller, independent outlets, many of which stock little or no FSC-certified product, according to industry experts. However, in the European market, demand for FSC-certified charcoal has been growing faster in recent years than demand for standard non-certified charcoal and is likely to grow even faster in future, as consumers are becoming more and more sensitive to environmental and social sustainability issues.

As far as industrial countries are concerned, Namibian wood charcoal tends to be more competitively priced than locally produced wood charcoal. For example, whereas the wholesale price of charcoal produced locally in the UK is about NAD 30,000 a tonne, Namibian quality wood charcoal is only NAD 4,500 a tonne (FOB), thus making it much cheaper for British wholesalers to import barbecue charcoal from Namibia, even taking the cost of transport into account.

According to Namibian industry experts, Namibia could export three to five times more charcoal than it is currently producing. Large and growing markets are seen in the EU, the USA, the Middle East and Asia, particularly Japan. From a value perspective, with a share of 11.2% in the total value of global imports in 2015, Japan is the single most important importer of wood charcoal, followed

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by the Republic of Korea (9.5%), Germany (9%), the USA (5.4%), France (4.5%), China (4.2%), Saudi Arabia (4.2%) and the UK (3.9%). Import unit values suggest that Japan and Korea are the most profitable markets, with import unit values of USD 807/tonne and USD 938/tonne, respectively. From a volume perspective, the world's biggest wood charcoal importers are Canada (which imports almost exclusively from the USA), Germany (where Namibia currently ranks 10th on the supplier list), China, Japan and Thailand (which mainly import from other Asian countries). Interestingly, the RSA ranks 10th on the list of leading charcoal importers, with imports totalling 111,000 tonnes, of which 101,000 tonnes were supplied by Namibia in 2015, i.e. 90% of total imports. However, the unit value of Namibian charcoal imported by the RSA was as low as USD 111/tonne in 2015, which suggests that the South African market is the most important export market for Namibian charcoal but at the same time the least profitable from a unit price perspective.

Since the demand for Namibian wood charcoal currently outstrips supply, chain actors are maximising their production capacities. With regard to trading partners, Namibia's charcoal exports are heavily concentrated on a small number of importing countries: although the share of exports to South Africa could be gradually reduced over time (from over 80% to less than 50% in the total value of exports), it still remains the most important market for Namibian charcoal (see Figure 10). As mentioned, South African traders assume that up to 70% of the wood charcoal locally consumed and exported from the RSA originates in Namibia.

Even though exports to European countries increased significantly over the last decade, exports within Europe are highly concentrated on the United Kingdom (with a 36% share in total export value). Currently, the UK buys more charcoal from Namibia than all other European countries combined (Greece: 8.3%; Germany: 3.8%; France: 2%; Cyprus: 1.8%; Portugal: 1.5%; the Netherlands: 0.4%). Lately, export activity to the Middle East has been developing (United Arab Emirates, Israel, Lebanon, Kuwait, Qatar and Saudi Arabia), although this region had a combined share in total export value of only 3% in 2014.

Exports to other countries are not firmly established. The fact that sales to other countries are fluctuating steeply over time is an indicator that they tend to happen "by accident" rather than based on well-established supplier–buyer relationships.

Given the predominantly recreational use of Namibian wood charcoal, depending on the target market, the demand for barbecue charcoal is subject to seasonal fluctuations, but the season differs from one country to another (peak demand in Europe: May to August). European buyers place their orders from September to May of the following year. Due to the weather-dependent consumption pattern of this leisure product, final consumer demand can be quite volatile. In the other markets (e.g. the Middle East), demand is year round and less volatile, and orders are placed from January to December.

Due to the commodity nature of wood charcoal, Namibian exporters are price takers with limited price-setting capacity. Product-differentiation strategies, based on industry-wide quality standards, may change this to some extent. Meanwhile, it is common for foreign buyers to have the power to negotiate price reductions with their Namibian suppliers, forcing them to decrease operation costs. The suppliers are then in the weaker position, because they are competing for buyer attention with many other similarly capable suppliers from other African countries such as Nigeria.

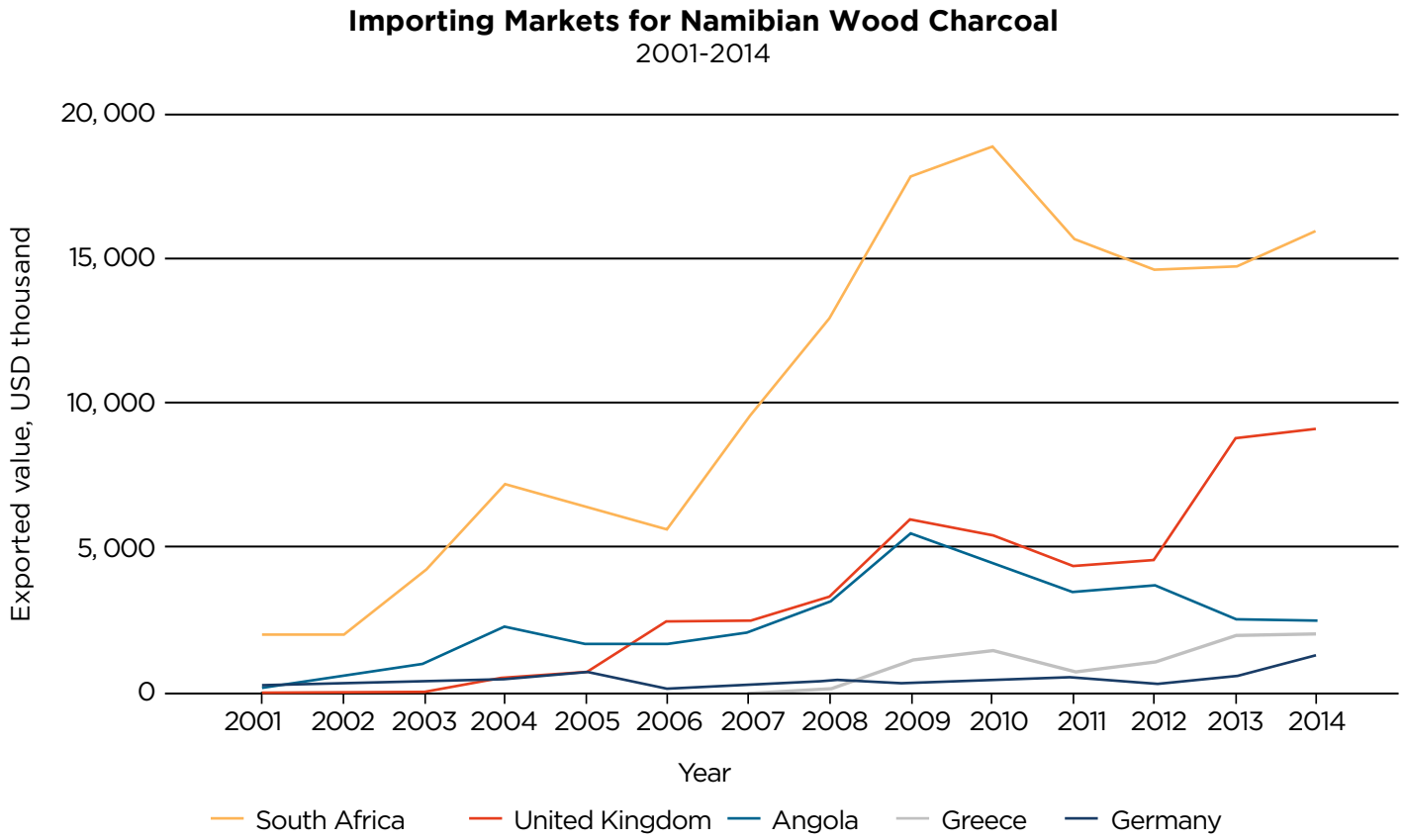

Figure 10: List of importing markets for Namibian wood charcoal
Source: ITC calculations based on UN Comtrade data

