



**Market chain of Zambian agrarian products in Mongu,
Western Province:
Case study of Cashew – Mr. Muyongo Muyongo Supper
Organic Manure-My Treasure**

**Within the project „Value chain development “financed
by the Czech Development Cooperation**



Mongu, Western Province, Zambia | 2019

Table of contents

Summary	i
Preface	ii
1. Introduction	1
1.1. Definition of markets and market chains.....	1
1.2. Theoretical background on value chains.....	1
1.3. Production opportunities and challenges for cashew.....	2
2. Aims of the survey.....	7
2.1. The main aim of the study	7
2.2. Specific objectives	7
2.3. Research questions	7
3. Methodology.....	8
3.1. Study site characteristics (Western province and Mongu district)	8
3.2. Data collection	9
3.3. Data processing and analysis	10
4. Findings	11
4.1. Supply chain actors in cashew production.....	11
4.2. Cashew as a product and its marketing possibilities.....	12
4.3. Challenges in cashew value chain	13
4.4. Factors influencing the purchase of cashew nut.....	13
5. Evaluation of Easy Cassava Meal business plan.....	15
5.1. Summary of the business plan	15
5.2. Production and quality estimates	15
5.3. Cost of technology/Equipment	16
5.4. Investment cost Evaluation.....	17
6. Final remarks and recommendations	20
6.1. Specific remarks and recommendations.....	21
6.2. Specific remarks and recommendations.....	21
References	22
Annexes.....	23
1. Address book for suppliers, Processors, and financial institutions	
2. Product certification manual	

Summary

This report is the outcome of the project titled Value chain development in Western province of Zambia, financed by the Czech Development Cooperation. Report has a standard structure starting with introduction to cashew agroecological characteristics, global production overview and utilisation. The aim of this study is to provide the reader with the logic of data collection and evaluation. All data was collected and assessed via methods that are frequently used in the studies on value chains and indicators provide easy and relevant respond to current situation. Study further provides basic feedback to business proposal on corresponding with the chosen product, in this case it is meal produced from cashew. Conclusion section summarizes main ideas, recommendations, lessons learnt as well as suggestions for value chain development. The study is trying to stress the role of traditional knowledge and processing technologies that are economically viable and accessible, there is slow but continuous rise on demand side for local and traditional products, and potentially they might attract either tourists or consumes abroad.

Preface

Cashew (*Anacardium occidentale* L., Anacardiaceae), a native of Brazil, was introduced in India during the latter half of the 16th century for the purpose of afforestation and soil conservation. From its humble beginning as a crop intended to check soil erosion, cashew has emerged as a major foreign exchange earner next only to tea and coffee. Cashew nut is one of the important nuts grown in the world and ranked first. Among various nuts such as hazelnuts, almonds, etc., cashew nut enjoys an unenviable position and it is an unavoidable snack in all important social functions especially in the western countries. Cashew nuts play a vital role in many developing countries (Valicek et al, 2002; Orwa et al. 2009; Chabi Sika et al. 2013).



Figure 1 Cashew in Western province, Zambia

Cashew production is suitable in Western province because it is drought resistant. Cashew has big economic potential, to diversify the economic base of the poor farming communities and households in the Western Province. The Zambian government started to promote the planting and processing of cashew trees in the 1980s. However, the growth of the cashew industry is very slow due to low production and lack of marketing and processing facilities.



Figure 2 Starting from the seeds: seedlings development and distribution to farmers in Mosambique

GIZ issued a report in 2015 on cashew initiative in African countries. Main outcomes were that small farmers contribute by +40% to the global cashew production. However due to the poor quality of the nuts, low productivity and a lack of organisation they are still not able to reach optimal negotiation power at the cashew market, both production and input site. Thus, any support of local input providers and business plans will lead to higher living standard of the farmers, including lower dependency and higher negotiation power.

Cashew promotion and value chains in Zambia are closely linked to African Development Bank project that started to be financed in 2015. Interestingly, first cashew was introduced to Zambia from neighbouring Angola in 1940s, and Western province (Barotseland) was the first region in Zambia with cashew production. It took however four decades to first regular support of cashew farmers from Zambian government.

CGIAR centre Bioversity International (2014) added cashew on the list of economic biodiversity resources of Barotse Flood Plain, showing high attention that is given both to the region and to cashew from world's leading research institutions.

1. Introduction

1.1. Definition of markets and market chains

The term market has received a variety of definitions. Nevertheless, in general, we can speak about the place where those who want to sell are meeting with those who are willing to buy. In one moment, if both parties make a deal, the market can be quantified in terms of price for a product and the quantity sold. Besides of this, market is a place that can provide unique information on local needs, preferences, culture, habits etc. This is important particularly for agricultural markets that deals directly to local food chains and diet. Thus, any new product must either meet local needs and preferences or to change them. Both strategies are risky and need good planning and resources to succeed in the market. In the case of new product, a seller should consider local food/taste preferences and traditional post-harvest handling, which could cause further changes in human diet and consequently in farming system. Globally, these strategies are usually linked to loss of biodiversity and cultural values as well as dietary failures leading to obesity, deficiencies in vitamins and other basic dietary elements, and other food-related health disorders. In this case, the role of government is to regulate import of such products or their production at the local level or to support local economy.

1.2. Theoretical background on value chains

Kaplinsky and Morris (2012) describe the value chain as the full range of activities, which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

Generally, to be successful at the market, sellers use various strategies on how to attract potential buyer. These strategies are called marketing. Even though marketing is always defined as a process of satisfying human needs by delivering the certain product (or service) in proper form, time and place, it also has a productive value for the seller. All sellers are following one goal – maximizing their profit.

One of the functions of marketing is to upgrade existing production systems and to bring/offer the consumer with something specific, in economic words we can call it added value. This strategy is usually linked to technological processes, such as proper storage, processing, transport, packaging etc. However, marketing must contain a significant creative component in all above-mentioned processes to get an advantage at the market. This requires additional resources and certain level of experience and/or education. Important point is not to maximize the profit by leaving behind quality standards. Marketing must be considered as a social and cultural aspect creating links between producers (farmers) and consumers, and other nodes along the market chain. These linkages are expected to be of a long-term character and are based on mutual understanding and commitment of all being involved.

The market chain could be thus described as numerous links that connect all actors and transactions involved in the movement of agricultural products from the production place (farm) to the consumer (household, restaurant, hotel, school, administrative office etc.). In

other words, all paths of product flow from its origin to the ultimate destination of final use. Very often the raw product is also being changed or transformed, which put into the market chain value-added component. In this case, we can speak about the value chain.

Every market/value chain tend to be more and more specialized in order to deliver a high-quality product at a good price to reach maximum profit. Specialization could occur also at different nodes along the chain as well. This specialization leads or may lead to product differentiation as the consumers have various preferences related to their socioeconomic and demographic characteristics. Any producer or seller should be aware of who are the consumers and how the product should be specified, and what price to ask. Final price also influences a marketing margin, measure of performance of a marketing system, or in other words, how consumers' expenses are divided along the market chain at different levels. Such margin is simply the outcome of the demand and supply at the market, quantified as a difference between the price the consumer pays and the price that is obtained by producers.

1.3. Production opportunities and challenges for cashew

Geographic aspects

There are basically 3 agroecological production zones distinguished within Zambia with the principal zone for cashew cultivation being in the Western province. The target region of this study belongs to the agro-ecological zone II. More specifically to the zone IIb.

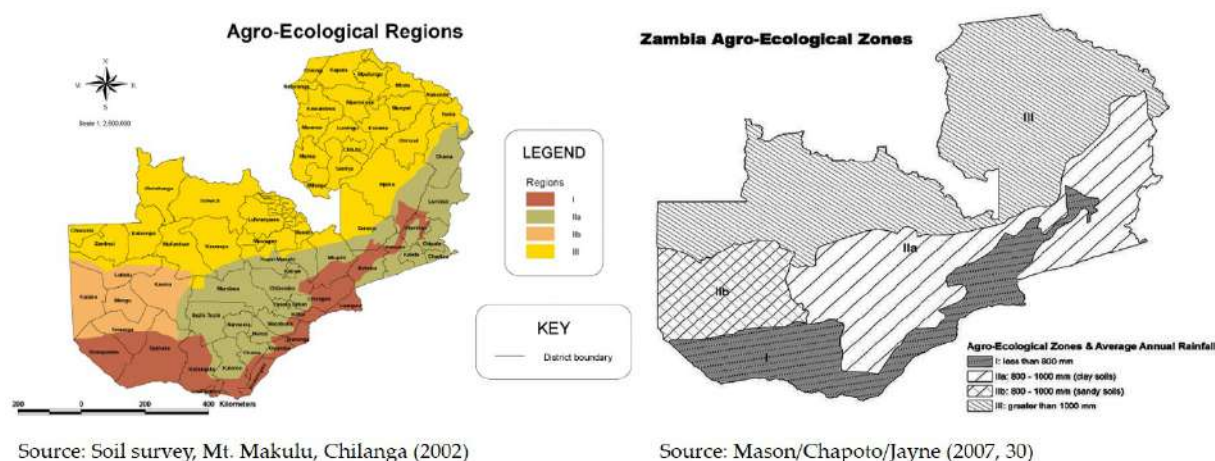


Figure 3 Zambia's Agro-Ecological zones

Status of cashew production in Zambia

The Zambian government through the Citizens Economic Empowerment Commission (CEEC) financed importation of cashew scions from Mozambique, and establishment of cashew nurseries in 2012/2013. In 2007 the Cashew Growers Association of Zambia (CGAZ) was established and had become member of the African Cashew Alliance. The association drafted the Cashew Development Initiative (2014) with the aim of improving the cashew industry. Cashew nuts sector revitalization have also received support from the African Development Bank. At present the responsibility of cashew is entrusted to the cashew Infrastructure development project (CIDP) and fully funded to conduct activities related to the cashew improvements. The CIDP has also engaged the Export Trading group (ETG) to handle the rejuvenation exercise.

