The Namibian economy can benefit greatly from biomass utilisation. This policy brief takes a closer look at two value chains: charcoal and bush-based animal feed production. They are complementary. Charcoal producers use the thicker stems and branches of the bush, while bush feed producers use the thinner twigs, leaves and pods.

For farmers, charcoal and bush-based animal feed production create opportunities for additional on-farm economic activities. This provides additional income streams also during times of droughts, reduces costs for the purchase of animal fodder and hence reduces vulnerability.

Both value chains also benefit further economic sectors such as manufacturing, transport and retail trade where they create income and jobs.

Domestically produced bush-based animal feed has the potential for foreign exchange savings, considering that the value of animal fodder imports rose to NAD 1.2 billion in 2019. Charcoal exports contributed some NAD 3.3 billion (EUR 230 million) to Namibia's foreign exchange reserves between 2009 and 2019.

**RECOMMENDATIONS FOR POLICY AND INDUSTRY**

- Identify additional business opportunities that go beyond these activities such as the establishment of feedlots supplemented by bush feed or moving from charcoal to biochar production.
- Support domestic producers of input materials such as machinery, supplements, packaging, protective wear.
- Approve bush-based animal feed as a commercial product through the Ministry of Agriculture, Water and Land Reform.
- Animal feed machinery has been exported to the region and as far as Somalia indicating that there is a demand for the Namibian products. The Namibian High Commissions and Embassies could play an important role in promoting this equipment and in connecting Namibian producers to potential customers of their host countries.
- Raise awareness among farmers about biomass utilisation, its benefits and economic returns.
- Provide further training regarding sustainable bush thinning, the proper use of machinery in particular for bush feed production and the right mix of bush-based animal feed. Extend this in particular to communities in need for drought relief in order to increase their resilience and reduce the need of drought relief.
- The lack of official data prevents a more robust analysis of the economic benefits. It is therefore recommended that the Namibia Statistics Agency adds activities related to biomass utilisation to their economic and social surveys, such as the National Accounts and Labour Force Surveys. Official statistics would allow for monitoring the development of these activities and for timely policy interventions.
- There are opportunities for closer consultations and cooperation between the various industry associations, which can lead to the identification of further business opportunities regarding the domestic supply of goods and services for bush-based animal feed and charcoal production can be identified.
Trade

Export of wood charcoal has increased substantially since 2011 from NAD 125 million to NAD 421 million in 2018, accounting for 0.30 per cent and 0.74 of total exports respectively. The export value rose by more than 50 per cent to around NAD 650 million in 2019, contributing 0.7 per cent to total exports.

Charcoal exports accounted for 12.5 per cent of total agricultural exports on average over the ten-year period 2009 to 2018. Charcoal exports increased substantially from 10.3 per cent in 2018 to 16.8 per cent in 2019. Charcoal exports emerged as the third largest contributor to total agricultural exports for most of the period 2009 to 2019 with the exceptions of 2015, 2017 and 2018, when it was surpassed by the export of sheep and goats.

In 2019, live cattle exports ranked first with NAD 1,605.8 million followed by grape exports with NAD 836.1 million and charcoal.

Charcoal exports have increased substantially. Of total agricultural exports, charcoal accounted for 10.3 per cent in 2018 and 16.8 per cent in 2019.

Manufacturing sector

Kilns and mobile retorts are almost exclusively produced by Namibian manufacturing companies, while the components for the few stationary retorts are imported. Companies are investing into research and development to improve the efficiency of, in particular, the kilns. It takes a welder about a day to produce a traditional kiln and about two days for the more advanced kiln. One company built more than 180 kilns so far this year amounting to employment for at least 180 work days, most likely more, which would translate into one-year full employment (accounting for weekends, public holidays and annual leave).

On average, 2,600 new traditional kilns are needed per annum. This estimate is based on an annual charcoal production of 160,000 tonnes, an output of about 120kg charcoal per the four-day production cycle for a traditional kiln and a nine-month production period per annum, as well as an average life span of 7.5 years for the traditional kiln.

The manufacturing of these 2,600 new traditional kilns amounts to around 18 full-time jobs in the production sector. The construction of advanced retorts is more work intensive.

Furthermore, Namibian companies manufacture wheelbarrows for the transportation of wood to the kilns or retorts as well as wheelbarrows specifically for charcoal transportation with a built-in sieve to sieve the charcoal while transported from the kiln or retort. They also produce briquette presses as well as hand-pressed grass balers.

Transport sector

Charcoal production has resulted in increased efficiency of transportation services in the country.

Several trucks per day transport charcoal to the port of Walvis Bay. Trucks often transport cargo from the ports to the final destinations inland without return load to the ports. Charcoal transportation reduces the number of these ‘empty legs’. This results in lower transportation costs and hence enhances overall efficiency and competitiveness.

Similarly, railway transport services have experienced an increased demand for the transportation of charcoal to Walvis Bay. About 90 containers are transported per month, which has contributed to rail services operating at full capacity from the North to Walvis Bay.

Smaller road transport companies which are often involved in the transportation of livestock in rural areas have additional business opportunities and hence income from the transportation of charcoal.

Charcoal exports through the port of Walvis Bay have increased more than threefold between the financial year 2013/14 and 2018/19 to 152,768 tonnes. Charcoal exports grew from 4.0 per cent of total export volumes through the port to 8.7 per cent in 2018/19 or from 0.9 per cent of total cargo volume handled at the port to 2.8 per cent respectively. Charcoal exports have therefore mitigated the negative impact of subdued global demand for commodities from the region.

