

Cashew value chain in Uganda: a diagnostic

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Introduction

This study diagnoses the current status of the cashew value chain in Uganda and identifies entry points for its further development. It aims at informing the development of a strategy for the development of cashew nut as a subsector. This information is relevant for the development of the value chain development support as it is currently envisaged in the context of Project Cashew nut for income security for poor farmers in Northern Uganda (2014-2017).

Rural people in Northern and Eastern Uganda face food insecurity. Integration of the cashew nut tree as a perennial cash crop seems to be an opportunity to increase farmer income. The main goal of this project is to enhance cashew nut production and productivity by introducing, developing and maintaining cashew varieties with desirable traits, adapted to various agro-ecologies and acceptable to international markets as an additional source of income for the livelihoods of poor farmers in Uganda. This approach involves participatory research on the introduction of high yielding and adapted cashew varieties and transfer of knowledge on multiplication and production technologies. A value chain analysis on the entire chain from production to marketing will position the market opportunity. This knowledge and experience will be generated in a participative way with the target group and sustained by institutional networks.

The findings presented draw from existing analyses and are complemented through information collected during field visits, consultations with key actors in the value chain and particularly with farmers. The author acknowledges the limits of this information base and propose that a more detailed value chain analysis, particularly of the poorly understood internal marketing, processing and trade sector should be conducted during the initial stage of any project that engages in supporting the development of the value chain.

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1 Mapping of the value chain

1.1 Cashew in Northern and Eastern Uganda

1.1.1 Historical data on cashew production

After Uganda attained its independence from the United Kingdom in 1962, after various changes of political leaders, Idi Amin took over leadership in 1971 (Histroy.com, 2017). He, amongst others emphasized the importance of cashew production. As a response, the government initiated a cashew project in the sub-regions of Teso and Lango (figure 1). Resultantly, every household would at least have a few cashew trees in the 60's and 70's, with a total estimation of 60 ha of cashew were established in the eastern and northern parts of Uganda. Additionally, governmental institutions such as: district headquarters, hospitals, sub-county headquarters, universities and primary-secondary schools planted cashew trees in their compounds. Simultaneously, in the time of his reign a processing factory was established. This led to the first steps to develop an organized value chain for Ugandan cashew. However, in the 1979 Idi Amin was overthrown by the current president Yoweri Museveni (State House of Uganda, 2017). During the power shift the recent build processing facility, which was not yet operational got destroyed. The sudden stop of continuous development towards a complete and organized supply chain, ceased farmer's ability to access market and induced loss of farmer's interest. Consequently, from 1980 until the commencement of the Regional Cashew Improvement Network for Eastern and Southern Africa (RECINESA) project in 2004 the cashew sector collapsed due to inadequate market, management, technical services and especially marketing (J. Esegu, 2012). Form 1980 until the start of the RECINESA project in 2004 the cashew subsector collapsed due to lack of management, inputs, technical services, processing and marketing.

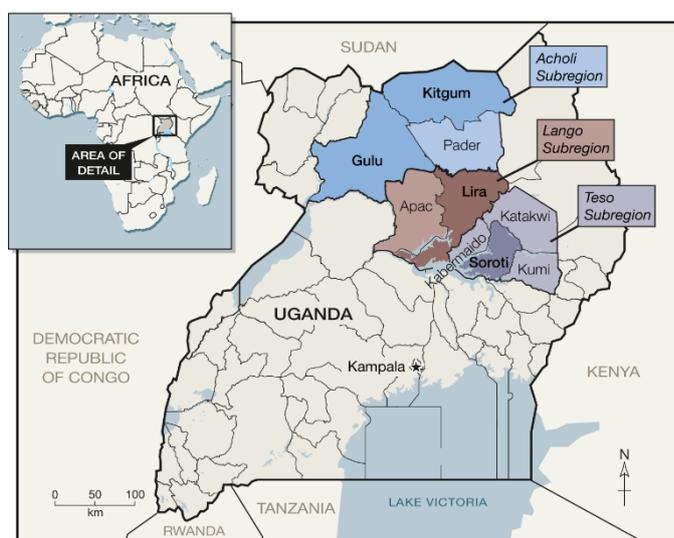


Figure 1: Region Indication Initial Cashew Production area: Teso & Lango

In the area of Northern and Eastern Uganda, interventions on cashew planting have been taken place by the project Regional Cashew Improvement Network for Eastern and Southern Africa (RECINESA 2004-2011)¹. The interventions have been taken place in Teso, Lango and West-Nile (Figure 1). Particularly in the districts Ngora, Kumi, Bugondo, Pingire, Amuria cashew trees planted under that project can be found.

Since 2005, NaFORRI has introduced improved high yielding and short rotation varieties from Tanzania and Brazil and over 41,000 trees of these

¹Common Fund for Commodities, Regional Cashew Improvement Network for Eastern and Southern Africa (RECINESA 2004-2011), retrieved at: http://common-fund.org/fileadmin/user_upload/Projects/FIGTF/FIGTF04/THE_RECINESA_SUCCESS_STORY.pdf

have been planted in the districts of Kumi, Ngora, Serere, Soroti, Arua and Lira. At the end of the RECINESA project the total tree population would be at 150.000 cashew trees.² A total number of 24 farmer groups was established, with an average number of 25 farmers per group, resulting in 600 cashew producing farmers. Two farmer groups have been officially registered as associations. In total, two cashew plantations have been established: a demonstration farm with high yielding varieties standing at Omodoi (near Soroti) and a cashew plantation in Aloi. Both have been poorly managed. Efforts to revive and maintain these plantations have not been effective till date.

Government introduced a cashew project in Lango and Teso: every household would have at least one cashew tree in the 1960s. Even government establishment such as subcounty headquarters and schools had cashew trees planted in their compounds; many of these trees still stand to-date, especially in the Teso sub-region, and a few in Lango sub-region. But the ensuing unrest, insecurity and lack of financial and extension service support to this relatively new crop, culminated into lack of market. This led to cutting down the trees.

After the project there was no follow up from the government and related services, neither from other actors. Except, one small processor (UCPL) continued producing kernels and providing support to a limited number of farmers.

1.1.2 Private Public Partnership

From 2014, a new project was started, by a consortium of two NGOs (AFSRT³ and NECPA⁴) and a research institute (NaFORRI⁵) and a Dutch company (Away4africa) in association with the local processor (UCPL⁶). The particular focus on the assured and sustainable market access for produced nuts by the farmers from the private sector, gave a new accent to the approach of cashew production. The intervention area of the project Cashew nut for income security for poor farmers in Northern Uganda (2014-2017) takes place in the Northern and Eastern part of Uganda as well, with focus on Lira, Teso and Karamoja sub-regions.

The parties having as common interest to promote the introduction of cashew nuts for income security for the rural poor farmers in Northern Uganda through increasing cashew production quantities and quality, improving access to markets and strengthening and sustaining cashew production knowledge. The objectives of the project are:

1. To significantly increase the production quantity and quality level of cashew nuts at farmer's level, aiming 5000 farmers and 300.000 new trees of high yielding varieties
2. To increase farmers' organisation in order to meet both internal and external market demands, aiming quality services on input supply, information dissemination and access to trainings and sustainable market linkages between farmers and the processor,
3. To strengthen and sustain the access to knowledge (network) of cashew production, aiming the proper identification of the existing and potential cashew sector in Uganda,

² Esegu et al, 2012, Status of the Cashew Industry in Uganda, retrieved at: http://common-fund.org/fileadmin/user_upload/Projects/FIGTF/FIGTF04/FIGTF_04/Proceedings_of_the_2nd_Int_Cashew_Conference.pdf

³ AFRST: Agency For Sustainable Rural Transformation

⁴ NECPA: North East Chilli Producers Association

⁵ NaFORRI: National Forestry Resources Research Institute

⁶ UCPL: Uganda Cashew Processors Ltd, interview by the Daily Monitor, 17th of December 2017, retrieved at: <http://www.monitor.co.ug/Magazines/Farming/My-goal-is-for-Uganda-to-become-leading-producer-of-cashew-nuts/689860-2559068-11en5cqz/index.html>

by involving governmental services, farmer organisations, private and associated parties.

The outputs and outcomes realized can be summarized as: 1000 producers of which have 6.500 existing trees and 2000 farmers who planted 106,613 additional trees, covering 2,665 acres in the Northern and Eastern Uganda, currently producing 25 Mt cashew nuts, of which 4 Mt is procured and processed nuts providing additional income of 18 Eur/year for farmers supplying the processor. Sustainable seedling production by private nurseries with a capacity of 50.000 seedlings/year supply farmer's demand. A quantity of 1 Mt processed kernels is supplied to local supermarkets and restaurants.

A value chain analysis and price policy paper (and presentations) indicate the direction of the development of the cashew value chain in Uganda. Sharing of these documents is done with the (local) governments.

The specific objective of 'Increase in food production and income security at 5.000 farmers in Northern and Eastern Uganda, planting 300.000 trees, with an estimated total income of 1 million Euro per year, 5 years after the end of the project', has been partly achieved in terms of outputs. The outcome of income increase is estimated at a potential yield of 525 kEur/year (after 5 years).

1.1.3 Ecological production zones and crop calendar

Cashew tree (*Anacardium occidentale*) belongs to the family ANCARDIACEA that includes among others the MANGO fruit and PISTACHIO nuts.

