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Creating a marketing environment that is conducive to growing and processing crops in Namibia

AGRONOMY AND HORTICULTURE MARKET DEVELOPMENT DIVISION

RESEARCH AND POLICY DEVELOPMENT SUBDIVISION

**RAPID ASSESSMENT OF COWPEA PRODUCTION AND
MARKETING IN NAMIBIA**

Final Report



2021

NAMIBIAN AGRONOMIC BOARD

FOOD AND AGRICULTURE ORGANISATION OF UNITED NATIONS

TABLE OF CONTENTS

i.	EXECUTIVE SUMMARY	4
ii.	LIST OF ACRONYMS	6
iii.	ACKNOWLEDGMENT	7
1.	INTRODUCTION	8
1.1.	Study Objectives	9
1.2.	Research Methodology	9
1.3.	Study Area	10
2.	GLOBAL COWPEA SECTOR	12
2.1.	Brief overview of the global cowpea trade, international markets, and value chains	12
2.1.1.	<i>Cowpea production and trade</i>	12
2.1.2.	<i>Cowpea price on international markets</i>	15
3.	NAMIBIA COWPEA SECTOR ANALYSIS AND ITS COMPARISON TO AFRICA LARGEST COWPEA PRODUCERS	16
3.1.	The Cowpea Value Chain In Namibia	16
3.2.	Demographic Information	17
3.4.	Input Supply	23
3.4.1.	<i>Seed Supply</i>	23
3.4.2.	<i>Fertilisation</i>	24
3.4.3.	<i>Pesticides and Herbicides</i>	25
3.5.	Production	25
3.6.	Storage	31
3.7.	Processing	33
4.	MARKET AND DEMAND	33
4.1.	Import and Export of Cowpea and Beans, and Bean Products	36
4.2.	Economic Benefit Analysis of Beans Imports Vs Domestic	37
5.	LOCAL CONSUMPTION	38
6.	THE COMPETITIVENESS POSITION OF THE SECTOR	40
6.1.	Competitive Position of Namibian Cowpea in Southern Africa	40
6.2.	Systematic Constraints to Industry Competitiveness and Challenges	40
6.3.	Opportunities	40
6.4.	Upgrading Opportunities and Recommendations	40
6.5.	The Business Enabling Environment and Regulations	41
6.6.	Farming Systems and Green Growth	41
6.7.	Policy Impacts on Cowpea Markets in Namibia	41
7.	SECTOR STRATEGY	41
7.1.	Strategy for Improved Competitiveness and Growth	41
7.1.1.	<i>Viability of the cowpea value chain project</i>	42
8.	RECOMMENDATIONS	43
9.	CONCLUSION	43
10.	SOURCES	44
11.	ANNEXURE	46

LIST OF FIGURES

Figure 1: Map of Namibia	11
Figure 2: World cowpea production.....	12
Figure 3: Production by main producers.....	12
Figure 4: Production Volume.....	13
Figure 5: International cowpea trades, major exporters & importers, 2018 (www.tridge.com).....	13
Figure 6: Formal, informal and import beans/cowpea value chain in Namibia	17
Figure 7: Gender representation of cowpea producers in Namibia.	18
Figure 8: Informal cowpea value chain in Namibia	19
Figure 9: Formal cowpea value chain in Namibia	20
Figure 10: Fresh cowpea vegetable buddle	20
Figure 11: Production cost differences between communal and commercial farming practices (Present study).	21
Figure 12: Cowpea production cost.....	21
Figure 13: Cowpea producers' price.....	22
Figure 14: Cowpea break-even price analysis at the farm gate vs market price.....	22
Figure 15: Seeds selection criteria	24
Figure 16: Alectra vogelii.....	25
Figure 17: Cowpea production reasons.....	26
Figure 18: Average area size (ha) under cowpea per producer.....	26
Figure 19: Most produced beans varieties in Namibia.....	29
Figure 20: Field preparation method	30
Figure 21: Weeding method.....	30
Figure 22: Harvesting method	30
Figure 23: Threshing method.....	31
Figure 24: Nakare beans ready for threshing.....	32
Figure 25: Cowpea production & Trade flow in Angola.....	34
Figure 26: Percent of cowpea sold per producer	35
Figure 27: Distance to the Market.....	35
Figure 28: Imported and exported beans in Namibia	36
Figure 29: Value of imported beans into Namibia.....	36
Figure 30: Cowpea processed products.....	39
Figure 31: Most preferred domestic beans in the local market	39
Figure 32: Cowpea profitability.....	42

LIST OF TABLES

Table 1: Main cowpea dry beans importers.....	14
Table 2: Price range for the last five years as reported by four major exporters in 2016.....	15
Table 3: Age distribution of cowpea producers in Namibia.	18
Table 4: Average production estimate	27
Table 5: Cowpea production calendar.....	29
Table 6: Economic benefit import vs domestic.....	37

i. EXECUTIVE SUMMARY

To develop a sustainable cowpea value chain in Namibia, it is expedient to analyse and assess the current situation, potential, and limitations, as well as the market demand, marketing constraints, and enabling environments, the implications of the occurring activities within the present cowpea value chain in Namibia. Thus, the study analyses the development of sustainable cowpea seed and bean production and the marketing strategy in Namibia.

Data were collected from cowpea value chain actors, which constituted a total of 148 respondents consisting of: 101 producers, 13 traders, 7 farmers' focus groups, 8 key informants, and 19 consumers, randomly selected from different localities within the targeted study regions (Namibia's North Central Regions of Omusati, Oshikoto, Oshana, and Ohangwena, as well Kavango East, Kavango West, Zambezi, Otjozondjupa, Omaheke, Khomas, and Erongo regions). Furthermore, data were collected through consultations with private and public institutions and prominent individuals involved in the cowpea value chain (dry beans) in Namibia. Individual and group interview questionnaires coupled with both qualitative and quantitative methods were used. SPSS statistical analysis was used for analysing the study results.

A well-developed cowpea value chain has the potential of enhancing a long-term conducive market environment for cowpea and promoting food self-reliance as well as job creation in Namibia. Cowpea has high nutritional content containing high protein coupled with high fibre, high vitamins, and high versatility. Beans are a great addition to any meal as they have relatively low cost, low fat, and low cholesterol. In addition to cowpea's high nutritional content, low production cost, and cultural acceptability in Namibia, scientific research studies have proven that cowpea has good adaptability and optimum performance under the harsh Namibian environmental conditions. Cowpea can also increase soil fertility and the yields of other grains when intercropped. Nevertheless, there is no formal commercial market of a satisfactory scale in Namibia. This does not only hinder production and marketing opportunities for local producers and traders in the country but also reduces local Namibians' access to a healthy and affordable balanced diet. Therefore, it is against this background that necessities were initiated by NAB to possibly develop a sustainable market environment in Namibia, and to promote cowpea processing and utilisation to add value to the product. The whole value chain of cowpea (availability of suitably improved seeds, extension services, post-harvest storage, pricing, and marketing) was assessed simultaneously, to enable stakeholders to focus on specific functions in an integrated way. Through this study, several hindering gaps were identified in the existing Namibian cowpea value chain. Gaps such as lack of formal market, lack of storage facilities, lack of value addition and product

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diversification, lack of support services to small-scale producers to increase competitiveness and enable formal market share penetration. Furthermore, both vertical and horizontal linkages among various value chain actors are lacking. Thus, the NAB sees the development of an integrated roadmap as an essential prerequisite for the development of a cowpea industry.

The study indicates that about 85% of cereal crop producers in Namibia intercrop cowpea with the main staple crops such as pearl millet (Mahangu) and or maize. These producers have no formal market of a satisfactory scale. As per this study, only 45% of the total local producers have a market opportunity, whereby the informal market constitutes a bigger portion of 40% and only 5% of local producers contribute to the formal cowpea market. At an average of less than 25% of the total harvest per producer, each season is marketed overall. At the same time, an average of 300 tonnes of beans and over 617 tonnes of canned beans are imported annually. Yet, the Namibian private sector is ready to invest in cowpea processing and commercialisation, if the market linkages are strengthened and the transaction costs minimized.

Keywords: Cowpea, value chain, production, producers, wholesalers, retailers, market

ii. LIST OF ACRONYMS

AMTA:	Agro-Marketing and Trade Agency
CVC:	Cowpea Value Chain
DARD:	Directorate of Agricultural Research and Development
FAO:	Food and Agriculture Organisation of the United Nations
HACCIADep:	Harambee Comprehensive Coordinated Initiative for Agriculture Development Programme
MAWF:	Ministry of Agriculture, Water and Forestry
NAB:	Namibian Agronomic Board
NCA:	Namibia Census of Agriculture
NNFSGC:	Namibian Farmers Seed Growers Cooperative
NSA:	Namibia Statistics Agency
PICS:	Purdue Improved Crop Storage bags
SACU:	Southern African Customs Union
SPSS:	Statistical Package for the Social Sciences

iii. ACKNOWLEDGMENTS

The rapid assessment of cowpea production and marketing in Namibia was prepared by the Namibian Agronomic Board (NAB) with desk technical support from the Food and Agriculture Organisation of the United Nations (FAO).

The study tool preparation, data collection, data evaluation, and report writing have been led by Venaune Hepute, a Researcher at NAB, with support from Barbora Hladka, an Agribusiness Officer from Sub-regional Office of Southern Africa FAO.

The study was reviewed by Akawa Amufufu – Agronomic Market Development Officer at NAB, Gerson Kampungu – Research and Policy Development Manager at NAB, and Cassandra Walker – Agriculture Economist at the FAO Headquarters Office. The data collection was financed by the Namibian Agronomic Board.

The NAB highly recognises the incomparable contribution provided by local farmers and traders during the data collection. Deepest appreciation goes to the Government of Namibia, government officials and all stakeholders who positively contributed to the realisation of this study.

1. INTRODUCTION

With the prevailing persistent drought spell of the El Nino weather pattern, low fertile soils, low rainfall, and harsh environmental conditions in Namibia, farmers will need to look for more resilient and drought-tolerant alternatives to grain production. Cowpea (*Vigna unguiculata*) [common local name *Omakunde* or *Akker-boon*] are drought-tolerant, resilient, and soil-improving legume crops that are produced in all crop-growing regions of Namibia. Cowpea is produced as a food crop, animal fodder, and green manure in areas with lower rainfall. Due to its ability of Nitrogen fixation, cowpea is an important crop in the adoption of Climate Smart Agriculture practices and it can decrease the need for nitrogen fertilizer application.

Cowpea is also a great source of “cheap” plant protein for human consumption, which is very important in areas of increased food insecurity and malnutrition. In Sub-Saharan Africa, about 23% of the population suffers from protein malnutrition (FAO, 2015) and Namibia is no exemption. Cowpea plant protein has also the potential to be processed and it offers an alternative to animal protein for niche markets. Recent health problems linked to excessive consumption of meat as a source of protein have led to renewed interest in a vegetarian diet (FAO, 2004). The consumption of a high volume of meat increases the risk of cardiovascular diseases and some types of cancers. It is to this end that intensive efforts are required to find alternative sources of protein through the introduction of underutilised leguminous plants (such as cowpea). Therefore, the development and promotion of cowpea production in Namibia will contribute to food security, promote a healthy and affordable balanced diet for local consumers, reduce food importation, and dietary protein deficiency.

In Namibia, cowpea for dry bean consumption is produced traditionally, intercropped with grains such as pearl millet and maize by family farmers. The production and productivity are low, cowpea wholesale and retail market are operated by informal traders, and value addition is limited to grading and packaging of the dry bean.

Yet Namibia has the best potential for cowpea inclusive value chain development, including recent investment into quality seed breeding and seed multiplication and the harsh semi-arid and arid climate, which is ideal for the cowpea production business. The experiment field research conducted in Namibia by Fleissner in 2005 showed that cowpea consistently yielded optimum yields and it also demonstrated lengthy benefits to follow-up crops as well as improved soil fertility. The locally produced dry beans/cowpea varieties are black-eyed beans (Nakare), Brown cowpea (Bira), and brown-eyed beans (Shindimba). Of these varieties, Nakare and Bira are the most preferred cowpea cultivars.

Namibia also has the potential for higher cowpea product utilisation, value addition, and diversification than currently done while offering income for mainly family and emerging farmers in semi-arid areas of the country. This includes opportunities for fodder production business for animal fattening and value addition to cowpea dry bean for human consumption at the semi-industrial level. Currently, Namibian farmers produce cowpea for dry beans on less than 0.5 ha per farmer, with an average yield of 350 kg per ha. Compared to Africa's lead producer, Nigeria, the average farmer produces 2 ha with an average yield of 600 kg per ha of cowpea beans. Also, the wholesale and retail price of dry beans in Namibia is not competitive and exceeds the global market price per kg significantly. By improving national value chains and increasing competitiveness, Namibia could join other African countries in benefiting from over 500 million USD (2016) cowpea global trade, which is on its rise as demonstrated by the recent Indian-Nigerian established bilateral cooperation for cowpea production and trade.

The mandate of the Namibian Agronomic Board is to promote the agronomic industry and to facilitate the production, marketing, and processing of controlled products in Namibia. Currently, approximately 300 tonnes of dry beans are imported into Namibia, while communal farmers lack a formal market for their cowpea dry beans. Therefore, creating a marketing environment that is conducive to the growing and processing of cowpea in Namibia will be of crucial significance to the entire agronomy industry. To understand the potential and limitations of cowpea value chains in Namibia, as well as the actors' demands for markets, and the marketing constraints they face, it is necessary to look at the value chain (VC) and its framing conditions as well as the various segments, processes, and functions along the chain.

1.1. Study Objectives

The major purpose of this study was to carry out a rapid assessment of cowpea dry bean production and commercialisation in Namibia, to provide an informed perspective on the current situation, the binding constraints, and leverage points for the cowpea market development. The study also aimed to provide information on cowpea production, commercialisation, and value addition from main cowpea producers in Africa. And thus, bring examples and lessons learnt for potential cowpea value chain development in Namibia.

1.2. Research Methodology

To understand the potential and limitations of the targeted value chain under study as well as the demands for markets and marketing constraints, it was necessary to look at the value chain (VC) and its framing conditions as well as the various segments, processes, and functions along the chain. The Value Chain Approach (VCA) and Markets Systems Analysis analyse the dynamics, opportunities, and constraints of

actors as well as the determinants of their competitiveness and profitability, the links between actors, and the distribution of benefits along the whole chain of producers, traders, processors, service providers, and end markets. Governance dynamics, gender, and women inclusion perspectives, and the enabling environment (societal, environmental, and structural) affecting the production, processing, and marketing of the targeted value chains were also examined.

Individual and group interview questionnaires, coupled with both qualitative and quantitative research methods were used for data collection. Data were collected from different cowpea value chain actors, which constituted a total of 148 respondents consisting of 101 producers (both communal and commercial), 13 traders (formal and informal), 7 farmers focus groups, 8 key informants, and 19 consumers randomly selected from different localities within the study regions (Namibia's North Central Regions, Kavango East, Kavango West, Zambezi, Otjozondjupa, Omaheke, Khomas, and Erongo regions). Statistical Package for the Social Science (SPSS) statistical analysis tool was used for data analysis.

The main limitation to the study was the lack of information on cowpea production and commercialisation in Namibia, as well as a quite marginal investment of value chain actors into cowpea businesses. The researchers had to complete missing data with estimations, thus the results have to be viewed with care, and in-depth analysis is required in the selected regions.

1.3. Study Area

The study covered all the crop-growing regions in Namibia. These include Namibia's North Central Regions (Omusati, Oshana, Oshikoto, and Ohangwena regions), Kavango East, Kavango West, Zambezi, Otjozondjupa, Omaheke, Khomas, and Erongo regions.