1.8 Industry Growth Perspectives (2020)

Considering current market demand as well as past demand growth and the industry's capacity to respond to it, it is estimated that the production of wood charcoal for export could be increased to 200,000 tonnes by 2020, i.e. by 60% compared to 2014. Assuming an average bush harvest volume of 10 t/ha suitable for carbonisation (the amount of biomass per hectare varies between 8 tonnes and 30 tonnes and depends on the local vegetation and weather conditions), in four years, the charcoal industry could contribute to the debushing of up to 400,000 ha. However, this would require urgent attention to existing challenges, particularly those related to technical, social and environmental production standards as well as innovation and technology aspects; otherwise Namibia might even lose its current world market share to regional competitors.

The charcoal industry alone could grow its exports by value from USD 25 million (2014) to USD 42.5 million p.a. (current prices) by 2020, i.e. a 70% increase, should the industry be able to capitalise on opportunities and remove the detected constraints to growth. By meeting these growth targets, Namibia could improve its ranking in wood charcoal export statistics both in terms of volume and value (world market ranking 2014: five in terms of export volumes and 13 in terms of export value) and climb at least two ranking positions by 2020.

By targeting export markets with charcoal (including specialised charcoal), briquettes and raw fines, the industry could make a significant contribution to the national objectives of export promotion (Strategic intervention area 2 of the Growth at Home Strategy: market access) and structural transformation (Strategic intervention area 1 of Growth at Home: value addition, upgrading and diversification).

The employment growth potential of the industry is difficult to estimate, as this can only be established once there is an agreement on an appropriate production technology; the introduction of more efficient kilns may actually reduce the number of workers employed at each production unit but is likely to have a positive impact on productivity levels, producer profits and subcontractor incomes as well as the social and environmental sustainability of the entire industry. A projection based on current technology use is not realistic due to its various conflicts with law and public (including buyer) perception.

Additionally, the charcoal industry has significant potential to promote capital formation, the diversification of income sources, rural livelihood strategies and resilience, especially for emerging farmers, as the barriers to entry are relatively low. There is also scope for the creation of new MSME run by previously disadvantaged groups, specialising in delivering state-of-the-art bush-harvesting and charcoal-processing services to landowners. Thus, given its huge potential to contribute to the overall objectives and targets of the Growth at Home Strategy, the inclusion of the charcoal industry and its value chain into Namibia's Agro-processing Sector Growth Strategy is of great importance.

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2. IDENTIFIED OPPORTUNITIES FOR AND CONSTRAINTS TO INDUSTRY GROWTH

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This chapter summarises the opportunities and constraints identified during the stakeholder consultation process in the following areas of the value chain: sourcing, primary production and input supply; processing and manufacturing; marketing and trade; support services; and regulatory framework.

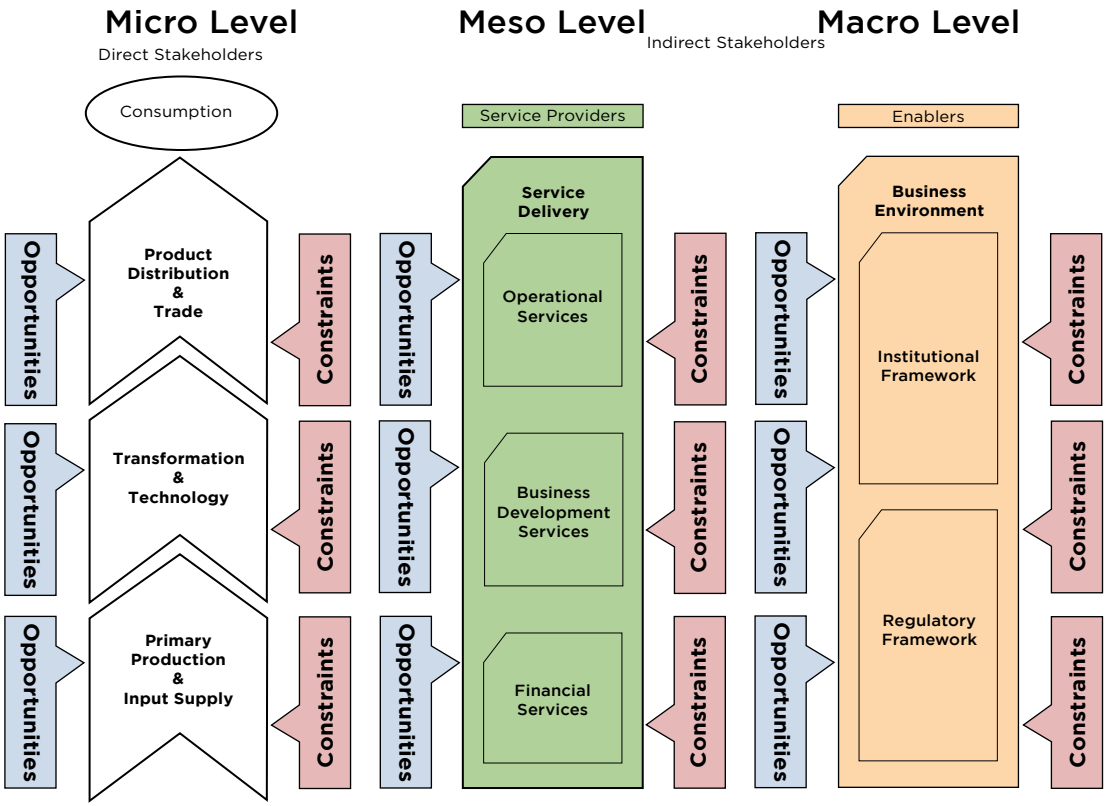

Figure 11: Analytical framework
Source: GIZ ProCOM

2.1 Primary Production and Input Supply

Only very few Namibian producers are currently known to apply semi-manual **harvesting methods** by using bush cutters or employing large machines to push the bush down before the pieces of wood are manually cut for carbonisation. According to the NCA, there are approximately 10 producers who have moved across to mechanised harvesting of timber in an effort to curb bush encroachment; these mechanised harvesting methods far exceed the capacities of charcoal burners, though they have proven to be less effective in the removal of some encroacher bush species.

In terms of legal (mandatory) standards, the only regulations currently in place refer to the maximum diameters and species of trees to be harvested. If wood were separately carbonised by diameter, theoretically the smallest branches could also be converted into quality wood charcoal. However, the current market (mainly for barbecue charcoal) requires larger charcoal (grade 1 = above 20 mm, grade 2 = 13–20 mm). Therefore, and because larger biomass inputs result in larger production quantities, the industry focuses on larger raw material inputs, frequently even above the maximum permitted diameter. In combination with the lack of equipment and human resources at the DoF to conduct regular onsite inspections, **the use of unsustainable harvesting and aftercare practices** has drawn criticism that charcoal production in Namibia is contributing to both debushing and deforestation. Since the EU Timber Regulation (EUTR) is currently under review and it is likely that wood charcoal will be added to the list of timber products that must be sustainably sourced in order to be marketed in the EU, buyer pressure on the Namibian charcoal producers and processors to comply with existing local regulations on tree species and diameters is likely to increase in the near future. Therefore, issues related to the protection of biodiversity and the sustainable management of forestry resources require further attention from the industry, both in terms of stakeholder compliance with existing legal regulations and voluntary adherence to international norms and guidelines regarding sustainable resource management.