According to the CIDP mid-term report, in improving the cashew infrastructure, there was average progress of about 85% roads works completion for all road started. Thus, road works in Mongu 90% of 3.1km, Nalolo 95% of 5km, Limulunga 80% of 5km, Sikongo 90% of 5km and Kalabo 70% of 5km translating to 19.64km of the 23.1km target for the 5 districts where works have started. Works not commenced in Mitete, Lukulu, Senanga, Sioma and Shangombo because RDA is still doing material sampling. The report further elaborates on the progress made at the other infrastructural components. Infrastructure for nurseries at ZARI, 1 irrigation system including civil works for main cashew nursery at ZARI-SRS has not been completed. There were only three movable shade-nets installed and are being used as nursery. The designs for irrigation infrastructure were done and the Contractor is on site and works are in progress. However, some contractors engaged to work on irrigation facilities in FTCs have limited experience in constructing irrigation facilities leading to slow pace of implementation and in some cases poor finishing. The report highlighted the challenges and findings of the contractor in regards to the cashew rejuvenation and maintenance exercise. They commenced operations in April 2019 and since then the following achievements have been recorded: farmer mobilization (about 15,000 farmers), provided 943,000 seedlings (grafted and ungrafted) to farmers which is an equivalent to 9,430 ha planted. In the same report, the District Agricultural Coordinator Office indicated that mortality rate was high, averaging 70% mainly due to poor rain pattern especially for farmers that planted late. ETG has sprayed old plantations covering 888 ha so far and this effort was on-going at MTR. ZARI sprayed 1,824.27 ha in 2018 giving a combined hectare of 2,712.27 ha.

Agroecological aspects

The general notion is that "cashew is very modest in its soil requirements and can adapt itself to varying soil conditions without impairing productivity". While Cashew can be grown in poor soils, its performance would be much better on good soils. The best soils for cashew are deep and well-drained sandy loams without a hard pan. Cashew also thrives on pure sandy soils, although mineral deficiencies are more likely to occur. Water stagnation and flooding are not congenial for cashew. Heavy clay soils with poor drainage and soils with pH more than 8.0 are not suitable for cashew cultivation. Excessive alkaline and saline soils also do not support its growth. Red sandy loam, lateritic soils and coastal sands with slightly acidic pH are best for cashew.

Cashew origins are in Latin America and Caribbean, nevertheless it is planted nowadays across tropical regions worldwide. Tree can grow in relatively high altitudes, in equatorial regions even up to 1,500 meters or higher. Temperatures ranging around 27°C are considered as an optimum as particularly seedlings and young trees tend to be susceptible to temperatures close to zero. Thus, cool conditions in some period of the year are for example causing delays in flowering. Optimum precipitation are 1,500-2,000 mm, but even 1,000 mm are suitable. Moreover, good root system – developed usually in the areas with deep soils – serve as an effective tool for adaptation to dry seasons. Nevertheless, well-distributed rainfall leads to constant flowering, but a well-defined dry season induces a single flush of flowering, early in the dry season. Similarly, two dry seasons induce two flowering flushes. Very important is, that between the onset of the flowering and harvesting time, no rains should occur.

Cashew trees are usually having long lifespan, they are spreading around, so wide spacing is required (at least 6x12 m, or 12x12 m; 140 and 70 trees per hectare respectively). Nevertheless, they can be used in agroforestry and other diverse farming systems. There is always importance of good pruning, using properly fertilizer, ensure adequate amount of water (irrigation or rely on rain-fed).

Regarding to value chain sustainability, harvesting is one of the key factor. Nuts are usually falling to the ground when they are mature, and they can be collected by farmers. Because of the protracted maturity time, picking from the tree or shaking the trees to hasten the drop is not considered a viable proposition. However, in case of commercial plantations, hand-picking from the tree is necessary. The extra labour costs make viable commercial use of the apples unlikely. Yields vary according to the age and vigour of the tree, effectiveness of pollination, nut weight and type, and other agro-technological measures used or applied. It may come to 20 or 40 kg per tree, but for economic efficiency starts with higher production.

Careful weeding — cleaning the area within 1 m of the trunk and slashing the remainder — is essential until the trees shade out most of the weeds. Fertilizers promote growth of the seedlings and advance the onset of flowering in young trees. With a production of some 420 kg of raw nuts per ha, 13 kg of nitrogen, 4 kg of P₂O₅ and 3 kg of K₂O are removed. These low figures suggest that fertilizing is unlikely to be required where only the nuts are harvested. When higher yields are realized, nutrients may become limiting. Little pruning is practised in cashew. From the sixth year onwards, the lower limbs may be removed to allow access for tractor-drawn implements, etc. The removal of such limbs, lifting the canopy skirt to a height of 2 m, entails yield losses of 10%. The economic life of cashew orchards is 25 years. Replanting is costly and leads to loss of income for at least five years. An alternative is to raise cashew in hedged rows. This increases the canopy surface area per ha. The resulting high productivity can be maintained by coppicing alternate rows at 50-75 cm when adjacent hedges come within 1 m distance of each other. The stumped trees will resume production in the second year. Tree rows may also be grubbed out and replaced with superior selections. The replanted rows come into production after 5 years. However, during that time the remaining hedges can expand fully and reach top yields. When the gap between hedges again becomes less than 1 m the rows of unchecked trees should be cut back, giving ample room for expansion of the rejuvenated/replanted rows. This system allows continuous cropping at higher than normal productivity and gradually improving yield levels. In Australia maintenance of hedgerows with tractor-mounted pruning equipment is being tested.

Under hot and humid conditions anthracnose (*Colletotrichum gloeosporioides*) attacks young shoots and flowers, which dry up and are shed. Infections of the fruits cause necrosis and shedding. This disease is often associated with insects and/or other fungi. Control is by removing and burning of infected parts; the use of fungicides is generally uneconomic. Selection of resistant material is probably a better measure. Powdery mildew is prevalent in cashew-growing areas. Affected plant parts become covered with white fungal growth. Leaves may shrivel, dry up and be shed. Similarly, loss of flowers may occur. The fungus needs a humid environment and densely planted trees may suffer more seriously than widely spaced trees. Sulphur controls the disease, but even this cheap fungicide is too costly. The damage caused by *Helopeltis* bugs is of particular importance in the African and Indian cashew production areas. These insects suck the leaves, but do most damage on inflorescences and young fruits, leading to drying up of the inflorescences and shedding of fruits. Control by treatment with contact insecticides is possible, but prohibitively expensive. Many other fungi (damping-off, wilts) have been recorded. Similarly, other pests may be locally destructive, e.g. wood borers, stem girdlers or sucking pests such as thrips. Nevertheless, such diseases and pests are seldom of economic importance.

Production and harvest

The cashew-nut tree is a fast grower and an evergreen tropical tree. The cashew tree has a well-developed root system and can tolerate drought conditions. Rain during the flowering season causes flower abortion due to anthracnose and mildew. It can grow to a height of 12 m. Cashew tree can bear a fruit about 50 to 60 years when properly cared of. In case of the most common in Western province - Brazilian dwarf - early maturing - variety of cashew tree, the first harvest comes after 2-3 years from planting of seedling.

The cashew seed has within the outside shell the edible kernel or nut. The nut (seed) is attached to the lower portion of the cashew apple, which is conically shaped. Blossoming and harvest in Zambia takes place only once a year between October and January. The fruit ripens fully within 2 months. When fruit is matured enough, it falls on the ground and it is being collected by workers every day. During harvesting, while nuts are on the ground, rain and overcast weather causes the nuts to rot or start germinating. The cashew farms in Western province are in upland parts. Most of farmers in the Mongu district are small scale having cashew trees spread round their house yards.