It is an evergreen perennial crop found in tropical areas between Latitude 15 degrees North and South. Cashew nuts can grow potentially in all ecological zones in Uganda. Even in the extreme Northern and Eastern parts, rainfall is still enough to grow cashew. Although, better yields are obtained by an annual rainfall of 800-1200 mm and an extended dry season to allow flowering and fruiting. Cashew trees prefer tropical climate with high and constant temperature. Cashew needs enough light for high yields. In dryer areas the cashew yields are quantitatively affected by lack of water reserves for the tree and the risks of high temperature affects negatively the quality of the nuts after harvesting. Dry spells do not affect the cashew as a perennial crop, as they do with the annual crops. In a period of climate change, where the unreliability of rainfall is increasing, the yields from cashew contributes to the resilience of the farming system in most of the zones in Uganda.

In areas with more rainfall insect and pest pressure affects the quality of the nuts, producing the so-called spotted nuts and favours decay of the kernels, once affected. Air humidity above 85% leads to vulnerability to Powdery Mildew Disease (PMD), a fungal attack to tender leaves, flowers, young nuts and fruits, resulting in drying and aborting of flowers. In those areas other perennial crops can be even more competitive and more adapted to humid climate conditions.

There has been no zoning from a policy points of view in Uganda concerning cashew production. There is need to deliberately promote zoning of cashew production so that there is high concentration of the plants in known geographical locations to ease training, produce collection, among others.

Cashew is a perennial crop, flowering and fruit bearing once or twice in a year. In the zones where cashew currently is planted, the harvest is from February to March.

Table 1: The crop calendar of cashew nuts in relation with the rainfall pattern in Northern and Eastern Uganda

Month	Existing trees	Seedling production	Rainfall pattern
January	Fruit bearing		
February	Harvesting	Seeding	
March	Harvesting		Rainy period
April	Harvesting; drying nuts	Planting seedlings	Rainy period
May			Rainy period
June			Rainy period
July	Pruning	Seeding	
August			Rainy period
September		Planting seedlings	Rainy period
October			Rainy period
November	Flowering; Spraying		
December	Flowering; Spraying		

1.1.4 Agro economic characteristics

Cashew is a perennial crop that can easily be integrated in the farming systems of Ugandan farmers. Moreover, intercropping with annual crops is a possibility, especially in the first 5 years of the trees. Once the canopies of the trees do not allow sufficient space for intercropping, still some crops can be grown under the canopies. This is conditioned by proper maintenance of the trees, allowing air and sunlight to penetrate. Marketing of cashew nuts contributes to an increased income for the farmers. Immediate sales of the collected nuts in the period provides cash in a period where annual crops have not yet matured and even need inputs.

Cashew crop activities do not conflict with labour peaks for the farmers. The most labour intensive activities are harvesting and pruning, which fall in the month of March and July.

Association of other income generating activities are possible. Beekeeping is an activity that enhances pollination of the flowers, resulting in improved yields of cashew nuts and honey production by the provision of nectar sources for the bees.

Cashew trees involve relatively low investments and can be progressively integrated in the farming system. This makes it possible for all types of farmers having land available to plant cashew nut trees.

1.1.5 Social characteristics

As cashew is a tree crop, the property and access of land is an important factor in the rationality of decisions of integrating cashew trees in the existing farming systems. Additional labour is required, where mechanization in cashew production is not developed, even not worldwide. In that light the gender aspect is important to be considered as well.

Mostly farm land is owned by men. Women have access to land, but do they own land so that they can plant trees. In many cases, it appears that the household owning farmland, deciding to plant cashew trees, that men are involved in the decision, planting and pruning and maintenance, marketing and hiring labour. Women are involved in harvesting, collecting and drying the nuts.

Observations and many testimonies indicate that children consider the cashew nuts as 'wild fruits', picking them from the trees, even before having ripened. After roasting and opening the nuts, it provides a welcome and tasty snack for them. To a certain extent this contributed to immediate food supply for those children. Although, this behavior should be rationalized and discouraged, in favour of ripening of the nuts and increased yields for the owner of the farm, finally resulting in a better income and food security for the entire household.

Cashew processing in countries where the processing is well developed it appears that there is a high percentage of women (>80%) employed in cashew processing. Activities as shelling, peeling and sorting are mostly manually executed and women adapt easier to this type of work than men.

1.1.6 Cashew tree varieties

The varieties are the existing trees are mainly 'local varieties'. This is particular, because under the RECINESA, efforts were done to introduce high yielding varieties, originating from Tanzania. The Omodoi farm in Soroti was established in order to provide a genetic variation of high yielding varieties.

The high yielding varieties are from polyclonal seeds. Characteristics on yield performance show results from 2 kg in the 3rd year after planting to 62 kg in year 18 (Appendix 3 for details per variety).

There is not only a big difference between the 'local varieties' and the high yielding varieties on yield performance, but also growth development and resistance to PMD. On quality the KOR and nut count of the high yielding varieties are performing much better in relation to the local varieties.

Table 2: Quality characteristics of local and high yielding varieties and their ranges of performance

Quality characteristic	Local variety	High yielding variety
Nut count	40-44	48-50
KOR	180-220	150-170

1.1.7 Agroecological zones and soil fertility

In 2014, there was identified a constraint of access to land in Lango. Although, in 2015 and 2016, farmer with more land available became interested. In Lango the average size of land that is possessed by a household is 3,8 acres⁷. In Karamoja it is about 5-6 acres⁸. Farmers indicate that they have land available to plant cashew.

⁷ ACF USA, Food Security and Livelihoods Assessment, April 2011 Uganda, p.6; *This is the case for 95% of the respondents*

⁸ Household survey ADP, 2016

Cashew tree likes textural porosity and therefore could be labelled as a sand loving plant. It grows best in well drained deep sandy loam soils. Cashew trees prefers a deep (>2m) well drained and light textured soil. Heavy clay (including) dark cracking clays, compact and hard surface setting soils, a hard pan or with concretions within rooting zone are not suitable for cashew production.

Hence, according to the different soil type classification of the FAO, cashew can grow in different agroecological zones (Figure 2). Some details of the two of the seven agroecological zones (the Teso system and Northern system) are presented:

a. The Teso system

The area receives bimodal rainfall on sandy-loams of medium to low fertility. The dry season is longer, from December to March. The vegetation association is moist *Combetrum/Butyrospermum* and grass savannas; short grassland which is ideal for grazing. The staple foods are millet, maize and sorghum; other crops are oil seed crops (groundnuts, simsim - *Sesamum indicum* - and sunflower) with cotton as the major cash crop. Mixed agriculture (crops and livestock) is practised, cultivation by oxen is the main agricultural technology. Livestock are kept extensively in those areas which are tsetse-fly free. The use of crop residues is very common in the Teso System. The average farm size is about 3 hectares.

b. The northern system

The rainfall in areas of this system is less pronouncedly bimodal with about 800 mm annually. Rainfall in the far north and north-east of the country (Kotido and Moroto) is unimodal and too low (under 800 mm) and erratic for satisfactory crop production. The dry season is so severe that drought tolerant annuals are cultivated; these include finger millet (*Eleusine coracana*), simsim, cassava and sorghum. Tobacco and cotton are major cash crops. The grassland is short and communal grazing abounds. This area is well-known for its pastoral system with seminomadic cattle herding.

Moreover, the FAO indicates low productivity of soils in Northern part of Uganda, and relates it with the sandy soil types.

- The Karamoja surfaces cover the North-Eastern part of the country and embrace two soil types of sandy clay loams and black clays with very low productivity.
- Volcanic soils are dominant in Mt. Elgon, Northern Karamoja, and the extreme South Western tip of Uganda (Kabale and Kisoro) with medium to high productivity except in N. Karamoja where their productivity is low.
- Alluvial soils are found outside the Rift Valley, mainly in Central Northern Uganda (Lango and Acholi) as well as West of Lake Victoria. The productivity of these sandy soils is very low.

Agroforestry is also practiced as one of the adaptation strategies to cope with the impact of climate change and variability on agricultural production in Teso sub-region of Eastern Uganda⁹.

The conclusion is that cashew can be considered as a tree species that could fit in the agroecological farming system, can fit well because of its preference for sandy loamy soil type and used as adaptation strategy to cope with climate change and agricultural variability.