The prevalent informal relationships at the primary production level lead to **high turnover rates and low levels of commitment from harvesters (and burners),** which constrain production planning and place charcoal producers at risk of non-supply (breaking commitments on delivery volumes and schedules), thereby negatively affecting subsequent segments of the value chain, i.e. supplier–buyer relationships between producers and processors and the management of supply contracts between processors and foreign buyers. Informality has many subcontractors migrating between farms regularly due to perceived better working conditions and remuneration. This is particularly pronounced during the rainy season and after the Christmas holidays, when most subcontractors return to their respective homes and some do not return. The general opinion amongst producers is that the labour question and more specifically the high labour turnover rate is the biggest constraint to sustainable production growth, as most producers are not currently running at full capacity because of the **local labour supply shortage.** At the same time, high turnover rates counteract the implementation of measures geared towards developing skills for improved management of the resource base, obtaining higher quality products and increasing efficiencies and yields at the harvesting and burning levels.

Generally speaking, charcoal production's current state as a **complementary rather than a primary income source** for many producers, especially commercial farmers, can be perceived as an overall obstacle to innovation and modernisation as well as to further **formalisation and professionalisation within the industry.** There are clear opportunities linked to efforts to formalise and professionalise primary production and first-stage processing, by supporting the establishment of formally licensed SMEs that deliver state-of-the-art harvesting and charcoal-production services to interested landowners, including communal areas. By applying sustainable harvesting and processing practices that comply with national and international quality, social and environmental standards, such SMEs could make an important contribu-

IDENTIFIED OPPORTUNITIES FOR AND CONSTRAINTS TO INDUSTRY GROWTH

tion to value-chain upgrading through meeting the specific requirements of different end markets.

2.2 Transformation and Technology

Technology and innovation are major constraints to a more sustainable and efficient wood charcoal production industry. Significant technological advances have been made in wood charcoal production worldwide regarding **production efficiencies (conversion ratios), value addition (use of by-products) and cleaner and safer production (emissions and other production-related health hazards),** especially in some of Namibia's Asian competitor countries. By contrast, over 90% of wood charcoal in sub-Saharan Africa, including Namibia, is still produced using traditional kilns with very low wood-to-charcoal conversion ratios ranging between 20% and 25%, no use of by-products from distillation of charcoal and high emission rates. The adoption in Namibia of more efficient and environmentally friendly production technologies has been poor so far. Hence, though the Namibian charcoal industry has grown over time, the technologies applied have remained basically the same, as more sustainable production practices and appropriate technologies are lacking. As charcoal production keeps booming, this lack is becoming more and more visible, and the industry is subject to growing criticism and accusations in local and foreign media. For example, one of the rules on fire prevention for charcoal producers issued by the Namibia Agricultural Union (NAU) stipulates that charcoal producers should inform all neighbouring farmers and local farmers' associations about charcoal production in writing; nonetheless, as the industry booms, bushfires that occur when the area around the kilns is not properly cleaned have become a constant phenomenon.

In Namibia, almost all commercial charcoal producers use simple hot-tail drum kilns made from steel sheets for carbonisation, as they have advantages: they can be easily produced by local welders at low investment cost for producers (NAD 2,000–3,000 per kiln), they are easily transported by rolling them to the harvesting sites and operating them requires limited skills. However, these advantages are outweighed by serious drawbacks: low capacity (average: 285 kg charcoal per kiln), high air-pollution levels, high risk of bushfires and low conversion ratios. During present charcoal production, nearly a third of the energy is lost due to kiln inefficiency. Most kilns in Namibia have efficiencies ranging from 20% to 25% for unimproved kilns, or 25% to 30% for kilns with improved technology. Evidence has shown that with the traditional kilns, much wood is converted into ash instead of charcoal. Charcoal combustion emits carbon monoxide and nitrogen oxides. In extreme cases, carbon-monoxide poisoning leads to brain damage and even death. Nitrogen oxide emissions react with sunlight to produce dangerous air pollution. Fumes from charcoal burning combine with those from diesel engines and industrial chimneys. Thus, charcoal production makes a small but not negligible contribution to climate change. Environmental issues, particularly around smoke emissions (the traditional kilns vent pyrolysis emissions directly to the atmosphere) and bushfires, are pushing producers to seek innovative solutions, as these issues – along with social sustainability concerns – are already affecting the industry's image and buyer perceptions in some of Namibia's key export markets. There are also complaints about air pollution from tourism companies that operate in the charcoal production areas.

On the opportunity side, there is a drive by the producers' association to research new kiln models that reduce the environmental impact (smokeless kilns) and also produce better quality charcoal with more efficient conversion ratios. Experts believe that significant progress could be made by replacing the traditional kilns with **double retort system kilns,** as these easily capture pyrolysis gases. However, any improved kilns should comply with the following key requirements: they should be simple in design, small scale and fast cycle, efficient and economical to use and environmentally benign. Given the challenges described above, there are a few producers that have already adopted more advanced production technologies, but considering the required investments and limited mobility of the kilns, the introduction of such

technologies on a large scale may only be feasible if the **by-products of the pyrolysis process can be marketed** as well, adding value to charcoal production and reducing the environmental impact of the production process, which is not yet the case. In the meantime, most charcoal producers in Namibia do not prefer the improved kilns, mainly due to their high initial investment cost and the higher skill requirements for their operation.

The NCA has expressed an interest in doing further technology research with universities and other technology providers to determine which kinds of innovation would be most suitable to the Namibian charcoal industry and to stipulate the related costs. Stemming from the above point, applied research should be conducted into teamwork methods for charcoal burners, as opposed to the current single-operator methods, to improve infield efficiency, production and safety. The industry is not reliant on foreign technology at present, but as environmental concerns increase, foreign technology may become key. Apart from exports to South Africa, most Namibian charcoal is exported to Europe, which could play an important role in future technological knowledge-transfer initiatives to Namibia. With support from German development cooperation, the NCA has recently tendered technology research, and a test of improved technology is planned for September–December 2016.

At the level of second-stage processing, the fine charcoal dust from the screening process is also viewed as an environmental and health hazard. Advances have been made by using water screens to absorb this dust, but further research into process innovation is required here as well to find more sustainable solutions.

The annual rainy season from December to April in Namibia creates a number of production challenges for the Namibian charcoal producers and processors. Charcoal that gets wet is considered to be of inferior quality, as the product defragments and its calorific value are affected. This natural production constraint obliges processors to stockpile charcoal during the last few months of each year in order to comply with their supply contracts. As processors need to carry significant inventories to be able to fulfil orders, the related costs and cash-flow constraints currently hamper industry growth. Considerable work has been carried out on the **wet season risk,** and the industry growth strategy should propose interventions geared towards reducing its negative impacts on the industry's international competitiveness. For example, wet season risks could be mitigated with new technology bags that include plastic liners to prevent charcoal from getting wet.

