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Cashewnut (*Anacadium occidentale* L.) Production and Utilization in Kenya

**Authors:** Francis K. Muniu and Stella Mwashumbe

Other names of cashewnuts in Kenya are:

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<tbody>
<tr>
<td>1.</td>
<td>Cashewnut</td>
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<tr>
<td>2.</td>
<td>Kiswahili – Mkorosho, Mmbibo</td>
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<tr>
<td>3.</td>
<td>Miji kenda: Mkaju, mmbibo, mkorosho</td>
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Cashew growing guide
1. **Introduction**

**Origin and Distribution**
Cashew is scientifically known as *Anacardium occidentale*, and locally known as Mkorosho/mkanju (Swahili). The crop originated from Northern part of South America. The Portuguese introduced cashew to Mozambique where it flourished forming extensive forests; eventually it also spread in the East African region. It has spread for over 500 years either naturally or through small holder cultivation.

In Kenya, Cashew is grown along the coastal primarily in Kwale, Kilifi, Tana River and Lamu counties. Some production also takes place in Taita-Taveta and Tharaka-Nithi Counties.

**Botany**
The cashew nut tree is a first grower, it grows to a height of 10-12m tall, and its trunk is often irregularly shaped. The leaves are spirally arranged, leathery textured, elliptic to obovate, 4 to 22cm long and 2 to 15cm broad, with a smooth margin. The flowers are produced in a panicle or corymb up to 26cm long, each flower is small, pale green at first then turning reddish, with five slender, acute petals 7 to 15mm long.

The nut is attached to the lower portion of the cashew apple which is heart like or conically shaped. The cashew nut (seed) hangs at the bottom of the apple and is c-shaped or kidney shaped. The tree has an estimated economic life span of 45 years.

![Cashew Tree and Nut](image)

**Uses**
It is grown for its fruits as well as nuts. The kernel is obtained by shelling the roasted nuts. The shells yield oil which is used as medicine, preservative and water proofing agent. The oil is also used in the manufacture of insulating varnishes and acid proof cements, tiles and inks. The raw cashew apple is edible and is a valuable source of sugar, minerals and vitamins. Nutritive values of cashew apple and nut are very high. Cashew apple is a very good source of Vitamin C. It contains 12.3% carbohydrate and 10% phosphorus and calcium. Cashew nut (kernel) contain protein (21.2%) and fat 46.9%) and carbohydrate (22.3%). It also contains comparatively good amount of minerals, iron and phosphorus. The wood and shells are used as fuel.
2. **Contribution to the Kenyan Economy**

Kenya produces about 15,000 metric tonnes valued at 397.4m annually against a potential of 45,000 metric tonnes estimated to have a value of 1 billion. Most of the cashew produced is from small-holdings involving about 68,000 farmers. The sub-sector has the potential to create employment through value addition and fetch the exchequer billions of shillings through exports.

3. **Ecological requirements**

Cashew does well in tropical climate with high and constant temperatures. It is frost sensitive.

**Latitude**
Cashew trees grow in a wide spectrum of climatic regions between 25˚N and 25˚S latitudes.

**Altitude**
It can be grown in elevations of between 0 and 1000 metres above sea level with an ideal elevation of 600 meters above sea level. Above the altitude of 1,000 meters above sea level, cashew trees do not tolerate low temperatures as this interfere with reproductive cycle of the tree and leads to delayed flowering and poor yields.

**Temperature**
Cashew requires hot temperatures of between 24°C and 28°C but can thrive even in temperatures of 40°C. The optimum monthly temperature for cashew growing is 27°C.

**Rainfall**
Rainfall should be between 500mm to 1200mm per year. Dry weather is required for the cashew plant to flower. A period of at least 4 to 5 months of dry weather after the rains is required for optimal yields. Excessive humidity leads to emergence of many fungal diseases for the cashew plant. Long days of sunshine are necessary for cashew to bloom and give a good yield.

**Soils**
Cashew prefers a deep (>2m) well-drained and light textured soil. Heavy clay (including dark cracking clays), compact and hard surface setting soils hardpans or with concretions within rooting zones are not suitable for cashew production. Cashew could be described as a sand loving plant. The optimum range of pH for cashew is between 4.5 and 6.5 and the minimum pH is 3.8. The tree is not tolerant to saline soils. It does not grow well in valleys, flood plains and swampy areas with poor drainage.

3. **Varieties**

Recommended varieties of cashew are A75/83, A100, A81 and A82. Cashew can either be propagated by seeds or grafted seedlings.