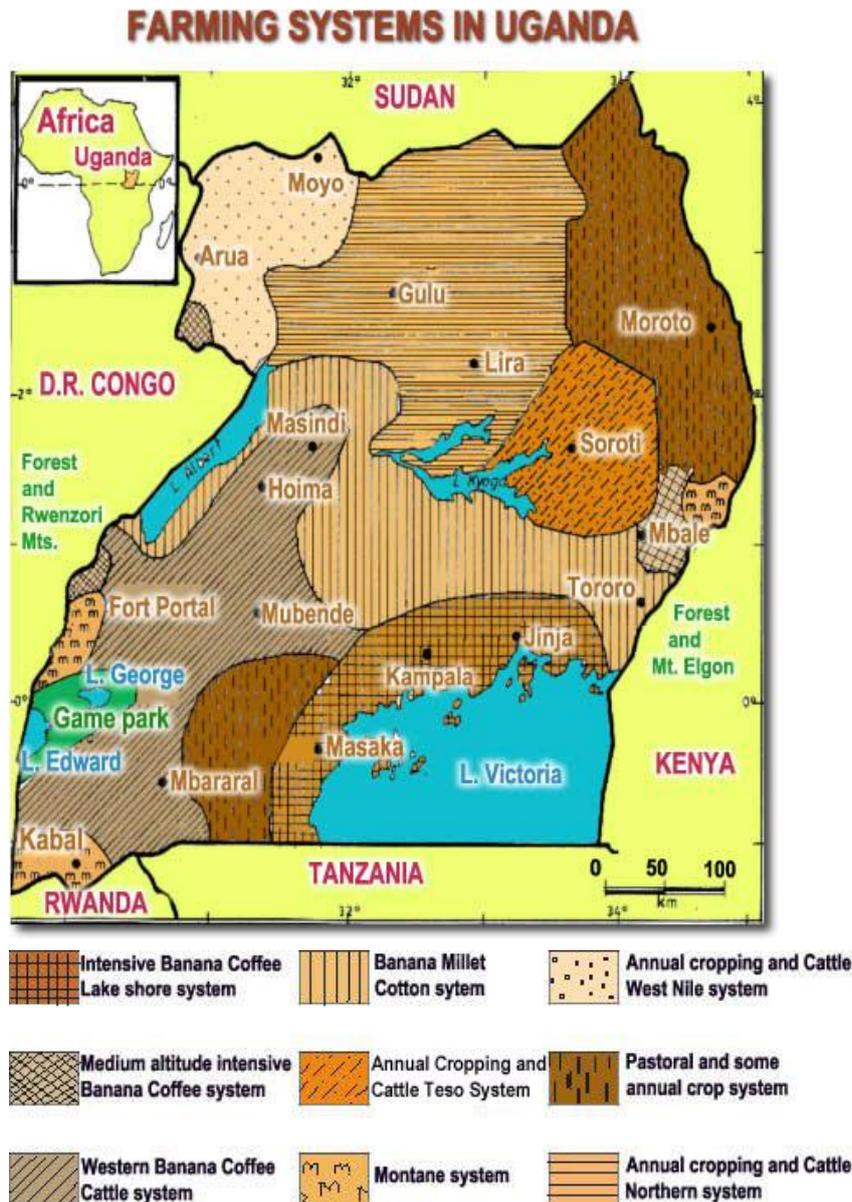


Figure 2. Agroecological Zones Uganda (FAO)

⁹ Ekiyar, V., The impact of climate change and variability on agricultural production: Adaptation strategies in Teso sub-region of eastern Uganda, retrieved at: <http://repository.ruforum.org/system/tdf/Ekiyar%2C%20V%20et%20al.pdf?file=1&type=node&id=32296&force=>

1.2 Production of Raw cashew nuts

1.2.1 Producers of RCN

The primary actors in cashew value chain (those who produce, transfer and own products) are farmers. In the context of the cashew nut opportunity, the existing farmers are considered as active farmers, eager to plant cashew on individual farm land. These were mostly smallholders adopting cashew nuts as a perennial crop in the farming systems.

1.2.1.1 The situation of the producers owning cashew trees

The most indicated districts in Northern and Eastern Uganda have been assessed in 2016: 8 districts in Teso and 3 in Lango Sub-region. By a field survey, just over a 1000 farmers were identified and 6.553 cashew trees were registered. The main concentration of trees is found in the districts of Katakwi, Soroti, Serere, Ngora and Kumi as indicated in figure 2. Jointly they represent 87% of registered cashew trees and 86% of registered production (table 3).

Table 3: Overview of the Regions, Districts, Distribution of Cashew Farmers, Trees and Production per District

Sub-Region	District	#Farmers	#Cashew nut trees
TESO	AMURIA	45	468
	BUKADEA	38	125
	KABERAMAIDO	4	21
	KATAKWI	306	1.163
	KUMI	120	1.224
	NGORA	98	960
	SERERE	294	700
	SOROTI	74	1.666
LANGO	ABIM	1	3
	APAC	12	48
	LIRA	24	175
Total		1.016	6.553

The distribution of gender amongst farmer households as seen in figure 3, over 70% of household heads are male. Females become household head in case of death of husband.

As seen in figure 5, 97% of all farmers dedicate less than 1 acre to cashew production. Only 3% of the interviewed farmers have dedicated more than 1 acre to cashew production. Keeping best farm practices in mind an acre can accommodate 27 cashew trees.

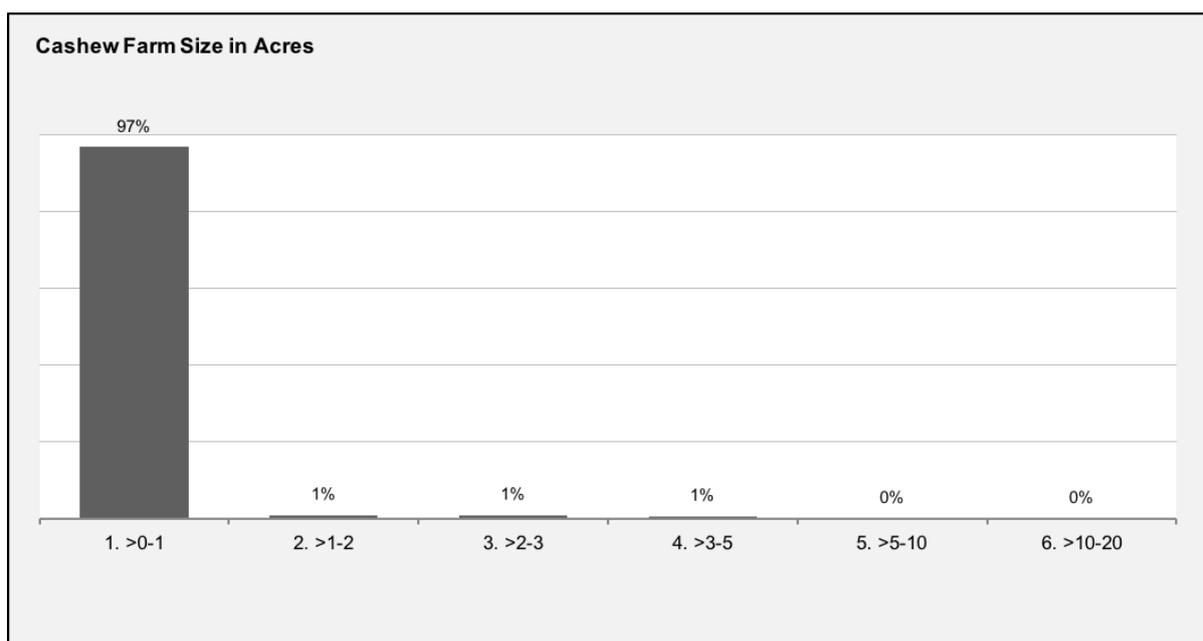


Figure 2: Cashew Farm Distribution per Size in Acres

1.2.2 On Farm Cashew Tree Distribution

As seen in table 5, 89% of farms have 1 to 10 trees on their production site. Table 4 shows a break down at different ranges. As seen there is no range which is significantly higher or lower.

Table 4: On Farm Cashew Tree Distribution

On Farm Cashew Tree Distribution at Different Ranges	
Number of Trees	Percentage of Total
>0-10	89%
>10-20	8 %
>20-30	1%
>30-40	1%
>40-60	0.5%
>60-80	0.5%
Total	100%

On Farm Cashew Tree Distribution at Different Ranges	
Number of Trees	Percentage of Total
>0-1	17%
>1-2	19%
>2-3	14%
>3-5	20%
>5-10	18%
>10-20	8%
Total	100%

1.2.3 Farmer groups

Farmers are poorly organised in cashew farmer groups. Under the RECINESA project 24 cashew farmer groups were established, but after the project they did not perform in delivering services to their members. Presently, a limited number of cashew farmer groups do still formally exist. The situation in 2016 is that from the existing cashew farmers, 90% of farmers operate individually and are not connected to a farmer's organization or cooperatives. Of the total number of interviewed farmers, 11% are member of one of the 64 identified farmer groups.

Name District	#Farmer groups	% of Total
Katakwi	16	25,0%
Serere	11	17,2%
Ngora	11	17,2%
Kumi	9	14,0%
Amuria	7	10,9%
Soroti	3	4,7%
Lira	3	4,7%
Bukadea	3	4,7%
kaberamaido	1	1,6%
Total	64	100,0%

Within the target area of 11 districts farmer groups were identified in 9 districts. Table 5 lists the distribution of farmer groups per district. Nearly 75% of registered farmer groups are located in Katakwi, Serere, Ngora and Kumi. This is also the area where concentration of farmers was highest. Of the 64 farmer groups, 2 groups are specifically focused on cashew production.

Table 5: Distribution of Farmer Groups per District

Both groups are in the district of Kumi, 'Arapada Cashew Famer Group' has 10 members and planted 150 trees of improved variety in August 2016 (survival rate yet unknown). Trees are evenly distributed over group members. 'Akida Cashew Farmers Group' Planted approximately 250 trees of the improved variety distributed over an unknown number of farmers. Trees were planted in 2012, first harvest is expected February 2017. Both groups are motivated to plant more seedlings next season, however numbers are to be verified. UCPL supplied both farmer groups with seedlings and technical advice and will purchase produced RCN of both groups in future. Both groups could also play an important role in the promotion of cashew within their regions, if given proper information.

Even though 97% of registered farmer groups are not directly connected to cashew production they could play an important role in the future concerning the increase of RCN production.