A considerable amount of **charcoal fines** are exported, primarily to South Africa, for further processing into briquettes and heat generators, which reduces the average selling price of Namibian charcoal products considerably. The stakeholder workshops revealed that the producers and traders consider the fines a menace to their businesses rather than an opportunity and therefore have not put in place any plans for its local utilisation or conversion to briquettes. In spite of clear advantages to charcoal briquettes, including price, burn time, environmental sustainability and potential for product standardisation, their uptake as a substitute for wood charcoal in sub-Saharan Africa remains very limited so far. According to processors and exporters, even the widespread adoption of charcoal briquettes is unlikely to have a significant effect on demand for wood charcoal. To date, the availability of charcoal briquettes has displaced only a small proportion of charcoal demand and has increased the energy options for limited consumer groups within niche markets. However, the Charcoal Association has expressed an interest in establishing a briquetting plant in Namibia, provided that it would allow for **increased local value addition to charcoal fines.** The local use of bush-based charcoal briquettes as an alternative form of wood fuel could eventually also help to reduce pressure on the country's forestry resources.

A major supply constraint at the processing level arises from the erratic **delivery and supply of printed charcoal bags.** A number of processors indicated that the fact that Namibia does not have a supplier of charcoal bags and therefore must import them causes excessive costs

and delays. This is thus a constraint that needs to be addressed.

A Namibian trade mission to Japan, supported by MITSMED in early 2016, has served the purpose of establishing initial contacts with Japanese charcoal-industry stakeholders in order to explore the potential and technical feasibility of Namibia becoming a future supplier of **high-end white charcoal to the Japanese market.** However, this will require further testing of suitable Namibian hardwood species, expert advisory services regarding the technological aspects of white charcoal production and further support to potential Namibian white charcoal processors in establishing business linkages to the Japanese specialty-charcoal market (and possibly other Asian niche markets for specialty charcoal). The example of white charcoal clearly shows the multiple advantages of market research and exploration efforts, as these can trigger product and process development efforts that contribute to both product and market diversification and are likely to have a positive impact on future export unit values and the profit margins of Namibian value-chain stakeholders.

2.3 Product Distribution and Trade

Several factors, mostly exogenous, such as devaluation of the local currency, have contributed to the boost in demand for Namibian wood charcoal, namely from Europe and the Middle East. Demand is also driven by endogenous factors, such as the perceived high quality of Namibian wood charcoal, given the abundant, low-cost hardwood feedstock that serves as essential input and its high calorific value and long burning properties. While the former factors might create only a temporary comparative cost advantage for Namibia's wood charcoal industry, the latter factors are more difficult for Namibia's competitors that operate on different input scenarios to emulate. However, the industry's successful export performance is to a large degree based on offering "value for money", i.e. a high-quality product at a low price, as Namibia ranges in the bottom price segment of global wood charcoal exporters (with an average unit value of USD 213 per tonne).

On the one hand, the current market-demand scenario opens the opportunity for the Namibian charcoal industry to exploit its comparative quality advantage by differentiating its product on the international marketplace with the aim of increasing the average unit value. Experts believe that given the current undersupply situation, there is a clear opportunity to achieve higher average selling prices across the range of product specifications by introducing a **national grading and technical (and environmental) standards system.** There is a considerable desire to standardise quality parameters, which could allow the Namibian suppliers to move more into a price-setting sphere. However, in the absence of prescribed quality parameters for the industry, such quality advantages are difficult to substantiate.

On the other hand, the current favourable demand scenario (with annual output growth rates close to 20%) has led to the entrance of new market players on the producer and subcontractor levels who are delivering substandard products which, given the current undersupply, are finding their way into the market, again due to the **lack of established quality standards and the weak control mechanisms.** Issues around ash, sand and foreign material content make up the bulk of current quality claims. Although yields and wood charcoal quality are influenced by wood species less than by the humidity and dimensions of the raw material, most Namibian producers carbonise fresh wood of mixed diameters. This reduces the yield and charcoal quality, since the optimal carbonisation time is related to wood diameter. It is thus feared that in the absence of process and product quality standards, current production practices could eventually undermine the generally good reputation of Namibian charcoal on the world market and eventually reduce buyer (and consumer) confidence.

So far, the Namibian charcoal industry has no real technical standard-setting authority. In the absence of such, each processor negotiates quality parameters with the respective buyer party. The current practice of quality specifications being agreed upon between supplier and buyer does not lead to the definition and application of

unified quality specifications and the establishment of common quality-control mechanisms within the industry and increases **transaction costs** for the stakeholders. Therefore, not only in terms of product differentiation efforts to better position Namibian charcoal products and obtain higher average sales prices, but also in terms of increased transparency and lower transaction costs, it would be in the interest of industry players to develop national standards that producers, subcontractors and processors would need to adhere to. The introduction of an industry-based quality standard should become a priority, as this would eliminate supply-quality issues to a certain degree, and inspections could be done at the point of departure rather than at the point of arrival. Namibian processors feel that South African buyers in particular could help to establish a **quality control and assurance platform in Namibia** whereby product quality could be checked before leaving the country.

Apart from technical standards, the medium- to long-term growth perspectives of the Namibian charcoal industry are also conditioned by the industry's adherence to international guidelines on social (labour) and environmental standards, in an overall context where current production practices have been subject to increasing criticism by international and local NGOs as well as international media. **Implementing sustainability certifications,** such as that given by the Forest Stewardship Council, across the industry and its value chain is perceived by the industry as a potentially effective way to address the related marketing challenges and risks. However, many charcoal producers are reluctant to apply for such certification given the facts that the South African market does not require it, the related requirements are above the current low production standards and the costs and administration involved in the certification process are quite high. It is deemed that industry-wide FSC certification efforts could certainly help to reduce the environmental and social impact of charcoal production, and discussion of it has at least sensitised producers and processors to the need to improve the industry's social and environmental track record and has fostered research into safety, health, social and environmental issues.

As described, Namibian charcoal is primarily exported to South Africa and the United Kingdom. Charcoal processors have therefore expressed a **market-risk concern regarding dominant debtor countries.** Should trade barriers arise and demand shifts materialise, the Namibian industry could be at risk. Increased enquiries and effective demand from Middle and Far Eastern countries are providing **market diversification opportunities to reduce dominant debtor risk.** At present, each private charcoal processor is responsible for initiating trade with foreign buyers, as there is no international marketing strategy on the industry level. Concluding sales with new buyers and mitigating sales risks, however, can be costly. Some exporters reported that they had incurred big losses due to foreign agents disappearing after a few consignments had been sent to them. Integrated trade workshops and organised trade missions could mitigate these risks and costs, to a certain extent. There is no **organised commodity trade function** at present, but the possibility of one is under investigation by the Namibian Charcoal Association. In combination with applied quality parameters, **joint strategic marketing initiatives** could also assist the Namibian wood charcoal industry in achieving better average selling prices for its products. Therefore, it is of paramount importance that **accurate market information** is available to processors to help them take more advantage of the present short supply scenario, diversify markets and achieve higher average sales prices.