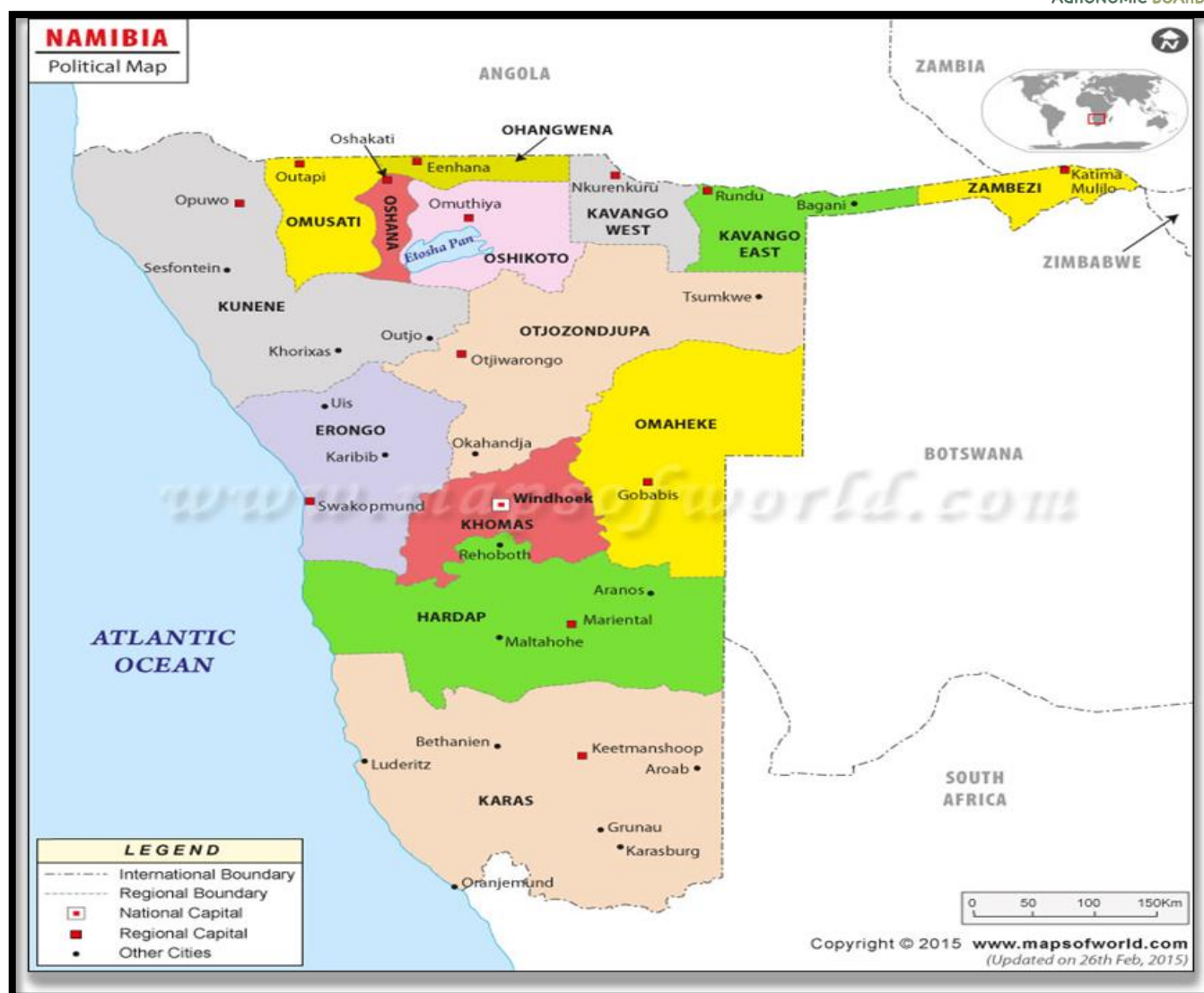


Figure 1: Map of Namibia

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2. GLOBAL COWPEA SECTOR

This section covers cowpea world production, trade on international markets and value chains and cowpea price at global perspective.

2.1. Brief Overview of the Global Cowpea Trade, International Markets, and Value Chains

2.1.1. Cowpea production and trade

It is estimated that cowpea is grown on over 12.6 million ha worldwide annually, and the total dry bean production in 2017 was around 7.4 million tonnes. It is important to note that the cowpea statistics are not inclusive and it is estimated that at least another 1 million hectares of cowpea are grown in India and Brazil. Cowpeas are produced predominantly in the drier inland areas of West Africa due to their drought tolerance and lower insect pressure. West Africa is the leading cowpea producing region with over 85% of cowpea dry bean produced in 2017 in Africa.

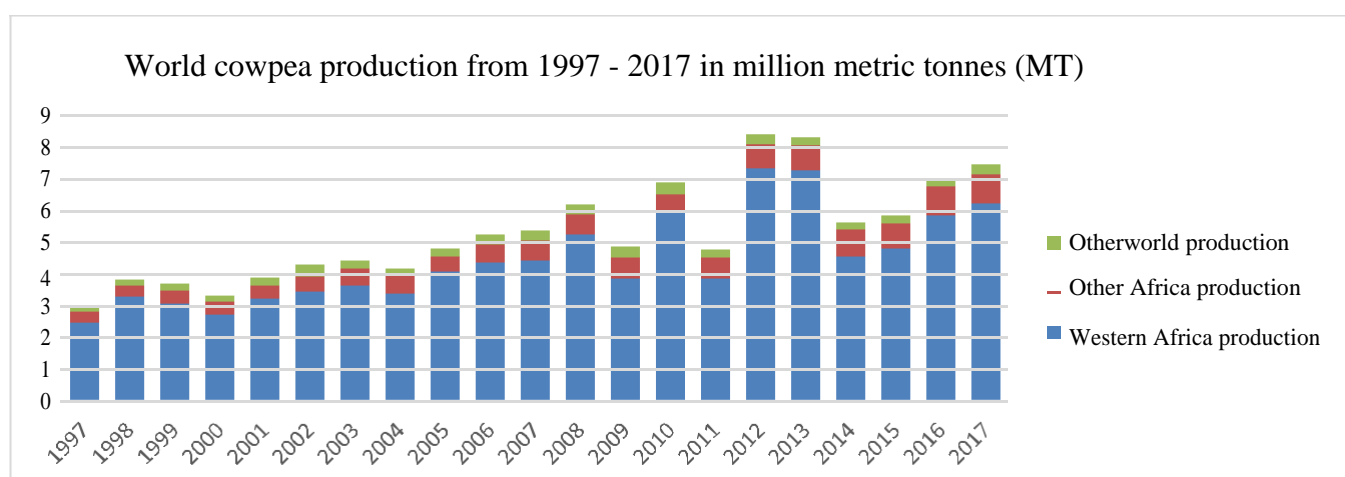


Figure 2: World cowpea production (FAOSTAT, 2017)

In 2017, Nigeria with 3.4 million MT of cowpea harvested, was the world's leading cowpea producing country, accounting for 46% of world production, followed by Niger producing 27% at 2 million MT, Burkina Faso 8%, Cameroon, Tanzania (2.7% each), Sudan (2.4%), Kenya, and Mali (both 2.1%).

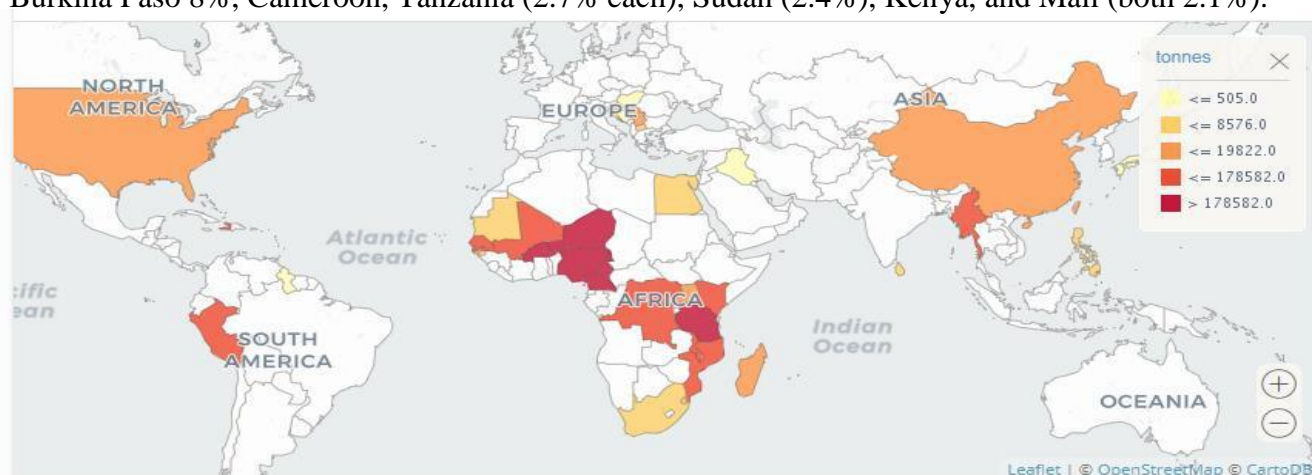


Figure 3: Production by main producers (FAOSTAT, 2017)

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More in-depth analysis of data shows that cowpea cultivation has been growing steadily in Africa since 1994 and in 2017 a total of 12 million were cultivated (Figure 4). West African production growth has been even steeper, increasing by over 40% in the last decade, with Nigeria increasing production by 11% in 2017 over the previous year.

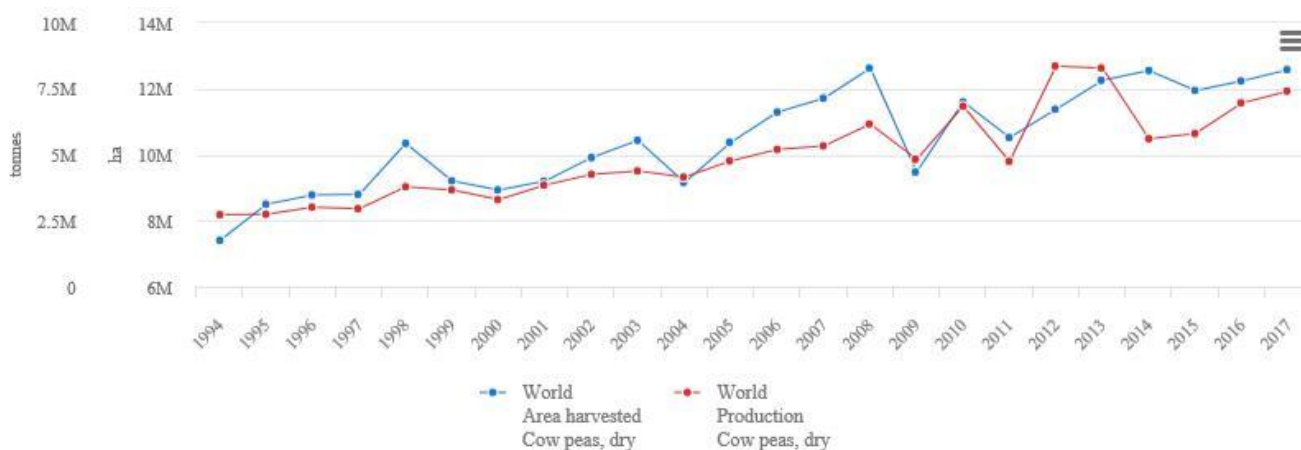


Figure 4: Production Volume (FAOSTAT, 2017)



Figure 5: International cowpea trades, major exporters & importers, 2018 (www.tridge.com)

In 2016, the United States of America was the top exporter, accounting for 26% of all traded cowpea with a total value of 135 million USD, whereas Canada accounted for 19.4% at 101 million USD, and Myanmar accounted for 13%. In Africa, the biggest exporters are Madagascar (5.4%), followed by Kenya, Malawi, and Burkina Faso with exports of over 1 million USD annually. The growth of exported cowpea has been significant in Africa, with 13% in Burkina, 3.2% in Malawi, and 1.7% in Kenya.

India is the top importing country and in 2016, it imported cowpea with a total value of over 77 million USD. In 2017, India offered Nigeria 1 billion USD to encourage Nigerian farmers to plant more pulses that would be exported to India, including offering extension services from Indian farmers. India is seeking new partnerships to meet the demand by its growing population.

Figure 6 shows the top main countries importing cowpea, including the world import shares. Angola is one of the major importers in Africa, with 24 million USD of cowpea dry beans imported in 2016, and this is clearly an opportunity for the Namibian cowpea sector. Moreover, the main deficit areas in Angola for dry beans are in the south of the country right at the border with Namibia.

Reportedly, Nigeria is also facing trade challenges as it lost a deal with Europe due to the country's regulatory mechanisms and failure of the government to properly equip the organisation responsible for certification of agro-commodities, as dangerous pesticides residues have been found in the grain. Some other African countries in general, are also reported to lose over \$750 million annually due to mycotoxin contamination which is contrary to regulations at international markets (Gbashi *et al.*, 2018). This is another opportunity for Namibia, because of the country's experience with European markets and the ability to control product quality.

Table 1: Main cowpea dry beans importers (www.tridge.com, 2017)

Rank	Country	Import Value in 2016 USD	Shares in Import %	1-Year Growth in Value
1	India	\$77.7M	14.87%	-2.69%
2	United States	\$38.9M	7.45%	-51.70%
3	Dominican Republic	\$33.5M	6.40%	-8.74%
4	Angola	\$24.6M	4.71%	-20.33%
5	Canada	\$23.7M	4.53%	15.37%
6	Kenya	\$22.3M	4.27%	-47.99%
7	Japan	\$19.4M	3.70%	-2.00%
8	Italy	\$17.7M	3.38%	+24.79%

From the above data, it is clear that Namibia is missing opportunities from not investing in cowpea production, value addition, and exportation. Moreover, with increased demand for plant protein from Europe and North America, and due to food safety challenges faced by other African exporting countries, Namibia could benefit from different markets through its experience in traceability and history of export to the EU. This will necessarily require a more in-depth focus on cowpea production and the market in Namibia. As of now, Namibia does not provide statistics on cowpea production, commercialisation, and or export.

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Market concentration calculated by Herfindahl–Hirschman Index (H index) is defined as the sum of the squares of the market shares of the firms within the industry, where the market shares are expressed as fractions. Increases in the H index generally indicate a decrease in competition and an increase in market power, whereas decreases indicate the opposite. An H index below 0.01 (1%) indicates a highly competitive industry, and an H index above 0.25 (25%) indicates high concentration. Cowpea market concentration on the Global level is 28%, and therefore high. This therefore, shows that production and commercialisation are dominated by a few countries which can in general bring advantage for new players, considering the cowpea demand growth and challenges that main producing countries face with food safety issues around their exports.

Cowpea growers in Africa are likely to face a growing demand for their crop for three reasons: (1) cowpea grain provides a relatively low-cost, high-protein source (“poor people’s meat”) to the large number of low-income consumers in West Africa who are trying, with very low incomes, to improve their diets; (2) the high-protein cowpea hay is a valuable livestock feed, and demand for it is growing as forage markets expand in response to the increasing profitability of livestock production, especially in peri-urban areas; and (3) processed cowpea products, particularly cowpea fritters and steamed cakes, are very popular street and snack foods in urban areas of West Africa (FAO, 2015).

The above conclusions might be relevant to Namibia considering aforementioned similarities to West Africa conditions: a large herd of livestock with limited access to feed during a dry period, food security and nutrition challenges in drought-prone areas, and demand for processed beans by consumers. Additionally, Namibia can explore other opportunities by diversifying the value addition of cowpea dry beans.

2.1.2. Cowpea prices on international markets

Internationally, the prices of cowpea on the African retail market fluctuated from 0.8 - 2.23USD (11.24 - 31 Namibian Dollars) per kg in 2018. The Coefficient of Variance measures the volatility of price trends. The higher the value, the more volatile, unpredictable and unstable the market is for investors. Cowpea has a coefficient variance of 30.6% which is high volatility on the global market. The figure below shows the price range by major exporters.

Table 2: Price range for the last five years as reported by four major exporters in 2016

Country	Export Value in 2016 (USD)	Rank in Export Value	Price Range for Last 5 Years (US\$/kg)
China	21,449,075	6	0.6 – 1.4
India	3,412,134	20	0.9 – 1.1
Turkey	1,772,045	29	0.9 – 2.2

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Portugal	1,591,893	30	2.3 – 3.0
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Comparing different markets at the farm gate, the wholesale and retail price of cowpea in West Africa, the price is volatile, being three times higher in Lagos compared to crop production areas, ranging from 0.41 and 1.24USD per kg respectively (5.85 – 17.7 Namibian Dollars). There is a slight growth of prices compared to the previous season and in general, to the last five years' average in West Africa. The price of cowpea fodder which is a commodity that is growing in importance has not been documented and data does not exist.

3. NAMIBIA COWPEA SECTOR ANALYSIS AND ITS COMPARISON TO AFRICA'S LARGEST COWPEA PRODUCERS

3.1. The Cowpea Value Chain in Namibia

Although dry bean cowpea production and consumption have a good tradition in Namibia, the production is mainly dominated by communal farmers (83% of cowpea produced in Namibia), with very little harvest and rather an occasional sale of cowpea dry beans. Cowpea is mainly produced as a secondary crop in the grain-bean intercropped system. The farmer's income is generated by the sale of maize and *mahangu*, which are both controlled products as they are protected by The Agronomic Industry Act, Act 20 of 1992, and thus they have a relatively secured market and set up price. The main commercialised cowpea product in Namibia is dry beans, while no evidence of the commercialisation of animal fodder has been found. The value addition to cowpea products is limited to drying, storage, and occasional packaging. In commercial production, setting cowpea is mainly produced as green manure or as an improved pasture for livestock.