The smallholder's farmer uses primitive ways of regularly pruned and cut to increase the productivity. Pest control is done when the plants show symptoms and manure is regularly applied on the trees. The technical know-how of farmers about advanced operations regarding management aspect is limited.

Cashew use and products

Apart from food, cashew trees are used also in traditional medicine. The edible kernel is the highly-prized cashew nut of commerce, which is usually sold as roasted cashews. Small or broken nuts may be used in confectionery or made into cashew butter, which is similar to peanut butter. A high-quality, pale-yellow, sweet oil may be extracted from the kernels. Some plant parts are used in combination for the treatment of certain diseases. Among the most treated diseases, it used against there are children allergy (79.2%), diarrhea (45%),

haemorrhoids (40%), cough (39.2%), pains related to teeth diseases (38, 3%), malaria (38.3%), tooth decay and stomach pain (35.8% each), hypertension (29.2%) and diabetes (28.3%). Less than 10% of farmers use this plant to treat other affections (Behrens 1996; Chabi Sika et al. 2013).

2. Aims of the survey

2.1. The main aim of the study

The main aim of this study is to document and analyse the existing market chain of Zambian agrarian products in Western province using and producing of cashew nut in Mongu district as a case study.

2.2. Specific objectives

The main aim of this study will be reached via the following specific objectives:

- (i) Describe cashew nut as a product and its marketing possibilities
- (ii) To identify supply chain actors in the cashew nut chain
- (iii) To determine the role played by different actors along the cashew chain
- (iv) To determine the profitability of cashew production among small holders

2.3. Research questions

Following research questions were set in order to understand the overall context of the survey:

- (i) What are the existing supply chain actors of the cashew chain in Mongu district?
- (ii) What are the roles played by different actors along the market chain of cassava in Mongu district?
- (iii) Who are the actors and their category of benefits in the market chain of cassava production in Mongu district?

3. Methodology

3.1. Study site characteristics (Western province and Mongu district)

Western province is characterized by difficult geographical and climatic conditions. It has limited arable land resources that can sustain crop production. Since independence, the province has experienced a period of economic relative isolation compared to other provinces. The province is also characterized by high population densities in certain areas especially the river valleys and the plains.

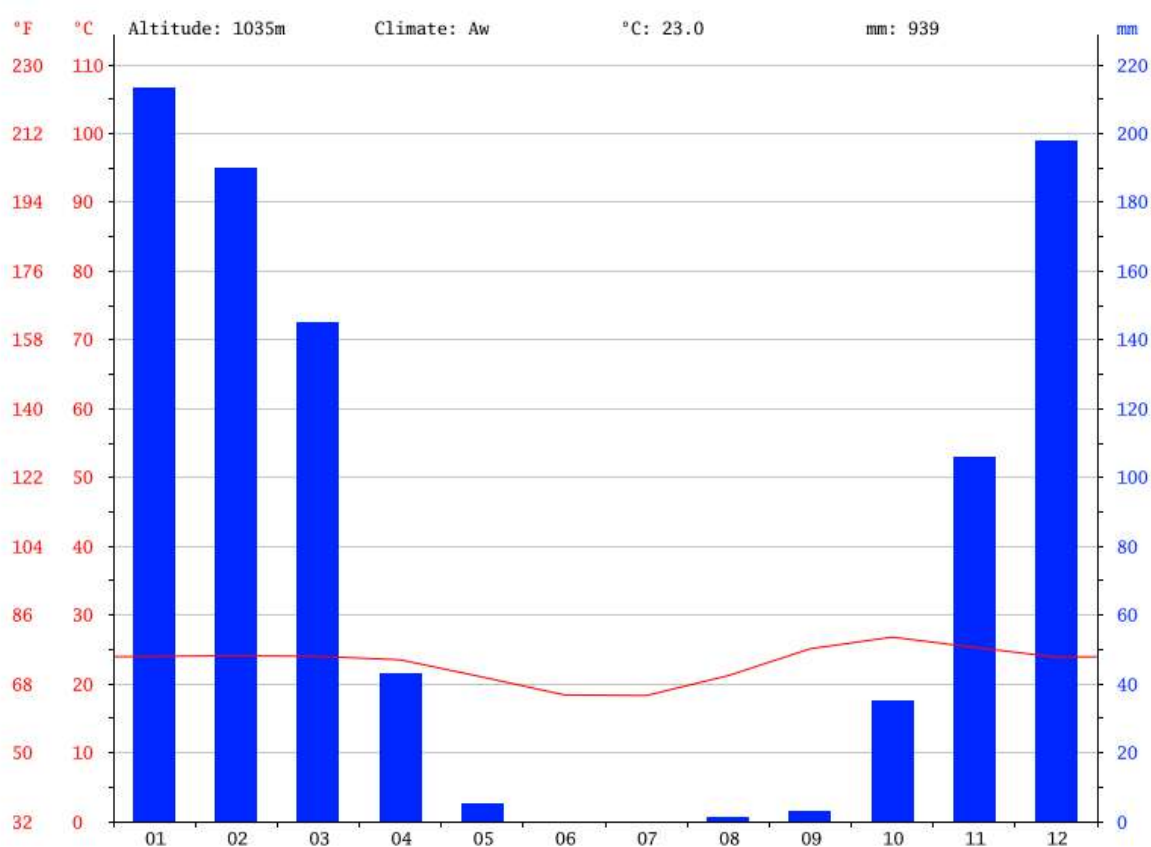


Figure 4 Climatogram of Mongu town, administrative centre of Western province and Mongu district (Climate Data, 2019)

Western province is the second province with the highest poverty levels in Zambia. The first is Luapula Province. About 80% of the population in the province is regarded as being poor and at least 70% of those in the poor category are women. The main stay of the people in western province is low subsistence-oriented agriculture with low productivity in crop and livestock production supplemented by fishing. Crop production is the main contributor to daily subsistence. In reasonably good rainfall years, most areas are, at aggregate level, self-sufficient in staple food. However, food security varies across agro-economic zones and within these areas there is a large variation among households.



Figure 5 Cashew tree in local farming systems

Mongu district has a population >142,000, which represents 13.47% of the population of the western province. Since 1990, population grew by 20,000, around 1% annually. Considering the total area of the district 6,360 km², average density is 22.42 per km².

3.2. Data collection

Mongu market

A survey was conducted for the selected cashew value chain. A semi-structured in-depth qualitative interview was employed. Interviews were conducted with consumers and vendors with each questionnaire taking approximately 15 minutes. The consumers questionnaire comprised of questions pertaining to quantification of purchases, the prices of different cassava products, some factors which influence the purchase of cashew products, satisfaction with purchases and their willingness to pay a higher price if quality of the product is improved

Lusaka market

The officers for value chain visited the open markets around Lusaka, mostly the old and new Soweto market, and the Tuesday market with the aim of finding out how cashew is fairing on the market in terms of price, factors influencing the purchase of cashew and the challenges being faced by the sellers/vendors. The officers also visited potential buyers and suppliers of agricultural inputs/machines around Lusaka. A semi-structured in-depth qualitative interview was employed.

3.3. Data processing and analysis

The product value chain analysis is done by identifying the opportunities and constraints of the various cashew products (commodities) in Mongu and partly Lusaka markets and presented in the SWOT analysis. The major preference attributes in cassava and products considered are the colour, the texture, taste and meal fineness. Basic economic indicators are also included in the survey to provide brief overview of current situation of particular market chain studied. Methodology for the study is adopted from other studies focused on tropical regions and dealing with similar issues (Umagowri and Chandrasekaran 2012; Narendra et al. 2013; Chagomoka et al. 2014; Hanadi et al. 2018).

4. Findings

4.1. Supply chain actors in cashew production

Figure below illustrates the market chain of cashew in Zambia base on the data collection.