2.4 Service Delivery

The charcoal industry in Namibia has no specific finance initiatives attached to it from any of the major local banks. Producers can access funding to finance their charcoal production the same way they would access standard agricultural loans. The larger processors indicate that the returns on investment are sufficient for the charcoal industry to be viewed as attractive. However, since almost the entirety of charcoal production is exported, **cash-flow constraints at the processor level** are considered an obstacle to industry growth, since many processors receive up to 25% of their revenue up to 60

days after shipment. Processors access funding through the mainstream banks in the form of overdrafts, but this is limited. The industry is presently not supported from a financial package point of view, causing cash-flow constraints on processers who need to carry volumes of charcoal to fulfil orders after already settling with the producers within two weeks of delivery. While DBN has started granting loans to individual producers to bridge cash-flow challenges and other institutions such as the NamPro have offered their first customised loan products, in general there is still the need for better financial service offers. Finance to bridge cash flow for processors on an order-based funding scenario could alleviate some of the current constraints. Processors have indicated that this is a primary constraint affecting production growth and that in some cases turnover and production could be doubled should bridging finance be available.

Processors are largely dependent on NamPower for a **reliable electricity supply;** in some cases they use diesel generators as a backup or even mainstream electricity source where NamPower is not yet available. Processors using diesel generators have therefore expressed a desire to be serviced by NamPower, as it is less costly than running on diesel.

A significant and increasing percentage of Namibian charcoal is exported via Walvis Bay. Uncompetitive **port charges and frequent delays** in the port with regards to loading and unloading of containers have also been highlighted as a support service issue that hampers international competitiveness and therefore needs to be addressed. Local transport charges in Namibia are considerably higher than transport charges to South Africa due to the lack of return loads. Since a high percentage of charcoal-packed containers originate in the Otjiwarongo area, industry stakeholders are of the opinion that a **dry port facility** in Otjiwarongo would not only reduce costs significantly but also reduce the logistical bottlenecks currently experienced in the port of Walvis Bay and contribute to reducing product loss through transport and handling. Due to the nature of charcoal and its tendency to break up when handled excessively, the charcoal loses value of up to 10% during transport. Although processors are currently not billed for this loss, it should still be considered a relevant factor to the industry's medium- and long-term competitiveness.

To transport containerised charcoal via sea freight, a number of **safety certifications** are required by the shipping lines due to the flammability of the product. Whilst the NamWater Laboratory in Windhoek is able to provide certification, a number of shipping lines do not accept it. **Facilitating the acceptance of local certification** would therefore reduce not only transaction costs but also time delays that occur when the certifications are done in buyer countries. As part of the industry growth strategy, Namibian laboratories should be accredited by the transport service providers (particularly the shipping lines). This would allow pre-shipment accreditation and certification to be done in Windhoek rather than in buyer countries such as South Africa and Europe, which involves samples constantly being sent abroad.

Under the current production system, wood charcoal is not an extremely specialised commodity, which explains the reliance on it by millions of unskilled workers throughout Africa for their livelihood. Charcoal producers and processors, however, believe that efficient bush harvesting and charcoal burning does require certain skills, and that **major skills improvement through training** could have a significant effect on the industry's competitiveness. Workers' skills are predominantly taught through on-the-job capacity transfer from existing burners to newcomers. Turnaround times and conversion ratios can be positively influenced through improved knowledge use and training. As mentioned, the lack of fire-management training and best practice applications result in constant veld fires that negatively affect both the sustainability and the local and international image of the industry. Environmental and ecological production pressures need to be managed – the Forest Stewardship Council provides an internationally recognised framework, which more and more international buyers and consumers of wood charcoal are requesting from processors and producers. Charcoal products that are FSC

certified are perceived to attract higher prices. Namibian charcoal producers have been slow to adopt such practices and become certified, though. Strategic intervention should **facilitate charcoal producers' access to such frameworks and the related auditing services.**

On the opportunity side, knowledge is typically shared between producers and is not perceived to be a barrier. The Namibian Charcoal Association is a source of knowledge for producers and processors and has future plans to **expand the knowledge base, especially regarding new technologies, environmental issues and market access.** The industry role players are quite willing to share knowledge to upgrade the industry as a whole. The development and annual updating of a **best practices manual,** including aspects such as sustainable harvesting and burning practices, legislation, labour practices, quality parameters, certifications, etc., would assist in streamlining the industry and creating opportunities for better production planning. Also, farther up the value chain, specialised knowledge becomes a key success factor to the industry's competitiveness, particularly knowledge on marketing, logistics and relationship management with foreign buyers; this knowledge should be shared among processors.

As has been mentioned in the sourcing chapter, **formalisation and professionalisation within the industry,** particularly at the levels of primary production (harvesting) and first-stage processing (burning), could be supported by means of a **pilot project in the context of the new national policy on MSME,** with MSME providing state-of-the-art production services according to best practices to landowners interested in completely outsourcing charcoal production to formal contractors rather than carrying out production themselves on their land within the current problem-ridden subcontracting arrangements. Within such a pilot initiative, MSME could be supported in different ways, e.g. through equipment aid and staff-training support as well as public procurement processes.

2.5 Business Environment

Regarding institutional framework conditions, unlike other Namibian industries, the Namibian charcoal industry already has an active industry body, which represents producers, processers and agents; however, with adequate support, the association could further seat itself as a strategic service provider to the industry to facilitate sustainable growth and general industry governance.

The charcoal industry has evolved over the last three decades. The original lower production levels, however, were not conducive to establishing a formal employment scenario at the primary production (harvesting) and processing (burning) levels, which kept two essential value-chain functions outsourced to subcontractors. As the industry steadily grew, accusations of exploitation surfaced, resulting in deteriorating industry perceptions in Namibian society and in some of the industry's most important end markets. Namibia's wood charcoal industry is still considered one of the least regulated industries in the country, particularly regarding social regulations. Critics argue that this status quo continues to pave the way for unfair labour practices, as charcoal workers, burners and cutters are treated by the producers as subcontractors and therefore are not formally entitled to the provisions of Namibia's Labour Act in respect to employees nor to basic social benefits like social security, medical aid and housing.

However, it is reported that this situation has been improving in recent years, since the start of tripartite negotiations between the Ministry of Labour and Social Welfare (MLSW), the Namibian Farm Workers Union (NAFWU) and the NCA. The NCA has already recognised that the producer–worker relationship must be formalised as an employer–employee relationship under the Labour Act, provided that a collective agreement was reached. Although underway for many years already, no final agreement has been reached to date. Despite their number and importance, cutters and burners remain unorganised. In the present undersupply scenario, relationships with 'outsourced' charcoal cutters and burners pose the greatest challenge to industry governance, as

IDENTIFIED OPPORTUNITIES FOR AND CONSTRAINTS TO INDUSTRY GROWTH

they result in poor production planning and sequencing and increased supply risk. Strategic intervention into formalising stakeholder relationships at the harvesting and first-stage processing levels would strengthen the supply chain by allowing producers to commit themselves to product volumes, qualities and time frames. It is therefore of strategic importance that the collective institutional arrangements regarding the employment conditions of charcoal cutters and burners are addressed in a manner which serves both the producers and the workers.

From a regulatory point of view, the farm owner has to obtain a number of permits from the DoF before commencing with the production of charcoal. Currently, by law, producers can only harvest up to 500 cubic metres of wood, which is far insufficient for any commercial charcoal production; in some cases, this regulation (Forestry Act, Section 23) has been enforced and permits were not renewed, effectively stopping production at the respective farms. The permit system is currently under review. In the meantime, special permits can be issued by the DoF only. **Delays in the issuing of harvesting permits** are a challenge for producers, and the fact that permits are only issued for a period of up to three months places an additional administrative burden and financial insecurity on producers.