This differs from West Africa, where cowpea in semi-arid areas is the main cash crop in the production system, while fodder commercialisation of cowpea hay increases the farmer's income significantly. Local farmers in Western Africa who cut and store cowpea fodder for subsequent sales at the peak of the dry season have been found to obtain as much as 25% of their annual income from this activity. Cowpea processed products as cowpea flour fritters and cakes are also very popular street food in Western Africa and local cowpea well-developed value chains are key for increased income generation from the cowpea dry bean production business. Cowpea in West Africa is processed at cottage-level industries and it provides additional income to rural women. The Namibian beans value chain can be divided into three sub-chains as depicted in the graph below: 1) predominantly communal farmer – local informal market – predominantly rural consumers, 2) predominantly commercial farmers – local formal market – predominantly urban consumers, and 3) import dry and processed beans – rural and urban consumers.

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As per this study, about 90% of local cowpea producers (both communal and commercial) participate in the informal market while the imported beans predominate the overall formal beans market in Namibia. The total quantities of dry grain moved from producers to consumers in the described value chains have been estimated to be 3000 tonnes/year in informal channels and around 125 tonnes through formal channels. While another 300 tonnes/year of dry beans and 617 tonnes/year of imported processed beans is being distributed and consumed in Namibia. The national cowpea value chain is largely underdeveloped and lacks many value chain segments and support services (e.g. seed supply, storage, value addition as well as marketing).

The local formal cowpea value chain consists of a few commercial producers from Omaheke, Summerdown, and Grootfontein area, who supply to the wholesalers in Windhoek. AGRI-GROW PTY LTD, AGRA, and KAAPAGRI are the only and or main actors.

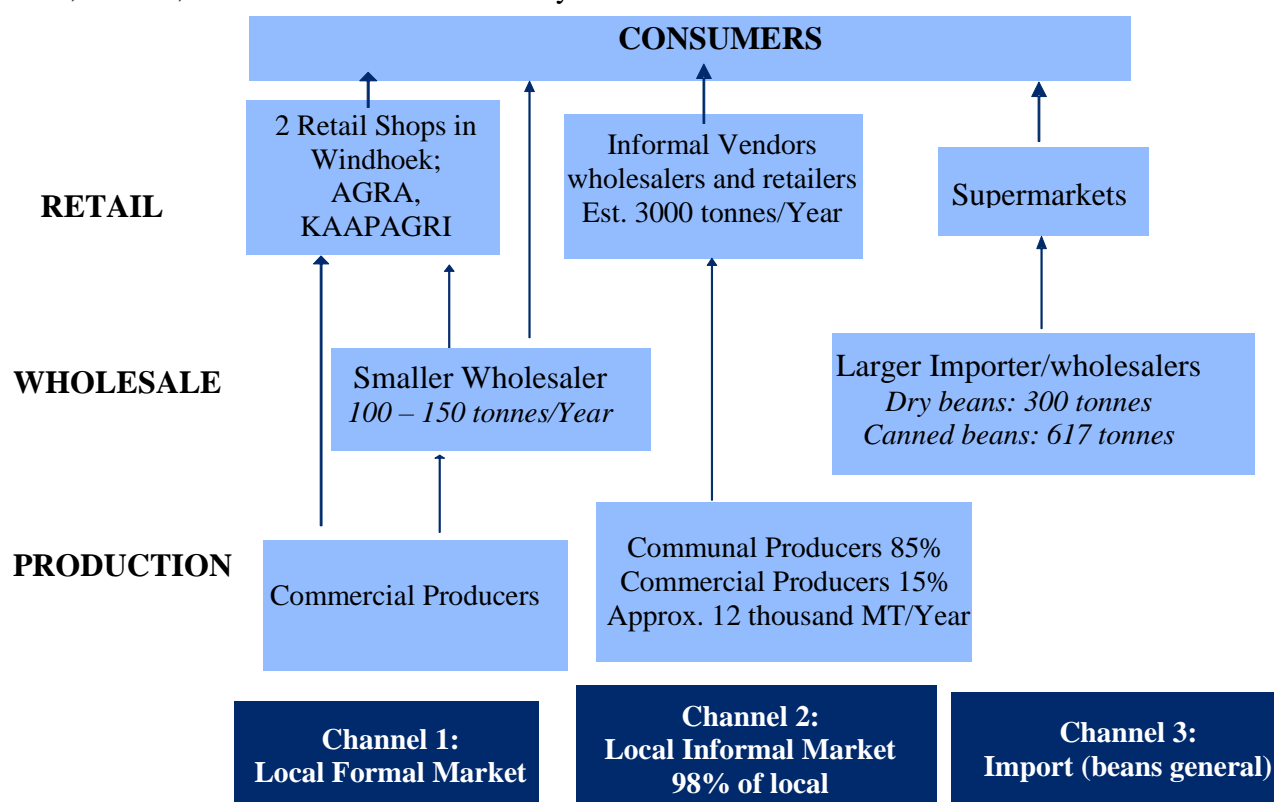


Figure 6: Formal, informal and import beans/cowpea value chain in Namibia

3.2. Demographic Information

The cowpea sector is predominantly operated by women and to some extent, cowpea seems to be attractive to the youth. Results of the field study show that about 60 percent of cowpea producers are female, and the majority are in the 30 – 49 age group. Over 40 percent of the producers possess a literacy level of secondary education and 30 percent of the producers' population acquired primary education.

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Moreover, 18 percent acquired tertiary education and only 9 percent of the respondents are illiterate. See the figure below.

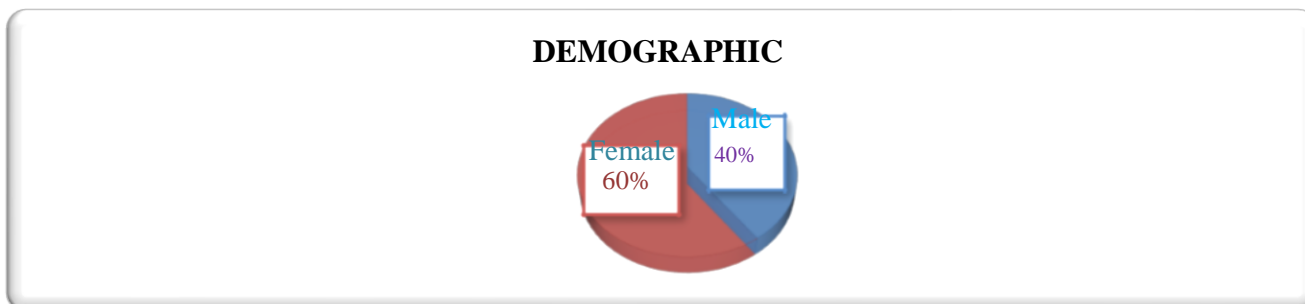


Figure 7: Gender representation of cowpea producers in Namibia

Table 3: Age distribution of cowpea producers in Namibia

Age Group	Frequency	%
<i>Less than 30 years old</i>	18	17,8
<i>30-39 years old</i>	25	24,8
<i>40-49 years old</i>	24	23,8
<i>50-59 years old</i>	21	20,8
<i>60+ years old</i>	13	12,9
Total	101	100

Furthermore, women are also predominant in the cowpea informal sector commercialisation, both wholesale and retail. Thus, interventions on the cowpea value chain will increase women's income generation.

3.3. Composition of Value-Added and Margin Analysis

Below is the price structure of cowpea dry beans at the different value chains (Figure 8 and 9).

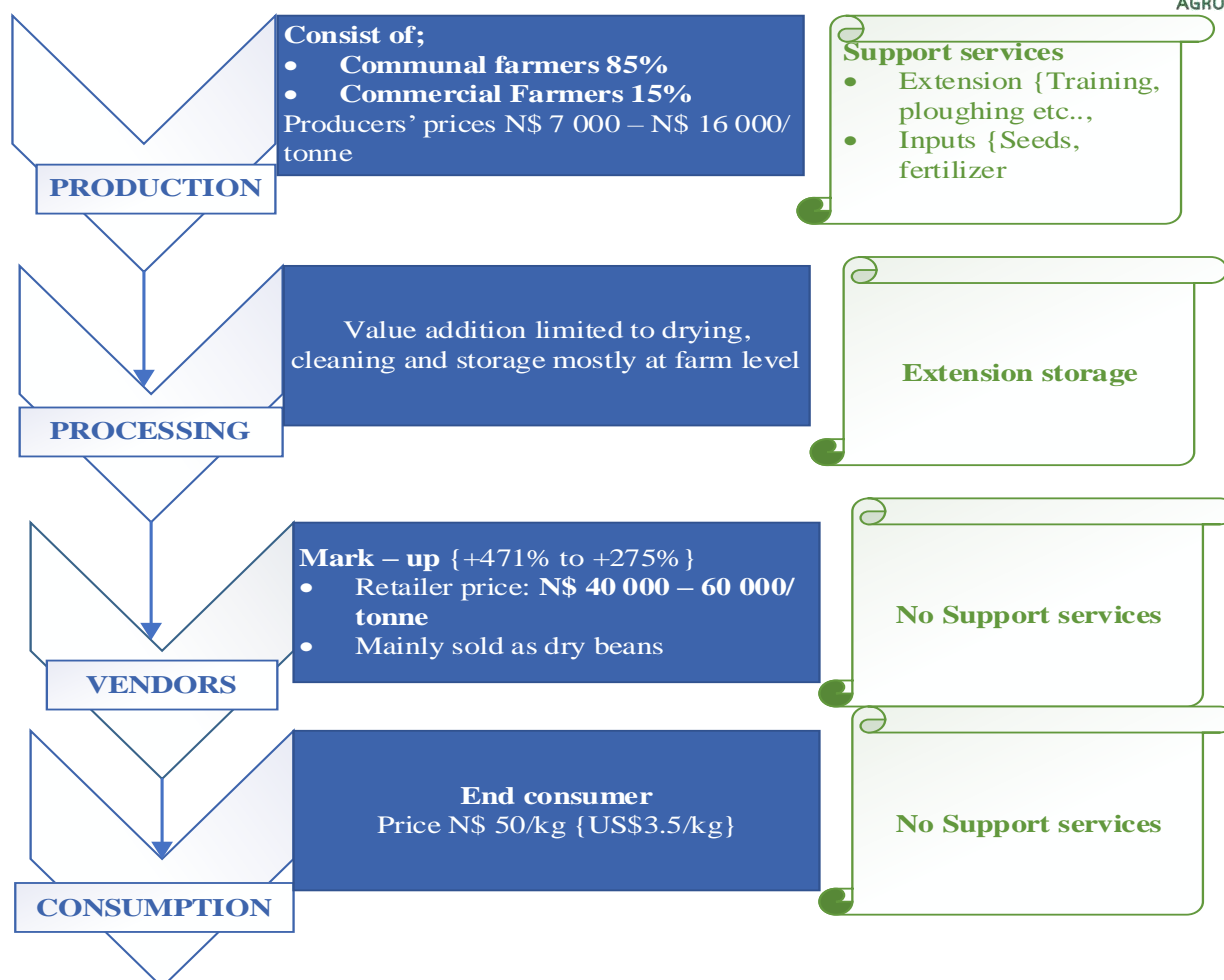


Figure 8: Informal cowpea value chain in Namibia

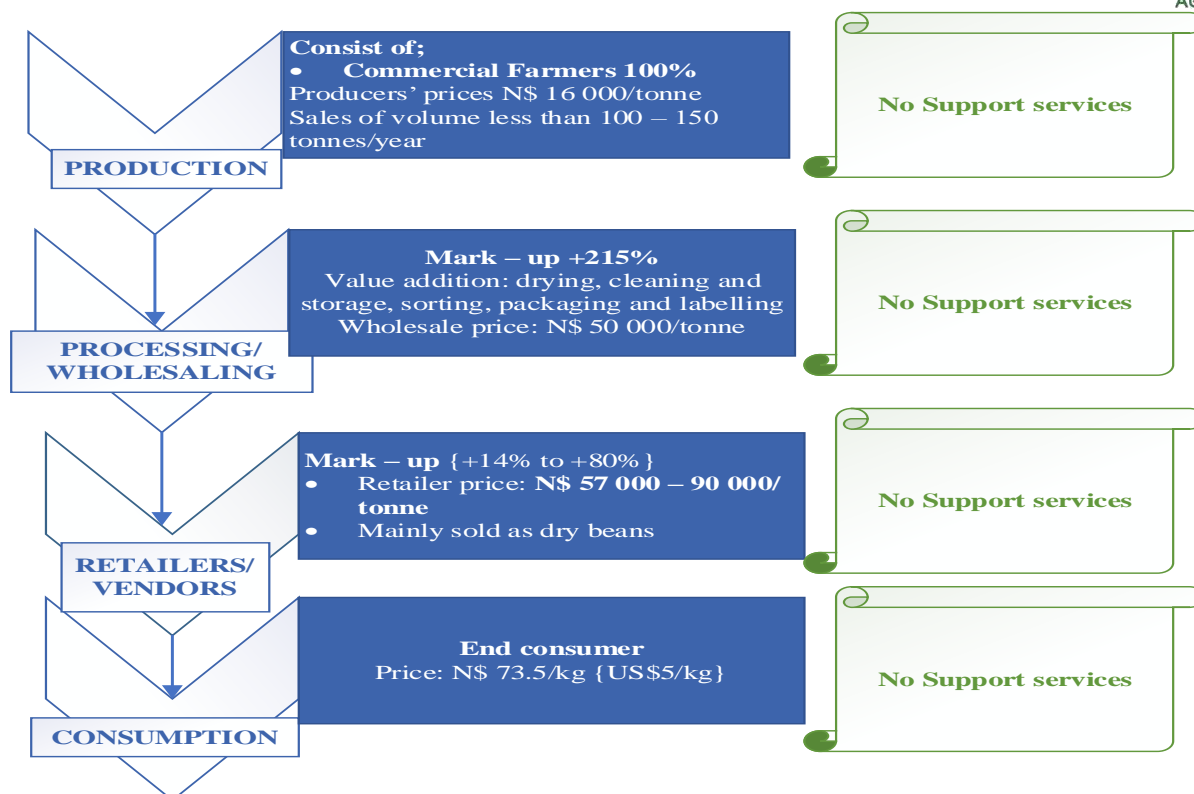


Figure 9: Formal cowpea value chain in Namibia

It is important to note that the demand and prices for cowpea at informal markets differ throughout different seasons of the year (see below):

- Fresh cowpea vegetables sold around April/May at N\$10.00 per buddle (not usually weighed)



Figure 10: Fresh cowpea vegetable buddle

- Relish (*oshingali*) around August/September at a range of N\$8.00 to 12.00 per kg (otherwise, N\$100.00 – N\$150.00 per latta/16kg)
- Seed around November/January at a range of N\$16.00 to N\$20.00 per kg (otherwise, N\$300.00 – N\$350.00 per latta)

Based on the study, the average cowpea production costs are as follows and they are comparable to costs in West Africa (See annex 11.5):

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From literature and other studies:

- Commercial producers: N\$3 475.78 per ha (244USD)
- Communal producers: N\$4 587.41 per ha (323USD)
- Conservation agriculture producers: N\$4 224 per ha (297USD)
- Government subsidy rate: N\$3 090.39 per ha (217USD), and
- Production cost estimated by NAB: N\$4 628.85 per ha (326USD)
- Standard international cowpea production cost ranges from N\$3 810.66 to N\$4 076.52 (this cost was established from different Sub-Saharan African countries as per Boahen *et al.*, 2017 study).

