



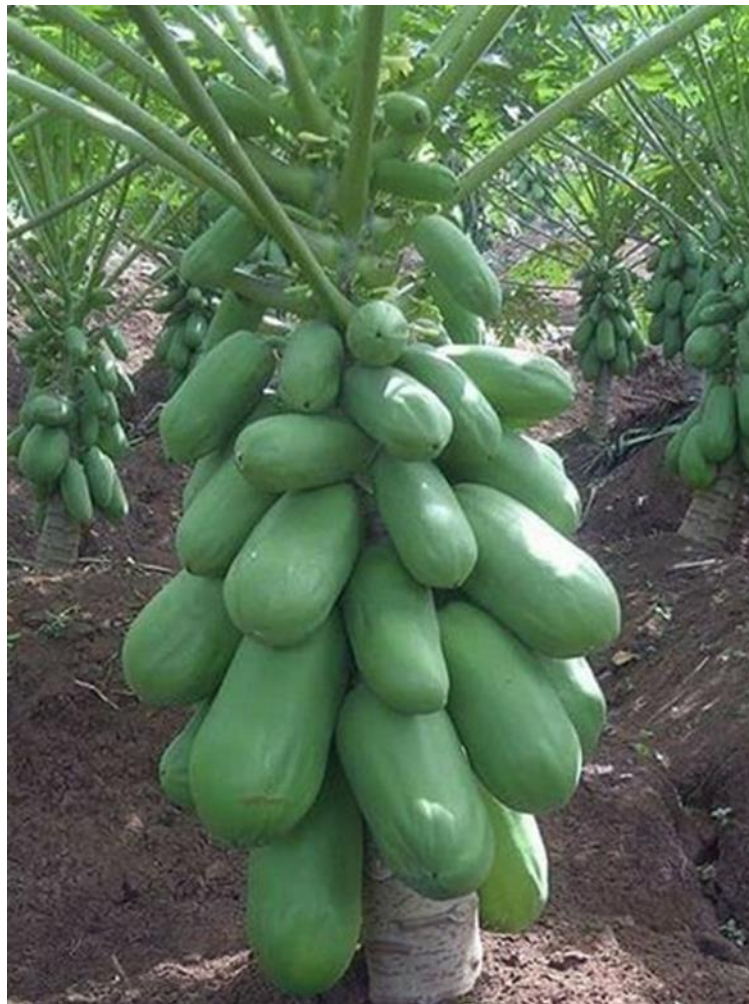
DEVELOPMENT INITIATIVE FOR NORTHERN UGANDA (DINU)



EUROPEAN UNION

Building Resilience to Enhance Food & Nutrition Security, Incomes and Health in Northern Uganda (BRENU)

Papaya (*Carica papaya*) Production Guide



Implemented by:



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OVERVIEW

Papaya is a small unbranched tree that can be grown from seed. It begins to bear fruit after 6-10 months after sowing. The tree produces fruit throughout the year and is usually cut back after 3 or 4 years if it has grown too high and is producing less fruit. Alternatively, many producers simply grow papaya on cyclical rotation so that when one planting has senesced the next is ready to begin producing heartily.

It is a luscious fruit that has been taken for granted. It is a good source of Vitamin A, B, and C. It is a familiar meat tenderizer for clearing fruit juices, fermenting liquors, pre-shrinking the quality of wool, and as soap for washing clothes. Papaya possesses medicinal values.

LAND PREPARATION PROPAGATION AND PLANTING METHODS

Papaya is generally grown from seed. The basic strategy for seed collection is to choose a tree which grows vigorously, has a good shape and produces many high-quality fruits. From the fruit of this tree take seeds, wash off the gelatin layer, dry in the shade and store in a cool and dry place. Well prepared seeds remain viable for several years. After collection, the seeds can be sown in polythene pots filled with soil mixed with organic matter and sand.

Land preparation for papaya orchard is similar to other upland crops. First clear the fields; then plow and harrow alternately about 2 to 3 times to kill weeds and provide good internal drainage. The distance of planting papaya ranges from 2 to 3 meters depending on the variety.

Papaya plants are usually planted by direct seedling in the field. Place 5 or more seeds in each hole; then cover with $\frac{1}{4}$ inch of soil. When fresh seeds are used, seeds will germinate in 10 to 14 days after planting. Seed germination is better and faster if the gelatinous envelope (sarcotestae) surrounding the seed is removed by means of the fingers. In some cases, seedlings are started in the nursery by sowing seeds in seed plots or individual containers such as in cans or plastic bags. Sow 3 to 4 seeds per container. Use sterilized soil to avoid nematode infestation and damping-off. Seedlings in the nursery should be grown under full sunlight to produce vigorous and hardy seedlings. Care should be taken not to disturb the root system. Constant watering is essential until plants are well-established.