Some producers have entered the charcoal business without any harvesting permits at all. In theory, the MAWF is obliged to conduct regular inspections on charcoal-producing commercial farms to avoid deforestation. **Capacity and human resources within the MAWF** should be enhanced to ensure regular inspections. There is a shortage of staff and vehicles, so inspections usually occur at random, with a focus on new producers.

The in-depth value-chain analysis further reveals a situation where charcoal producers are finding it difficult to comply with certain policies regarding the management and utilisation of timber resources. Within the current subcontracting system, producers cannot always ensure that bigger trees are not harvested. However, if the DoF detects harvesting of larger trees, permits might not be issued/renewed. Producers also report inconsistencies regarding the use of chemical bush removal and some aspects of charcoal burning.

Strategic policy intervention and development is required to create a regular PPD platform between the NCA (which has the advocacy mandate for the industry) and the DoF, which addresses environmental concerns through effective regulations that are consistently applied, but also allows a scenario in which the charcoal industry can keep growing and making its valuable contribution to fighting bush encroachment.

3. INDUSTRY GROWTH STRATEGY

3. INDUSTRY GROWTH STRATEGY

3.1 Vision of Industry Stakeholders:

"By 2020, Namibia's wood charcoal industry will have achieved high production, export, income and employment growth by mainstreaming technical innovations and quality management and adopting environmentally sound and socially equitable business practices along the value chain."

3.2 Industry Growth Indicators and Targets

- Grow total production volume between 2014 and 2020 by 60% to 200,000 tonnes
  (Base 2014: 118,000 tonnes; Target 2020: 200,000 tonnes; Data source: NSA)
- Grow total exported value between 2014 and 2020 by 70% to USD 42.5 million
  (Base 2014: USD 25 million; Target 2020: USD 42.5 million; Data source: ITC/UN Comtrade)
- Improve Namibia's ranking in global wood charcoal exports from 13 (2014) to 10 (2020) in terms of value and from 5 (2014) to 3 (2020) in terms of volume
  (Base 2014: 13 / 5; Target 2020: 10 / 3; Data source: ITC/UN Comtrade)
- Increase average income and gross profits of Namibian producers, processors and workers by at least 50%
  - Average producer profit:
    Base 2014: NAD 24,000 (average output of 30 tonnes; gross profit/tonne: NAD 800)
    Target 2020: NAD 40,000 (average output of 40 tonnes; gross profit/tonne: NAD 1,000)
  - Average worker income:
    Base 2014: NAD 3,000 (average output of 4 tonnes; gross income/tonne: NAD 750)
    Target 2020: NAD 4,500 (average output of 5 tonnes; gross income/tonne: NAD 900)
  - Average processor profit:
    Base 2014: NAD 120,000 (average output of 1,000 tonnes; gross profit/tonne: NAD 120)
    Target 2020: NAD 175,000 (average output of 1,250 tonnes; gross profit/tonne: NAD 140)
  - Data source: NCA
- Grow total direct employment in the different Namibian value-chain segments by at least 25%
  (Base 2014: 6,500 (estimate, TBC); Target 2020: 8,125+ (TBC); Data source: NCA)

3.3 Strategic Objectives, Indicators and Proposed Interventions

The stakeholders identified 5 strategic objectives:

Intervention Area 1: Primary Production and Input Supply	**Intervention Area 2:** Transformation and Technology	**Intervention Area 3:** Product Distribution and Trade	**Intervention Area 4:** Service Delivery	**Intervention Area 5:** Business Environment

Intervention Area 1: Primary Production and Input Supply

Strategic Objective 1:

"Increase the industry's contribution to debushing by means of improved production planning and sustainable management of the natural resource base."

Indicators and Targets:

- Increase share of producers and harvesters applying best harvesting and aftercare practices to 50% (2020) (Base 2016: X% (TBD); Target (2020): Y% (TBD))
- Increase total bush harvesting area dedicated to charcoal production by 70% between 2014 and 2020 (Base 2014: 50,000 ha; Target 2020: 85,000 ha; Data source: NCA/DoF)
- Increase share of biomass input harvested with semi-mechanised and mechanised harvesting techniques to 25% (Base 2016: X% (TBD); Target 2020: Y% (TBD); Data source: NCA/DoF (charcoal producer survey to be conducted))

Proposed Interventions:

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
1.1	**Identification and documentation of best practices for sustainable management of the resource base (production planning, harvesting and aftercare)**	• Identify specialised service providers to establish scope of best practices manual • Develop a database for dissemination of best practices manual • Develop guidelines for charcoal industry for Namibian conditions to promote the efficient use of resources and the protection of natural heritage and ecosystems • Continuously update best practices manual according to changes in legislation and technological advances within the charcoal industry	NCA
1.2	**Facilitation of producer access to FSC certification**	• Conduct awareness campaign, including workshops with FSC representatives, to inform farmers/producers about the risk of unsustainable management practices resulting in losing market access and opportunities related to FSC certification • Lobby for support and assist farmers/producers with certification and auditing, e.g. by subsidising costs, building local certification and inspection capacities to reduce costs	NCA
1.3	**Support of (semi-) mechanised harvesting/ creation of MSME**	• Support research on bush-harvesting technologies suitable for Namibian conditions • Support establishment of new MSME providers of (semi-) mechanised harvesting services, e.g. through Equipment Aid Scheme	MITSMED
1.4	**Design and piloting of an incentive scheme for harvesters on sustainable management of resource base**	• Already proposed through Support to Debushing Project (proposal is currently to be reviewed by Cabinet)	DoF/GIZ

Intervention Area 2: Transformation and Technology

Strategic Objective 2:

"Achieve higher production efficiency, increase local value addition and promote cleaner production by means of successful process and product innovations."

Indicators and Targets:

- Establish at least five new local business opportunities related to production supplies (e.g. bags), new by-products (e.g. from distillation and fines) and new final products (e.g. "white" charcoal) by 2020
  (Base 2016: 0; Target 2020: 5; Data source: NCA and MITSMED)
- Grow the share of value-chain stakeholders applying best practices at the transformation level (first- and second-stage processing) to 50% between 2016 and 2020
  (Base 2016: X% (to be defined by producer survey); Target 2020: 50%; Data source: NCA (charcoal producer survey to be conducted)
- Improve the average conversion ratio by at least 5% between 2016 and 2020
  (Base 2016: 25% (to be confirmed by producer survey); Target 2020: 30%; Data source: NCA (charcoal producer survey to be conducted)
- Grow the share of charcoal produced under new process technology to 30% between 2016 and 2020
  (Base 2016: 0%; Target 2020: 30%; Data source: NCA (charcoal producer survey to be conducted)

Proposed Interventions:

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
2.1	**Support to introduction of new technologies, especially retort kilns**	• Support research, knowledge exchange and technology transfer and adaptation to Namibian conditions regarding charcoal-processing technologies and technologies for manufacturing new value-added products (briquettes, "white charcoal", etc.); see also intervention area 4. • Support introduction of validated technologies at producer and manufacturer levels, including co-financing of investment costs via Equipment Aid Scheme and IUMP	MITSMED
2.2	**Promotion of local product and process innovations within the wood charcoal industry and associated value chains**	• Design industry-specific incentive scheme for producers, processors and providers of applied research and other support services relevant for innovation • Organise (bi-annual) national innovation contest and innovation-focused conferences and exhibitions	MITSMED + NCA