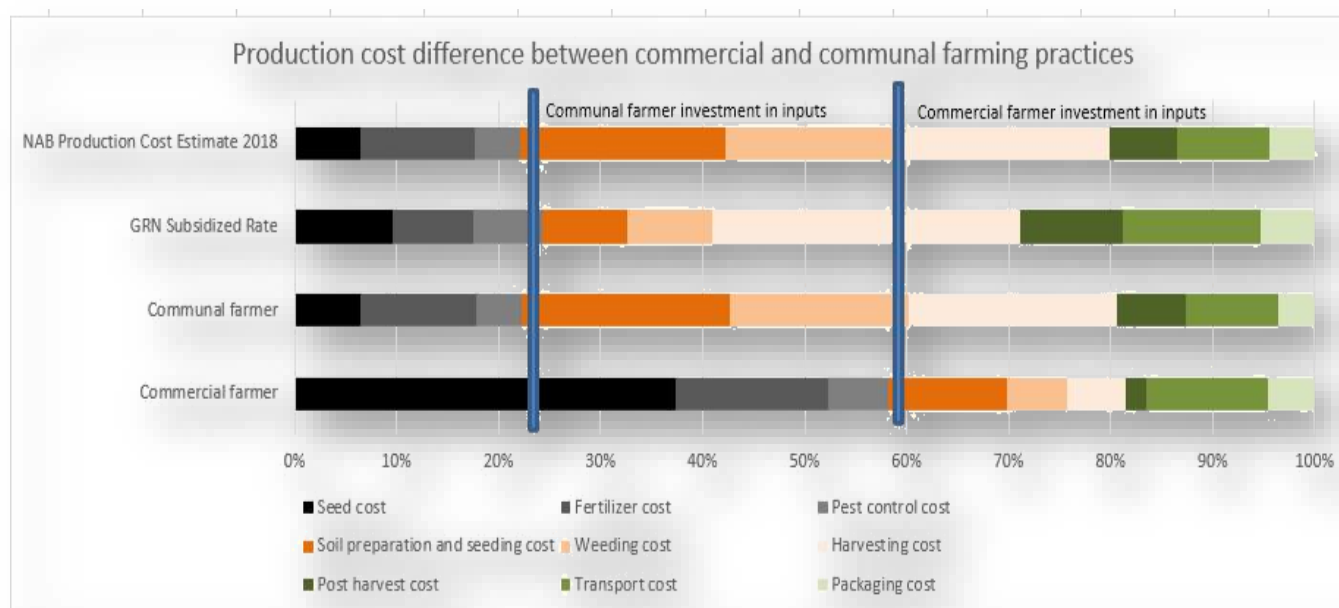


Figure 11: Production cost differences between communal and commercial farming practices (Present study)

From the current study results

- However, as per the study, the average estimated production cost is N\$3 900.00 (274USD), with the lowest cost in Omaheke and Zambezi and highest in the Omusati region. The production cost correlates with the farm gate price in different regions (see graph 12 and 13).

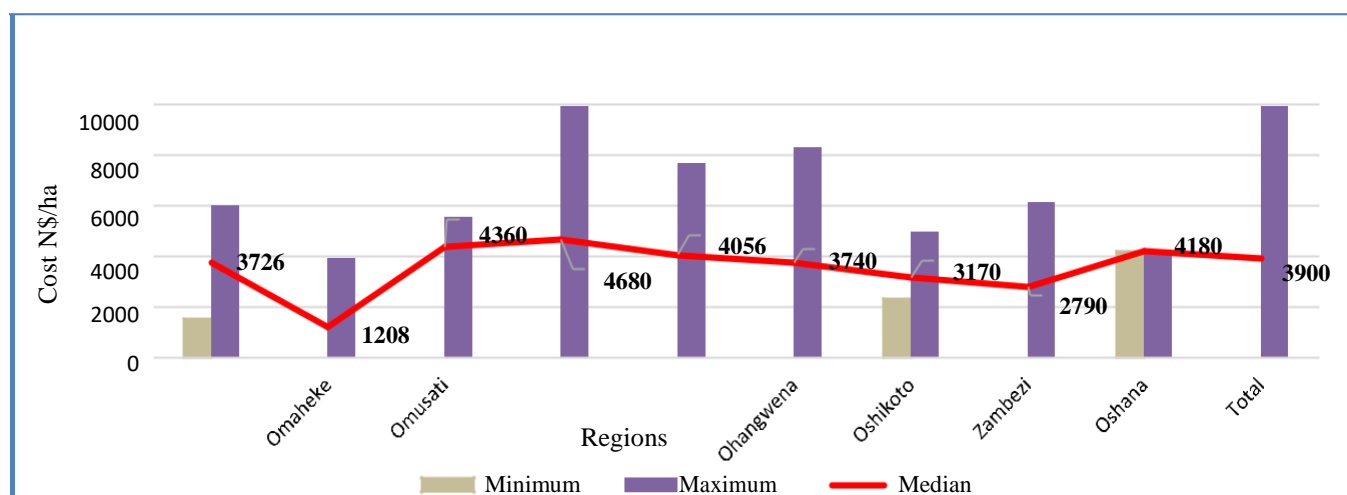


Figure 12: Cowpea production cost

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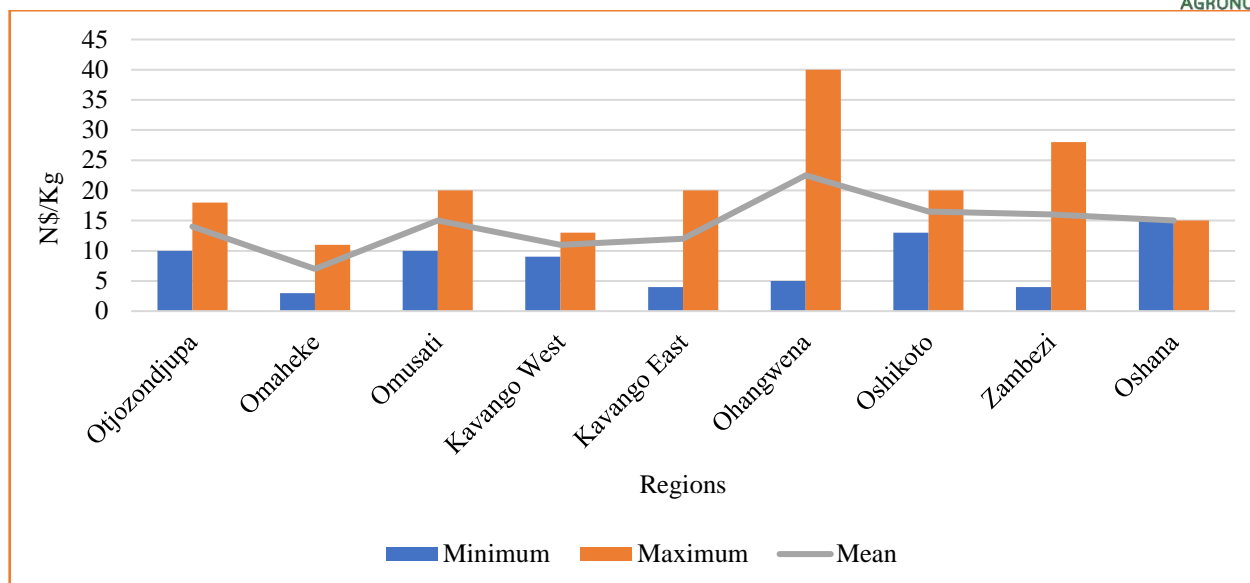


Figure 13: Cowpea producer price

To calculate the profitability of the farm enterprise, it is important to calculate the break-even price for cowpea at the farm gate and the break-even volume of cowpea produced. Considering the average cost calculated above and the average yield of 300kg/ha, cowpea farmers may face challenges in current market systems to break even with cowpea production. Considering the fact that cowpea is intercropped with grains and the fact that farmers probably over-reported costs for cowpea production as some activities would cover preparation for both, cowpea and other crop production cost. These data remain limited in providing a realistic view of the profitability of the farming enterprises. With the current market prices at the farm gate and considering the production costs, the break-even volumes of production are above 500kg/ha. When we consider the current market prices and costs in Namibia, they are comparable to market prices and costs in other African countries. The increased income from cowpea production for communal farmers will thus depend mainly on value addition and cowpea production business diversification.

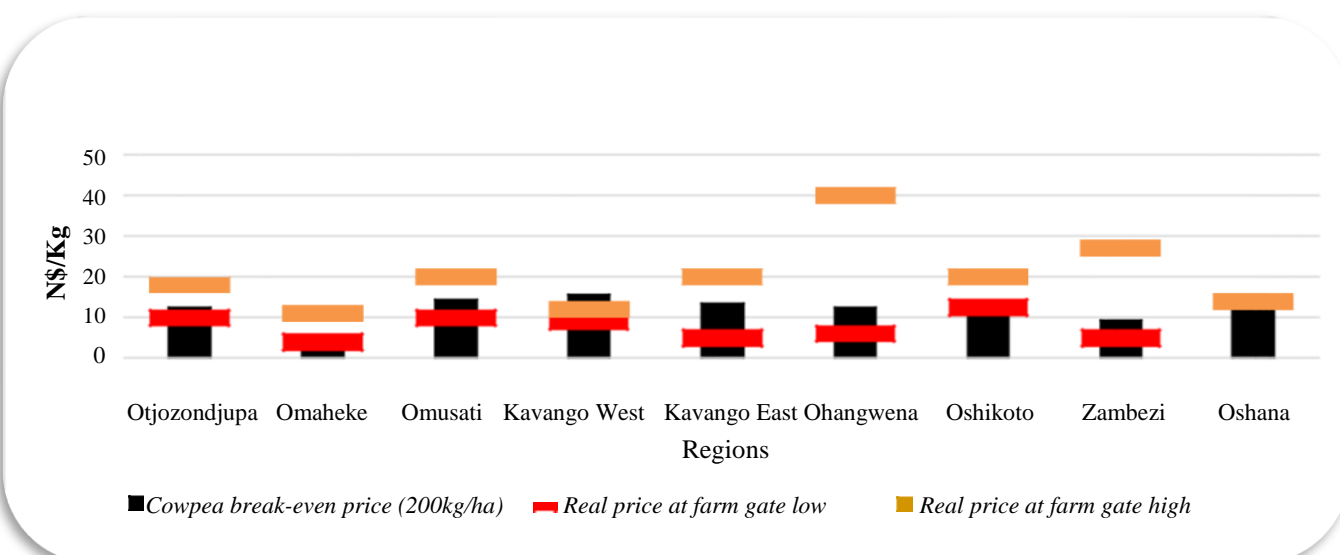


Figure 14: Cowpea break-even price analysis at the farm gate vs market price

3.4. Input Supply

Crop producers in Namibia rely on the importation of inputs (such as fertilizers, pesticides, fumigants, and herbicides) as there are no inputs manufacturing or fertilizer blending plants in existence in the country. This harshly increases the transportation costs on inputs, which consequently influences the overall crop production costs in Namibia.

3.4.1. Seed supply

In Africa, cowpea breeding and varieties development has been focusing on early maturity, increased tolerance to heat and drought, combined resistance to some pests and diseases (Septoria leaf spot, scab, bacterial blight, nematodes, or Nigerian strains of Striga), and an overall increase of yields. Improved varieties can have an 80% yield increase over the local varieties. Currently, researchers are focusing on breeding cowpea that is resistant to the most severe storage pest, the cowpea weevil.

The lack of availability of improved cowpea seed varieties in Namibia deprives farmers from planting high-yielding cowpea varieties, resulting in low output and low returns on revenues per unit area. The Namibian Ministry of Agriculture, Water and Forestry (MAWF) through the Directorate of Agricultural Research and Development (DARD) is the only identified institute producing breeders' seeds (which yield certified seed) in the country, through the cowpea breeding and mutation programme.

The MAWF produces breeder seeds (Nakare, Bira and Shindimba) and it has established over 20 seed multipliers located near the Omahenene research station district. Despite the efforts by the MAWF, 91% of the producers opt to use their own reserved seed. These findings are in line with the research findings of Horn *et al.* (2015) which indicated that most farmers are still using traditional low-yielding seed cowpea varieties.

However, a few registered seed growers (less than 30 producers) in the northern central area sell certified seed to the Northern Namibian Farmers Seed Growers Cooperative (NNFSGC) at N\$5.00 per kg. The cowpea varieties produced include Nakare (black-eyed beans), Bira (brown cowpea) and Shindimba (brown-eyed beans). NNFSGC tests for germination and packs the seed to sell to local producers at N\$12.00 per kg. To a certain extent, some local producers source their cowpea seed from the informal market and/or in exchange with other crop seeds. Due to the volatility and unreliability of the cowpea market in Namibia, cowpea production is mainly for household consumption in the communal sector and livestock fodder in the commercial farming sector. Therefore, seed quality assessment criteria are not a priority aspect among the local producers at the moment. Most farmers select cowpea seeds based on visual examination, looking at seed size, colour, wholeness, and cleanliness. Other farmers have no

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standards for seed selection, which can be a sign of a lack of knowledge. No pattern comparing larger and small farmers has been observed, nor has any radical pattern between the regions.

The quality and availability of cowpea seeds in the local informal market are not guaranteed throughout/till the next planting season due to weevil infestation and the low volume of improved seed production. A total of 98% of local producers uses their seed bank or purchase seed from local suppliers, whereas only 2% of producers import cowpea seeds from neighbouring countries such as Angola, Zambia, and South Africa.

Cowpea seeding rate in Namibia ranges from 12 kg/ha to 25 kg/ha at a minimum average cost of N\$12.00 per kg. Considering seeding requirements, which are around 20-30kg/ha, a low seeding rate in Namibia might lead to a low plant population per hectare, which results in low production per hectare. Thus, a farmer needs from N\$240 – N\$360 investment on seeds to improve yield through increased plant population per hectare.

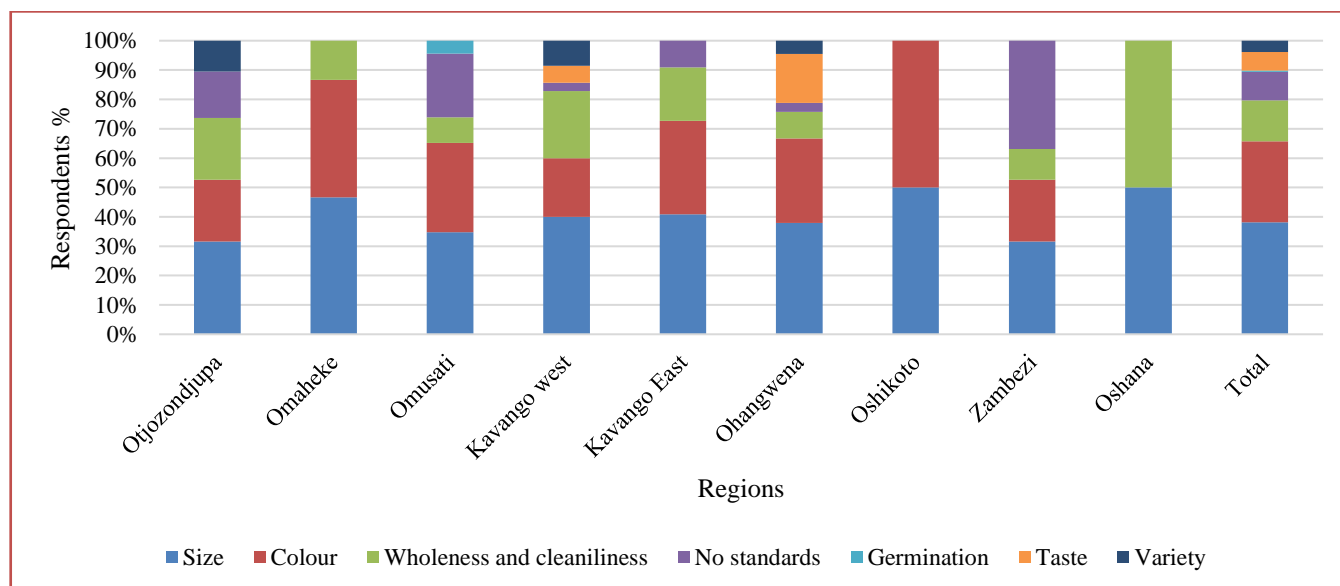


Figure 15: Seeds selection criteria

3.4.2. Fertilisation

Fertilisation is not commonly practiced by most local producers due to low accessibility and high fertilisation costs and the current low returns on revenue on cowpea production. The low fertilizer application rate is also because cowpea can convert atmospheric nitrogen to nitrate through rhizobium bacteria in their root system. However, the fertilizer application rate of 30-60 kg/ha of MAP (Monoammonium Phosphate) is recommendable based on specific site soil nutrient availability (Boahen *et al.*, 2017). It is imperative to apply the recommended fertilizer quantity in order to obtain an optimum yield, putting into consideration the site-specific available soil nutrients.

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3.4.3. Pesticides and herbicides

The majority (87%) of cowpea producers surveyed practice manual weeding methods (hand-hoeing). However, a few commercial producers practice chemical and mechanical methods which only account for 2% and 12% of the total producers in the sampled population respectively. The picture below shows the parasitic weed (*Alectra vogelii*) which causes significant yield reduction in most cowpea varieties.



Figure 16: *Alectra vogelii* (Source: Authors' compilation)

3.5. Production

The environment in which cowpea is produced influences the production technology and the needs of final consumers. In arid areas, cowpea is produced traditionally by farmers as an intercrop for food security, while cowpea hay is a very important fodder and an increasingly important source of income. As rainfall increases, cowpea becomes a very important food crop and it is usually cultivated for household consumption and market purposes. As rain and humidity increase further, cowpea becomes susceptible to attack by aphids and pod borers, which make production costly, so cowpea is replaced by other crops with higher pest resistance, yield, and market value such as maize, another type of beans, groundnuts, etc. In general, cowpeas are widely valued as dual-use or multipurpose legumes, with an enhanced impact on sustainable farming in semi-arid lands. Apart from its drought tolerance, the cowpea production cycle is short, can be timed to when labour is less constrained, and when vulnerability to climatic variation is reduced. Therefore, it can serve farmers as insurance, planted as a relay intercrop, or after a cereal crop has failed due to an extreme weather event.