Seedlings are transplanted when there are 3 to 4 leaves, are 20cm tall (about two months). The best planting conditions are when the earth is fairly moist, the sky is cloudy, and the air is humid. Papaya will grow in poorer areas but to produce optimally requires a well-drained, airy and moisture-retentive soil with a large amount of organic matter.

The best time to plant is in the evening. To correctly plant much care must be taken when digging the whole. The steps in this process are as follows: Determine where you want to plant the tree, clear the vegetation from this middle point 1m squared around the whole, dig a whole 40cm wide and collect the topsoil, Dig the whole down to a depth of 40cm and collect the subsoil, Loosen the soil in the bottom of the whole and add charcoal fines, ashes and/or compost. Put the topsoil back into the bottom of the whole and water until moist. You can now plant the seedling. Papaya should be planted 3m*2m apart when planting in a plantation. They can also be planted stand alone in a compound.

THINNING

Thin papaya seedlings in the field 4 to 6 weeks after emergence. Leave only 3 of the strongest seedlings in each hole. Save plants that are spaced far enough from one another to allow minimum competition for sunlight and nutrients.

The second and final thinning in the field should be done as soon as flowers appear. This is usually 4 to 6 months after seed germination. At this stage, leave one tree seedling per planting hole. In plantation where female trees are grown, some pollinating trees of either male or hermaphrodite forms should be preserved during the thinning process. Allow one male plant to grow for every 15 to 20 female trees for pollination purposes.

CARE AFTER PLANTING

Watering: Young trees must be watered regularly until they are well established. Although papaya stands up well comparatively to other fruit crops during drought to produce heartily they must be watered. This should happen at intervals of no less than two weeks to a soil depth of 50mm (on a newly planted tree this amounts to 50 litres of water every two weeks). To promote water retention in the soil during the dry season mulching around the tree is advised. When mulching, make sure not to allow the mulch to touch the stem of the tree and keep moist. Although this practice will not completely prevent weeds, it will keep them to a manageable level. If weeds persist, keep them away from the trunk at a distance the same as the crown of the tree.

Establishment of Windbreaks: Windbreaks are necessary in areas where strong winds prevail. The distance between windbreaks varies with location. Where winds blow horizontally across the plantation, a common rule of thumb is to space windbreaks at a distance of 20-30 times the height of windbreak trees. Where winds come in different directions and angles, it is necessary to have windbreaks half as close.

In general, a good windbreak should be permeable, allowing some air to pass through.

Fertilizing: Because you have added the topsoil to the root system as well as compost and charcoal fines/ashes your job will be easier in the very beginning. Young trees should be given a dose of organic fertilizer (plant tea, or liquid manure which can be applied to the top of compost or mulch) two to four times per year, particularly right before flowering and after fruiting. This should be applied directly around the trunk of the tree but must not touch the trunk.

Weed Control: Weeds can be controlled by mechanical and chemical means—Hand-weed when papaya plants are less than 2- ½ meter high. Always keep one-meter area around the trunk free from weeds.

In large commercial papaya plantation, weed control is done by using herbicides. Spray pre-emergence herbicide to hinder weed control for six months without much damage to plants. Spray post-emergence herbicides such as Paraquat or Gramoxone plus a surfactant, at intervals between sprays 5-6 weeks. Since papaya seedlings are very sensitive to chemical sprays, remove weeds close to the seedlings manually.

Intercropping: Papaya can be grown as intercrop with coffee, pineapple or assorted vegetables. Intercropping with papaya increases total farm income and reduces weeding expenses. It is important to provide fertilizer requirement of the intercrop.

HARVESTING

Harvesting is a simple operation when papaya trees are short and the fruit can be reached by hands. The first harvesting starts on the 6th to 8th month after planting. Pick all fruits showing a tinge of yellow at apical end.

Place harvested fruits in picking bags, galvanized containers or pails. Allow fruits to mature more fully to develop better flavor. However, this shortens shelf life and make them more susceptible to fruit fly infestation.

When papaya trees grow older, harvesting is done with the use of ladder. It is a tedious, time-consuming and costly method of harvesting. Farmers can also use a long pole to strike the apical end of the papaya fruit to detach it from the tree while the fruit is caught by hand.

The papaya plant will keep on fruiting for many years but production declines rapidly as it grows older. Old trees grow slower and produce lesser fruits. The productive life span of papaya end after 3-4 years. The yield of well-managed papaya plantation is 14 to 16 tons of fruits per acre.

