

Why Grow the Ndjanssang Tree?

Ndjanssang is a high-value multi-purpose tree indigenous to Africa. It is a source of food, medicinal extracts, oil, organic manure, and substantial income to rural people.

BENEFITS

1. For appetising dishes

- ☞ The kernels are rich in proteins, minerals, carbohydrates, vitamin B2, fibres and unsaturated fatty acids, which lower cholesterol levels.
- ☞ Use its kernel powder and paste to flavour or thicken stews and sauces.
- ☞ Extract fresh cooking oil from its kernels.

The pulp is not yet used for human consumption.

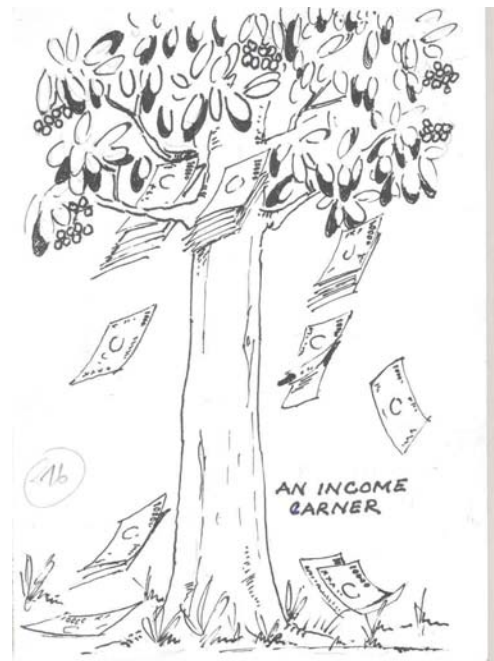
2. For income

- ☞ 1 kg of ndjanssang kernels sells at US\$ 2.5 on average.

3. For medicinal uses

Several parts of the tree can be used as medication.

- ☞ **Boiled tree bark:** used against leprosy, elephantiasis, gonorrhoea, dysentery, diarrhoea, coughs, hernia, rheumatism, abscesses, rickets, smallpox, yellow fever, anemia, skin diseases, malaria, stomach pain, headache, toothache, worms, as an aphrodisiac and an anti-inflammatory.
- ☞ **Seed husks and latex:** used against gonorrhea and diarrhea.
- ☞ **Leaf decoctions:** used against dysentery, oedema, female sterility and as a febrifuge.
- ☞ **Sap:** used as eye drops against infections.



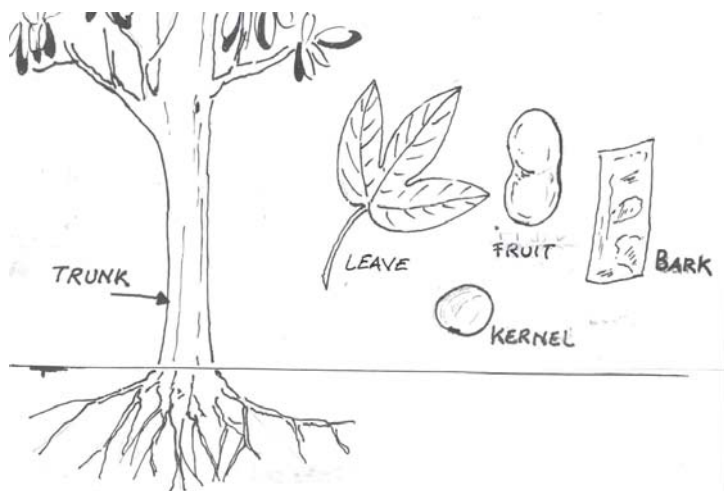
Ndjanssang fruits

Ndjanssang kernels



4. For fuel and timber

- ☞ Use as firewood.
- ☞ Use for durable building.
- ☞ Use to make small wood handicrafts such as stirring sticks and tool handles.



5. For industrial use

- ☞ Oil used for soap and vanish making.
- ☞ Wood ashes used in soap making.
- ☞ Fibres suitable for the manufacture of paper pulp.

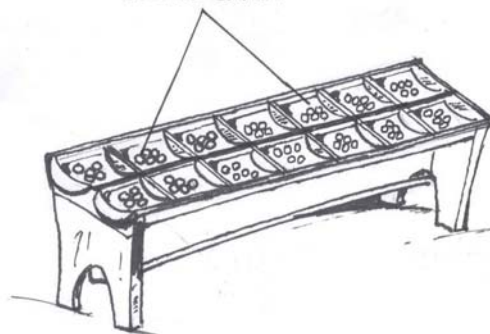
① A DRUM TO ANIMATE TRADITIONAL DANCES



6. Socio-cultural value

- ☞ Wood used for drum manufacturing.
- ☞ Dried seeds used for popular games ("songo") and rattles for dances.