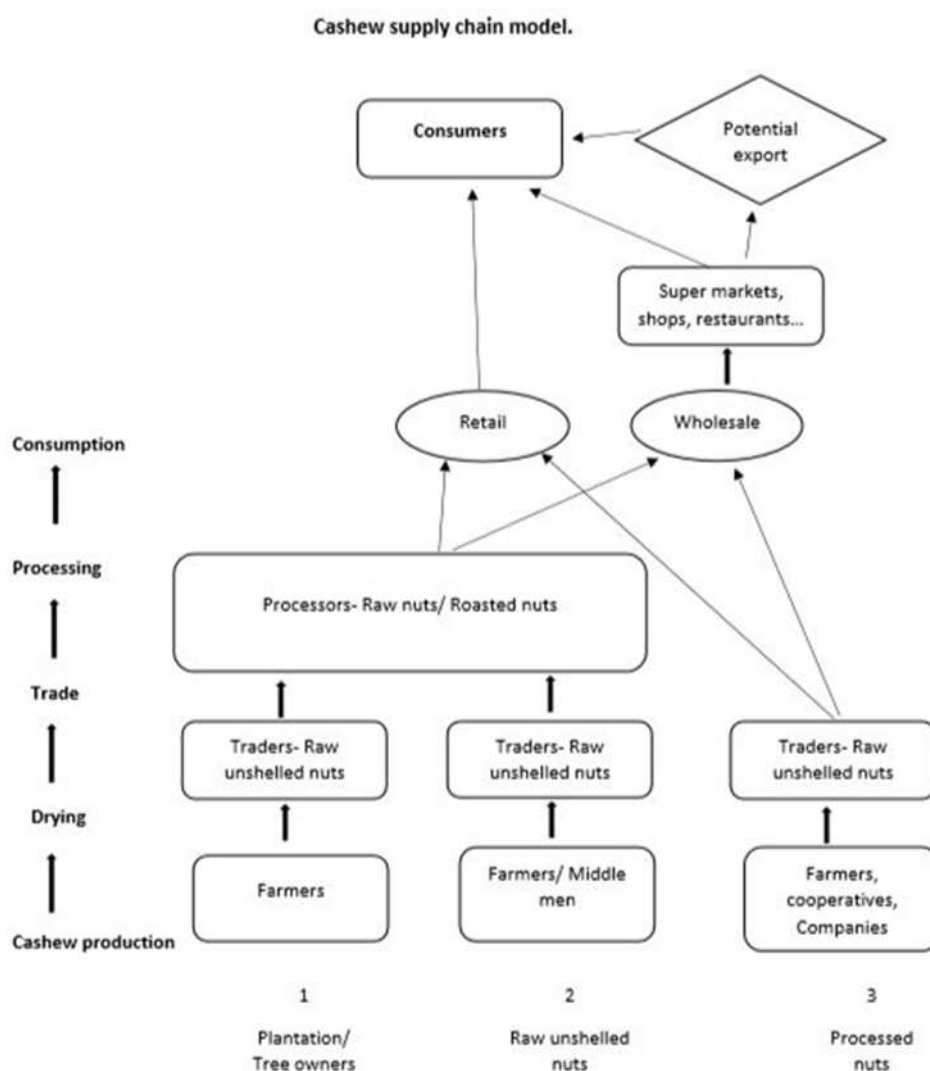


Figure 6 Cashew tree in local farming systems

Cashew market chain actors

Cashew supply chain actor is made up of plantation/tree owners, middlemen/ briefcase buyers, processors (Barotse cashew company, Tihisezo cashew processors), traders (retailers, wholesalers), chain stores (supermarkets- Shoprite, Pick and Pay, local mini marts shops), cooperatives (Nandusu, Zuho) and individual farmers.

Government and NGOs

The government is the main player in the cashew production, processing and marketing with the responsibility of creating an enabling environment to conduct business for actors at each stage of the value chain. The development of infrastructure such as roads and provision of utilities helps create a conducive business atmosphere. Through the government and NGOs research institutions also play a key role in disseminating information on technological innovations and monitoring the standard.

Financial institutions

The financial intuitions have a responsibility of providing credit for investments to farmers, traders and processors. However, for many actors in the value chain, the access to credits is difficult and usually unaffordable particularly for small scale farmers.

Input suppliers

Farmers cooperatives and individual farmers supply the seedlings for planting and are a major actor in cashew nut production. The actors in input suppliers consists of agro chemicals suppliers, fertilizers, pesticides and machinery. These help to improve the quality and farm productivity.

4.2. Cashew as a product and its marketing possibilities

Cashew market opportunities

- Local markets- general public
- Chain stores- Shoprite, pick and pay, Choppies
- Restaurants, hotels, guest houses, lodges, Pubs, Café

Potential markets

Export to Europe, Australia, USA and focusing on neighbouring countries such as Angola, Congo, Malawi, Tanzania, Zimbabwe.

Profitability of cashew

- Cashew is a lifetime investment
- Profits are for many years- 20-50 years.
- Good and constant yields.
- Affordable inputs, only demanding during the early stages

4.3. Challenges in cashew value chain

Cashew prices in Zambia

The officers had an opportunity of visiting the famous Tuesday market for farmers and cooperatives around Lusaka area. Most of the cashew nut found at the Tuesday market are sourced from Tanzania. The cashew nuts are not roasted but sold raw and the selling price is in the ranges of K150/500g – K200/500g. In Chilenje market, it was a similar situation as of that of Tuesday market in Kabwata. In chain stores like pick 'n' pay, the cashew nut is mainly from South Africa but sourced from Asia (Vietnam and India) and only a few brands if not just one is from Western province. The prices range from k 26.99 to k 207.99 for both roasted and raw nuts.



Figure 7 Cashew at markets in Lusaka (left), imported from Tanzania, and in Mongu (right)

4.4. Factors influencing the purchase of cashew nut

One of the traders narrated that, customers like nuts, which are not broken, in some instances some few customers go for broken nuts as it is relatively cheap and suits their budgets. The size of the nut basically depends on the target customers, the high-income earners prefer a full nut and the low-income earners prefer broken nuts as they are relatively cheaper. The other factor is that customers like nuts, which have less oil content.

Challenges

The traders pointed out the unavailability of cashew nut in the country as they have to travel to Tanzania for the commodity hence transport becomes expensive. When asked why spend so much on transport to reach Tanzania instead of within Zambia such as Western province, and if they are aware of the cashew infrastructure project in Western Zambia, the response

was that, the traders are fully aware but pointed out that the commodity is too expensive but of poor quality as compared to the Tanzanian respectively.

Table 2. Cashew – planting, processing and marketing (SWOT analysis)

Strengths	Weakness
Multipurpose tree with wide range of products with good production potential	Lack of quality inputs such as seedlings, fertilizer or training, food safety issues, and hard work
Long tradition of cultivation (naturalized species) in Africa and Indo-African region	Trees are difficult to maintain (spraying application 3 to 4 times in a year)
Western province (Mongu region) produce very tasty cashew nuts	Local varieties produce small that is/could be visually unattractive nuts
Few already established plantations that only require rejuvenation	Market saturation. At some point buyers tend to stop the buying leaving the farmers stranded and causing a lot of price fixing biasness.
Opportunities	Threats
Continuous improvement and focus on various products, and promotion local Mongu brand/variety of nuts	Unknown varieties of cashew trees which brings about scepticism in the supply chain
Tendency toward more sustainable management of plantations; many projects on climate change mitigation use cashew value chains as a component	Few players in the cashew processing, causing the price fixing phenomenon by the processors and at times they halt the buying, leaving the traders and producers stranded
Appropriate tree pruning will lead to higher yields and consequently increase incomes of resource-poor farmers and develop rural economy	Cashew from Tanzania is slightly cheaper, causing a stiff and competitive market and many traders prefer it from the local ones
	Clearing of Miombo forest for the land for cashew plantations Unsustainable land use management

5. Evaluation of Easy Cassava Meal business plan

5.1. Summary of the business plan

Business plan titled „Supper Organic Manure – My Treasure “ is a very original idea, not just according to the title itself. Proposal reflects current development strategies in Western province in the field of agriculture. Cashew is one of priority species, which should help local farmers to start their business, support local/rural economics, increase export opportunities. Project nevertheless does not aim to produce cashew, but rather contribute on input availability, and to one of the most important one – fertilizer. Expected production is almost 20 thousand tons, enough for 500+ thousands of seedlings. Project proposal is well structured and planning is at very good.

5.2. Production and quality estimates

Product	Price (K)				Production expected (10kg bags)	Benefits expected (K)
	Consumers kg	Competitors kg	Proposed kg	Proposed 10kg		
Super organic manure	6.00	7.00	5.00	50.00	20,400	1,020,000.00

Super organic manure fertilizer will be produced and packaged in 10 kg quantities. The estimated production is 17,000kg / month which is equivalent to 204,000kg annually equal to 20,400 of 10kg bags). The production estimates for commercial purposes with the suggested technology is 500kg per hour as stated in manuals from the Chinese suppliers. Therefore, the production targets proposed can be practically attainable with potential for more production than estimated. Provided that the production is at a small-scale production and still at an infant stage the quantities of the direct inputs' materials are readily available. For instance, the cow dung can be collected from many farms within the districts of western province. The vegetable wastes are similarly available and cheaper with higher yields during the rainy season as more farmers who lack irrigation utilize the rainwater. However, over dependency of external suppliers is one drawback which may reduce the targeted production of the required inputs. This implies that the producers must ensure a stable supply for example designing appropriate cooperation agreements with the input suppliers.

Regarding the prices, the estimate of K5/kg is affordable and competitive and on a lower side in comparisons to other markets. On the Lusaka markets the average prices of organic manures is approximately K10/kg.