Cowpea is among the most grown crops in Namibia, especially in the communal area, as about 85% of cereal crop producers (maize and mahangu) intercrop the main crop with cowpea. It is traditionally, socially accepted, and well adapted to Namibian soil conditions (Fleissner, 2005). Cowpea production in Namibia is limited to household use and fodder use, and this is due to limited market opportunities. The graph below shows the different cowpea uses as per region. However, some farmers preferred Bira

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(brown cowpea) irrespective of the colour. This is due to its high forage yielding attributes for fodder and plant cover feature for soil management. Some studies conducted in west Africa also indicated that large black-eyed cowpea would fetch a premium price in the market than the small-sized grains (Horn *et al.*, 2017). More so, farmers indicated their willingness to adapt to any bean's cultivar, provided that it has a short growth duration, has good adaptability and has high yielding potential, as well as the provision of a guaranteed market.

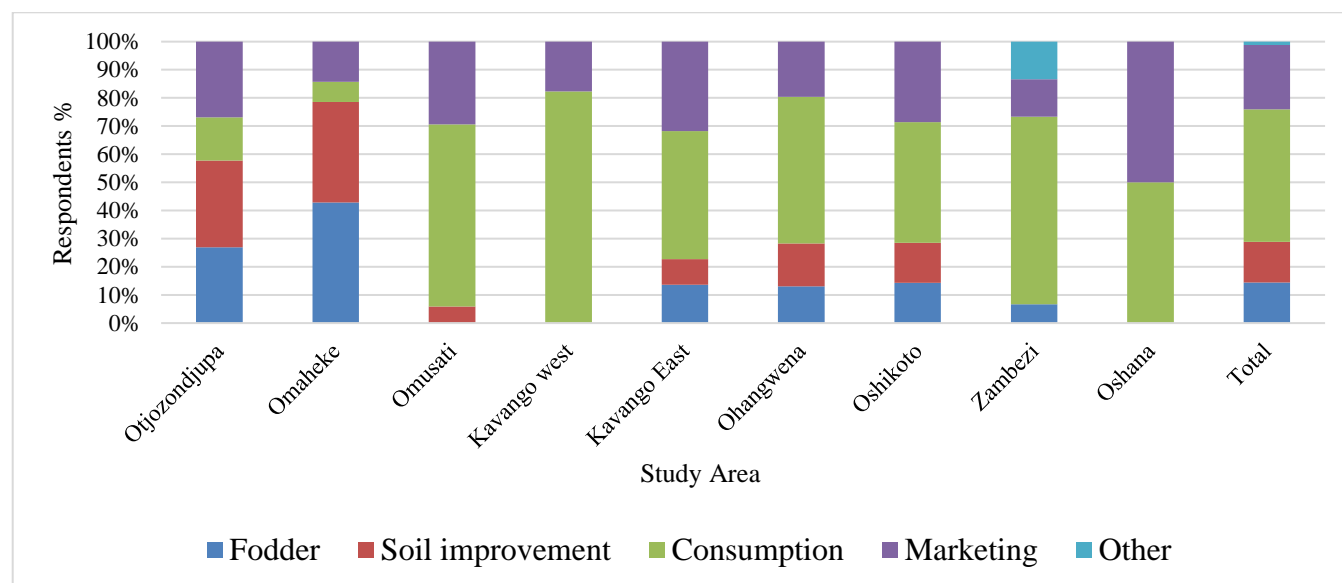


Figure 17: Cowpea production reasons

It was difficult to quantify the total number of cowpea producers and the area under cowpea production in Namibia as there is no cowpea census or survey that is conducted in Namibia to formulate baseline data information. However, the study estimated that 85% of cereal crop producers (146649) in Namibia grow cowpea either by intercropping (70%) or under crop rotation (30%), under an average area of 0.5-1.5 ha per producer.

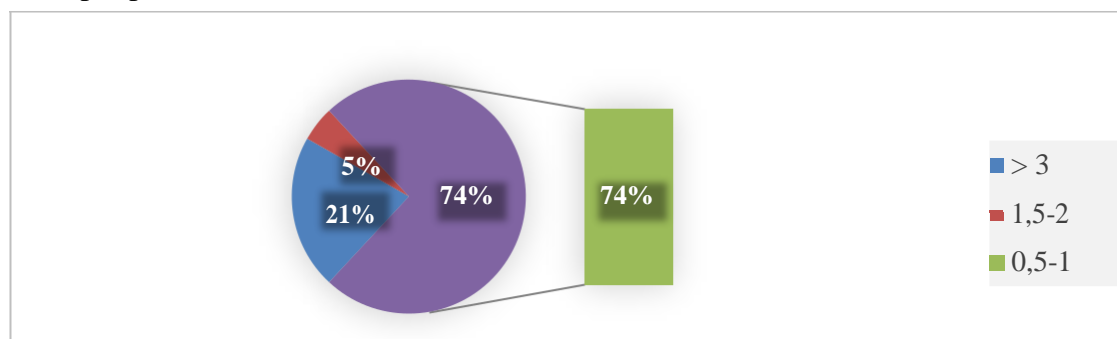


Figure 18: Average area size (ha) under cowpea per producer

Cowpea production intensification is important to achieve satisfactory volumes and profits for farmers. In general, cowpeas vary in growth habits from erect or semi-erect types with a short duration of 50 days and a long duration of 120 days. Trailing plants are primarily grown for forage. Generally, for grain

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production, a plant population of 200,000 to 300,000/ha is preferred. When intercropped, three seeds are planted at 20 cm along the ridge, spaced 75 cm apart, representing 133,000 plants/ha for erect/semi-erect varieties, and 60,000 plants/ha for the spreading types. One week after germination, the plants in each hole are reduced to two, leaving 40-80 thousand plants per ha. This can be converted to around 25 to 30 kg of seeds per hectare.

As per the established number of cowpea producers in Namibia based on this study, 74% of farmers have 0.5-1.5ha, 5% of farmers have 1.5-3ha, and 21% have more than 3ha under cowpea production. However, there is a need to conduct a cowpea survey on a regular basis. Nevertheless, as per the findings of the NCA (2014), which indicated that the average area size per crop producer is 3.7 ha, it can now be estimated that out of this 3.7 ha per producer, an average of 0.5 ha (13.5%) is allocated for cowpea production. Given that the total area under cereal crops (sorghum, maize, and pearl millet) in Namibia is 463,248 ha (NCA, 2014), it is estimated that cowpea is produced on about 62 000 ha per season, at an average yield of 0.2 t/ha to 0.5 t/ha; and total production is in the range of 12,466 tonnes to 31,163 tonnes per season (see figure below).

Table 4: Average production estimate

Major Crop	Number of Producers	Number of Cowpea Producers (based on 85% of the main staple cereal producers) with 0.5 ha on average	0.5 ha each producer – an estimated area of cowpea	Average total production tonnage (0.2-0.5 ton/ha)
<i>Mahangu</i>	129,029	109,675	54,838	109,68 - 274,191
<i>Maize</i>	17,620	14,977	7,489	1498 - 3744.5
Total	146,649	124,652	62,326	12,466 - 31,163

The difference in the area under cowpea production and yield per ha between commercial and communal producers was observed. The majority of commercial producers grow cowpea on an average land area of over 10 ha per producer per season, and harvest an average of 0.8 to 1.3 tonnes per ha. The majority of communal producers grow cowpea under an average area of 0.5 ha to 1.5 ha each per season and they harvest an average yield of 0.2 to 0.5 tonnes per ha. Compared to other developing countries, the yields in Africa are still low as the cowpea harvest should reach 1 ton/ha in Africa at the smallholder level, yet the yield is mostly lower around 0.6 ton/ha. Maximizing the economics of cowpea production systems is therefore the key strategy on how to achieve profitability on the farm and attain competitiveness of cowpea on national and international markets. As discussed above, intercropping and multipurpose production of cowpea increases the overall outcome. The experimental study conducted in Kenya of cowpea intercropped with maize revealed a harvest of 2.2 tonnes/ha of fresh leaves, 1.5 tons/ha of

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cowpea grain, and 2 tonnes/ha of maize, which increased the gross margin by 42% compared to cowpea monocrop and by 67% compared to solely grain production.

It is worth noting that communal farmers are in two categories, i.e. conventional planting by intercropping (70%) with cereals and crop rotation under conservation agriculture practices (30%) which is on the increase. Due to the wide-spaced cowpea plant stations under intercropping, the yield per hectare is likely to be less than 0.5 tonnes as estimated by farmers and indicated above. This finding is again indicated in the research findings of Horn *et al.* (2015), which alluded that cowpea productivity in Namibia is low in the subsistence farming system as a result of less plant population per unit area and unfavourable agricultural cropping practices. Compared to other countries, 0.6 ton/ha in Nigeria and 1 ton/ha should be easily reachable in West Africa with improved varieties and good agriculture practices, including investment into seeds, fertilizers, and insecticides. Farmers also produce cowpea in bigger areas than in Namibia, cropping on average 2ha per year, thus the expansion on the unit area under cowpea per producer will result in a production increase. The estimated cowpea tonnage of 12,506-31,269 produced locally on an annual basis is poorly utilized, with minimal economic benefits. Despite the multiple-use opportunity possessed by the cowpea crop, the current overall cowpea usage in Namibia is dominated by household use (81%), animal fodder (24%) as well as soil fertility management which has recently gained momentum, and also the informal market which approximately only takes up 25% of total production per producer.

The introduction or inclusion of cowpea in the rotation with the main crop through conservation agriculture practices increased the adoption rate of crop rotation practices and an increase in cowpea production. The inclusion of cowpea in the rotation of major crops was sharply demonstrated by local farmers. The inclusion of cowpea into the rotation of cereal crops under conservation agriculture practices again ascends the necessity of developing the cowpea formal market of a satisfactory scale in Namibia. While 68% of farmers have not changed their area under cowpea production and 11 percent have decreased, one-fifth of the total producers interviewed showed interest in increasing their area for cowpea production despite currently limited marketing opportunities due to the foreseen return on unit costs. For the detailed cost of each activity, see annex 11.1.

Black-eyed beans (Nakare) are the most produced beans in Namibia. About 70% of local producers grow black-eyed beans (Nakare) followed by brown cowpea (Bira) and then brown-eyed beans (Shindimba). According to this study, black-eyed beans were revealed to be the most preferred by producers at 84%.

Although black-eyed beans are the most preferred, yet sugar beans/red speckled beans are the most marketed beans in the urban market through imports, whereas sugar beans are the least preferred and they are not locally produced but they are readily available on formal urban markets.

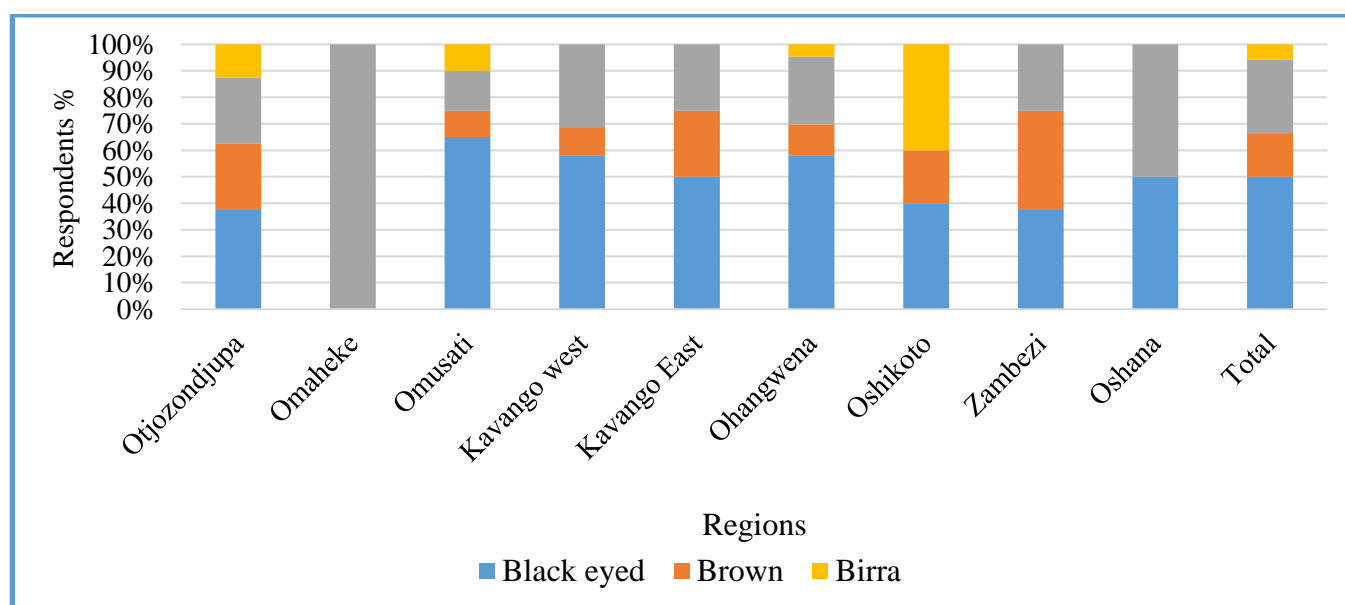


Figure 19: Most produced beans varieties in Namibia

Table 5: Cowpea production calendar

Type of operation	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug
Seed purchase												
Preparation of land												
Planting												
Weeding												
Pest management												
Harvesting												

Although some producers practice multiple methods (manual and mechanical) per each activity, most of the cultivation or production activities such as weeding, harvesting, and winnowing are executed manually except the field preparation activity which is dominated by the mechanical method at 51%. Yet 50% of producers use animal traction and manual field preparation methods such as hand hoe and other traditional methods. The dependency on manual cultivation practices leads to labour intensive and increased overall production cost per hectare (Boahen *et al.*, 2017). The figures below show the dependence on manual cultivation methods by local farmers dominated various production activities ranging from 87% to 93% for each activity. As per the context of this study, the manual method is the

use of hands (e.g. traditional hand removal of weed), and the mechanical method is the use of machines (e.g. tractors, planters) while traction refers to the use of draft animals.