NOJANSSANG KERNELS IN POPULAR SONGO GAME



7. Ecological and environmental value

- ☞ Positively improves soils through mycorrhizae, leaf litter, ash from burnt nut-shell, waste from fermented leaf pulp.
- ☞ Provides shade for other plants.
- ☞ Source of fodder for sheep and goats.

How to Grow the Ndjanssang Tree

- Propagation by Seed -

1. Collecting planting material

- ☞ Collect seeds from 'elite' trees.
- ☞ Trees free from pests and diseases.
- ☞ Trees that have produced fruits at least twice.

2. Propagating

Ndjanssang can be propagated:

- ☞ By planting the seeds.
- ☞ By vegetative multiplication.

3. Seed collection and handling

- ☞ Plant seeds immediately after extraction from fruits.
- ☞ Dry for one week and store to plant later.
- ☞ Scarify the seed coat manually by scraping the seed on sandpaper, to hasten germination.



4. Collecting potting soil

- ☞ Collect forest soil.
- ☞ Mix 3 parts soil with 1 part sand.
- ☞ Use potting medium to fill pots.
- ☞ Seeds can also grow in clay or very sandy soil on farmland.

5. Sowing

- ☞ Sow seeds at a depth of 2–3 cm in seedbeds or pots.
- ☞ In dry season, water plants once every two days in the morning.
- ☞ Keep seedbeds or seed pots under shade for the first 2 months.



How to Grow the Ndjanssang Tree

- Vegetative Propagation -

1. Vegetative propagation

- ☞ There are 3 methods of vegetative propagation:
 - Cuttings
 - Marcotting
 - Grafting
- ☞ Rooting of leafy stem cuttings using a non-mist propagator is the most appropriate technique for the vegetative propagation of ndjanssang.

2. Rooting of leafy stem cuttings

- ☞ Cut shoots from coppiced trees.
- ☞ Mist shoots with water and store in moist polythene bags for not more than 18 hours.
- ☞ Cut the shoots into sections 3–4 cm long, each having one single node and a full internode below.
- ☞ Reduce the leaf size by half.
- ☞ Insert cuttings into 1:1 mixture of river sand and decomposed sawdust in a propagator.
- ☞ After 5 weeks, lift each cutting very carefully to assess rooting.
- ☞ If cuttings are rooted, remove them from the propagator and put in 1 litre polythene bags filled with a 2:1 mixture of sand and decomposed sawdust.



Leafy cuttings in a propagator

How to Grow the Ndjanssang Tree

- Grafting -

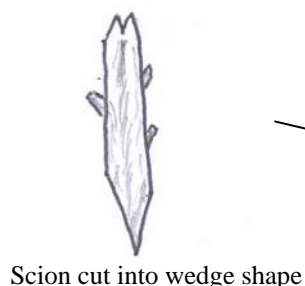
1. Grafting

In order to graft this plant, you will need

- ☞ A sharp budding knife.
- ☞ Polyethylene tape (budding tape) (1.5–2.0 cm wide x 30–40 cm long), or strips cut from black or transparent polyethylene bags.
- ☞ Transparent plastic bags large enough to cover the top of the scion.

2. Scion preparation

- ☞ Collect shoots (scions) from mature trees, having borne fruit at least once, pest- and disease-free. Collect scion only at the vegetative growing stage of the tree.
- ☞ Cut scion material 5–15 cm long, 1 cm in diameter (pencil size), with 1 or more buds.
- ☞ Place the knife almost parallel to the twig to cut a level surface of 3–4 cm long at the base in one stroke.
- ☞ Make a second cut on the other side.
- ☞ The scion should fit exactly and tightly into the notch of the rootstock.



3. Rootstock preparation

- ☞ Choose rootstock:
Raised from a seed for 4–6 months, measuring 40–50 cm long, and with a diameter of about 1 cm (pencil size),
OR young plant collected under mother tree.
- ☞ Clear the stem of soil and debris.
- ☞ Cut off the top at a height of 30–40 cm, leaving 2 or more leaves below the cut.
- ☞ Make a slit cut of about 3–4 cm long in the rootstock.