COMMON DISEASE AND PESTS OF PAPAYA AND THEIR CONTROL

DISEASES

Phytophthora blight – caused by *Phytophthora palmivora*. Common symptoms are found on stems and fruits. Small, water-soaked, discolored spots may occur anywhere on the stem, around the fruit or leaf scars, especially during fruit production. These infected areas enlarge and often completely encircle stems of young trees. Green fruits are resistant to infection but can be invaded through the wound or through the peduncle from the stem cankers. Infected mature fruits that hang on the tree shrivel as disease progresses, turn dark brown, become mummified and fall to the ground. Mummified fruits become reservoir for fungus and source of infection.

Control – remove rotting fruits from the tree as these serve as reservoir of spores from fungal mass which is carried by rain or wind to healthy parts of plants. These spores may infect non-injured leaf tissue, stems or fruit. Good drainage conditions reduce infection and use of protectant spray such as copper sulfate or DithaneM-45 fungicides limit extent of injury.

Anthracnose – Affects both plants in the field and the fruits at harvested. First symptom is usually a small, round, water-soaked area on ripening portion of the fruit. As fruit ripens, these spots enlarge rapidly, forming circular, slightly sunken lesions; these enlarge up to 2 inches in diameter as fruit matures. Fungus frequently produces large, light orange or pink masses of spores in the center of the lesions. Sometimes spores are produced in concentric rings similar to a bull's eye. In addition to producing this surface damage, the fungus also advances into the fruit. Occasionally, green portions of the papaya become affected with anthracnose. Disease first appears as a small, water-soaked lesion. Soon after fungus penetrates the fruit, latex comes out

in sticky mound of horns. These lesions enlarge to ½ inch in diameter as fruit remains green and eventually plant dies. Infected petioles may act as source of inoculum for infection of fruit.

Control – Control of this disease can be achieved only by means of a thorough spray program. In rainy areas with high temperatures, spray Dithane M-45 at 7 to 10 days intervals. Copper-based fungicides also provide good control.

Papaya mosaic – Initially, leaves develop rugged appearance. Undersides of leaves show thin, irregular, dark-green lines etching the borders of cleared area along veins. Younger leaves of crown are generally stunted and severely chlorotic with veins banding; transparent oily areas are scattered over leaf or along leaf veins. In mature leaves, chlorotic patterns are light colours between veins accompanied by numerous small rinds ranging from transparent yellow to tan yellow. In several affected areas, defoliation progresses upward until only a small tuft of leaves remains at the crown. Stems of infected plants show pinpoint-sized, water-soaked spots may develop into linear or concentric ring patterns, w/c become larger and more intense in color. This is generally transmitted by green peach aphid.

Control – The only satisfactory way of controlling mosaic is by destroying source of the virus. A strick roguing program should also be followed:

- Spray all infected trees with insecticide to kill aphid carriers.
- Cut all infected trees and remove them from growing trees and other cucurbit plants.
- Avoid nearby cultivars of cucurbit plants.
- Control aphids with pesticides since they are disease-carriers.

INSECT PESTS:

Mites – They colonized on different parts of plants and feed on plant, causing premature leaf drop, reduce tree vigor and produce external blemishes on fruit. They puncture plant tissues with their needle-like mouthparts and feed on tissue juices. Some multiply rapidly throughout the year and cause widespread damage in a very short time.

Control – Control mites by sulfur dustings. Spray Malathion at rates recommended by manufacturers.

Fruit fly – These infest papaya when fruits are allowed to ripen on the tree beyond recommended picking stage. Fruits harvested in the mature green stage are not infested due to the milky substance they exude when fruit is punctured.

Control – Sanitation is important. Destroy all dropped and pre-mature ripe fruits and suspected of being infested to prevent larvae from developing into adults flies.

NOTE: *The best methods of prevention are to keep the tree healthy during its early years through the use of the above “care after planting” methods. Additionally, you can use the locally made crop protection methods presented earlier in this training as much as needed. Generally, papayas are a hearty plant which resists disease.*

MEDICINAL VALUES OF PAPAYA

Bruised papaya leaves are used as a poultice in treating rheumatism. In nervous pains, leaves can be dipped in hot water or warmed over a fire and applied. As purgative, one tablespoon of the fresh fruit juice mixed with honey and 3 to 4 tbsp. of boiling water is taken one draught by an adult; two hours later, it is followed by a dose of castor oil. This treatment is repeated for 2 days, if necessary, for children aged 7 to 10 years old. The children under 3 years, half the dose is given.