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
2.3	**Support to technical feasibility and market studies on new business and investment opportunities in the charcoal industry and associated value chain, namely:** • Packaging material (printing facility for handling, wholesale and retail bags) • Local briquette manufacturing • Local production of by-products from charcoal distillation (wood gas, wood tar, acetic acid, etc.) • Local production of specialty charcoal (e.g. "white" charcoal) • Local production of improved (retort) technology kilns	• Prioritise business and investment opportunities with industry stakeholders and experts (industry steering committee) • Develop terms of reference for feasibility and market studies (demand profiling, supply costing, testing of feasibility and sensitivity, etc.) • Gather (international) tendering to attract suitable service providers • Should feasibility be established, disseminate findings among industry stakeholders, potential local and foreign investors (investment promotion) • Support local and foreign investors and entrepreneurs	MITSMED/DID + NIC
2.4	**Identification and documentation of best practices for sustainable charcoal production and processing**	• Identify specialised service providers to establish scope of best practices manual • Develop a database for dissemination of best practices manual • Develop guidelines for charcoal industry to promote efficient carbonisation and further processing methods and good and sustainable manufacturing practices • Continuously update best practices manual according to change in legislation and technological advances within the charcoal industry • Build extension capacity to provide best practice training, partnering up with other key industry players, such as the (new) Debushing Advisory Service and the Namibia Biomass Industry Group (DAS, N-BiG) • Develop methodology to measure best practice implementation amongst producers	NCA

Intervention Area 3: Product Distribution and Trade

Strategic Objective 3:

"Obtain higher average selling prices by means of effective product quality management (standardisation, differentiation and certification) and export market diversification."

Indicators and Targets:

- Increase the average export unit value* by at least 30% between 2015 and 2020 (*attributable to interventions in the areas of product standardisation, certification and grading, quality management and marketing)
  (Base 2015: USD 213/tonne; Target 2020: USD 275/tonne; Data source: ITC/UN Comtrade)
- Grow percentage of charcoal output marketed under and compliant with common industry standard to 50% (by 2020)
  (Base 2016: 0% (no common standard defined); Target 2020: 50%; Data source: NCA (based on producer and processor survey))
- Increase the number of firmly established export-promotion instruments with tangible effects on market penetration and diversification to five between 2016 and 2020 (one additional instrument per year)
  (Base 2015: 0; Target 2020: 5; Data source: NCA)
- Reduce share of dominant debtor country exports (RSA and UK) in overall exports (volume) by 20% by 2020
  (Base 2014: 80% (share of RSA and UK exports in overall exports); Target 2020: 60% (share of RSA and UK exports in overall exports); Data source: ITC/UN Comtrade)

Proposed Interventions:

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
3.1	**Support to the definition and implementation of a (national) industry standard for lump charcoal**	• Conduct a benchmarking study on quality management/ assurance and certification and verification systems in competitor countries, including environmental and social standards and covering both regulatory and market standards along the VC • Conduct a market study focused on current and future requirements of buyers in different target markets for Namibian charcoal • Participate in formulating a product-differentiation and quality-assurance strategy according to identified requirements of different key markets for Namibian charcoal • Support standard setting and standard assurance (first party and/or B2B assurance) and/or auditing/third-party assurance/certification, testing and accreditation processes according to strategy-implementation milestones	NCA + NSI

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
3.2	**Support to the establishment of an end-market monitoring/business intelligence system**	• Identify key market information gaps among processors/ traders and define basic elements of a market monitoring system according to best (local and international) practices (benchmarking study) • Generate market (access) information, including information on relevant niche markets, according to identified information gaps and disseminate information within the industry in line with agreed dissemination strategy (tools) • Provide regular updates on buyer- and end-consumer-related trends and relevant changes in regulatory framework conditions in the different markets • Provide regular updates on direct (regional) competitor performance and their marketing and sales performances	NCA
3.3	**Support to joint strategic marketing initiatives for market penetration and diversification**	• Appoint a representative marketing and logistics forum for charcoal consisting of marketing-related role players within the NCA • Formulate an industry-specific product marketing and promotion strategy, including market-specific marketing and export-promotion tools • Get support from MITSMED to assist the industry with developing new markets • Develop trade missions with new market buyers to promote market access and order generation and other export-promotion instruments	NCA + MITSMED
3.4	**Identification and documentation of best practices for charcoal export marketing**	• Identify specialised service providers to establish scope of best practices manual • Develop a database for dissemination of best practices manual • Develop guidelines for charcoal industry to promote efficient product marketing and distribution practices • Compile marketing manuals for charcoal for different target markets • Continuously update best practices manual according to changes in local and international legislation and the trade environment • Develop methodology to measure best practice implementation amongst processors/traders	NCA

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
3.5	**Support to improvement of logistics and reduction of transport costs**	• Appoint a representative marketing and logistics forum within the NCA consisting of logistics-related role players • Establish communication mechanisms between the charcoal industry and other industries (to co-ordinate negotiations with Namport and other stakeholders) • Conduct investigation and solution development to excessive Namport container handling costs (Walvis Bay) • Conduct feasibility study and design study on Otjiwarongo dry port container terminal (clearing and loading of containers) • Implement recommendations of feasibility study on completion, dependant on outcomes	NCA (with support from MITSMED)

Intervention Area 4: Service Delivery

Strategic Objective 4:

"Improve the access, coverage and quality of services essential for industry growth and strengthen the NCA as a service platform for the charcoal industry and value chain."

Indicators and Targets:

- Increase number of joint I, R&D projects addressing critical issues for industry competitiveness to five by 2020 (Base 2016: 0; Target 2020: 5; Data source: NCA (+MITSMED and other institutions supporting R&D projects, such as DAS and N-BiG))
- Grow percentage of industry stakeholders that apply best practices (at harvesting, production/transformation and marketing/distribution levels) to 50% by 2020
  (Base 2015: 0%; Target 2020: 50%; Data source: NCA, based on industry surveys)
- Grow percentage of industry employees that have received formal training to 50% by 2020
  (Base 2015: 0%; Target 2020: 50%; Data source: NCA, based on industry surveys)
- Establish five new support services offered through NCA to industry stakeholders by 2020
  (Base 2015: 0; Target 2020: 5; Data source: NCA)

Proposed Interventions:

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
4.1	**Support to applied research on production and marketing-related topics, such as:** • Mitigation of wet season supply risk • Improvement of production efficiencies (retort technology) • Reduction of environmental impacts and health hazards • Teamwork methods (harvesting and carbonisation) • Labour fluctuation and shortage; improvement of working conditions	• Establish research capacity and research needs (short-term and long-term agenda) • Identify preferred research partners based on current capacity, research deliverables, past track record, availability of specialists, location, service area and fields of expertise • Establish collaborative teams locally and internationally to make use of international funding opportunities to develop effective solutions to prioritised problems on research agenda • Document research results • Disseminate research results to industry and value-chain stakeholders • Support application of research results to value chain	NCA (in co-operation with DAS/N-BiG)

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
4.2	**Support to the establishment of an advisory, extension and training platform related to application of best practices and industry standards**	• Build extension and training capacity related to the dissemination and adoption of best practices along the value chain, , with emphasis on new charcoal producers, partnering up with other key industry players such as the (new) Debushing Advisory Service and the Namibia Biomass Industry Group (DAS, N-BiG), DoF, etc. • Develop and implement comprehensive trainings on the worker/operator level in topics such as species identification and knowledge of forestry and environmental regulation, fire-management training courses, etc. • Organise best charcoal practice workshops with technology suppliers • Support excursions to production countries where best practices are already implemented to promote knowledge transfer	NCA
4.3	**Support to local testing facilities and provision of essential testing services**	• Identify critical testing needs (laboratory and inspection services) related to the implementation of the national industry standard for lump charcoal and potential local service providers • Implement pilot project with accreditation of NamWater Laboratory for inspection and testing according to requirements of international shipping lines	NCA
4.4	**Support to development of export financing package for charcoal processors (bridging finance)**	• Determine scope of funding required by processors • Workshop with all relevant stakeholders on a high level to get financiers involved • Assist and support application and closing of finance support deals	NCA

Intervention Area 5: Business Environment

Strategic Objective 5:

"Create a business environment conducive to sustainable and equitable industry growth by reconciling the legitimate interests of all direct and indirect stakeholders and maximising benefits for society at large."