The service that the groups delivers to its members is mainly access to training and access to planting material. The option of collecting and group selling and access to finance for its member is not yet actual for cashew production, but should be in perspective while establishing or developing the farmer groups.

There are several models of producer's organisation:

- Farmer groups on several commodities and specific on cashew (with existing relations with the CSOs and new formed groups)
- VSLA groups integrating cashew nuts as one of the income generating activities
- Farmer cooperatives, consisting of 5 -10 farmer groups (including a marketing committee)
- Individual commercial farmers, to which often surrounding farmers are (informally) linked

For the growth of the cashew sector it is recommended that specific cashew farmer groups are to be established.

In Tanzania, farmers often organize in primary cooperative societies, either in so-called Agriculture Marketing Cooperative Societies (AMCOS) or Savings and Credit Cooperative Societies (SACCOS). Through the AMCOS farmers are able to jointly market their products

efficiently and get in turn pesticides and other inputs at a better price. Through the credit societies, farmers get access to credits they need to buy pesticides and hire labour.¹⁰

The raw cashew nuts are collected by individual farmers. There is direct contact to purchase the raw nut with intermediate persons. The main flow of raw cashew nuts is oriented towards UCPL.

The collection of raw nuts faces constraints. The collected quantities are small and the farmers are scattered. This means that the added value for collection, communication and logistics per kg is relatively high. This can be done by collector agents, who generate an income out of these services.

In this emerging market, where cashew nuts are not a common commodity to trade, it is important to pay upon delivery. A procurement system, where collectors are provided with cash is a condition for farmers' confidence in the market.

There is high need for establishing sustainable farm-firm relations to ensure efficient central collection and distribution of the nuts once collected from the individual farmers. As of now, the required level of organization is largely lacking; with individual farmers scattered and out of this system. The organization of this out of reach farmers into accessible bulking centres could boost not only create efficiency and collaboration, but also increase coherence on quality and measuring control and uniformity in deliveries in terms of time, place and packaging. The processor's direct involvement hence is a good avenue through which trainings, value control, management information could be disseminated to the farmers. The lack of farmer mobilization makes training difficult and expensive. Most of the information is provided to the farmers in response to challenges encountered in the individual cashew farms.

1.2.3.1 Cashew producers, recently started

For the newly planted cashew seedlings a total number of 2.000 producers are identified, covering approximately 2,665 acres in the Northern and Eastern Uganda. The average acreage per farmer planted with cashew trees is 0,83 acres, where 60% has a plantation of less than one acre. Mobilization of cashew farmers is not well developed although nearly all farmers manifest interest in cashew growing. There are a few farmers (14) planted more than 100 trees.

1.2.4 Estimation of cashew production

The total production of cashew nuts is estimated at 25 Mtons¹¹ with the current producing trees. As the trees are scattered, collection is difficult to centralize and to identify.

Cashew nuts are collected by household members (mainly children) and roasted for home consumption. They are considered as a supplementary diet, to compare with ground nuts. For a reduced number of farmers, cashew plays the role as cash crop. Collection of those nuts is done on individual basis.

Beneficiaries include also the family members, employees of the households involved in the value chain. If there are at least 3 individuals in these households directly benefiting from

¹⁰ Cashew value chain Diagnostics, Tanzania, 2011

¹¹ It is a rough estimation, done by UCPL, on the basis the number of trees.

cashew production, the total number of cashew beneficiaries is around 5.000 of the local communities within the cashew growing areas are indirect beneficiaries.

In order to compare, in Tanzania, a country where 80.000-90.000 ha are planted with cashew, by 734 thousand of farmers producing 180 metric tons of raw cashew nuts, more than 85% of the plantation owners are smallholder farmers of around one hectare¹².

1.2.5 Farm economics

Cashew production is a viable economic activity for farmers, as integrated tree crop in a farming system. Intercropping is possible until the canopy covers the allotted space, within a period of 5-6 years.

Different scenarios are calculated:

1. Local varieties, with current agricultural practices, as monocrop, with a density of 25 trees/acre, as monocrop.
2. Local varieties, with current agricultural practices, as monocrop, with a density of 25 trees/acre, intercropped with soybeans.
3. High yielding varieties, with improved agricultural practices, as monocrop, with a density of 25 trees/acre, as monocrop.
4. High yielding varieties, with improved agricultural practices, as monocrop, with a density of 25 trees/acre, intercropped with soybeans.

Estimations of the production parameters of cashew nuts have been based on information on local and international level. An estimated RCN yield of 360 kg/ha (density of 75 trees/ha and yield of 4,5 kg/tree) is realized, with gross margin of 76 USD/ha. New varieties can yield between 13 kg/tree, with gross margins up to 433 USD/ha. (When intercropped with an annual crop like soybeans, the gross margin in the first years will be determined by the annual crop). See Appendix 2 for the details of the 4 scenarios.

To compare, Tanzania before 2011, with local varieties, an estimated RCN yield of 360 kg/ha (density of 80 trees/ha and yield of 4,5 kg/tree) has been realized, with gross margin of 53 USD/ha. New varieties can yield between 8-15 kg/tree, with gross margins up to 272 USD/ha¹³. In comparison to annual crops, this might not be excessive, but the higher drought resistance of the cashew tree and the annual low level of inputs for production are reduced risk factors on household level.

1.2.6 Research on production

NAFORRI has been involved in the RECINESA project as the research partner and also involved in this cashew project. NAFORRI is related to the Naliendele Agricultural Research Institute in Mtwara in Tanzania, obtaining knowledge and polyclonal cashew seeds. NAFORRI has its research partners, as NABOUIN, involved as research department in the cashew project.

Research has still a major role to play in the introduction of cashew in Uganda. Research is recommended on the further development of the cashew in Uganda on variety of topics: (i)

¹² Cashew value chain Diagnostics, Tanzania, 2011

¹³ Cashew value chain Diagnostics, Tanzania, 2011

on integration of the cashew in the agroecological context, adaptation of farming systems with this agroforestry component, including the resilience strategy on income, food security and livelihoods; (ii) on biophysical development of new varieties and phytosanitary practices (iii) strategy of commercialization and supply to the local processing unit(s) to develop and (iv) the development of sector governance policy for this new product, including a strategy on local and national level.

1.2.7 Service providers on production

Input suppliers. Regarding the stage of the cashew nut sector in Uganda, planting material is needed in the first place. The most important input is the high yielding varieties for propagation.

Input supplies, mainly the polyclonal seeds of high yielding varieties, originate from Tanzania. Secondly, seeds from the Omodoi farm are used additionally. Seedling production is done at central places by NGOs, delivering seedling to farmers at moderate prices. NECPA, AFSRT and UCPL are active seedling producers, having nurseries producing about 50.000 seedlings yearly. In the past, specific farmers from farmer groups were trained to establish village nurseries. In Teso there have been 14 active nurseries identified, with a capacity of about 370.000 seedlings/year. Projection estimates of 10% of cashew is done for the future. Those farmers supply the seedlings to the other group members.

With the new varieties and expressed demand from farmers, nursery operators and supporting organisations can apply it for cashew seedling production as a viable economic activity, based on a minimum production of 1000 seedling. Crucial is the provenance of the seeds. It is recommended that the Omodoi farm is well managed to deliver high yielding varieties. Identified tree nurseries demanded assured market before adopting cashew seedling production. As registered cashew farmers massively expressed their interest to plant additional trees, this acts as an opportunity to connect farmers within a production area/district to the nursery operators located within this production area/district.

Input supplies as pesticides and fungicides are supplied by distribution shops. There is not much awareness and knowledge on the diseases and the treatments. Although, without controlling powdery mildew disease there will be a crop loss of more than 70% and the remaining production will be of poor quality (Sijaona and Shomari 1987, Waller et al., 1992). There are also a number of other pests, such as Helopeltis bugs, coconut bugs and mealy bugs which attack young succulent shoots causing no flowering and hence low cashew production unless controlled. It is therefore necessary to undertake pest and disease control measures to cashew plantations. Incorrect use of pesticides, whether over-doses or under-dose, cause severe effects. For example, applying lower rates than the recommended ones make the pathogen to build resistance against that fungicide (Sijaona and Mansfield, 2001). On the other hand, excessive use of inorganic pesticides can lead to high levels of the chemical above authorized limits in the kernels, unnecessary environmental pollution and unnecessary additional cost to the farmer. Recommended pesticides and fungicides are Bayfidan, Topas, Bayleton, Fosphite and Pearl, because they are organic.

1.2.8 Training service providers

Training service providers: the owner of Uganda cashew processors Ltd is a trainer of trainers and has been involved on personal title in the cashew projects. A few other local nonprofit organizations raise seedlings and deliver trainings/support to farmers: NECPA, AFSRT. NECPA and AFSRT are partners of the cashew project, which is working to promote and support cashew production in Uganda. NAADS has been involved in training services under the RECINESA project.

1.2.9 Financial service providers

Financial service providers: Much as these have not yet been directly contacted for cashew nut value chain production, these financial service providers are known to provide small scale support to agro production activities in Uganda: Pride Mirofinance, Vision Fund, Ugafode Microfinance, Finca Uganda, Centenary bank. Since cashew is relatively new and the tree species begins to yield fruits after three years, there is higher likelihood of these finance institutions supporting the processing than the crop production.