5.3. Cost of technology/Equipment

Business Premises	Unit count	Quantity	Unit amount (K)	Total amount (K)	Depreciation	
					Life span (years)	AMount(K)
Construction of warehouse	number	1.00	50,000.00	50,000.00	25	2,000.00
Construction of offices	number	1.00	15,000.00	15,000.00	25	600.00
Furniture	number	1.00	1,500.00	1,500.00	2	750.00
Major Equipment						
Compost turner	number	1.00	111,800.00	111,800.00	10	11,800.00
Packing machine	number	1.00	67,900.00	67,900.00	10	6,790.00
Light truck	number	1.00	120,000.00	120,000.00	10	12,000.00
Sinking a borehole	number	1.00	35,000.00	35,000.00	5	7,000.00
Wire fencing	m	3,136.00	4.46	13,999.10	10	1,400.00
Shovels	number	5.00	90.00	450.00	2	225.00
Total				315,649.10		41,945.00

Business premises

The suggested cost for construction of the warehouse is K50,000. The cost is reasonable for a small storage facility measuring approximately a 20 m by 20 m storage facility which can be able to cover the estimated production volumes. Construction of a small office premises for operations is manageable with K15,000. The favourable life span for building is 25 to 30 years period. Labor and material for construction is locally available.

Major Equipment

Compost Turner and Packing Machine

The compost turner and the packing machines can be sourced outside Zambia. Preferably consultations with major suppliers of different machinery in the country is imperative. Both machines require electric power for their operations. Lower electric efficiency is expected due to the current state of power shortages experienced in the country. Therefore, the operation costs are generally expected to be higher to sustain production through using alternative energy sources. Further, the cost of maintenance, repairs and replacements of the machine parts from wear and tear are similarly expected to be expensive provided that the product is imported, and the parts may not be readily available on the Zambian local markets which

eventually may result in decline of product production. This situation entails allocating extra budget to cover for replacement and spare parts. Concerning the work force and operations, specialized and trained operators can be employed. The Equipment price trend can be affected by different costs such as the advancement of technology. However, in this case the choice of the technology is simple and realistic for small scale production. The suggested compost turner is appropriate and widely used as it can biodegrade many different types of waste such as cow dung and straw.

Light truck

The purchase of a light truck can be done within Zambia as many foreign vehicle suppliers have support offices in the country mainly from Japan. With K180,000 a good condition, four ton loading capacity truck can be acquired.

Sinking of a borehole

The cost of sinking a bore is pegged at K35,000 which is slightly on a higher side. The actual average cost is at K20,000. However, considering annual costs and price changes of 10 %, the cost can be safely be accounted for at K25,000. The suppliers and service companies providing boreholes are widely spread in the country and therefore, the maintenance and repairs can be done on time and affordable costs.

Wire fencing

The wire fencing can be accessed within the country in hardware shops and the of cost of K4.5 is realistic and overall the maintenance is affordable.

5.4. Investment cost Evaluation

a) Lifespan of the business project.

To evaluate the viability and profitability of the business plan, the concept of Net present Value (NPV), Internal Rate of Return (IRR), the Payback Period (PB) and the sensitivity analysis of the prices of the products are employed. Two scenarios of 10- and 5-years life span are used to see how the business fares. The net present value (NPV) is positive an indication that the business is viable. NPV is close to zero at a discount rate. of 172%

Year	B-C	Disc.	Disc.	PV	PV	Benefits	Costs	Benefits	Benefits	Costs	Costs
		58%	59%	58%	59%			58%	59%	58%	59%
1	740,720.00	1.58	1.59	468,810.13	465,861.64	1,020,000.00	706,379.10	645,569.62	641,509.43	447,075.38	444,263.59
2	740,720.00	2.50	2.53	296,715.27	292,994.74	1,020,000.00	279,280.00	408,588.37	403,465.05	111,873.10	110,470.31
3	740,720.00	3.94	4.02	187,794.47	184,273.42	1,020,000.00	279,280.00	258,600.23	253,751.61	70,805.76	69,478.18
4	740,720.00	6.23	6.39	118,857.26	115,895.23	1,020,000.00	279,280.00	163,671.03	159,592.20	44,813.77	43,696.97
5	740,720.00	9.85	10.16	75,226.12	72,890.08	1,020,000.00	279,280.00	103,589.26	100,372.46	28,363.15	27,482.37
6	740,720.00	15.56	16.16	47,611.47	45,842.82	1,020,000.00	279,280.00	65,562.82	63,127.33	17,951.36	17,284.51
7	740,720.00	24.58	25.69	30,133.84	28,831.96	1,020,000.00	279,280.00	41,495.46	39,702.72	11,361.62	10,870.76
8	740,720.00	38.84	40.85	19,072.05	18,133.31	1,020,000.00	279,280.00	26,262.95	24,970.27	7,190.90	6,836.96
9	740,720.00	61.36	64.95	12,070.92	11,404.60	1,020,000.00	279,280.00	16,622.12	15,704.57	4,551.20	4,299.97
10	740,720.00	96.96	103.27	7,639.82	7,172.70	1,020,000.00	279,280.00	10,520.33	9,877.09	2,880.51	2,704.39
Total PVs				1,263,931.34	1,243,300.50			1,740,482.19	1,712,072.73	746,866.74	737,388.02
NPV				836,832.24	816,201.40						
IRR				173%							

5-year business life span plan

Year	B-C	Disc.	Disc.	PV	PV	Benefits	Costs	Benefits	Benefits	Costs	Costs
		46%	47%	46%	47%			46%	47%	46%	47%
1	740,720.00	1.46	1.47	507,342.47	503,891.16	1,020,000.00	706,379.10	698,630.14	693,877.55	483,821.30	480,530.00
2	740,720.00	2.13	2.16	347,494.84	342,783.10	1,020,000.00	279,280.00	478,513.79	472,025.54	131,018.95	129,242.45
3	740,720.00	3.11	3.18	238,010.16	233,185.78	1,020,000.00	279,280.00	327,749.17	321,105.81	89,739.01	87,920.03
4	740,720.00	4.54	4.67	163,020.66	158,629.78	1,020,000.00	279,280.00	224,485.73	218,439.33	61,465.07	59,809.54
5	740,720.00	6.63	6.86	111,657.99	107,911.42	1,020,000.00	279,280.00	153,757.35	148,598.18	42,099.37	40,686.77
Total in flows of PVs							1,367,526.12	1,346,401.24			1,883,136.19
NPV				940,427.01	919,302.14						
IRR				172%							

b) Payback period

1) 10- and 5-years business life span

The business plan shows that the payback period to cover the initial investment cost is 2 years. The initial investment is K427,099, and at about 1 year 5 months is specifically the payback in the 5 years business life span. to reach the K449,102.03. This indicates a quick recovery from the investment's perspective. Concerning the 10-year life span, the payback is at 1years 6 month with an amount of K446,099 (See tables below).

The 10-year payback period			
Year	Cumulative benefits	Cumulative costs	Difference
1	645,570	447,075	198,494
2	1,054,158	558,948	495,210
3	1,312,758	629,754	683,004
4	1,476,429	674,568	801,861
5	1,580,019	702,931	877,087
6	1,645,581	720,883	924,699
7	1,687,077	732,244	954,833
8	1,713,340	739,435	973,905
9	1,729,962	743,986	985,976
10	1,740,482	746,867	993,615
The 5-year payback period			
Year	Cumulative benefits	Cumulative costs	Difference
1	698,630	483,821	214,809
2	1,177,144	614,840	562,304
3	1,504,893	704,579	800,314
4	1,729,379	766,044	963,334
5	1,883,136	808,144	1,074,992

b) Sensitivity analysis of the prices

Definition of parameters

Break-even point: The amount or level of sales or revenue that a business must generate in order to equal its expenses. In other words, it's the number of units needed to cover the costs. At breakeven point, total volume equal total expenses.

Break-even Point (BEP) = Total fixed cost / Price per unit - Variable costs per unit

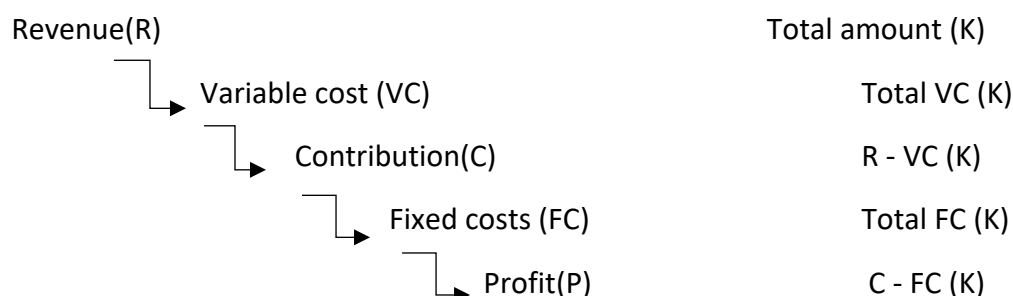
Break-even analysis: It gives an insight into whether revenue from a product or service can cover the relevant costs of the production of that product or service.