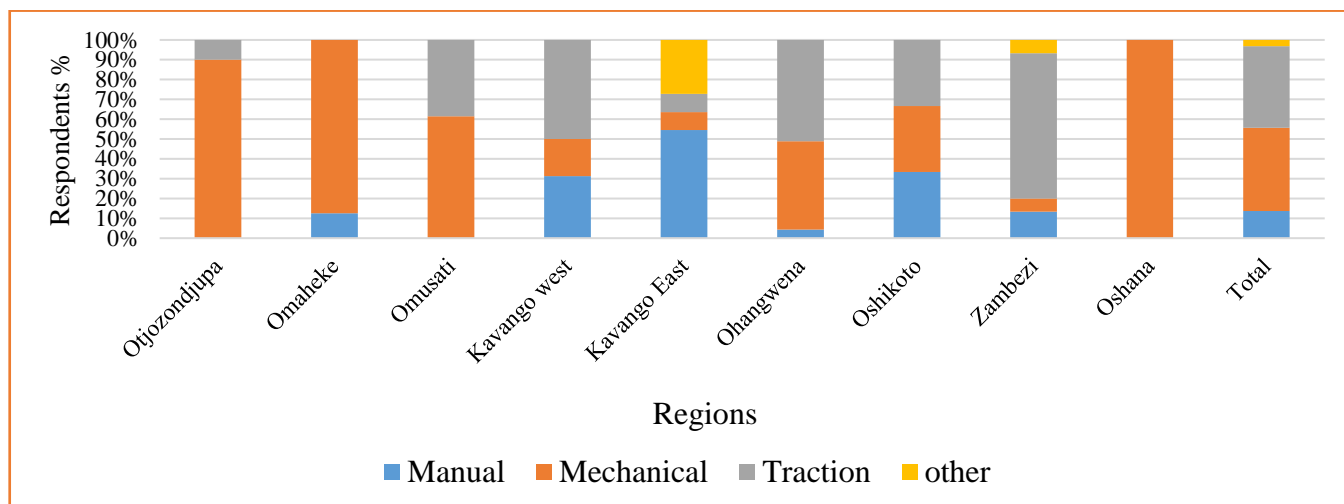


Figure 20: Field preparation method

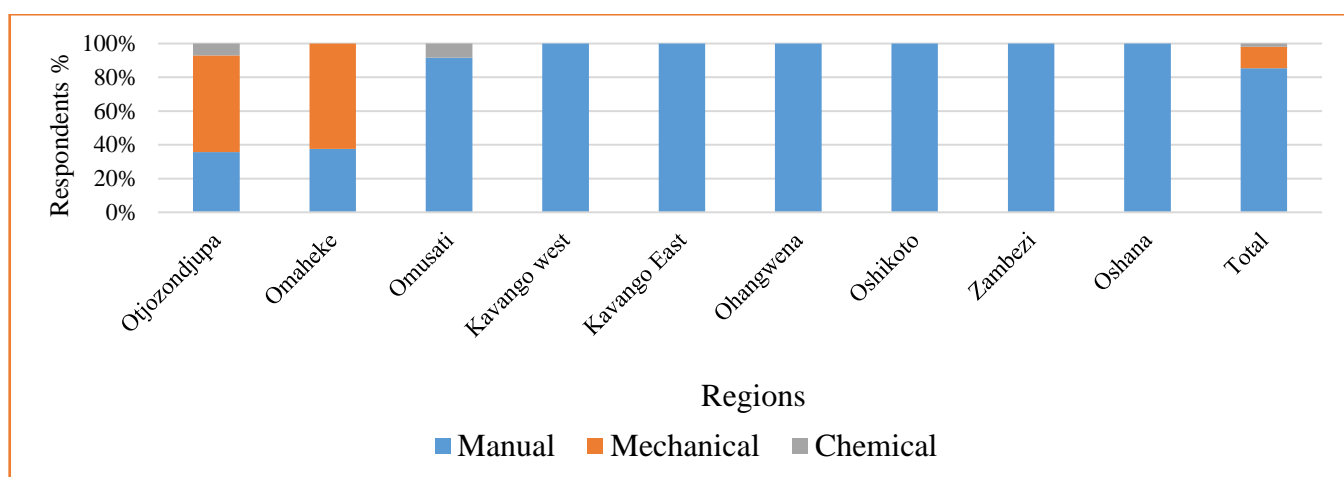


Figure 21: Weeding method

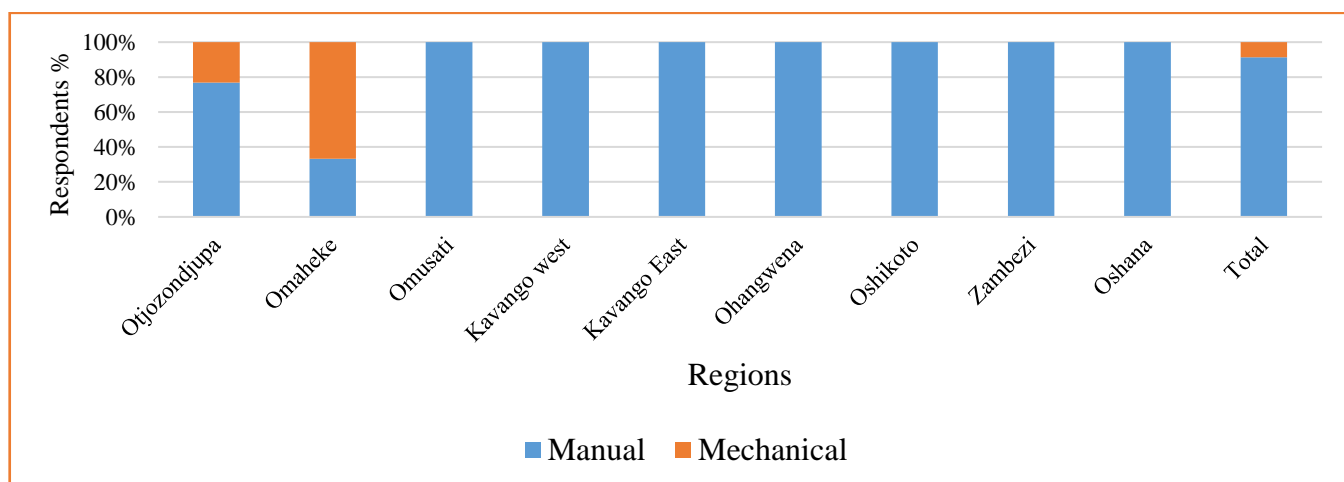


Figure 22: Harvesting method

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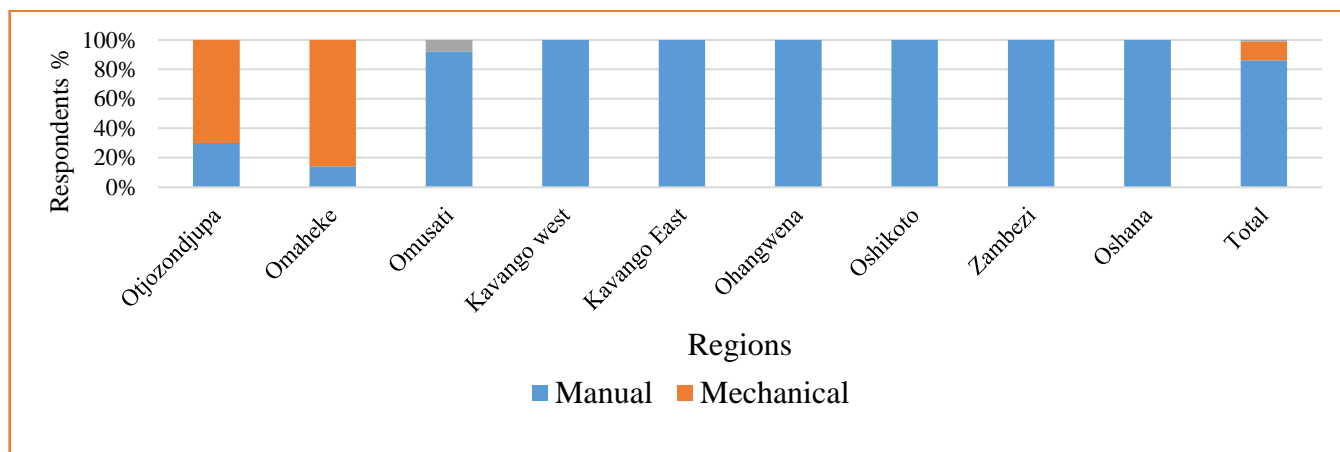


Figure 23: Threshing method

However, the usage of machinery or mechanical method evidenced a huge reduction in the labour force and improved efficiency and effectiveness on production practices, eventually leading to high returns on revenues per unit area.

3.6. Storage

Cowpea should be harvested at 12% seed moisture content and stored at 8% moisture level so as to extend the storage period. Cowpea weevil (*Callosobruchus maculatus*) is the major and most serious storage pest, while infestation with moulds is another challenge. Therefore, good post-harvest practices are key to improving the cowpea value chain. It is advised to store the seeds using hermetic storage techniques such as Purdue Improved Crop Storage bags (PICS), together with Integrated Pest Management education so as to reduce losses. PICS bags can also prevent pesticide/chemical residue.

It is assumed that post-harvest loss on cowpea in Namibia is over 30% and mostly this occurs on the farm level due to inappropriate storage facilities. Cowpea is easy to break and therefore post-harvest and storage have to be done carefully. Markets require quality cowpea which is measured by uniformity, free from pest damage and contaminants.

Although weevil infestation on cowpea starts at the field, the insects multiple during storage under favourable weather for their reproduction activities. Therefore, the lack of storage facilities for the cowpea crop and its products in Namibia restrict local producers and traders from prolonged (year-long) trading. Instead, producers and traders are confined to seasonal trading due to severe grain loss encountered during prolonged trading by weevil infestation (bruchid - *Callosobruchus maculate*) and another insect attack. Besides, these practices disadvantage them from high returns on revenue as the better price is always fetched during the off-season trading period when supply is low and demand is high. On the contrary, local producers and traders sell at low prices during the production peak season

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when the market is oversaturated. Out of those few producers who market less than 25% of their cowpea per producer, the majority opt to sell immediately after harvesting to avoid huge losses by weevil infestation. But seeds are always preserved till the next planting season through traditional storage methods. The picture below shows locally harvested cowpea. The total yearly cost of insecticide is around US\$50/ton. Just to highlight that a 100kg hermetic bag costs around US\$3 and it has a lifespan of 3 years and the metal silo costs US\$107 per 0.5 ton with a lifespan of 20 years. These are all possible storage facilities that can be adopted for Namibia.



Figure 24: Nakare beans ready for threshing

The storage **capital cost** varies from N\$160.00 (polyethylene bags 100kg) to N\$30 000 000.00 (complex steel silo, see storage options). This cost depends on the:

- Type of storage facility;
- Materials of the storage facility;
- Storage capacity; and
- Durability of the type of storage facility.

The storage **operational costs** on the other hand vary from N\$350.66 (polyethylene bags) to N\$4 938.03 (complex steel silo) per tonne per year.

Therefore, in selecting a storage facility, one needs to take the following in mind:

- Capital cost and Operational cost;
- The durability of a storage facility; and
- Storage facility effectiveness against weevil infestation.

3.7. Processing

After de-hulling, cowpea grains can be consumed without further processing or as canned or processed into flour for the preparation of high protein food products like fritters or cakes. Cowpea is mainly valued as a quality source of protein. The need for processing depends on the end market and this is influenced by local demand for processed cowpea. Cowpea processing in West Africa is done mainly at the household, SME level, or in small-scale community mills. Cowpea is rarely processed by large processors.

In Namibia, sun-drying is used, then manual threshing and winnowing for peeling and removing impurities from the grain. Then cowpea is later prepared as dry beans with no further processing, although cowpea can be processed into different products such as instant porridge, flour, extracted vegetal protein, canned with tomato or brine, fresh pod vegetable, as well as a relish. In Namibia, cowpea varieties are only confined to fresh vegetables, relish and used in the traditional dish called *oshingali*, which is mostly consumed during traditional ceremonies. Therefore, there is an opportunity to diversify and add value. Cowpea is culturally accepted and it is a traditionally consumed crop by the majority of the Namibian population (over 90%), especially in rural areas. Yet there is no value addition and product modification on cowpea in Namibia; this might be the contributing factor to the low cowpea consumption rate in urban areas as the rural cowpea products do not make it through to the formal urban market.

4. MARKET AND DEMAND

The study revealed that much of the total output is currently consumed at the household level and less than 25% is marketed. This is due to the limited market opportunities as the formal market is dominated by imported beans (Sugar beans). Thus, only 3116.5 tonnes were marketed locally, plus 300 tonnes of average dry beans imported, and 617 tonnes of canned beans were imported. We can roughly establish a total market demand of 4033.5 tonnes of beans in Namibia. This is in line with research findings by Horn et al. (2015), which indicated that cowpea is the third most grown grain crop in Namibia after *mahangu* and sorghum grown by most of the small-scale farmers in the north-central regions, yet it is the least marketed product in the formal market. With the current demand for beans in the prevalently southern part of Angola and the increased import demand in India, these could be a potential regional and international export market.

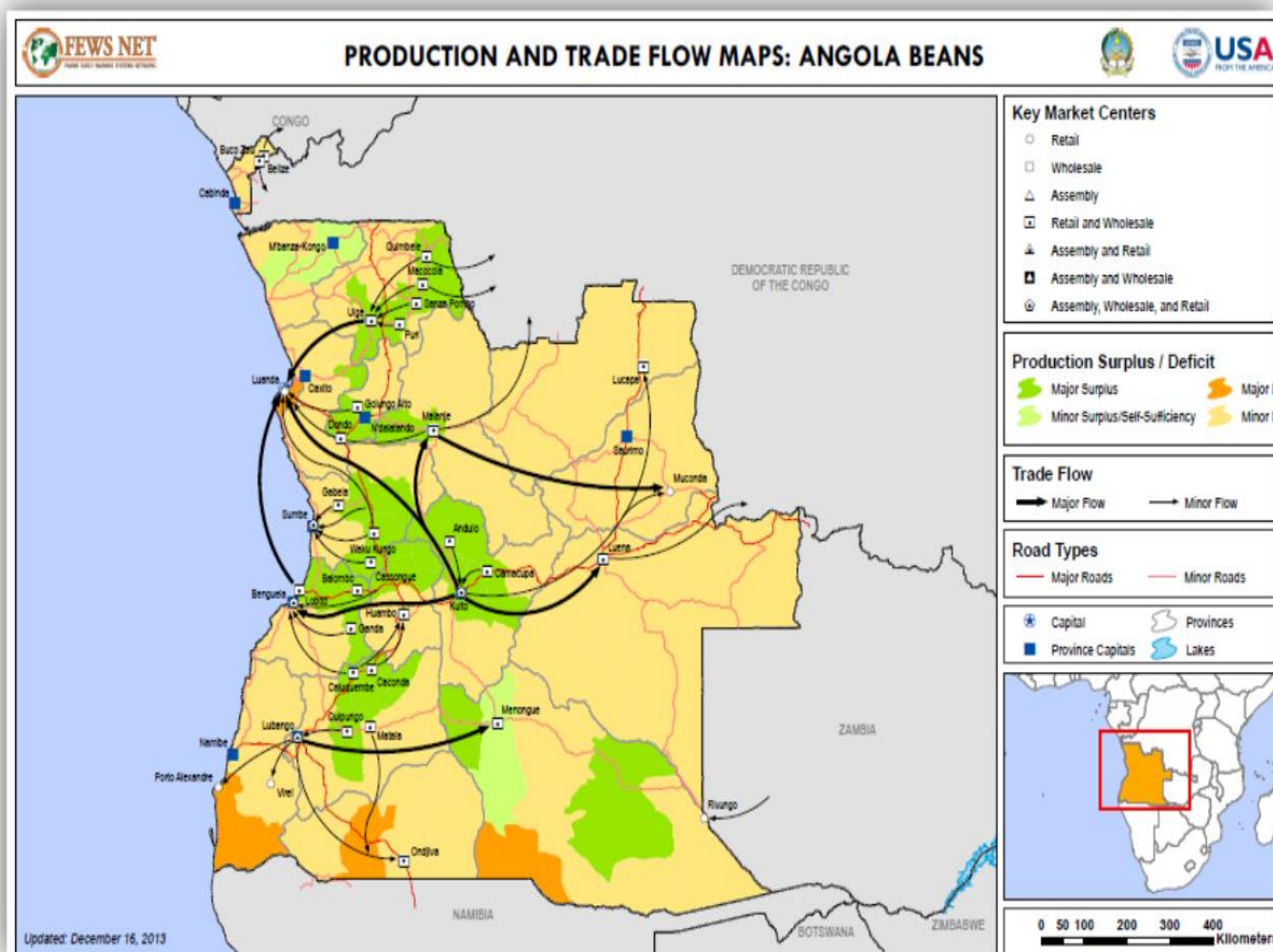


Figure 25: Cowpea production and trade flow in Angola

The Namibian formal dry beans market is dominated by imported beans, and for the past six years, an average of 300 tonnes of dry beans was imported into the Namibian market at an average value of N\$5 million annually (at an average unit cost of N\$16 666.00 per tonne) (NSA, 2017), SACU, 2017). Unfortunately, the available records do not specify the different types of beans (sugar beans, butter beans, black-eyed beans, or black beans) in the Namibian market. They are only collectively referred to as *dry beans*, therefore, it is difficult to quantify the amount of cowpea. These difficulties were again experienced during the study conducted by NAB (2009). Therefore, a survey on cowpea crops should be conducted to provide baseline information on cowpea data. Despite the high demand and local production of black-eyed beans, sugar beans are the most marketed beans into the formal market through importation. The figure below shows the total average sold cowpea per producer in different regions.