Rootstock sliced to fit in scion



Scion tightly fitting into rootstock

How to Grow the Ndjanssang Tree

4. The graft union

- ☞ Match the surfaces so that both growing zones have firm contact.
- ☞ Firmly bind the rootstock and scion with plastic tape to form a union, making sure that the wound is entirely covered.
- ☞ Cover the top of the grafted plant with a transparent polythene bag.
- ☞ Water the plant regularly.
- ☞ Remove polythene bag when fresh leaves start growing on the scion, in 1–3 months.



Wrapping the graft union.



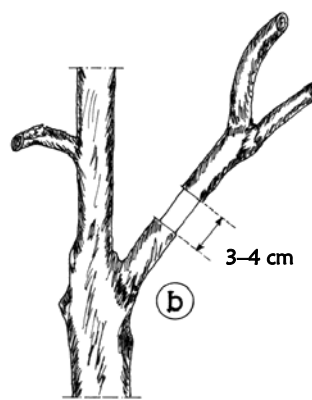
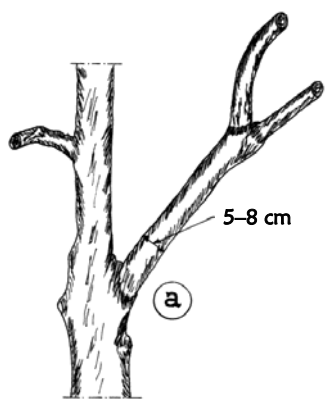
Growing grafted ndjanssang plant

How to Grow the Ndjanssang Tree

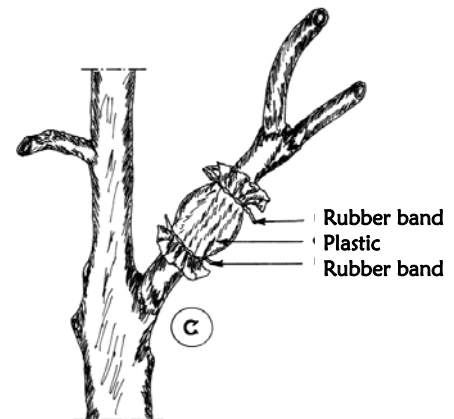
- Air-layering -

Air-layering or marcotting

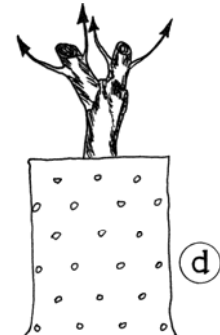
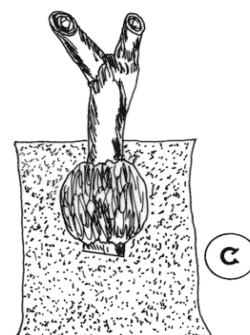
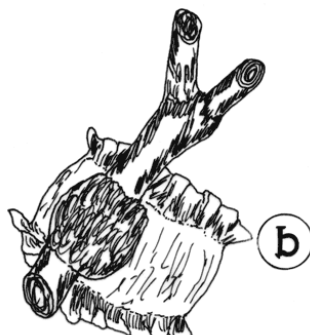
- ☞ Select trees of 7–12 years old that have produced fruits at least once.
- ☞ Choose a tree's vertical branches of 5–8 cm in diameter.
- ☞ Remove the bark from a 3–4 cm girdle at about 10–15 cm from the main tree stem.



- ☞ Place the plastic sheet below the cut and secure it tightly with a rubber band.
- ☞ Fold the plastic over the cut so that a pocket is formed.
- ☞ Mix rooting medium of moist rotten sawdust with powder insecticide.
- ☞ Put rooting medium in plastic pocket.
- ☞ Wrap the plastic and its contents around scraped section of the branch and close the top end with a rubber band.