Contribution analysis: Describes what a business needs to achieve from selling its products in order to first cover its fixed costs and thereafter make a profit.

Total contribution = Total revenue - Total variable cost

Contribution per unit = Selling price per unit - Variable cost per unit

- Net profit model



A price variation matrix analysis was employed to determine the profitability of the business considering the proposed price as a base (K50) with control price below the proposed (K30) and a higher price from the competitors (K70). Overall, the business is profitable despite a price reduction of 40% as shown in table below.

Product: Super organic manure 10kg bags				
Price per unit	40.00	50.00	60.00	70.00
BEP-Minimum production of 10kg bags	7,486.98	5,910.61	4,882.59	4,159.19
Expected production	20,400.00	20,400.00	20,400.00	20,400.00
Profit	280,175.09	688,175.09	892,175.09	1,096,175.09

6. Final remarks and recommendations

Based on the market and field survey as well as considering proposed Business Plan, following recommendations and suggestions should be taken into consideration by involved stakeholders in cashew value chain development in Western province of Zambia

6.1. Specific remarks and recommendations

- The business is more innovative and will contribute to ecofriendly and sustainable production for cashew growers. However, the production and sales volumes and the success of this business is largely dependent on the commitment from the Zambian government to fulfil the promotion of cashew production among the smallholder farmers. Secondly, within Mongu this business must be competitive to stand the already well established and heavily capitalized companies like ETG manufacturing organic manure. Likewise, to overcome the competition, the quality, quantities produced, and the prices must be lower to attract and penetrate the markets.
- The use of compost turners is not development or nonexistence among the smallholder farmers. This technologic is developed among the commercial farmers who are mostly producing organically. This indicates that type of machinery must be sourced outside the country. Machinery suppliers such as SANOS, Indian engineering, expressed the low demand for machinery such as the compost turners on the Zambian markets, however, the company can source it from India at any time upon request. The fuel for operation is available in Mongu to keep the machine running and operating. Therefore, accessory equipment and maintenance costs must be budgeted for highly. On the other hand, the packaging equipment machines are available and accessible from many different local suppliers.
- Overall, the suggested prices of the organic manure are favourable and the gained benefits are feasible to sustaining the business plan.

6.2. Specific remarks and recommendations

- Cashew of local production should be supported due to its specific properties (taste, history).
- Very important is to look on the diversity of the production, introduce cashew where possible into more diverse farming systems.
- Promote local varieties so they can be more competitive to imported ones, particularly from Eastern coast countries (Tanzania, Kenya, Mozambique).
- Support local input providers and processors of cashew nuts.
- Farmers should have access to improved processing equipment and facilities, while considering sustainability of the production

References

- 1) Baidu-Forson JJ, Phiri N, Ngu'ni D, Mulele S, Simainga S, Situmo J, Ndiyoi M, Wahl C, Gambone F, Mulanda A, Syatwinda G. 2014. Assessment of agrobiodiversity resources in Borotse flood plain, Zambia. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2014-12.
- 2) Behrens R. 1996. Cashew as an agroforestry crop. Prospects and potentials. Weikersheim, Germany: Margraf Verlag, 83 pp.
- 3) Chabi Sika K, Adoukonou-Sagbadja H, Ahoton LE, Adebo I, Adigoun FA, Saidou A, Kotchoni SO, Ahanchede A, Baba-Moussa L. 2013. Indigenous knowledge and traditional management of cashew (*Anacardium occidentale* L.) genetic resources in Benin. Journal of Experimental Biology and Agricultural Sciences 1(5): 375-382.
- 4) Chagomoka T, Afari-Sefab V, Pitoro R. 2014. Value Chain Analysis of Traditional Vegetables from Malawi and Mozambique. International Food and Agribusiness Management Review 17(4): 59-86.
- 5) Hanadi EA, Mohammed IM, Salih EE. 2018. Value Chain Analysis for Tomato Production and Marketing in Khartoum State, Sudan. Current Investigations in Agriculture and Current Research 5(4): 651-656.
- 6) Kaplinsky R, Morris M. 2012. A handbook for value chain research. In: AgriFood Chain quantitative analyses. International Development Research Centre (IDRC), Canada, 113 pp.
- 7) Narendra BH, Roshetko JM, Tata HL, Mulyoutami E. 2013. Prioritizing Underutilized Tree Species for Domestication in Smallholder Systems of West Java. Small-scale Forestry, 12(4): 519-538.
- 8) Orwa C, Mutua A, Kindt R, Jamnadass R, Anthony S. 2009. Agroforestry Database: a tree reference and selection guide version 4.0. World Agroforestry Centre, Kenya
- 9) Umagowri M, Chandrasekaran M. 2012. An Economic Analysis of Value Chain of Banana in Western Tamil Nadu. The IUP Journal of Supply Chain Management 8(3): 66-80.
- 10) Valicek P (ed.), Hlava B, Holubova K, Husak S, Kokoska L, Michl J, Pavel L, Polesny Z, Wroblewska E, Zeleny V. 2002. Useful plants of the tropics and subtropics. Academia, Praha, 486 pp. (book in Czech).

Annexes

1. Address book for suppliers, Processors, and financial institutions

Super Organic Manure My Treasure Muyongo Muyongo					
Institution	Relevance	Contact /Focal point person			Location
		Name	Position	Phone/Email	
Financial Institutions (Loans &Grants)					
1) Citizens Economic Empowerment Commission (CEEC)	Grants and loans in different value chains	Michael Mulenga	Business Development Support Officer	+260 978022570 +260 966359081 MulengaM@ceec.org.zm michaelmulenga23@gmail.com	Mongu
2) National savings And Credit Bank (NATSAVE)	Loans/Asset financing in conjunction with CAMCO and SARO	Tembeya T Sinyangwe	Branch Manager	+260 977837774 +260 967837774 Tembeya.Sinyangwe@natsave.co.zm	Mongu
3) Indo Zambia bank	Security based loans/ asset financing in conjunction with Tata Zambia. MOU in place.	Shanobe Clifford	Branch Manager	+260 977844755 +260 955844755 abmmongu@izb.co.zm	Mongu
4) AGORA	Loans in different Value chains for Individuals and Small groups. Collateral based loans	Tellia Sakala	Field officer	agora@gmail.co.uk	Mongu
5) Pilot Programme for Climate Resilience (PPCR)- Provincial administration.	Grants in different value chains- Livestock, Small livestock and crops	Mukuni Kapumpa	Logistics Officer	+260 874599749	Mongu
6) Enhanced Small Livestock Investment Project (E-SLIP)	Livestock Pass on Program	Garry Siatwiinda	Provincial Livestock Officer-WP	+260 967495174	Mongu
7) Christian Empowerment Micro Finance	Loans in different value chains	Akaman disa Sitali	Accountant	+260 974445535	Mongu
7) African Development Bank Zambia	Spur sustainable economic	Ms Mary Monyau	Country Manager	+260 211 257868 Fax: +260 211 257872	Lusaka

Super Organic Manure My Treasure Muyongo Muyongo					
Institution	Relevance	Contact /Focal point person			Location
		Name	Position	Phone/Email	
	development and social progress				
8) Development Bank of Zambia	Support farmer development projects			+260 211 228 577 +260 211-425501 dbzmail@dbz.co.zm	Lusaka
9) Musika	Reducing poverty and creating wealth in rural Zambia			+260 211 251 371, +260 211 250 355, +260 211 253 989 +260 211 255 502	Lusaka
10) Zambia Development Agency	Promote and facilitate investment, trade and enterprise development in Zambia.			+260 211 220177 +260 211 223859	Lusaka
11) International Fund for Agricultural Development (IFAD)	Transform rural economies and food systems by making them more inclusive, productive, resilient and sustainable.	Ambrosio Nsingui Barros	Country Programme Manager	a.nsinguibarros@ifad.org +260 211 25.1711 +260.21.125.1711	Lusaka
Agriculture Input Suppliers					
1) Export Trading Group (ETG)	Agro Input / output markets; Maintenance of cashew plantations.	M. Ndiyoi	Manager	+260 977430928 Mukebai.ndiyoi@gmail.com	Mongu
2) D.I grow Mongu	Organic Agro inputs suppliers	Tobby Lufunda Kakoma	Sales manager	+260 0969508966 tobbykakoma@gmail.com	Mongu
3) Sonas, Indian engineering machinaries	Suppliers of agriculture machinery	Patel	Marketing manager	+260 977454499	Lusaka
4) Pasonny Zambia limited	Suppliers of agriculture machinery			+260 965965965	Lusaka
5) D.I. GROW	Suppliers of organic fertilizers			+260 211232377	Lusaka