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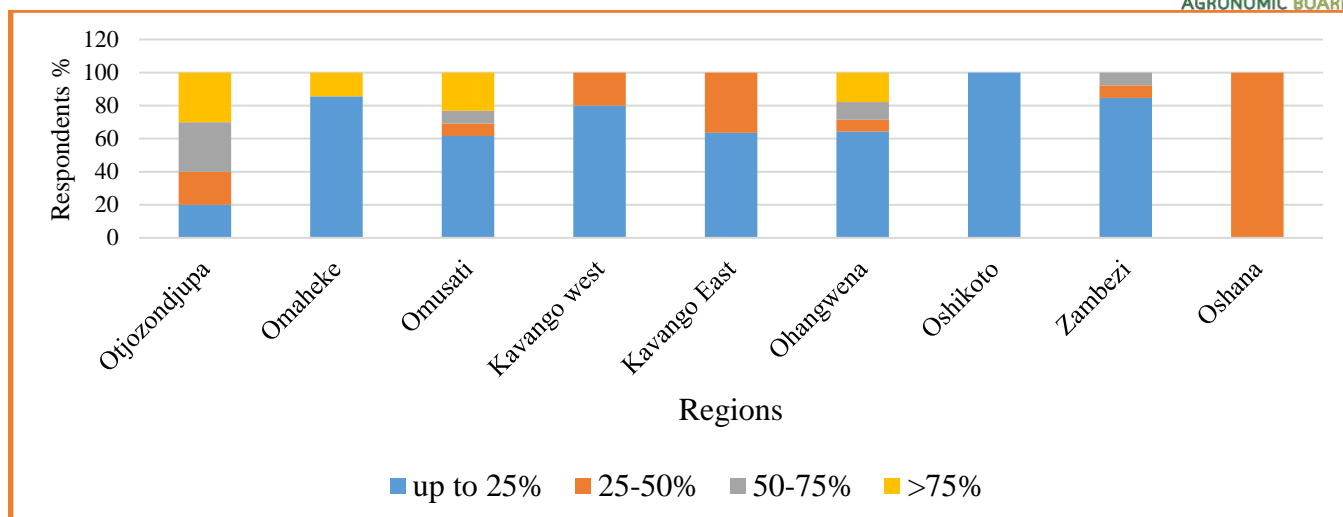


Figure 26: Percent of cowpea sold per producer

Only 45% of local producers market their crops, whereby the informal market constitutes 40% and less than 5% of participants are in the formal market. At an average of less than 25% of the total harvest per producer, each season marketed overall. A total of 55% of local producers do not have a market. The results are in line with study by Horn *et al.* (2015) which reported that the majority of farmers are forced to grow cowpea for consumption uses only.

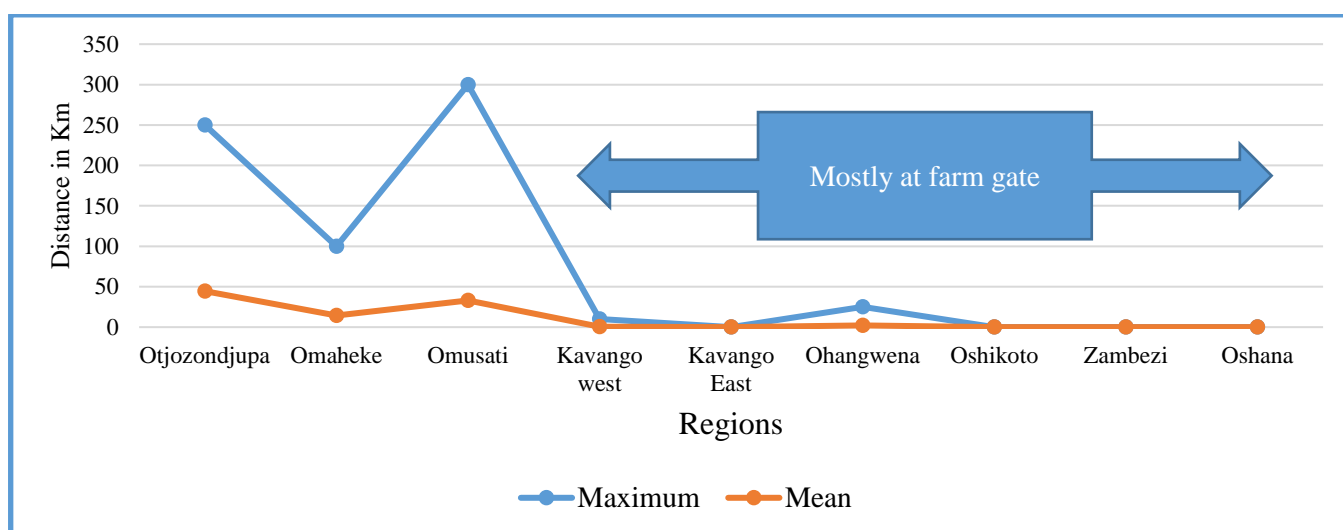


Figure 27: Distance to the market

The Namibian cowpea market is dominated by the informal sector. Therefore, there is no specifically articulated quality criterion that is practiced in the current market. The market assessment or consumer preference is currently based on wholeness, cleanliness, beans type and colour as well variety, degree of weevil infestation, and more importantly grain size. This is per the research findings by Horn *et al.* (2017), which indicate that the grain size and colour influence cowpea grain and seed selection as per the consumer's preference. Nakare (black-eyed beans) is the most preferred cowpea cultivar. The study

further indicated that local producers and consumers regarded grain colour and size as an important selection criterion affecting the market potential of cowpea in Namibia.

The locally produced cowpea marketed is mostly sold in the informal market. As a result, the volumes sold are not known. It is important to note that the demand for cowpea in the informal market differs throughout the different seasons of the year.

4.1. Import and Export of Cowpea and Beans, and Bean Products

Exports are minimal, however, there were 64,207 tonnes of cowpea which were imported from April 2017 to June 2018 (MAWF, 2018). However, it was difficult to extrapolate the volumes of beans consumed each year in Namibia due to the double-counting that takes place in the local supermarkets as they sometimes import directly and again buy from wholesalers. A similar problem was encountered during the study conducted early by NAB (2009). The table that follows shows the importation and exportation record of beans in Namibia (data collected from NSA, SACU and AMTA).

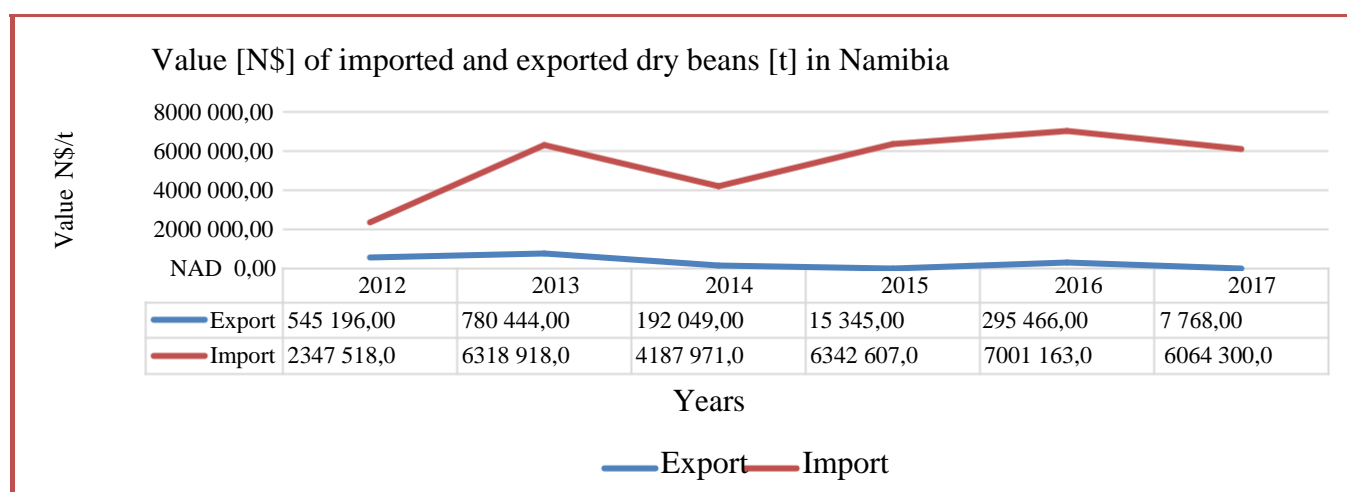


Figure 28: Imported and exported beans in Namibia (Source: NSA, 2017, SACU, 2017)

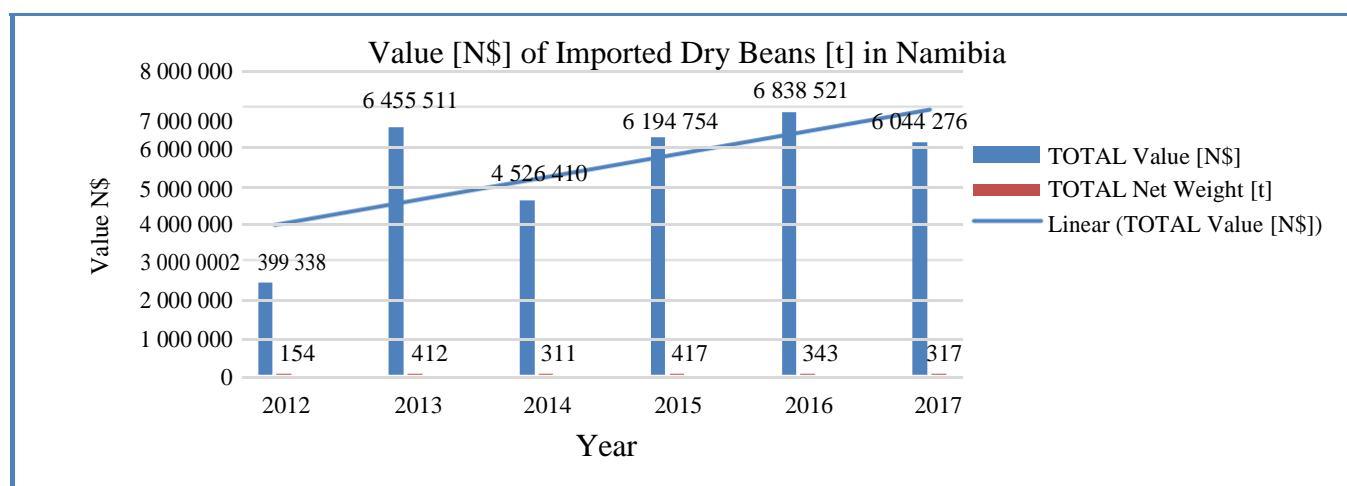


Figure 29: Value of imported beans into Namibia (Source: NSA, 2017, SACU, 2017)

Another market opportunity is through government institutions which can be created through the inclusion of the beans ration on the government drought and flood relief feeding programme. This can be attained by either supplementing or sharing fish rations with beans to the ratio of 2:1 or 1:1, putting into consideration all factors such as economic benefits to the government's savings and the nutritional value of each commodity.

With the relatively low price of beans compared to fish, economic benefits will be realised and this shall enable the government to cater for more impoverished people with limited resources without compromising the nutritional quality of the food ration provided (NAB, 2009). The inclusion of beans on the government drought/flood relief feeding programme will not only result in huge government savings; it will also stimulate local production, and job creation by creating a market for the bean industry. However, the nutritional benefits of each commodity shall be put into consideration so as to maintain a healthy diet.

4.2. Economic Benefit Analysis of Beans Imports Vs Domestic

Table 6: Economic benefit import vs domestic

Import: e.g. South Africa			
		<i>Benefit to Namibian economy</i>	<i>Benefit to South African economy</i>
	<i>Prices N\$/t</i>		
<i>Producer Price</i>	8 000	0%	100%
<i>Wholesale Price</i>	12 000	0%	100%
<i>Transport cost</i>	655	0%	100%
<i>Distributor/Reseller</i>	32 000	100%	0%
<i>Retailer price</i>	45 000	100%	0%

Domestic			
		<i>Benefit to Namibian economy</i>	<i>Benefit to South African economy</i>
	<i>Prices N\$/t</i>		
<i>Producer Price</i>	8 000	100%	0%
<i>Wholesale Price</i>	12 000	100%	0%
<i>Transport cost</i>	655	100%	0%
<i>Distributor/Reseller</i>	32 000	100%	0%
<i>Retailer price</i>	45 000	100%	0%

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5. LOCAL CONSUMPTION

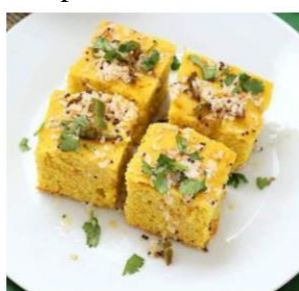
Cowpea consumption differs between urban and rural communities. In rural areas, local cowpea is highly demanded where it is eaten fresh during the summer season and eaten as *Oshingali* or as dry beans during the dry season (in August). Whilst in the urban areas, as per the consumer's perspective survey, the majority consume more canned beans every week and sugar beans are the most consumed bean types in the urban community. From the consumers' perspective survey conducted, dry beans are consumed on a monthly basis at an average range of 2kg to 5kg per household. The huge consumption quantity of dry beans is during traditional gatherings and wedding ceremonies in August and September, and during the festive season (in December). Although the sugar beans displayed dominance on the formal market through imports, as per the consumer's perspective survey, the black-eyed beans are the most preferred, culturally accepted, and well adapted to the Namibian soil conditions, yet its availability is limited to the informal market.

Due to the dominance of the informal market on the Namibian cowpea value chain, it was difficult to quantify or gauge the local consumption. However, an estimated cross-match calculation method was used. Based on the beans consumption rate by the Office of the Prime Minister (OPM), this stands at 12 600 tonnes of beans during a moderate drought period per year and 28 620 tonnes of beans during a severe drought season per year. The beans consumption rate is estimated at an average of 20 610 tonnes of beans per annum at the household level, with an additional average of 300 tonnes of imported beans, plus consumption by schools, which is currently at 522 g of beans per learner per year. The consumption is likely to be higher because of the Ministry of Poverty Eradication and Social Welfare (Foodbank), Ministry of Safety and Security (Prisons), and the Ministry of Health Social Services (hospitals). The pictures below show some of the cowpea processed products which are sold in the global market.

Cowpea fritters



Cowpea cake



Cowpea flour



Cowpea protein



Cowpea pickles



Cleaned peeled cowpea



Figure 30: Cowpea processed products (Source: Nedumaran et al., 2013)

Despite the foreseen profitability and overwhelming interest displayed by local cowpea producers, over 90% of the interviewed producers, the cowpea grain commercial or business industry is in jeopardy due to lack of a formal market for locally produced cowpea/beans.

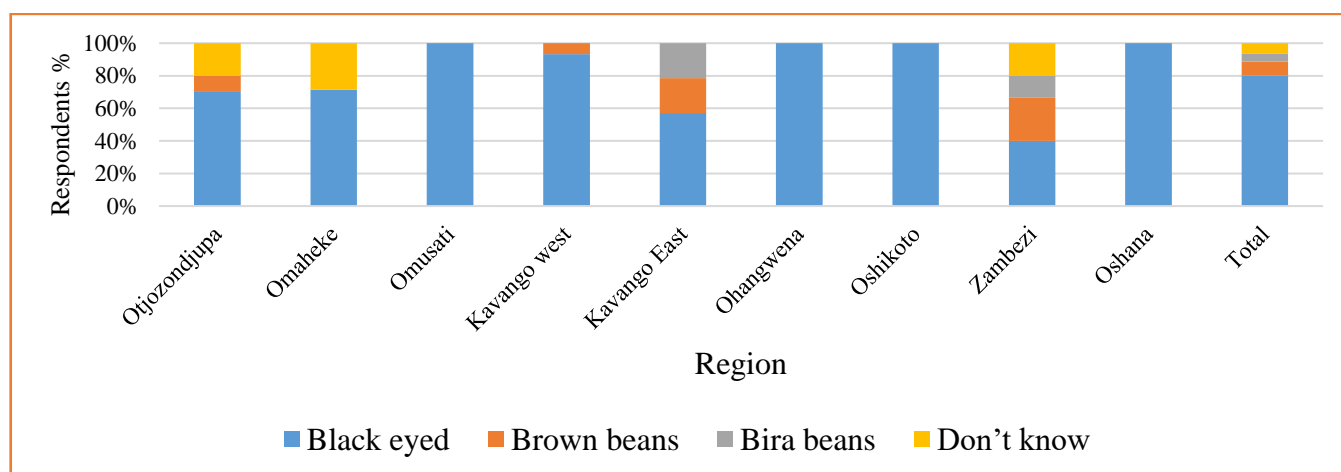


Figure 31: Most preferred domestic beans in the local market

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6. THE COMPETITIVENESS POSITION OF THE SECTOR

This section analyses the cowpea competitiveness in the sector by focusing on challenges and opportunities with possible recommendations for improvement. It further looks into the business enabling environment and regulations.