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>POTENTIAL YIELDS /Kg/Tree</th>
<th>Kg/Acre</th>
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</table>
4. **Cashew propagation**
Cashews are usually propagated through seed or grafted seedlings. In propagation by direct seeding 3 seeds are planted in the planting hole and two months after germination the weak seedlings are uprooted leaving the strong one to grow.

**Propagating through grafted seedlings**
Propagation through grafting starts by raising rootstock. Rootstock is raised from local cashew varieties. First step is visual selection of seeds to remove diseased or deformed seeds. The selected seeds are then taken through flotation test in water. Seeds that sink are then planted in pre-germination beds.

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<table>
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<tbody>
<tr>
<td>A81</td>
<td>50</td>
<td>1400</td>
</tr>
<tr>
<td>A82</td>
<td>55</td>
<td>1540</td>
</tr>
<tr>
<td>A75/83</td>
<td>70</td>
<td>1960</td>
</tr>
<tr>
<td>A100</td>
<td>60</td>
<td>1680</td>
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</table>
The pre-germinated seeds are transplanted into polythene bags when they produce 2.5 –3cm radicals (Tap root) after 7-10 days. The recommended soil media for cashew seedlings is in the ratio of 2:1:150 where :- 2 - is two buckets of soil, - 1 - is one bucket of well decomposed farmyard manure - 150 - is 150gms of DAP. The seedlings are transplanted in polythene bags of (6” X 9”). This composition is able to hold the plant for averagely three months after transplanting the pre-germinated seeds in them.

Seedling are ready for grafting when they attain more than two functional leaves and, preferably while the cotyledons are still attached to the young stem. Grafting is done 3-4 weeks after transplanting into polythene bags.

Scions for grafting are harvested from mother plants of the variety intended propagated. The following procedure for grafting is recommended:

i) Cut and remove the actively growing part of the stock, leaving two functional leaves
ii) Vertically cut down the stock between the two leaves to a depth of 2.5 – 3.0cm

iii) Make a wedge cut of the scion of a similar length of 2.5-3.0 cm and sharpen it.

iv) Insert the scion to the rootstock and tie them together.

v) Cover the scion and the rootstock by wrapping with a grafting tape.

vi) Wait for 2-3 weeks and unwrap the scion

**Grafting tools:** Tree pruner, Pruning saw, Secateurs- for harvesting scions, pruning

• Grafting knife and Grafting tape

The seedlings of cashew are grown under shade 60% and hardened off before planting in the orchard. It is very important not to disturb the root system during planting. Young trees should be supported for the first 2 to 3 years so that the wind will not blow the plants over.
5. **Planting**

Cashew should be planted at the beginning of the rain season. The best time for planting will depend on available soil moisture. In the Coastal lowlands, the best time for planting is April to June.

To establish a cashew orchard the following steps are recommended.

- Plough the land thoroughly, removing stems and roots
- Lay out the field by spacing holes 12m x 12m.

A Spacing of 6m by 6m can be adopted with intention of thinning to 12m by 12m at a later stage when the canopies start to overlap.

- Dig holes one or two months before planting. The depth should be 60cm x 60cm x 60 cm (2ft x 2ft x 2ft).
- Mix the top soil with two buckets of well decomposed farmyard manure and 150g (7.5 table spoonful) of DAP
• Carefully remove polythene bag without disturbing the roots and plant at the centre of the hole. Plant the cashew seedling on the same soil level as that of the soil when the seedling was in the polythene bag i.e avoid burying the graft union. Prepare a shallow basin and cover with mulch and water after planting.

• Water the plant every 3-4 days until it has properly taken.
• Intercrop with short duration perennials e.g pawpaws or food crops e.g maize, cassava, cowpeas
• -vegetables e.g tomatoes, melons, pumpkins, chillies, brinjals
• Ensure that the orchard is always free from all kinds of weeds

Management of young orchard

Formative pruning
Formative pruning is the training done on the grafted plants to make the tree grow upright to a height of 1.0-1.5 m. This work should be done within the first 5 years after establishment of the cashew tree and is important for continuous development of the tree.

Removal of suckers
Suckers are shoots growing from the rootstock. They compete with scions for food hence they should be removed. Lateral branches on the scions suppress upright growth of the scion material. When removing horizontal shoots/branches, ensure that leaves of the main stem are not removed. Desuckering should be done continuously in year one until the tree is 1 m high.

Fire breaks
To avoid the risk of fire in the field, it is necessary to put fire breaks around the field soon after planting particularly during the dry season

Control of insects pests
Young cashew seedlings are susceptible to damages caused by cashew bugs and coconut bugs therefore it is important that the seedlings are routinely protected against the insect pests.