Super Organic Manure My Treasure Muyongo Muyongo					
Institution	Relevance	Contact /Focal point person			Location
		Name	Position	Phone/Email	
6) Good hands fertilizers limited	Suppliers of bio-organic fertilizers			+260 978014669 +260969531586	Lusaka
7) Lamasat international LTD	Suppliers of water tanks and pipes			+260 973926814	Lusaka
8) Kasisi Agricultural Training Centre	Suppliers of Agro – forestry seeds and offering training in organic farming.			+260 965840303	Chongwe
9) CAMCO	Agriculture machinery and equipment			+260 972249988	Lusaka
10) SARO	Agriculture machinery and Equipment			+260 211 241477	Lusaka
Agricultural Commodity Processors and buyers					
1) Tiisezo enterprise	Buyers and processors of raw cashew nuts and cashew plantations	Brenda Akatama Mwana mwalye	Director	+260 975486047 +260 964858751	Mongu
2) Zambia cashew limited	Buyers and processors of raw cashew nuts	Silimela Charles Mate	Factory manager	+260 962003844	Mongu
3) Shoprite Chain stores	Retail supermarket. Buys and sells from local and international commodities (Mangoes and cashew and cassava).			+260 217 221 623	Mongu
4) Export Trading Group (ETG) Agri Inputs	Buying of commodities such as cashew and cassava	Zulu Siakoni	Sales and marketing Manager	+260977477536 Marketing.zam@zamfertco m	Lusaka

Super Organic Manure My Treasure Muyongo Muyongo					
Institution	Relevance	Contact /Focal point person			Location
		Name	Position	Phone/Email	
5) Pick” N” Pay chain stores	Retail supermarket. Buys and sells from local and international commodities (Mangoes and cashew and cassava).			+260.21 126 0508	Lusaka

2. Product certification manual



PRODUCT CERTIFICATION MANUAL FOR: ORGANIC MANURE

(Animal and Plant Wastes)



Table of Contents

<u>INTRODUCTION</u>	7
<u>DEFINITIONS</u>	8
<u>PURPOSE OF THIS MANUAL</u>	11
<u>PRE-REQUISITES TO PRODUCT CERTIFICATION</u>	11
<u>REQUIREMENTS FOR PRODUCT CERTIFICATION</u>	12
<u>CONDITIONS FOR PROCESSING</u>	13
<u>General quality requirements</u>	14
<u>METHODS OF COMPOSTING</u>	14
<u>STEPS TO CERTIFICATION</u>	15
<u>ANNEX 1: LIST OF RELEVANT LEGISLATION AND STANDARDS</u>	1
<u>ANNEX 2: SAMPLE SCHEDULE OF ZABS CERTIFICATION FEES</u>	3

INTRODUCTION

Organic manures are the organic materials derived from animal, human and plant residues that contain plant nutrients in complex organic forms. Organic manure provides all the nutrients that are required by plants but in limited quantities. Organic agriculture is based on minimizing the use of external inputs, avoiding the use of synthetic inputs such as fertilizers, pesticide hormones, feed additives, etc. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people. Advantages of organic manure

- Improve soil structure, aeration, infiltration rate and water holding capacity of the soil.
- Provide all essential nutrient elements, which are available in the soil for longer periods.
- Regulate the soil temperature in summer as well as in winter.
- Promote microbial activity in the soil.
- Reduce soil erosion in sandy soils.
- Can be prepared locally and eco-friendly

Certification is a voluntary process that involves an independent body giving written assurance (a certificate) that a given product, service or system complies with a set of requirements (standards). This is done through an assessment that is usually accompanied by a test report. Certification is a market-based mechanism that promotes compliance. For some industries, certification is a legal or contractual requirement, while in most industries it is purely voluntary and at the discretion of the supplier.

In Zambia, the Zambia Bureau of Standards (ZABS) has a legal mandate to provide various certification schemes meant to support standardization activities for commerce, trade, and industry. ZABS mainly offers two types of certification schemes – Product Certification and Management Systems Certification. Recently, a third scheme called Certified Local Supplier Scheme was launched. It is specifically designed for Small and Medium Enterprises MSMEs. The main highlights of the Certified Local Supplier Scheme include affordability, flexibility and possibility group certification.

There is a growing trend in the market interest or demand for certified products. The demand for certified products is much higher within elite markets such as chain stores which usually offer more space to accommodate a variety of goods as well as a wider customer base, including high-income earners. Certification helps address the quality and food safety concerns among consumers.

Benefits of certification include, but not limited to;

- ✓ Manufacturers, producers, and processors will have better control of their processes resulting in increased efficiency and reduced production waste.
- ✓ Penetration of new markets and maintaining access to markets.
- ✓ Provision of confirmation that relevant legal requirements are fulfilled.
- ✓ Relieves the customer or consumer of the need or burden to verify for themselves that the products were produced in the manner prescribed by the producer

DEFINITIONS

Biosolids

Organic material from sewage and related materials recycled and treated for use as a fertilizer.

Blood meal

Dried, powdered blood collected from livestock slaughterhouses used as fertilizer.

Bone meal

Fertilizer made from the degreased bone which may be degelatinized and has been ground or crushed.

Codex Alimentarius Commission

The Codex Alimentarius Commission (CAC) is a joint intergovernmental body of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). It is responsible for setting standards, codes of practice, guidelines, and other recommendations relating to foods, food production, and food safety.

Compost

Well decomposed organic wastes like plant residues, animal slurry from livestock sheds.

Farmyard manure

A decomposed mixture of livestock dung and urine with straws and litter used as bedding material and residues from the fodder fed to livestock.

Green manuring

It can be defined as a practice of ploughing or turning into the soil undecomposed green plant tissues for improving physical structure as well as soil fertility.

Manure

A mixture of litter and/or dung in the process of biological change.

Night soil

Human urine and faeces collected separately from each other or mixed with flush water and amendments such as soil, ash other organic matter.

Organic matter

Biomass of animals and plants. For this reason, only products that are solely derived from organic matter may be identified or described as "organic".

Standard

A technical document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes, and services are fit for their purpose. A standard can be voluntary or compulsory.

Traceability

Ability to trace the history, application or location of an object. Traceability of a product or service is the set of documented evidence related to the origin of materials and parts; the processing history; or the distribution and location of the product or service after delivery.

Vermicompost

Product or process of composting using various worms such as earthworms to create a heterogeneous mixture of decomposing vegetable or food waste, bedding materials

.

PURPOSE OF THIS MANUAL

The manual is intended to help especially Micro Small and Medium Enterprises (MSMEs) understand and implement requirements for product certification. It applies to organic manure.

PRE-REQUISITES TO PRODUCT CERTIFICATION

Good Agricultural Practices (GAPs)

GAPS are a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agriculture products.

Good Manufacturing Practices (GMPs)

The aspect of quality assurance that ensures that products are consistently produced and controlled to the quality standards appropriate to their intended use and as required by the product specification.

Good Hygienic Practices (GHPs)

Procedures that are put in place to provide safe food by preventing contamination of food with pathogens spreading from people, pets, and pests.

Recommended Practices for fresh/ or raw manures

According to the African Organization for Standardization (ARSO), the following are given:

All fresh manures should be composted. However, where they are used the following conditions shall apply:

Fresh manures shall not be used as pre-plant or side-dress fertilizers on vegetables that are eaten raw.

Dog, cat or pig manures and those derived from equines (donkey and horse family) shall not be used as these species share many parasites with humans.

Raw manure may NOT be applied to food crops within 120 days of harvest where edible portions have soil contact.

Raw manure may NOT be applied to food crops within 90 days of harvest where edible portions do not have soil contact (i.e., grain crops, and most tree fruits.)

The manures shall be free from heavy metals and other chemical contaminants.

Untreated human wastes shall not be used as manure.

REQUIREMENTS FOR PRODUCT CERTIFICATION

In order to obtain product certification, there are three conditions that must be fulfilled namely; Review of application, onsite assessment of the process integrity (review of documented evidence) and analysis of test report.

At the very least, records for the following processes should be maintained:

- Incoming material checks
- Inspection and tests
- Temperature and time
- Product recall and traceability
- Storage
- Cleaning and sanitation, as appropriate
- Pest control
- Medical and health
- Hygiene inspection for food handlers
- Training
- Internal audit – both regular process and facility audits
- Calibration/ verification
- Non-conforming products
- Waste disposal.

The test report is analyzed so as to establish whether the product conforms to the specifications outlined in the standard to which the product will be certified. The product must conform to the given requirements in the applicable standard.

CONDITIONS FOR PROCESSING

Manure should be prepared in places far away from the crop area.

Manure should be prepared in places far away from water sources and lands subject to floods.