Employment effect

Employment in charcoal production has increased substantially over the years amounting to some 10,000 workers currently. In addition, jobs are created in the charcoal packaging industry where the charcoal is sieved and packaged before exported overseas or to South Africa. There are about five packaging companies operating in the area of Otjo, while other companies operate around Grootfontein and Otjiwarongo. It is estimated that these companies employ on average about 60 workers, respectively. Estimates put the total number of processors of various sizes at about 40 with at least 1,200 employees.
Made in Namibia

The manufacturing sector appears to be one of the main beneficiaries of both charcoal production and bush-based animal feed. Namibian bush grows slow and hence the wood is harder. This makes Namibian wood ideal for charcoal production. Most machinery built elsewhere and imported is suitable only for softer wood and does not work effectively or does not last long in Namibian conditions. Domestic manufacturing companies have invested in research and development to produce innovative machinery and equipment that is well adapted to the specifics of the Namibian situation.

The import of animal fodder has soared in 2019. At the same time, values show a trend for domestic production of bush-based animal feed. This value chain offers further potential for foreign exchange savings when machinery, supplements, packaging, protective wear and further inputs are produced domestically rather than imported.

Manufacturing Sector

Namibian companies manufacture the whole range of machinery used for bush-based animal feed production, from chipper, hammer mills and feed mixer to combined equipment. Namibian manufacturers offer after-sales and maintenance services, which provides them with a competitive edge.

The demand for domestically produced machinery has increased substantially during 2019. According to a Namibian producer, they produced five units in 2017, ten in 2018 and 80 in August to September 2019. However, Namibian manufacturers produce on a rather small scale and hence customers face waiting lists of sometimes up to several weeks. This has resulted in the demand shifting to imported machinery that is more readily available.

In addition, Namibian companies produce fodder supplements that are mixed with bush-based fodder.

Trade

Namibia imported bran of maize and other input material for animal fodder at net value of NAD 833 million during 2019. This amounts to an increase of 117 per cent compared to 2018 (NAD 385 million for the whole year).

Furthermore, Namibia imported Lucerne and other forage products at NAD 152 million during 2019. This almost equals the total value of the past ten years (NAD 154.4 million over the ten-year period 2009 to 2018 with peaks of NAD 40 million in 2013 and NAD 29 million in 2015).

These imports of Lucerne, brans etc. accounted for one per cent of total imports in 2019 compared to 0.38 per cent in 2018. The import of fodder supplements such as molasses and urea added another NAD 24.9 million in 2018 to the import bill.

Lucerne & Bran imports (NAD million)

<table>
<thead>
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<th>Year</th>
<th>Lucerne and other forage (NAD million)</th>
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<tr>
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This brief analysis indicates the potential for foreign exchange savings by converting bush into animal feed domestically.

The import value of machinery for the preparation of bush-based animal feed such as milling machines has already increased by 25 per cent between 2018 and end of September 2019 (from NAD 40 million to NAD 50 million). Since Namibian companies can also manufacture required machinery, further savings on the import of machinery can be achieved by supporting local producers.

Protective clothing and packaging material is also mainly imported. The demand for these products could provide business opportunities for Namibian companies, in particular those that are already involved in the clothing and packaging industry.

Domestic fodder production results in a larger livestock herd, which has further positive impacts on downstream industries such as slaughtering and meat processing.
Wholesale and retail trade sector
The wholesale and retail trade sector has benefitted in various ways from both increased charcoal production and bush-to-feed production. While previously retail outlets specialising in the agricultural sector ordered machinery such as hammer mills on demand, these items are now listed. Overall, more retail outlets offer this equipment that were previously not selling agricultural equipment at all. A retailer specialising in agricultural equipment indicated that the demand for hammer mills increased from ten in 2018 to 400 between January and October 2019.

This growing demand has mitigated the drop of demand for other agricultural inputs due to the persistent drought and hence cushioned the wholesale and retail sector somewhat.

Employment effect
It can be expected that bush feed production has a positive impact on on-farm employment since it is labour intensive. The additional income benefits rural economies that are often characterised by limited economic opportunities. This increases the demand for locally produced goods and services.

Annual loss of NAD 1.6 billion
Bush encroachment in Namibia reduces carrying capacity of rangeland. As a result, the value of farmland as well as the value derived from it are declining. Estimates are that some 30 million hectares of Namibian rangelands are affected. This amounts to an annual loss calculated in 2004 of at least NAD 700 million per annum (De Klerk, 2004: Bush Encroachment in Namibia). Adjusted for inflation this would be the equivalent of NAD 1.6 billion in 2019.

Financial sector
Depending on herd size, the value of the machinery for the production of bush-based animal feed can amount to several hundred thousand Namibia Dollar. The purchase is often financed through bank loans and hence provides additional business for financial institutions. In addition, the diversification of income streams can de-risk agricultural activities and hence reduce the risk of loan defaults.

ABOUT THIS POLICY BRIEF
This brief is based on a paper by Klaus Schade, Windhoek. Klaus Schade works as an independent economic consultant. He has been involved in socio-economic research in Namibia for more than 20 years. His main areas include macro-economic and fiscal policy analysis, regional integration and international trade and poverty analysis. He has been involved in the formulation of various policies and sector strategies. He was appointed as a member of the presidential High-level Panel on the Namibian Economy from March 2019 to March 2020.

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