1.3 Kernel production

1.3.1 Processors

Production of cashew kernels out of the raw cashew nuts is a laborious activity. The main steps in processing¹⁴ are:

1. Raw nut are sun dried for three days around homestead or collection point
2. Raw nuts marketed to the processor where the nuts are stored in gunny bags. If the nuts contain too much moisture, they are sun dried.
3. Raw nuts enter the process of deshelling in batches. The first step is a steaming bath. The raw nuts are deshelled manually.
4. The deshelled nuts are sun dried for one day.
5. The peel is removed manually.
6. Kernels are graded into several grades before they are either vacuum packed or roasted, salted or unsalted ready for marketing.

Uganda Cashew Processors Ltd (UCPL) is the only known processor in Ngora district's Mukura subcounty. With the high level of local knowledge that the processor has, only a little more facilitation would propel it to a high level of processing. The owner of UCPL is not only processing (un)roasted cashew kernels, but also a seedling producer and cashew farmer at the same time.

The installed processing capacity is limited to 100 kg of raw cashew nuts a day, and the actual quantity of processed raw nuts does not exceed 3 Mt on yearly basis, since some years. In 2015, the total quantity of roasted cashew kernels was about 500 kg, which has been sold to the hotels and restaurants. The last two years, the processed quantity nearly doubled.

¹⁴ UCPL has entire manual processing. The steps are different and more detailed for semi- or full mechanized processing.

Procurement of raw nuts, logistical capacity and access to finance are the main constraints that UCPL faces. UCPL (Uganda Cashew Processors Ltd) to make a strategic business plan in relation to potential procurement of raw nuts, projected sales and net revenue and established a sourcing system with local buying agents, in 2017.

1.3.2 Quality of Raw Cashew Nuts

The quality control system with international standards (for the major indicators Kernel Outturn Ratio (=KOR), Nut count and humidity) for raw cashew nuts is implemented by and through the processor, and the buying agents in the field. For the farmers, only the nut count indicator is applied, as quantities are too small for taking sampling for destructive tests.

1.3.3 Sustainable supply linkage between producers and the local processor

The RCN market is a free market and prices; delivery terms and quality are determined and negotiated between producers and buyers.

The RCN price in Uganda will be aligned with the FOB prices in Tanzania and Kenya, during the cashew harvest period. Costs of handling, logistics, packing and finance should be considered while relating RCN Farm Gate prices in Uganda.

Between actors in the cashew value chain, platforms where agreement and common understanding of value chain collaboration and the development of the sector is developed, the price policy and even price boundaries can be discussed and agreed upon.

For the purchase of the RCN from farmers, a price is indicated. The quality of the stock of nuts accepted under this contract has the following features:

As an indicator for the new or local variety, the nut count is used and split up into 3 quality grade groups:

1. 0-160 nuts/kg – new variety (2000 UGX/kg)
2. 160-190 nuts/kg – old variety, but good (1500 UGX/kg)
3. 190+ nuts/kg – old variety, inferior quality (1000 UGX/kg)

These prices are the prices delivered at buying point, mostly in the trading centres in the districts.

A commission is paid as incentive to buying agents for collecting the RCN, transporting it stocking it at appropriate conditions at a central collection point, commonly agreed upon with Ugandan Cashew Processor Ltd. The buying agent is also responsible for the distribution of payments to the farmers.

1.3.4 Supply services and employment opportunities

Processing will create employment opportunities in the direct processing of the cashew nuts, but also at supplier's level.

Next, local suppliers (on transport services, maintenance, utensils and tools, communication, etc.) will have the opportunity to extend their services and. This will impact the local economy.

By products (shells for substitution of combustion) and juice production out of the apple can be used for local consumption. Potential markets can be developed as it is seen in a cashew producing country as Tanzania. Potential supply for those clients is to be done out of the processing unit.

Collaboration with existing artisans for machinery and vocational training institutes and job seekers units will be developed. The specific technologies for cashew processing will be subject of training modules in those collaboration.

1.4 Cashew kernels market

1.4.1 The final product: Cashew kernels

Cashew nut kernels are mainly used for the snack market as a roasted and salted snack. Due to the lovely taste, the cashew nut is seen as an upper class nut. The cashew nut has become of more and more interest to industrial users and is as such used for cookies, cereals and is also promoted as a topping on ice-cream. The cashew nut kernel can be considered as a healthy and nutritious snack, as it contains mainly unsaturated fatty acids and is rich in vitamin E.

1.4.2 Household consumption and contribution to environmental conservation

Cashew could contribute as food ingredient to the household consumption. In a vulnerable area as Karamoja, it can be considered as contributing directly to the food security of the households. The increasingly unpredictable weather patterns seem to curtail production of traditional crops and hence cashew could become a viable household alternative especially in places such northern and Eastern Uganda. Since these places have extreme climatic conditions as realized of late, the growing of cashew could furthermore help to offset the adverse climatic conditions, moreover the laves will contribute to rejuvenation of land fertility for further household farm production of locally grown crops.

1.4.3 Domestic cashew market potential

The customers of those cashew nut kernels buy them mainly in supermarkets, but are also served in restaurants and at catering services. Mostly, they want to be supplied with roasted cashew kernels, packed in packages of 100, 200, 500 and 1000 g, and for the white cashew kernels in packages of 500, 1000 g. There is demonstrated interest, especially among the Asian communities in Kampala. There is also ready market with the large hotels in Kampala. Supermarkets in the towns of Mbale, Soroti, Jinja, Lira could also be supplied with the processed cashew nuts. Currently 100% of registered enterprises import their kernels from foreign countries, 80% of kernels originate from Tanzania. No cashew kernels from Uganda were identified. Available records (2017) show a very good market potential and demand. It

clearly indicates that there is no local competing supplier; and that demand far outweighs the production, since the only source of cashew is from out of Uganda.

1.4.4 Supply and demand in the domestic market.

The final product can be the white cashew kernel, as well as the roasted cashew kernel. The yearly demand from supermarkets and restaurants in the capital and bigger towns is estimated at 50-100 Mt/year¹⁵. A market survey among 50 different clients (restaurants and supermarkets, mainly in Kampala) identified a domestic demand of approximately 40 Metric ton per year was identified/registered¹⁶. Currently, they are supplied by processors in Kenya and Tanzania. The prices in the supermarket are extremely high (an average of 40.000 to 50.000 UGX/kg, equivalent to 15 USD/kg), which makes it for so many customers not an affordable choice. Although it can easily make part of the diet of so many people in Uganda. On supply of the cashew nut kernels towards supermarkets and restaurants, there will be a competition with the current suppliers from mainly Tanzanian and Kenyan origin. Regarding the high prices of the sold cashew nut kernels (in comparison to the international market) the impression is that there are some monopoly price features. Local supply to those supermarkets and restaurants will substitute import of cashew kernels from abroad. The clients indicate that they are really interested in this new supply.

But there is no national supplier of cashew nut kernels, except the processed kernels from UCPL. Unfortunately, the supply from Uganda cannot address the demand.

1.4.5 Cashew market East Africa

Kenya and Tanzania, as Uganda neighboring countries are cashew producing countries. Especially Tanzania has a long history in cashew production, processing and export. Production is declining, due to structural problems of the cashew sector. Kenya's production is steadily increasing.

Trends in Tanzania and Kenya can be positive for an emerging cashew sector in Uganda. Knowledge, input supplies and processing equipment can be supplied from those countries.

Emerging export of nuts and cashew kernels can pass through market channels via Tanzania and Kenya, although not exclusively.

1.4.6 Perspectives on the international market

The international cashew kernel market knows an increasing demand over the past years. A total estimated consumption of more than 500.000 Mt cashew kernels per year. The main consumers are in the United States, Western Europe and India. The consumption of cashew nuts, and thus the demand, will be growing particularly in East Asia. Cashew nut kernel prices are at the range of 6 to 8 USD/kg FOB.

¹⁵ Joseph Okilan, UCPL, 2014

¹⁶ Away4Africa, field survey, 2017

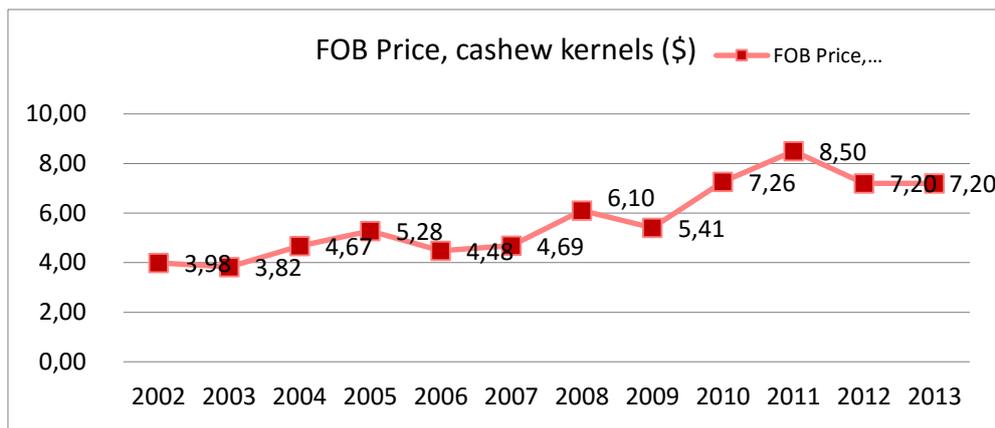


Figure 6: Price development cashew kernels (Source: Technoserve 2012, GTA 2013)

As the demand of cashew nut kernels will increase relatively faster than the supply, it is expected that prices will gradually increase over the years, besides other factors as inflation. Prices have gradually increased over the last 5 years. Particularly, African processed cashew kernels are appreciated by the roasters in European and American countries (Intersnack, Kraft Foods), because of the socio economic impact and the traceability in the supply chain.