- ☞ After 2 months, detach rooted marcotts from the mother tree (a).
- ☞ Remove the plastic and take care not to injure the newly formed roots (b).
- ☞ Pot the detached rooted marcotts in a 10 litre polythene bag containing a 2:1 mixture of river sand and decomposed sawdust. Water the plant after potting. (c&d)



Where to Grow the Ndjanssang Tree

- Field Establishment -

FIELD ESTABLISHMENT

1. Site characteristics

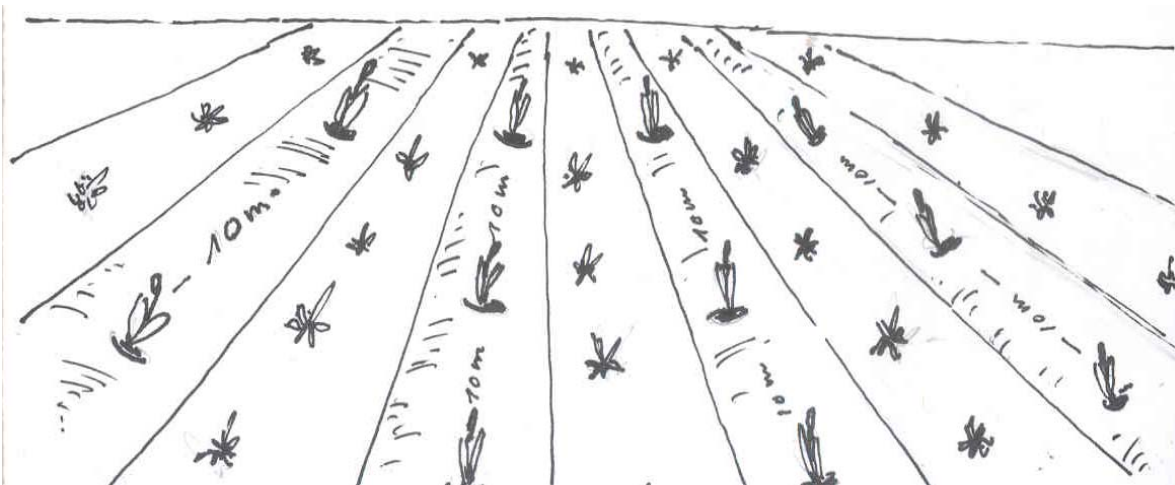
- ☞ Plant in humid lowlands (0–800 m above sea level).
- ☞ Do not plant on soils with too much clay or sand.
- ☞ In areas between 1000 mm and 3000 mm of annual rainfall.
- ☞ Plant in a good light with a little shade.
- ☞ Avoid windy areas since branches break easily.



Ndjanssang trees growing on a demonstration plot

2. Site preparation

- ☞ Clear all shrubs from the site before rainy season.
- ☞ Dig planting holes of 30 x 30 cm for seedlings, cuttings and grafted plants.
- ☞ Dig holes of 50 x 50 cm for marcotts.
- ☞ Space out planting holes by 10 m.



3. Transplanting

- ☞ Transplant only 6-month-old seedlings, marcotts or rooted cuttings, measuring least 20–30 cm.
- ☞ Plant at least 24 hours after sufficient rainfall.
- ☞ First put topsoil in the hole, then the plant, and cover with the remaining soil.



How to Grow the Ndjanssang Tree

- Field Management -

1. Watering

- ☞ Water plants abundantly before planting.
- ☞ Water 10 cm round the plant in the morning every 2 days.

2. Weeding

- ☞ Weed 1 metre around the trees once every two months for the first year after planting.

3. Use of fertilizer

- ☞ In nursery, apply inorganic fertilizer, at a rate of 25 g (e.g. NPK 20:10:10), as top dressing every 4 months.
- ☞ In field, apply 50 g of inorganic fertilizer (e.g. NPK 20:10:10), as top dressing every 4 months.
- ☞ Follow the instructions on the labels of all chemical products you use.
- ☞ During the first year, mulch with dry herbs during the dry season to avoid water loss.
- ☞ Application of organic manure is optional.



Apply fertilizer around, not on the plant

4. Land use systems

- ☞ Ndjanssang trees can be associated with food crops species that grow under shade e.g. - cassava
 - cacao
 - yams
 - maize
 - bananas
 - plantains
- ☞ Plant at 10 m spacing when growing with food crops.
- ☞ Grow alongside other trees in the forest.
- ☞ Plant in home gardens.

Harvesting

1. Harvesting time

- ☞ In managed systems, the tree produces fruits 4–5 years after planting. The fruits should ideally be harvested in the month of August. After this period, they lose some of their germination potential.

2. Fruit maturity

When mature, the fruit is:

- ☞ Indehiscent green in colour.
- ☞ Oval in shape.
- ☞ Formed of 2 or 3 lobes.
- ☞ Between 20 and 45 g in weight.



