

## The Cashew Value Chain: Cashew Processing and Its Economic Potential

The cashew tree (*Anacardium occidentale*) is a tropical evergreen tree that takes about 2-3 years to grow from seed, with the tree first developing a drupe; it later develops into a cashew apple from the small stalk bearing the drupe. The fruit which is the cashew apple also bears a single seed known as the cashew nut. Unlike the cashew fruit which can be eaten when plucked, the nut can't be eaten unless after being roasted, it contains a toxin which can only be destroyed by smoke or fire.



Cashew is a seasonal fruit grown in Kaduna, Abia, Kogi, Enugu, Kwara, Oyo, Niger, Imo, and Abuja FCT Nigeria. Nigeria produces

98,291MT nuts with shell (FAO, 2017) with an approximate average yield of 0.84MT/Ha (FAO, 2017). It is a succulent one, though it is highly perishable, and is highly sought after in the Nigerian market. Its fleshy pulp and nuts can be eaten and it's very nutritional as it a good source of protein and contains also selenium, manganese, copper, phosphorus, magnesium, iron and vitamin B6.

It requires a warm humid climate, with a minimum of 600mm rainfall, but well distributed rainfall is more important. Cashew thrives under a wide range of temperatures from 15° to 40° degrees Celsius. The cashew is a strong plant that is renowned for growing in soils, especially sandy soils that are generally unsuitable for other fruit trees. For the best production, deep well drained sandy or sandy-loam soil is recommended.

Cashew can be propagated using either seeds or vegetative method such as grafting, budding, and layering. It takes about 5-6 years for first bearing when propagated through seeds. However, vegetatively propagated planting material is necessary to obtain higher and early yield. Planting of cashew at a spacing of 10m x 5m which will give a tree density of 200 trees per ha and at the same time providing sufficient space for growers to plant Inter-crops during the initial years of establishment.

The trees grow vigorously in the first 3 years; branches hanging on the ground should be removed because they interfere with harvesting.

### Process of Nut (Kernel) Extraction

The cashew shell, when broken to extract the kernel, releases a caustic liquid (CNSL) that is a strong skin irritant. Processing requires gloves, or the nuts must be tumbled in sawdust or ashes to absorb the liquid. Manual kernel extraction as practiced in some countries can cause serious burns on the hands of the workers. Several processes have been developed to reduce this hazard, such as pan- or drum-roasting, steaming prior to shelling and soaking in hot oil.



In the roasting process, the exudate catches fire and produces a thick black and irritating smoke that causes air pollution. After roasting, the nuts are quenched with water to prevent further burning. The waste water also has some contaminant effect and must be treated. The roasted shells become brittle and can be easily opened.

In the steaming process, the nuts are placed in a boiler and steam-cooked, which makes shelling easier and produces a higher percentage of whole kernels due to the increased elasticity of both the nuts and kernels.

In the oil soaking process, the nuts are put in a bath of hot oil (around 190°C) for a couple of minutes. The heat eases the CNSL release and nut shelling. Once the kernels are extracted, the thin testa surrounding them is removed by drying. Cashew kernel is consumed in three ways:

- Directly by the consumer;
- As roasted and salted nuts;
- In confectionery and bakery products, for example, finely chopped kernels are used in the production of sweets, ice creams, cakes and chocolates, both at home and industrially, and as paste to spread on bread.

Cashew nut is processed by:

Valency Cashew Processing Limited a subsidiary of Valency International with an installed capacity of 40 MT/day.

FoodPro Limited with a 5,000 Tonnes Cashew Nut Plant Inaugurated in Kwara in 2017.

NEPC mini processing factory at Obollo-Afor, Enugu

### **Health And Environmental Issues**

The shelling of cashew nuts has deleterious effects on worker health and the environment as seen above in Processes. CNSL is harmful to the skin, the smoke pollutes the atmosphere and the wastewater contaminates soil and water. In India, the installation of cashew nut extraction plants is regulated: it is forbidden to build a cashew factory in the vicinity of hospitals, schools, airports and public buildings, and extraction plants must be at a distance of at least 500 m from each other

Other by products of cashew includes:

**Cashew wine:** Cashew wine is made in many countries throughout Asia and Latin America. It is a light yellow alcoholic drink, with an alcohol content of 6-12 percent.

**Cashew Apple or false fruit:** is an edible food rich in vitamin C. It can be dried, canned as a preserve, or eaten fresh from the tree. It can also be squeezed for fresh juice, which can then be fermented into cashew wine which is a very popular drink in West Africa. Cashew apples (pseudofruit) are too fragile to be suitable for transport and relished only in areas of production. They can be eaten fresh in salads, pressed to make juices.