6.1. Competitive Position of Namibian Cowpea in Southern Africa

- Availability of potential total land for cowpea production
- Interest by local farmers
- New improved varieties with high promising yield potential
- Comparable low production costs to countries in Southern Africa
- Highly adapted to the Namibian soil and climate (sandy to sandy loam soil)
- Growing market and untapped potential

6.2. Systematic Constraints to Industry Competitiveness and Challenges

- Lack of formal market
- Lack of machinery
- Lack of technology
- Lack of storage facilities
- Lack of value addition and product diversification
- Main drawback: competition by imports
- The dominance of imports on the local formal market
- Low yields (low availability of improved seed varieties and seed supply)
- Weevil infestation (lack of storage facilities)
- Aphids and parasitic weeds (*Electra vogelii*)

6.3. Opportunities

- Cowpea is culturally accepted and highly demanded especially in the north-central region, a good cash crop, profitable, low production costs, and a high price fetcher compared to other cereal crops
- Job creation
- Reducing reliance on beans importation but increasing domestic production
- Economic empowerment through market creation
- Food security and demonstrated governmental support

6.4. Upgrading Opportunities and Recommendations

- Gazette cowpea (Controlled product)

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- Import and export regulatory measures
- Price regulation mechanisms at all production stages
- Beans cannery
- Product diversification
- Creating coordinated vertical and horizontal linkages between all actors
- Public awareness

6.5. The Business Enabling Environment and Regulations

Creating a conducive guaranteed market for local producers, traders, and processors through regulatory measures on facilitating the production and marketing of cowpea. Setting up-regulation measures on import and export as well as through price regulation mechanisms at all value chain stages and promoting finished/processed beans and beans products through the establishment of beans cannery. This can only be realisable through collective efforts and a holistic approach by private or public organisations and the business community at large.

6.6. Farming Systems and Green Growth

The development of the cowpea market industry will not only improve local economic livelihoods and promote healthy diets for Namibians and even low-income people, but will promote sustainable farming through conservation agriculture practices such as crop rotation, and subsequently improve soil fertility through the nitrogen fixation process. Fortunately enough, the support services by extension and conservation agriculture activities such as on cowpea production and pieces of training are already ongoing and currently being adopted by local farmers.

6.7. Policy Impacts on Cowpea Markets in Namibia

Although there are supportive services from the government such as inputs and extension services and there are no restrictions on cowpea local production, yet regulatory measures are required on the importation of cowpea/beans to enhance the local market and promote local competitiveness.

7. SECTOR STRATEGY

7.1. Strategy for Improved Competitiveness and Growth

Based on the results, the identified gaps on the existing cowpea value chain such as lack of formal market, lack of value addition or product diversification, and lack of storage facility at both small- and large-scale level, it is further proposed to establish storage facilities either at a centralised strategic local point or at farm level. It is also imperative to implement the above-mentioned resolutions to enhance the Namibian cowpea industry's competitiveness.

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7.1.1. Viability of the cowpea value chain project

Most of the producers interviewed demonstrated interest and willingness to participate in the cowpea value chain provided that there is a guaranteed market (market linkages could be created through institutional procurement as mentioned earlier or through investment in value addition and contract farming with a canning or other processing business), and if that is implemented, farmers are willing to increase their area under cowpea production. Furthermore, producers indicated their flexibility on prices if the floor price is determined before cultivation. The practical vision of this project is in line with food security and poverty eradication through the creation of jobs at the local, regional, and national level. As per returns on revenue on cowpea against the production costs, cowpea is profitable, and this was further supported through the conducted interviews (see figure below).

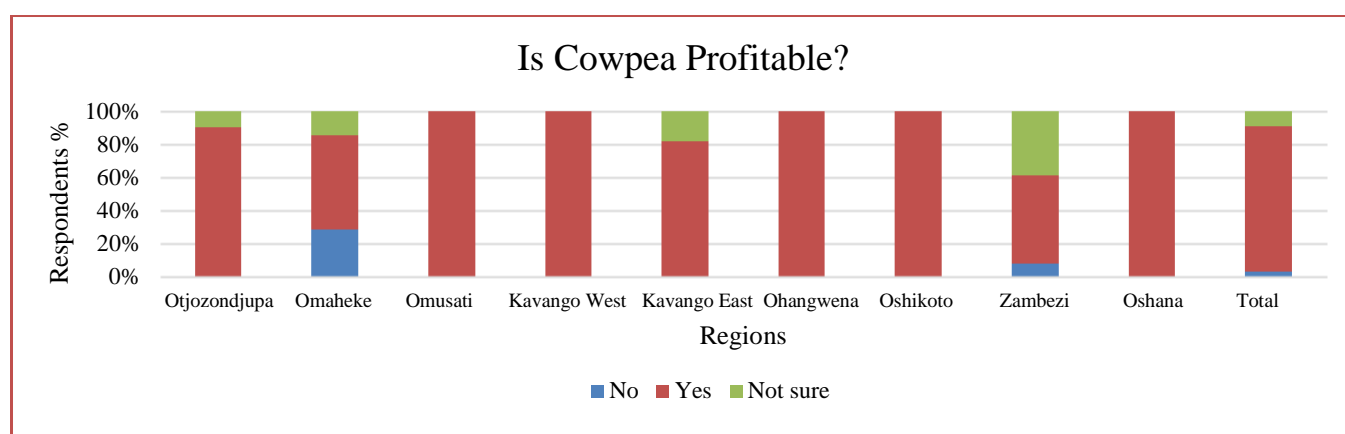


Figure 32: Cowpea profitability

Certain potential bulk traders consulted also demonstrated high interest in participating in the cowpea value chain on condition that there is:

- Financial support for storage facility construction;
- Regulated cowpea pricing mechanism; and
- A guaranteed market before planting.

The principles on which the HACCIADep model is based fully support the supply of locally produced high-quality crop products from small and medium-scale agricultural producers and agro-processors to the government and OMAs. If the HACCIADep is well implemented, then there is no doubt for cowpea to be one of the dominant crops grown in Namibia. Besides, with support from the Conservation Agriculture projects, more producers are likely to adopt the new land-use practices (climate-smart agriculture) that respond to the impacts of climate change and climate variability.

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8. RECOMMENDATIONS

- The guaranteed market for local producers, processors, and traders
- Introduction of effective and efficient storage facilities for both communal and commercial producers
- Price regulatory mechanisms - cowpea to become a controlled/gazetted crop
- Availing improved cowpea seed cultivars and increased seed production for local producers
- Create vertical and horizontal linkages between cowpea value chain actors
- Product diversification and value addition
- Reduce beans importation and promote domestic production with future export possibilities into the Angolan market, the regional market, and international markets such as the Indian market
- Involvement of all stakeholders
- Income increases most when farmers adopt the dual-purpose strategy of intercropping cowpea with maize and harvesting cowpea leaves until the first flowering every seven days.

9. CONCLUSION

A guaranteed market with a price regulatory mechanism will attract more producers and traders to participate in the cowpea value chain in Namibia. Ensuring consistent supply and equity in profit distribution along the value chain will be beneficial to the entire beans industry. As per the study, it can be concluded that black-eyed bean and the large grain size cowpea (Nakare) is the most preferred cultivar. The introduction of improved cowpea varieties with a short-growth duration, high yielding, drought tolerance, and disease and insect or pest resistance will enhance cowpea production in Namibia. The introduction of affordable and effective storage facilities for both small scale and large-scale producers in both communal and commercial farming sectors will serve as a long-term solution against storage losses caused by bruchid, and securing of all-season marketing and the availability of cowpea and cowpea products into the Namibian market. The existing Namibian cowpea value chain is largely undeveloped and lacks a guaranteed market, storage facilities, processing, transformation, and value addition, as well as both vertical and horizontal linkages between all actors at different stages within the chain, which requires immediate intervention.

10. SOURCES

- FAO. (2014). *Post-harvest loss assessment in cowpea, maize and sorghum selected supply chains in BurkinaFaso and recommended solutions and strategies*. Retrieved from https://www.ipcinfo.org/fileadmin/user_upload/food-loss-reduction/Nairobi_congress/BF_Pre%CC%81sentation__FLA_Kenya_Finale.pdf
- FAO. (2015). *Agriculture growth in West Africa, Market and Policy Drivers, Part III: Chapter 10 Response of selected value chains*. Retrieved from <http://www.fao.org/policy-support/resources/resources-details/en/c/447562/>
- FAO. (2016). *Dual purpose sorghum and cowpea intercropping*. Mali, 52 Profiles on Agroecology: collaborative crop research programme. Retrieved from <http://www.fao.org/3/a-bt400e.pdf>.
- FEWS NET, (2017). *NIGERIA Price Bulletin fews*. Retrieved from <https://data2.unhcr.org/en/documents/details/49156>
- Fleissner, K.W.E. (2005). *The Effects of crop rotation between cowpea and pear millet on pearl millet yield*. AGRICOLA. Ministry of Agriculture, Water and Forestry: Windhoek, Namibia.
- Gabdo, B. H. (2017). Lucrative status of improved dual purpose cowpea (*Vigna unguiculata* L., Walp) in Damboa, Borno State, North-Eastern Nigeria. *Agricultural Science and Technology*, 9(4), 286-290.
- Gbashi, S., Madala, N. E., De Saeger, S., De Boevre, M., Adekoya, I., Adebo, O. A., & Njobeh, P. B. (2018). The socio-economic impact of mycotoxin contamination in Africa. In P.B. Njobeh (Ed.), *Fungi and mycotoxins their occurrence, impact on health and the economy as well as pre-and postharvest management strategies* 1-20. Publisher.
- Horn, L. N., Ghebrehiwot, H. M., Sarsu, F., & Shimelis, H. A. (2017). Participatory varietal selection among elite cowpea genotypes in northern Namibia. *Legume Research: An International Journal*, 40(6),
- Horn, L., Shimelis, H., & Laing, M. (2015). Participatory appraisal of production constraints, preferred traits and farming system of cowpea in the northern Namibia: Implications for breeding. *Legume Research: An International Journal*, 38(5), 691-700
- <https://agriculturenigeria.com/farming-production/crop-production/crops/beans>
- <https://www.dailytrust.com.ng/nigeria-s-potential-at-global-cowpea-market.html>
- <https://www.farmersweekly.co.za/crops/field-crops/cowpeas-replace-maize-on-a-free-state-farm/>
- <https://www.zamace.co.zm/content/market-information-data>
- Kyei-Boahen, S., Savala, C. E., Chikoye, D., & Abaidoo, R. (2017). Growth and yield responses of cowpea to inoculation and phosphorus fertilization in different environments. *Frontiers in Plant Science*, 8, 6-46.
- “What is better than food for local people grown by local people”*

- Namibian Agronomic Board - NAB. (2009). *Feasibility study to describe and quantify current and future market demand for Namibian domestic food legumes (beans)*. Publisher.
- Nedumaran, S., Abinaya, P., Shraavya, B., Rao, P. P., & Bantilan, M. C. S. (2013). Grain legumes production, consumption and trade trends in developing countries - An assessment and synthesis, socioeconomics. *Discussion Paper Series Number 3*.
- PRICE WATCH (2018). *Cowpea prices*. March 30, 2018, Few's Net.
- Production Guidelines for Cowpea, Directorate Plant Production (2018). <http://www.arc.agric.za/arcgci/Fact%20Sheets%20Library/Cowpea%20%20Production%20guidelines%20for%20cowpea.pdf>
- Saidi, M., Itulya, F. M., Aguyoh, J. N., & Mshenga, P. M. (2010). Yields and profitability of a dual purpose sole cowpea and cowpea-maize intercrop as influenced by cowpea leaf harvesting frequency. *Journal of Agricultural and Biological Science*, 5(5), 65-71.
- Simon, S., Moses, J.D., Zalkuwi, J., & Medugu, A.J. (2015). Profitability analysis of cowpea production in Gombi local government area of Adamawa State. *International Journal of Advances in Agricultural Science and Technology*, 2(1), 1-13.
- Snapp, S., Rahmanian, M., Batello, C., & Calles, T. (2018). *Pulse crops for sustainable farms in sub-Saharan Africa*. Food and Agriculture Organization of the United Nations (FAO).
- USAID, (2016). *Mozambique agricultural value chain analysis*. Retrieved from https://www.researchgate.net/profile/Jill-Findeis/publication/330072847_MAPPING_SOYBEAN_VALUE_CHAIN_IN_MOZAMBIQUE/links/5c2bab06299bf12be3a64e23/MAPPING-SOYBEAN-VALUE-CHAIN-IN-MOZAMBIQUE.pdf
- Wakili., A.M., (2013). Economic analysis of cowpea production in Nigeria. *Russian Journal of Agricultural and Socio-Economic Sciences*, (1), 60-65.

11. ANNEXURE

Production Cost

COWPEA PRODUCTION COSTS OF 2018			Determining the floor price for the 2018 marketing season							
VARIABLES			Commercial		Communal		GRN Subsidized Rate		NAB Production Cost Estimate 2018	
			PRICE/UNIT (N\$)	COST/ha (N\$)	PRICE/UNIT (N\$)	COST/ha (N\$)	PRICE/UNIT (N\$)	COST/ha (N\$)	PRICE/UNIT (N\$)	COST/ha (N\$)
SEEDS	UNIT	UNITS/ha								
Nakare {Black Eyed Beans}	Kg	24	NAD 50,00	NAD 1 200,00	NAD 12,00	NAD 288,00	NAD 12,00	NAD 288,00	NAD 12,00	NAD 288,00
Seeds treatment {Inoculation}	Kg	1	NAD 50,00	NAD 50,00	NAD 0,00	NAD 0,00	NAD 0,00	NAD 0,00	NAD 0,00	NAD 0,00
Sub - Total:				NAD 1 250,00		NAD 288,00		NAD 288,00		NAD 288,00
SOIL PREPARATION & PLANTING										
Ploughing & Sowing {Own Tractor}	Litre	30	NAD 13,00	NAD 390,00						
Ploughing & Sowing {Hired Tractor}	Hour	2	NAD 0,00	NAD 0,00	NAD 450,00	NAD 900,00	NAD 125,00	NAD 250,00	NAD 450,00	NAD 900,00
Sub - Total:				NAD 390,00		NAD 900,00		NAD 250,00		NAD 900,00
FERTILIZER										
MAP	Kg	50	NAD 10,00	NAD 500,00	NAD 10,00	NAD 500,00	NAD 4,70	NAD 235,00	NAD 10,00	NAD 500,00
Sub - Total:				NAD 500,00		NAD 500,00		NAD 235,00		NAD 500,00
WEEDING										
Mechanical {Own Tractor}	Litre	15	NAD 13,00	NAD 195,00						
Manual {Labour-Day}	Person/Day	13	NAD 60,00	NAD 780,00	NAD 60,00	NAD 780,00		NAD 250,00	NAD 60,00	NAD 780,00
Sub - Total:						NAD 780,00		NAD 250,00		NAD 780,00
Pest Control										
Chemical Pest Control	Litre	2	NAD 100,00	NAD 200,00	NAD 100,00	NAD 200,00	NAD 100,00	NAD 200,00	NAD 100,00	NAD 200,00
HARVESTING										
Mechanical {Harvester}	Litre	15	NAD 13,00	NAD 195,00						
Manual {Labour-Day}	Person/Day	15	NAD 60,00	NAD 900,00	NAD 60,00	NAD 900,00	NAD 60,00	NAD 900,00	NAD 60,00	NAD 900,00
Sub - Total:						NAD 900,00		NAD 900,00		NAD 900,00
THRESHING										
Mechanical {Thresher/Pre-Cleaner}	Litre	5	NAD 13,00	NAD 65,00						
Manual {Labour-Day}	Person/Day	5	NAD 60,00	NAD 300,00	NAD 60,00	NAD 300,00	NAD 60,00	NAD 300,00	NAD 60,00	NAD 300,00
Sub - Total:						NAD 300,00		NAD 300,00		NAD 300,00
TRANSPORT										
Transport cost to the nearest market	Bag	20	NAD 20,00	NAD 400,00	NAD 20,00	NAD 400,00	NAD 20,00	NAD 400,00	NAD 20,00	NAD 400,00
Sub - Total:				NAD 400,00		NAD 400,00		NAD 400,00		NAD 400,00
PACKAGING MATERIAL										
Empty Polyethylene Bags	Bag	20	NAD 8,00	NAD 160,00	NAD 8,00	NAD 160,00	NAD 8,00	NAD 160,00	NAD 10,00	NAD 200,00
Sub - Total:				NAD 160,00		NAD 160,00		NAD 160,00		NAD 200,00
COWPEA PRODUCTION COST/ha under rainfed				NAD 3 355,00		NAD 4 428,00		NAD 2 983,00		NAD 4 468,00
Inflation rate	%	3,6		NAD 120,78		NAD 159,41		NAD 107,39		NAD 160,85
TOTAL COWPEA PRODUCTION COST/ha under rainfed				NAD 3 475,78		NAD 4 587,41		NAD 3 090,39		NAD 4 628,85
Producer Price (Determination based on Production cost)										
COWPEA AVERAGE PRODUCTION COST/ha						NAD 3945,61				
STANDARD/INTERNATIONAL COWPEA PRODUCTION COST/ha						N\$3 810,66 - N\$4 076,52 {272,19 - 291,18 USD}				

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PUBLISHED BY:

Namibian Agronomic Board
Agronomy and Horticulture Market Development Division
Research and Policy Development Subdivision
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