Shading
If drought conditions occur, shade or mulch and irrigation should be provided to the seedling.
**Recommended fertilizers rates**
Animal manure and compost are the most desired types of fertilizers for Cashew. However, if manure is not available or intensive production is carried out, chemical fertilizer DAP (Diammonium Phosphate, CAN (Calcium ammonium nitrate and Potassium Sulphate can be applied. The fertilizer and manure rates recommendation are as given in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Manure (10-15 kg tin)</th>
<th>DAP (g)</th>
<th>CAN (g)</th>
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<tbody>
<tr>
<td></td>
<td>Long rains</td>
<td>Short rains</td>
<td>Long rains</td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>1</td>
<td>520</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>2</td>
<td>780</td>
</tr>
<tr>
<td>Above III</td>
<td>2</td>
<td>2</td>
<td>780</td>
</tr>
</tbody>
</table>

**Irrigation**
Irrigation is important during establishment of young trees because it doubles the growth tempo of young trees in a dry season. Due to the deep root system the trees can survive several months without irrigation. Mature trees should receive 1800L of water per tree every 2 weeks.

**Wind control**
Grass strips in the inter-rows between the tree lines are ideal to prevent erosion and should be cut regularly.

**Pollination requirements**
Pollination is mostly carried out by insects and after the process, it takes 6 to 8 weeks for fruits to develop. Concentration of honey bee colonies during flowering would alleviate problem of poor fruit setting.

8. **Managing old cashew orchards**

The following options are available for improving old cashew orchards depending on their condition.

**Pruning**
Pruning is done to remove unwanted plant parts. It is best done immediately after harvesting the last nuts and before flowering to give an allowance for wounds to heal.

- Remove all the dead branches
- Remove intermingling branches that prevent light penetration
- Remove branches that have been attacked by pests and diseases.
- Remove all branches that are below 1 m from the ground level
- Protect the wound by painting
- Tools used: Pruning saws and secateurs

**Selective thinning**
This is removal of unwanted trees from the orchard.

- Remove trees that are too closely spaced
- Remove diseased trees
- Remove unproductive trees
- Remove undesired varieties
- Remove volunteer trees

**Rehabilitation of old and unproductive trees**

**Pollarding**
Pollarding is a pruning system in which the upper branches of a tree are removed, promoting a dense head of foliage and branches. In cashew severe pruning of the tree is done at a height of about 3m to reduce canopy to allow easier spraying and harvesting. Once the tree is pollarded the canopy grows again and the tree flowers the same year.

- Remove the whole canopy at a height of 2.5 to 3.5 m from the ground
- Pollard aged but productive trees with large canopies that are difficult to manage.
- Continue with normal pruning

**Coppicing**
Coppicing is cutting down the tree at a height of 0.5 m to 1 m to renew the canopy

- Coppice old trees
- Unproductive trees
- Low yielding trees.
- Cut the tree at a slope to avoid water settling on the cut surface.
• Allow 3 to 4 sprouts to grow into the new canopy

**Top-working**
Top working is grafting of sprouts from coppiced trees. Top-work 3-4 sprouts per stem when pencil thick.

9. **Pests Management**
The most notable insect pests for cashew are the cashewnut bugs (*Helopeltis anacardii*) that suck sap from the leaves and from the young cashew fruit. Other insect pests include stem borers, thrips, meallybugs, weevils, caterpillars and leaf miners. Diseases include Anthracnose and powdery mildew. The table below shows the main diseases and pests found in the coastal region and recommended control measures.
10. **Harvesting of Cashew and post-harvest handling**

Cashews planted by using seed are usually ready for harvesting 3 to 4 years after transplanting seedlings. Nuts should be harvested as soon as possible, especially under wet conditions and should be dried before storage.

Grafted seedlings can yield within 2 years. Depending on age and maturity of plant, a tree can give between 10 to 100 kilograms of unshelled nuts per year. One hectare can give between 2000 to 5000 kilograms of unshelled nuts per year. Harvesting can continue for 40 to 50 years. Commercial harvesting is done for 35 years.

The cashew nuts do not mature at the same time. The duration of harvest extends from 45-75 days and the nuts should be collected daily during this period. November to May is the harvesting period, November to January is the peak harvesting period. To get good quality nuts, clear the area beneath the tree, collect fallen fruits, detach the nut from the apple and dry the nuts under the sun for about 2 hours. The nuts can be graded into Fair Average Quality (FAQ) and Under Grade (UG). FAQ are well matured nuts and they should be full and well dried (12% moisture content). The colour should be grey or pale brown. They should neither be wrinkled nor spotted.

FAQ Cashew nuts

UG are well dried and mature nuts. They can be spotted but not wrinkled.

Other grading systems can be used depending on the buyer.