3. Fruit collection

- ☞ Clear the surroundings of the tree to easily find the fallen fruits.
- ☞ Collect mature fruits that drop under the tree.
- ☞ Gather them in small heaps under the tree or any secure place.
- ☞ Keep them under ambient temperature for 2 to 4 weeks for the pulp to rot.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Flowering	Flowering		Fruits still developing seeds	Fruits ready for collection	Fruits ready for collection	Fruits containing seeds with low germination potential		

4. Yields

- ☞ Healthy trees will produce a harvest of 900–2180 fruits.

Post-harvest Handling

1. Extracting seed from fruits

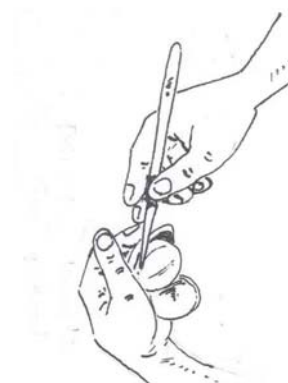
- ☞ Squeeze the rotten pulp from the fruit.
- ☞ Wash the seeds abundantly in cold water.
- ☞ Boil them in water for at least 8 hours.
- ☞ Leave in cold water for 24 hours.
- ☞ Rinse and place in lukewarm water for about an hour until the seed shells crack.



Boiling seeds in a pot

2. Extracting kernels from the seeds

- ☞ Take out the kernel using a small knife or nail.
- ☞ Watch out not to wound yourself.
- ☞ Sort the kernels in order to remove low quality and cracked ones.



Remember to protect your fingers when extracting kernels from seeds.



3. Conditioning

You can improve the kernels:

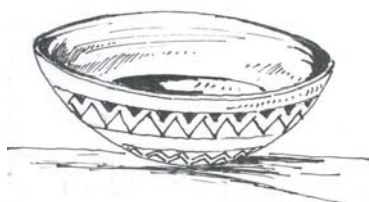
- ☞ By exposing them sheets on mats or sheets to sunlight for 2–3 weeks.
- ☞ By putting them on a rack above the fire-place.

4. Storage

- ☞ Store well-dried kernels in bamboo baskets, calabashes, airtight steel containers or pots.
- ☞ Keep kernels for up to 2 years.
- ☞ Watch out for rodents, which might feast on the dried kernels.



A basket



A calabash



An airtight container

Marketing and Economics

MARKETING and ECONOMICS

1. Marketing potential

In Yaoundé alone, capital city of Cameroon, there is a market for 380 tons (7600 50 kg bags) of ndjanssang kernels annually. The kernels are sold:

- ➡ Directly to people who live around you.
- ➡ To retailers in urban and rural markets.
- ➡ To wholesalers from urban and regional markets.
- ➡ To exporters to international markets.
- ➡ In some areas where ndjanssang is exploited intensively, households generate about 12% of their annual income from the sale of its kernels.



Measuring kernels

2. Pricing

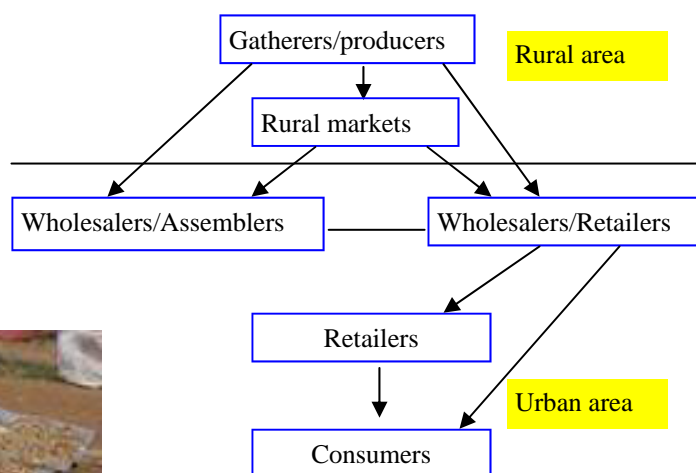
- ➡ Because the kernels can easily be stored, ndjanssang is sold throughout the year. Prices are lowest between July and December (150–200 CFA Frs per milk cup) and highest between January and June (250–300 CFA Frs per milk cup).

3. Economics

- ➡ Store and sell in periods of scarcity.
- ➡ Sell in markets where there is high demand and low supply to benefit from high price margins.
- ➡ Shiny bright kernels (dried in the sun) will fetch higher prices than matt dark kernels (dried above the fireplace).



Conditioning kernels



The ndjanssang market chain

Estimated half-year sales (1995) in Cameroon: 229 million CFA (432,000 USD)