The cashew nut processing brings also by products, like the shell and the cashew apple. Cashew nut shell liquid can be extracted from the shell and be commercialised. The de-oiled shells are a good substitute for conventional biomass for firewood, particularly for thermal energy supply in industries. The cashew apple can also be processed into juice.

1.5 SWOT analysis of the cashew subsector in Uganda

Below is a draft SWOT analysis is meant to provide insight into the Strengths, Weaknesses, Opportunities and Threats relating to the cashew nut production in Uganda. These are likely to develop over time and some changes may be seen as the enterprise develops

Strengths	Weaknesses
<p><i>Historical and environmental advantages:</i></p> <p>Good climate and abundant land on which to grow the crop in West Nile, Eastern and northern Uganda</p> <p>The tree species have been grown before with success, only neglected due to lack of concentration</p> <p>Suitable crop type in many parts of Uganda</p>	<p><i>Governance and organization:</i></p> <p>Lack of coordination among the existing stakeholders on strategy for the cashew value chain (price policy, procurement of raw nuts and seedling production)</p> <p>Individual farmers, each with a few trees and scattered and this makes cashew collection and processing less cost effective</p> <p>Lack of farmer mobilization for collective and coordinated production</p>

<p>Has been grown in Eastern, Northern and West Nile parts of Uganda before</p> <p>There are new and good species introduced from Tanzania which can be easily multiplied; there is good link with Tanzania for new high yielding varieties</p> <p>Recent initiatives have been done in the supply chain on cashew seedlings raising, distribution and planting with relative success in terms of interest and uptake</p> <p>Easy to grow, with good management skills imparted to farmers</p> <p>Presence of a national research institute to help promote the species (NAFFORI) and the NFA</p> <p>It is known for various nutritional, medicinal and industrial uses</p> <p><i>Competitiveness and motivation:</i></p> <p>There is good return on investment since it is not very labor intensive</p> <p>Available expansion areas for production, increased expressed willingness to plant cashew</p>	<p>Insufficient knowledge on availability of the tree growing areas and their numbers</p> <p>Unclear/poorly coordinated government/NGO support program for the promotion of this valuable tree species</p> <p>Lack of availability of land and lack of land governance for concentrated tree planting</p> <p><i>Marketing and processing:</i></p> <p>Insufficient investment in the processing equipment for efficient commercial scale production</p> <p>'Invisible' processor</p> <p>Lack of market information leading to lack of appreciation of the value of cashew</p> <p>Lack of group/ association marketing</p> <p><i>Production and crop management:</i></p> <p>Inadequate knowledge and production skills (crop production technics and management)</p> <p>Inadequate crop financing</p> <p>Infestations and infections not researched into</p> <p>Farmers are not trained to detect and handle the threat of cashew diseases and pests</p> <p>Expensive and sometimes not readily available spray chemicals</p> <p>Inadequate postharvest facilities</p>
<p>Opportunities</p> <p><i>Expansion and upscaling:</i></p> <p>Very good alternative trees species especially in northern, Eastern and West Nile parts of Uganda</p>	<p>Threats</p> <p><i>Environmental management:</i></p> <p>Occurrence of pests and diseases due to heavy rains during flowering and fruiting stage</p>

<p>Scale of production can be increased significantly with farmer mobilization</p> <p>Could be promoted at district (production department) and national (OWC) level as valuable food security and commercial crop</p> <p>It is a drought resistant crop, can grow successfully in areas with distinct wet and dry season; fits well in the existing farming system, in combination with annual crops</p> <p>Cashew planting could be integrated as an economically sustainable environmental conservation activity</p> <p>Income increasing opportunity for many vulnerable households</p> <p><i>Market opportunity:</i></p> <p>Increasing national and international demand for cashew kernels</p> <p>No known producers /processors competing with UCPL as yet in Uganda</p> <p>Increasing knowledge on cashew as a locally available consumable nut and interest, especially among the Asian communities in Uganda</p> <p>Possibility of processing many products and by-products from the same tree (ink, gum, manure, vitamin C rich fruit juice, etc.)</p>	<p>Local trees that have been planted in the past do have a very inferior quality. Dissemination of those species is a threat.</p>
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1.5.1 Strengths

There is also evidence of these tree species having been promoted in Uganda in the 1960s and these trees are still standing and productive. The fact that the trees when mature can be harvested for over 50 years lends credible reason for its support as a stable source of household income and additional remedy for support to low income people who have some land which they may not have much capital to develop into modern farms.

The profitability of production and processing are good. It is the up scaling of cashew growing and processing that will generate more margin and significant turnover.

The fact that cashew when planted, needs little management and can be harvested for up to 50 years, makes cashew growing suitable for low income producers. Northern, Eastern and

West Nile regions of Uganda are ideal locations for cashew nut growing, which is also compatible with environmental conservation strategy, because many parts of northern and Eastern Uganda experience dry spells. Cashew growing can also contribute to a very good level towards the offsetting of the carbon emission effects from the big industries. With good spacing, it is a crop in between which other annual crops such as cereals, pulses and grain could be intercropped, rendering more efficient utilization of the land, while its leaves provide good manure for the annual crops grown within the same field. Moreover, there has been previous attempt by government (through NaFFORI) in 2004-5 to reintroduce this product in Soroti, with some success rate.

There are fast maturing cashew tree species with larger kernels which have been introduced from Tanzania and have shown success. The old species with high yields could be grafted and research into them carried out further for the most appropriate type with right attributes. There is also the possibility of introducing another species reported to produce up to 100kgs of cashew kernels/tree within ten years.

1.5.2 Weaknesses

There is still very low farmer knowledge, management skill and even interest in cashew growing. This is mainly due to low farmer mobilization and the fact that cashew is not featuring among the government/district supported crop/tree species. It could also be related to the fact that the old cashew trees are not being taken advantage of. Despite the fact that there are many old trees, there is no organized collection of these nuts. This makes the apparent insufficient production scale low to make profitable processing. The producers are scattered all over the region of northern, Eastern and West Niles regions of Uganda. This reduces the costs effectiveness of cashew collection and processing; data on the old trees is not readily available and calls for a specific action to document and capture this data. There also is inadequate knowledge about the quality requirements and harvesting techniques; thus the need for farmer mobilization to offer the right and uniform cashew production training. Cashew supply chain is undeveloped, there are no collecting centers with appropriate processing and packaging equipment to maintain the quality and even local packaging has only been tried by Uganda cashew processors Ltd. Inadequate financing leads to limited access to appropriate cashew production, processing, packaging, promotion, and marketing; tree seedlings, insecticides, packaging materials and processing equipment.

1.5.3 Opportunities

Cashew production can provide significance to the local economy as a very sustainable source of family and regional income. This is possible with appropriate training for people with interest and some land. There could also be middle men who specialize in sourcing the nuts from farmers and selling them to the processors. The global demand for honey (and other cashew products) is increasing, and Uganda can potentially produce a huge volume of natural cashew nuts. The opportunity to develop cashew growing cereal crop integrated systems would increase the farm productivity and profitability. There is an opportunity for establishing coordination between cashew nut collection centers and potential purchasers. Cashew growing could be integrated within the government supported programs at district and or national level. The government research institutions could continue to provide

technical expertise to determine the exact species that do well at the different locations in the country, to offer continuous extension services to interested farmers.

1.5.4 Threats

The cashew production will be affected by infections and infestations, which may not have readily available remedies. Where the drugs for spraying may exist, they tend to be expensive beyond the reach of many farmers. There is low research onto the tree type and this call for intervention of the research institutions such as MAK, NABOUIN.

2 Governance of the cashew value chain

2.1 Impact of the cashew sector on national level

On national level, the cashew sector will be contributing to the GNP, generate tax income on local and national level and even generate foreign currency with the export of the cashew kernels.

Moreover, the Uganda Investment Authority (UIA) particularly focuses on the development of the SME, stating that “The Micro, Small, Medium, Enterprises (MSMEs) are the engine of growth for the economic development, innovation, wealth creation of Uganda. They are spread across all sectors with 49% in the service sector, 33% in the commerce and trade, 10% in manufacturing and 8% in other fields. Over 2.5 million people are employed in this sector, where they account for approximately 90% of the entire private sector, generating over 80% of manufactured output that contributes 20% of the gross domestic product (GDP).”¹⁷. The creation of the cashew processing unit will particularly consider the rural poor, by providing a market for the cashew nuts and providing of low skilled job opportunities. A business idea is even promoted on the website of the UIA¹⁸.

By export of cashew kernels all over the world, the origin of the processed kernels will be marked by the brand, which will broadcast the message among the costumers that such a delicious product is produced in Uganda.

On environmental level, the procurement of cashew nuts will encourage farmers to plant and maintain cashew nut trees. This will have a positive impact on reforestation. Reforestation will have a positive environmental impact on several levels: decrease of soil erosion, increase of a better micro climate. Next, it will also contribute on village level to the availability of fire wood. If the cashew apple is not processed, it is often consumed by passengers in the field.