All materials and/or the products produced from genetically engineered/modified organisms (GEO/GMO) are not compatible with the principles of organic production (either the growing, manufacturing or processing).

Major sources of manure are;

- Cattle shed wastes-dung, urine, and slurry from biogas plants
- Human habitation wastes-night soil, human urine, town refuse, sewage, sludge, and sullage
- Poultry Jitter, droppings of sheep and goat
- Slaughterhouse wastes-bone meal, meat meal, blood meal, horn and hoof meal, Fish wastes
- By-products of agro industries-oil cakes, bagasse and press mud, fruit and vegetable processing wastes, etc
- Crop wastes-sugarcane trash, stubbles, and other related material
- Water hyacinth, weeds, and tank silt, and
- Green manure crops and green leaf manuring material

Manures, based on the concentration of the nutrients, can also be grouped into two groups,

- (a) Bulky organic manures such as farmyard manure, cattle dung, swine dung, chicken dung, night soil, sewage and sludge, vermicompost
- (b) Concentrated organic manures such as oil cake (non-edible and edible), bone meal, fish meal.

General quality requirements

Organic fertilizer shall be homogenous in texture.

The organic fertilizer shall be free from contaminants which include but not limited to residual hormones, antibiotics, pesticides and disease organisms.

A high-temperature aerobic composting shall be employed to make the compost

The fertilizer shall be free from pathogenic organisms.

METHODS OF COMPOSTING

Methods of Compost Making Generally, there are two methods of compost making, i.e., the pit method and the heap method. It can also be categorized according to domestic or industrial composting.

Pit method

Dig a compost pit of desirable size, which depends on the number/quantity of materials to be composted but the desirable size is 1 meter deep, 3-meter-long and 1.8 meters wide. Put the composting materials and starters in layers. The layers should not be very thick. The pit should not be completely filled at one time so as to make the turning easy. Moisture is essential for the decomposition of the materials put in the pit, and for this, the water is added to every layer. When decomposition starts, the temperature increases up to 60-90°C. After one month of filling the pit, the materials should be turned using the remaining part of the pit. While turning the materials, the top should go down and vice versa. Second turning after one month of first turning and last turning after one month of second turning is needed. In every turning, starter and water should be put in each layer. Completely decomposed organic matters when pressed with fingers become friable.

Advantages of Pit Method

- Composting is easier in the pit if temperature and moisture are favourable.
- It is useful during the dry season.

- From the point of view of sanitation, it is better to prepare compost in a pit.
- If the land is available and there is no problem regarding the water table, the pit method is more economical.

Heap Method

This method is useful in the high hills where the temperature is low. In this method, the composting materials are put in a heap in the open field. The method of putting the composting material is similar to the pit method. When the heap becomes the height of a human, the top should be covered with a layer of soil. Turning is also similar to the pit method.

Advantages of Heap Method

- It is preferable during the rainy season.
- It is useful when the water table is high, and the land is scarce.
- Mixing and turning composting material is easier.
- It is a laborious method but takes less time to prepare

STEPS TO CERTIFICATION

There are four main stages involved in product certification.

1. REVIEW OF THE APPLICATION. The factory representative correctly fills out an application form. The application form will require details such as the name and address of the manufacturer. The location is important as it can affect the **administration fees**. The form will generally ask for the name of the product and estimated quantity and revenues. The **marking fees** are usually calculated at a given percentage against the gross turnover. The form will also require information on the size of the organization in order to determine the number of **auditor man-days** required. A quotation and proposed schedule are sent by the certifying body to the client for review and approval.
2. ONSITE AUDIT AND FACTORY SAMPLING OF PRODUCT TO BE CERTIFIED. The auditor visits the factory on the agreed date and confirms the details (**audit criteria and scope**) of the audit with the client. The auditor obtains a sample of the product for inspection and

laboratory testing. During the onsite visit is important for the client to ensure that the factory is in full production and there exist enough records to demonstrate that there is effective control of the production processes, especially the critical ones. The auditor will inform the client of the audit findings. **Major non-conformances** should be closed immediately, **minor non-conformances** should be addressed with **corrective action plans** and are reviewed in the subsequent onsite audits.

3. **CERTIFICATION DECISION:** This is done by an independent committee that will look at the test report and verify product compliance to the standard. They also look at the audit report and assess whether the audit findings were addressed with pesticide appropriate action. The committee ensures that the due process was followed.
4. **THE AWARD OF THE CERTIFICATION:** Upon satisfying the requirements of certification, the certificate is given to the client. The certificate gives the client the right to use the certification mark on the applicable product only. Product certification is not transferable. The certificate is **valid** for a given period but there are **surveillance visits** arranged within that period to ensure continued monitoring of product compliance.

ANNEX 1: LIST OF RELEVANT LEGISLATION AND STANDARDS

The Agriculture (Fertilisers and Feed) Act

An Act to provide for the regulation and control of the manufacture, processing, importation, and sale of agricultural fertilizers and farm feed; to provide for minimum standards of effectiveness and purity of such fertilizers and feed, and to provide for matters incidental to or connected with the foregoing.

The Metrology Act No 6 of 2017

This Act was enacted to provide for the designation, keeping, and maintenance of national measurement standards. This Act ensures that machinery and equipment used for weighing and measuring products are correct and accurate. It covers the scientific and legal metrology.

The Competition and Consumer Protection Act 2010

This Act safeguards and promotes competition; protects consumers against unfair trade practices and provides for the establishment of the Competition and Consumer Protection Tribunal. This act prohibits unfair trading practice, false or misleading representation of goods and services, prohibits the display of disclaimer, prohibits the supply of defective and unsuitable goods and services.

The Factories Act Cap 441

An Act to make further and better provision for the regulation of the conditions of employment in factories and other places as regards the safety, health, and welfare of persons employed therein; to provide for the safety, examination and inspection of certain plant and machinery.

This act regulates the design and specifications of operating factories to ensure safety standards are maintained in processing factories.

CAC/GL 32–1999 GUIDELINES FOR THE PRODUCTION, PROCESSING, LABELLING AND MARKETING OF ORGANICALLY PRODUCED FOODS

These guidelines apply to the following products which carry, or are intended to carry, descriptive labelling referring to organic production methods:

a) unprocessed plants and plant products, livestock and livestock products to the extent that the principles of production and specific inspection rules for them are introduced in Annexes 1 and 2.

b) processed agricultural crop and livestock products² intended for human consumption derived from (a) above.

1.2 A product will be regarded as bearing indications referring to organic production methods where, in the labelling or claims, including advertising material or commercial documents, the product, or its ingredients, is described by the terms “organic”, “biodynamic”, “biological”, “ecological”, or words of similar intent including diminutives which, in the country where the product is placed on the market, suggests to the purchaser that the product or its ingredients were obtained according to organic production methods.

ZS 725:2009 Organic Farming and Production – Code of Practice

Provides requirements for organic farming and production. It covers plant production, animal husbandry, beekeeping, game farming, the collection of wild products and the processing and labelling of the products therefrom. It also includes guidelines for inspection. This standard does not replace other regulatory requirements.

DZS 1204 Organic Fertilizer – Specification

This Draft Zambian Standard specifies the requirements, sampling and test methods for organic fertilizers.

ANNEX 2: SAMPLE SCHEDULE OF ZABS CERTIFICATION FEES

Below is a table showing a sample of the fee structure at the Zambia Bureau of Standards (ZABS). However, it is important to consult with ZABS as this schedule may be subject to change periodically.

Type of fee	Description	Rate
Assessment Audit Initial/Surveillance/Recertification	This fee covers the audit of the factory	Ranges from 1000 to 4000 per auditor (man-day)
Testing	This fee will cover the cost of testing	As per the invoice from the testing laboratory.
Annual Marking Fee (per factory)	This fee is for the license to use the legally protected quality mark.	0.15% of annual ex-factory sales, minimum ZMW 2,000
Travel	This fee will cover travel-related costs incurred by the auditor	At cost depending on the distance covered.
Accommodation	This fee will cover boarding and lodging for factory auditors, when applicable	At cost

N/B: ZABS was restructured. in 2018. The new ZABS, has no provincial offices. What used to be ZABS office in Mongu is now a new agency called Zambia Compulsory Standards Agency(ZCSA), formerly ZABS inspections department. This agency is basically placed to enforce the law by providing inspections as deemed necessary. In an instance where a company/client wants certification from outside Lusaka, they can contact ZaBS offices by phone or email and ZaBS will provide guidelines.

Main ZaBS contacts:

Margaret Lungu	Zambia Bureau of Standards	Executive Director	mlungu@zabs.org.zm	0211 227182
Nteema Muzandu	Zambia Bureau of Standards	Training and certification manager	nmuzandu@zabs.org.zm	0976787483
Mwangelwa C. Matongo	Zambia Bureau of Standards	Standards Office	mcmatongo@zabs.org.zm	