Indicators and Targets:

- Increase the percentage of private industry stakeholders familiarised with the legal regulations relevant to their operations to 85% by 2020
  (Base 2016: X%/Y% (TBD by industry survey); Target 2020: 85% (familiarised)/value has doubled compared to baseline value Y (satisfied); Data source: NCA, based on survey data)
- Increase percentage of private industry stakeholders (producers, processors, employees, subcontractors) who feel that their interests are well represented under the existing institutional and regulatory framework by 100% between 2016 and 2020;
- Increase the number of regulation- and policy-related bottlenecks to the industry's competitiveness and sustainable long-term growth effectively addressed by public–private stakeholder dialogues and negotiations to five by 2020
  (Base 2015: 0; Target 2020: 5; Data source: NCA + NTF)

Proposed Interventions:

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
5.1	**Development of a regular PPD forum/platform for the charcoal industry, with participation of relevant private and public stakeholder groups**	• Conduct a joint benchmarking study and visits to other charcoal-producing countries to investigate the institutional and regulatory framework conditions (and other relevant VC topics) • Consult Department of Forestry, the NCA and MITSMED to develop clear understanding of the legislative requirements and develop recommendations (regarding aspects such as burning sites, species and chemical spraying regulations, etc.) • Consider sensitive production issues and develop policies consistent with the regulatory framework that meet the needs of both the Department of Forestry and industry stakeholders • Distribute guidelines to all producers/farmers through best practices manual and training and advisory services	NTF (+ NCA)

Int. Num.	Intervention	Key Activities	Proposed Champion(s)
5.2	**Development and streamlining of the permit-management, extension and onsite-inspection capacity within the Department of Forestry (DoF)**	• Undertake a project for streamlining permit process and improving onsite-inspection capacity • Review Forestry Act and other existing legal regulations	DoF (in co-operation with NCA)
5.3	**Development of a sustainable labour concept for the industry**	• Conduct baseline study on current status of labour relationships in the industry • Workshop the concept with the Department of Labour and establish a vision, mission and mandate for the proposed organisation • Identify key functions and competencies required from the organisation • Identify criteria to be used to select serving members of the organisation/committee structure • Advertise through the media and existing charcoal structures for applications to serve on the organisation structure/committee • Establish a leadership structure/voice • Establish a communication protocol between the leadership structure, MOL and the NCA • Conduct regular meetings to gather input from the harvesters, the NCA and MOL to develop the harvester/producer relationship	MOL (in co-operation with NCA)
5.4	**Support to organisational strengthening of the NCA**	• Identify the existing charcoal regional structures (NCA) and establish shortfalls and required assistance for the proposed industry growth and lobbying support • Identify gaps and develop a support strategy for the NCA to achieve objectives • Develop a business plan/strategy for the NCA • Align institutional development within regions to the national NCA strategy • Establish a dedicated NCA secretariat as the primary link with and facilitator of activities initiated by the NCA • Monitor and evaluate the level of progress in terms of strategy implementation annually	GIZ

BIBLIOGRAPHY

- **Anon. (2009).** Cost-benefit analysis of encroachment bush removal in Namibia 2008-2009.
- **Anon. (2015).** Biomass Workshop Stakeholders.
- **Blodgett, C., (2011).** Charcoal Value Chain and Improved Cook Stove Sector Analyses.
- **Confidential.** (2015). No Title. Biomass Stakeholders Workshop - April 2015.
- **De Klerk, J.N. (2004).** Bush Encroachment in Namibia – Report on Phase 1 of the Bush Encroachment Research, Monitoring and Management Project. Ministry of Environment and Tourism, Windhoek, Namibia.
- **Dieckmann, U., & Muduva, T. (2010).** Namibia's Black Gold. Charcoal Production, Practices and Implications.
- **FAO (2001).** Simple technologies for charcoal making, FAO FORESTRY PAPER 41.
- **FAOSTAT. (2015).** Retrieved from http://faostat3.fao.org/browse/Q/QC/E
- **FSC. (2015).** Retrieved form https://us.fsc.org
- **Gardner, G. (2014).** Republikein, NAU News: WEEKLY NEWS – 17 August 2012.
- **Honde, G.J., & Odhiambo, O. (2014).** NAMIBIA 2014. Retrieved from http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2014/PDF/CN_Long_EN/Namibie_ENG.pdf
- **Ignagni, K. (Not dated).** Playing with fire. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/21966704
- **ITC Trademap. (2015).** UN COMTRADE database.
- **Joubert, D., Nuulimba, N., Pringle., H., & Zimmermann, I. (2013).** Baseline Study of Bush Encroachment and Available Management options for the Windhoek Green Belt Landscape.
- **Louw, A. (2015).** Financial institutions report - Namibia_AL_JS.
- **MFW4A. (2015).** Making Finance Work for Africa. Retrieved from http://www.mfw4a.org/news/news-details/article/2/namibia-credit-and-data-providers-can-now-share-borrowers-information.html
- **Mulamo, R. (2012).** Vision 2030, Namibia Roadmap to Industrialisation.
- **Namibia Investment Centre. (2009).** Opportunities from Namibia 2009. Investment projects & opportunities. Retrieved from http://www.namibiahc.org.uk/resources/content/Specific%20investment%20projects.pdf
- **Potgieter, P. (2015).** Biomass Stakeholders Workshop - September 2015.
- **Pringle, H., Shamathe, K., & Zimmermann, I. (2009).** Bush encroachment in the Auas - Oanob Conservancy, Namibia: Grassroots: Newsletter of the Grassland Society of Southern Africa, 9(1).
- **STEAG Energy Services. (2013).** Study on Namibian Biomass Processing for Energy Production. Occasional report of STEAG Energy Services GmbH/Transworld Cargo (Pty) Ltd, Essen, Germany.

- **Steierer, F. (2011).** Forestry Officer (Wood Energy), FAO Forestry Department Data source: FAOSTAT-ForesSTAT (12 January 2011).
- **The Namibian. (2015).** Retrieved from https://www.namibianewsdigest.com/page/1693/
- **Trede, R. (2012). Republican. NAU News:** WEEKLY NEWS – 17 August 2012.
- **Villager, N.J. (not dated).** Charcoal: Still a multimillion dollar industry 17 Oct 2011 - 23 Oct 2011
- **World Bank. (2014).** The World Bank Doing Business 2015 report.


10 kg

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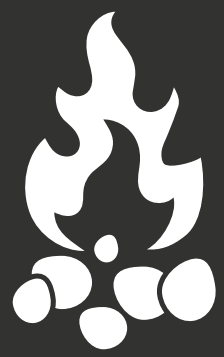

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