2.2 Governmental policy

As of now, there is no direct involvement of the local or central government in cashew production. It has however been muted by NABOUIN and the district Natural Resources officer, Soroti district that there is a possibility of NABOUIN getting some funds to manage especially the Omodi farm. If this happens, this could be a big boost for the cashew production in Uganda as seeds and grafting materials as well as a training facility could be within easy reach.

Cashew is likely to have far reaching and positive impact on appropriate land use and increased land productivity per acreage, if taken up in Uganda, especially in the former cattle corridor and relatively dry eastern, West-Nile and northern Uganda regions.

¹⁷ <https://www.ugandainvest.go.ug/smes-driving-economy/>

¹⁸ UIA, Final report for generation and updating Business ideas; retrieved at https://issuu.com/weinformers/docs/500_investment_ideas_uganda

Sensitization at local government and community level is key to increasing awareness and advocacy for this high value tree species to be included among the ones receiving government support under OWC programme. High level government contacts and interaction will help to augment and speed up the possibility of cashew inclusion on the central government programme.

From the government side, there is currently no specific policy or program on cashew nuts, although in a recent publication (2016), of the Ugandan Investment Authority cashew is indicated as an investment opportunity¹⁹. Local governments have been involved in the current cashew project, by informing them on the project objectives and activities. The attitude towards the potential possibility of the integration of cashew nuts in the farming systems and the contribution to income and food security is positive at the local governmental authorities, as it is in line with the policies.

The local authorities and the governmental agricultural services can be involved on several levels in order to enhance the sustainable development of the cashew sector in Uganda.

- Facilitating of the dissemination of information on cashew as an opportunity for income generation, as well as relating actors in the value chain.
- Offering and promoting the legal framework and adherent facilities for value chain collaboration, in order to position the cashew sector as a professional sector. A cashew board, representing the actors in the cashew value chain, can be the governing body for the sector, adopting regulations and being the voice of the represented actors.
- Facilitating of an administrative framework for registering actors who are or intend to be active in the cashew sector. This framework aims to regulate practices, particularly concerning (land) governance issues, market information and price mechanisms.

2.3 Governmental services and dissemination

With regards to Operation Wealth Creation (OWC), a link with the governmental program of fruit tree planting can be established. As Operation Wealth Creation supports other tree species (like citrus, coffee) the cashew tree can also be supported, as the demand from the farmer's side is significant. OWC could facilitate the message of cashew production as a viable tree, integrate the tree in agroforestry trainings and facilitate the supply and demand for seedlings.

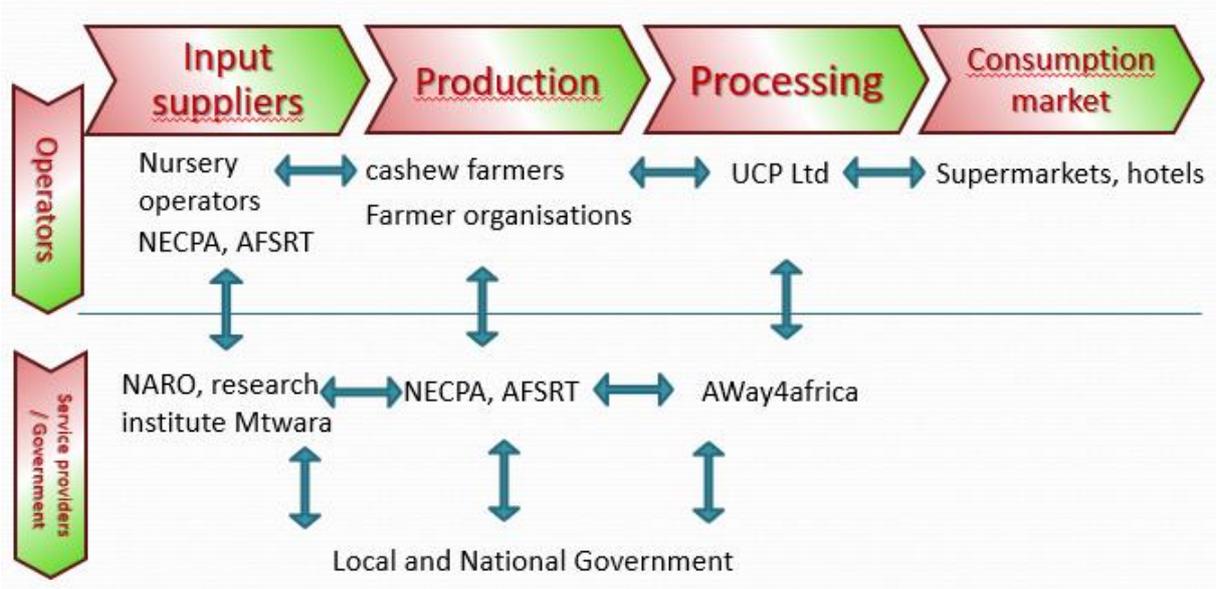
A crucial point on the production of cashew seedlings is the tracing of the origin of the seeds. By an increasing demand from the farmers, and an availability of seeds from high yielding varieties, there can be a tendency to use local varieties for seedling production. This is dangerous, because the genetic features of the local varieties do not allow to have considerable nut count and KOR characteristics, which affect the competitiveness of processing and even the entire value chain.

¹⁹ UIA, TESO INVESTMENT PROFILE, 2016, retrieved at: <https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/Teso-Investment-Profile.pdf>

2.4 Actors in the cashew value chain

Up till 2017, a few actors have been active in the cashew value chain. The most prominent actors are UCPL, the cashew farmers and farmer groups, the local supermarkets and hotels as buyers and the nursery operators. Supporting organisations are Away4Africa, NECPA and AFSRT and the NARO research group. Figure 7 presents the different actors and existing relations. A complete list of actors is drafted in Appendix 1.

Figure 7 collaboration and co-creation between stakeholders in the cashew value chain



Actor	Type	(Potential) role in cashew development
Supermarkets, hotels Kampala	Buyers	Buyers of (un)roasted cashew kernels
UCP Ltd	Processing	Buying and processing
AWay4africa	Technical service provider, market linkages	Technical and financial support in buying and processing
Farmer associations (NECPA, AFSRT)	NGOs, Technical service provider	Promotion and monitoring production of seedlings and planting
NARO, Nafforri, Nabuin	Research	Applied research on production and adoption by farmers

2.5 Organization of the sector

Although the first trees were planted 50 years ago the cashew sector in Uganda is to be born. Producers need to be organized in organizations of different levels, in order to ensure

representation and efficiency. Currently there is one processor. Farm-firm linkages are to be established.

For the emerging cashew sector a number of considerations are done, based on experiences in West African countries which are producing and exporting RCN.

From the beginning a platform of coordination and regulation should be put in place, representing the active actors with a prominent place for the private sector and the government.

The current market situation of the cashew nut sector in Uganda has the following characteristics:

1. Uganda has a very low RCN production (about 25 metric tons per year)
2. Quality of RCN is not high due to neglect of Good Agricultural Practices and post-harvest handling and a quality control system is relatively unknown
3. Cashew is not produced as primary crop in the farming system; there is no rational farm economics of cashew nut production
4. There are no foreign buyers, except some rumors about Indian buyers passing through local traders, spreading radio announcement with a market price
5. Processing of cashew nuts is very limited (a few metric tons per year); small quantities are supplied to local supermarkets.
6. In Africa there is a high demand for RCN by Asian buyers, because of the high capacity of the cashew processing industry in Asia (India and Vietnam) and shortage of RCN. The short harvesting period of RCN in the year leads to aggressive buying by those Asian buyers. This can result in high price fluctuations and unrest in the market. Other RCN exporting countries face the difficulty of price fluctuations and market instability. This affects the procurement for the local cashew processing.

To create a healthy environment for the sustainable development of the cashew sector, the starting point is that for each actor, adding value in the cashew value chain, there must be a margin. It is assumed that the product is within the quality margins²⁰, according to the international standards of quality control. No actor should exploit another by exceeded pressure. That constitutes a global framework for the price policy.

A cashew governance board should be established, representing the actors in the cashew value chain, can be the governing body for the sector, adopting regulations and being the voice of the represented actors. Market information is validated and issued to the members in the sector.

A legal and administrative framework should be facilitated to avoid the errors that have been made in other cashew producing countries. Practical regulations will enhance order and overview over what is happening in the RCN market and enhance a balanced development. Terms of trade must be developed and agreed upon and adhered by every RCN buyer.

Buyers of RCN need to register themselves at the cashew board. Attention should be on the RCN buyers coming from abroad. An identification, verification of the buyers need to be

²⁰ For RCN Uganda, this is a KOR of more than 44 and a nut count of not more than 200. According to the nut size and physical aspect of the cashew nuts, a distinction is made between the (a) high yielding variety and the (b) local variety.

done. Before giving authorization, they must agree the terms of trade in the Cashew sector in Uganda.

In case significant violence of this price policy, this is to be announced to the cashew board.

2.6 RCN Price policy

The RCN market is a free market and prices; delivery terms and quality are determined and negotiated between producers and buyers.

On the one hand, the RCN prices must relate to the viability of the cashew production and generate gross margin at farmer's level. Next, prices must be at that level that the processor also generates a gross margin, while selling the kernels to the distributors and clients. A global overview on value addition and economic return to the involved actors is needed, preferably by the cashew governance board. A balance, with provide a fruitful space for all actors in the value chain to develop, to invest and to finance.