**Cashew wood** is also used for furniture and fishing boats. Cashew tree timber provides good firewood and can make valuable charcoal. The nut shells can be burnt to produce heat to be used in the processing of Cashew Nut Shell Liquid.

**Cashew nut oil meal or cashew nut oil cake:** is the residue of the oil extraction from kernels. It is suitable for livestock feeding.



*Cashew nut oil cake*

**Cashew nut testa:** are the red skins that are manually or mechanically removed in the final step of preparing cashew nuts for confectionery. These skins may contain pieces of broken kernels and can be used as feed.

**Cashew tree leaves** can be cut and eaten fresh or cooked.



### Production Constraints

- ❖ Production constraint results from damages from different insect species at different stages of production, these results into high loss of yield. The sucking pest attack various parts of the plant, it attacks the leaf causing black lesion on petioles or the leaf midrib or causing black angular spots on the leaf surface. It also attacks the stem which appears as a discolored and lesion which also occurs on fruits and developing nuts. In situation of high infestation of these insect on a farm, it eats up the whole shoot and it dies or the entire tree looks burnt. This brings about great loss of income to farmer.
- ❖ Problem of good planting materials, selection, introduction of new materials, establishment of germplasm trials for short, medium and long term breeding and distribution of planting materials to farmers.
- ❖ Extension services are another constraints militating against the production of cashew in Southwest Nigeria. This is very difficult, complex issue in dealing with numerous and widely spread rural farmers. The procedure/cost of the training is too expensive and

unsustainable for the rural farmers to undertake. The activities of the extension agents are carried to the “Contract” farmers whereas the information is meant for the farmers on the field who are supposed to be the real beneficiary of the extension activities.

- ❖ Pricing of Nigerian cashew includes: good cashew price is limited by low quality, small nut and kernel size, and poor kernel peelability (that is, the difficulty in the removal of the testa from the kernel) which adds more to the cost of processing. Poor peelability may possibly be resulting from the single or complex effect of poor harvest, poor post harvest handling, abiotic factors or inherent genetic composition of the Nigerian cashew.
- ❖ Poor handling of cashew production and defective export packaging processes for the international market

**The missing link;** When the produce are taken to the market, the price offered for them are too low leaving no margin for the poor farmer who has incurred some cost in the process of production, transportation, and even payment of duty on the produce in the market. Farmers lack information on current market price, resulting in exploitation from the middle men. Farmers from the rural areas received lower prices due to higher transportation cost of moving the produce to the market. No premium price for the fruits and nuts of better quality thereby discouraging the poor farmers from improving the quality of it produce.

### **Cashew Nut Shell Liquid (CNSL); An Investment Potential?**

Cashew nut shell liquid (CNSL) is a viscous and dark liquid contained in the fruit mesocarp, which is extremely caustic as it is a mixture of 70% anacardic acid (a salicylic acid analog, and a strong skin irritant) with 18% cardol, and 5% cardanol. The two latter components are caustic phenolic substances that readily polymerize and are used for epoxy resins and many high-tech materials that can withstand high temperatures, such as brake linings.

CNSL is also used as a pesticide against termites in timber, and the bark gum is repellent to insects. It is an important and versatile industrial raw material. There are more than 200 patents for its industrial application, in particular, its use as raw material for phenolic resins and friction powder for the automotive industry (brake linings and clutch disks).

CNSL is also used in mouldings, acid-resistant paints, foundry resins, varnishes, enamels and black lacquers for decorating vases, and as insecticides and fungicides.

In tropical medicine, CNSL has been used in treating leprosy, elephantiasis, psoriasis, ringworm, warts and corns.

Like cashew nuts, CNSL also has an excellent international market and its imports have reached almost US\$10 million annually, corresponding to the sale of the raw liquid. However, the exporting country would earn much more foreign currency if manufactured products were exported.

### **Other Investment/Export Opportunities**

Cashew can either be eaten as a fruit or processed into cashew butter and cheese.

The cashew pulp can be distilled into liquor or even processed into fruit drink.

The cashew shell can be used in a wide range of applications such as in paints and lubricants.

However, Nigeria offers one of the cheapest sources of raw cashew nuts. Nigeria exports 27,804.228MT (Report linker data, 2016) cashew nuts. Nigerian nuts have consistently served the Indian and Vietnamese cashew factories and in recent years have added the Brazilian market. The kernels are well accepted in the United States of America and Western Europe because, of high quality of the produce.

**Sources:**

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