On the other hand, it needs to be considered that the RCN is a product that is traded over the borders of the African countries. The RCN price in Uganda will be aligned with the FOB prices in Tanzania and Kenya, during the cashew harvest period. Costs of handling, logistics, packing and finance should be considered while relating RCN Farm Gate prices in Uganda.

Between actors in the cashew value chain, platforms where agreement and common understanding of value chain collaboration and the development of the sector is developed, the price policy and even price boundaries can be discussed and agreed upon.

3 Perspectives of Cashew nuts in Uganda

3.1 Competitiveness and scaling up

Projections of production, based on the existing number and the age of the trees, it is possible to reach a significant increase production. An increase in production and supply for processing is preconditional for an economy of scale, creating efficiency in transactions in the value chain.

A 25 years' projection scenario, based on an annual production of 300.000 seedlings²¹ to a RCN production of 15-20 thousand of metric tons on yearly basis. This constitutes a solid supply for competitive local processing, attaining a turnover of 100 million UGX, able to produce 3000 Mt of kernels for domestic consumption and export.

3.2 Recommendations

Based on the diagnostic, a couple conclusions and considerations for further policy development for the cashew sector can be made.

Cashew nut **production** as contributing to income generation and enhanced food security for farmers in Uganda seems to fit in the agroecological zones, the availability of land, the soil type as well as farming system and crop calendar of the Ugandan farmer, particularly in Northern and Eastern. Zoning and concentration of production would allow the efficiency in farm-firm collaboration as well as the delivery of services. Some of those services need to be further developed qualitatively, before upscaling.

In terms of cashew plantations, Uganda is considered to be a virgin land for the cashew sector. New planting can be and should be exclusively done with high yielding varieties. The high quality of nuts will be of an enormous value addition for farmers, for processors and buyers. This will impact the competitiveness of the entire cashew value chain.

Rejuvenation of old cashew plantations is supposed to be done. The indicated reason of neglecting maintenance of trees, was the lack of market access. By the pronounced place of the private sector in the development of the cashew sector in Uganda, this can now be reverted: unless quality is too low, all cashew nuts will be procured by the processor UCPL in Uganda.

The development of the cashew **processing** will be in coherence with the supply of the cashew nuts from the farmers. Sustainable farm-firm linkages must be created by establishing contractual farming, including input supplies, financing mechanisms and feedback information systems in order to enhance production in terms of quality and quantity. The processing of cashew nuts will allow value addition and create many sustainable employment opportunities, particularly for women.

Concerning the **trading** of cashew nuts, securing mechanisms of supply of the processing units and domestic market should be enhanced. Cashew kernels have grown in popularity in the last 10 years worldwide and the tendency is that the growing demand will not be followed by the supply of cashew nuts. That will make the demand from abroad increasingly, when production and supply of cashew nuts progressively increases. A mess of all types of

²¹ Assuming a survival rate of 70% of seedlings

aggressive raw nut buying can be the consequence. The buying practices, stirred to unrealistic price fluctuation by external instant buyers, in other African cashew producing countries, provide unnecessary challenges for the healthy development of the cashew sector, including threatening the investments done by the local actors. A legal and administrative framework should be facilitated to avoid the errors that have been made in other cashew producing countries. Practical regulations will enhance order and overview over what is happening and enhance a balanced development.

On the **consumption** of the cashew kernels, import substitution of roasted cashew nuts in supermarkets and hotels is a prevalent opportunity for national production and processing. It will be a proud of Ugandan consumers to consume products produced by their fellows in the country. The increasing supply tends to have a decreasing effect on the price of roasted cashew kernels in the supermarkets and hotels, which will favor the consumption of many people who cannot easily afford it with the current prices. This healthy snack will not only appreciated but contribute to enrich the nutritious diet of Ugandans.

Once the domestic market will be sufficiently supplied, export of the white cashew kernels will be the next step to be developed. The growing demand will constitute a sustainable market for this product. The export of the cashew kernels will evidently contribute to the gross national product and bring in foreign currency. The appetitive snack, appreciated by elite people all over world, will be traced of being produced by Ugandan farmers, contributing to their well-being!

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Appendix 1 Global overview of actors in cashew subsector in Uganda

Active actors	Type	Role in cashew development
Supermarkets, hotels Kampala	Buyers	Buyers of (un)roasted cashew kernels
UCP Ltd	Processing	Buying and processing
AWay4africa	Technical service provider, market linkages	Technical and financial support in buying and processing
Farmer associations (NECPA, AFSRT)	NGOs, Technical service provider	Promotion and monitoring production of seedlings and planting
NARO, Naforri, Nabouin	Research	Applied research on production and adoption by farmers
Secondary or non- active actors	Type	(Potential) role in cashew development
Naliendele Agricultural Research Institute in Mtwara Mtwara	Research	Supply of high yielding varieties
SNV	Input suppliers	Integration of bee keeping programme; role: finance
UIA – Ugandan Investment Authority	Government	Request of land for a processing facility in Soroti
MFP – Ministry of Finance	Government	Link the nursery operators with Wealth Creation; the Wealth Creation has funds for seedling productions
T&I – Ministry of Trade and Industry	Government	Policy and authorization
DLG – District Local Government	Government	Authorization for the management of Omodoi Farm
FAO	CBOs, NGOs	Cashew nuts for nutritional supplements
MAAIF – Ministry of Agriculture, Animals industry and Fisheries	Government	Cashew plantation in Aloi
LFSNC – LangoFood Security & Nutrition Cluster	CBOs, NGOs	Promotion of production
Banks (Postbank, Pride, IFCU, Centenary Bank, BOA)	Financing	Linking the buyers, nursery operation
Makerere University	Input suppliers	Linking with research
F&BKP – Food and Business Knowledge Platform	CBOs, NGOs	Linking with research, knowledge sharing, co-creation
TKFSNC (TesoKaramoja Food Security & Nutrition Cluster)	CBOs, NGOs	
ICCO Cooperation	CBOs, NGOs	Submitted business plan for processing
BD – BroederlijkDelen	CBOs, NGOs	Technical Expertise and financial (Strengthen the cooperatives, sustainable agriculture)
METL – private company from Tanzania		Supply of cashew seeds

Appendix 2 Profit and loss estimations of the cashew production for 4 scenarios

Annual / at maturity	Cashew 1	Cashew 2	Cashew 3	Cashew 4
Production technique	Current (no fertiliser, no pesticides, no fire belts, no pruning, no regular ploughing, not enough weeding), as monocrop	Current (no fertiliser, no pesticides, no fire belts, no pruning, no regular ploughing, not enough weeding), with initial intercrops	Improved (GAP)	Improved (GAP)
Variety	Local (non-selected seeds)	Local (non-selected seeds)	Local / grafted	Local / grafted
Yield (kg)	360	360	1.000	1.000
Associated crop 1	none	Soybeans	none	Soybeans
Associated crop 2	none	Maize (non improved)	none	Maize (non improved)
Currency	Ush	Ush	Ush	Ush
Gross Revenue	540.000	3.165.000	2.000.000	4.625.000
Variable cost	287.950	268.150	569.750	569.750
Gross Margin	252.050	2.896.850	1.430.250	4.055.250
Fixed cost	33.132	33.132	33.132	33.132
Profit	218.918	2.863.718	1.397.118	4.022.118
Labour productivity per MD	13.412	91.801	19.022	44.757
Capital productivity	1	11	3	7
Unit cost per kg	892	837	603	603
Sales price per kg	1.500	1.500	2.000	2.000
Gross Margin (USD)	76	878	433	1.229
Net Profitability	41%	90%	70%	87%
Investment	Cashew 1	Cashew 2	Cashew 3	Cashew 4
NPV after 8 years	-715.243	-750.121	1.248.941	4.137.389
NPV after 25 years	461.243	-206.390	8.367.284	11.255.733
IRR after 8 years	-22%	111%	27%	N.A.
IRR after 25 years	12%	5%	40%	N.A.
Payback period (year)	12	17	6	1
Investment capital	1.202.377	1.186.066	1.367.984	968.476

Appendix 3 for details of yield per variety

The trees in Omodoi farm are mostly POLY CLONAL SEEDS originating from Tanzania. There is a block of these selected elite variation from the polyclonal seed group. Twenty cashew clones were identified in terms of yielding capacity and disease resistance particularly powdery mildew (PMD). Out of these twenty, five (05) of them were re selected as Elite varieties and these are the once in Omodoi farm. The first twenty (20) cashew clones identified were AC1, AC4, AC4/17, AC4/105, AC6, AC10, AC10/129, AC10/220, AC14, AC22, AC28, AC34, AC43, AZA2, AZA17/79, AZZ17/156, AZA17/158, AC4/285, AC10/14. Out of these five elite clones were identified thus AC4, AZA2, AC4/285, AC10/220 and AC43.

AGE	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
CLONES																					
AC4		11	9	27	22	43	37	67	61	61	65	69	50								K G S
AZA2		4	13	20	15	32	49	41	45	54	50	52	51								
AC4/285	2	9	16	22	29	33	30														
AC10/220										26	29	40	51	56	58	62					
AC43		8	18	13	25	24	33	31	56	63	66	68	67								
Total Average yearly yield	2	8	14	20.5	17	33	37.2	46.3	54	51	52.2	57.2	54.7	56	58	62					