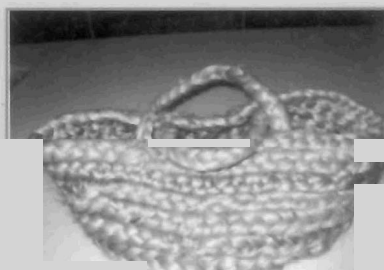
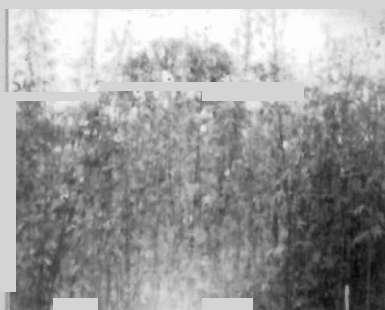




Guide on Kenaf Production and Processing



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1.0 INTRODUCTION

Kenaf is one of the major industrial crops cultivated in Nigeria. Various research efforts have been carried out to improve its production and utilization. Research efforts in the Institute of Agricultural Research and Training have been directed towards solving the problems of seed viability and quality of core fibre and farm systems involving kenaf.

Problems of wrong choice of fertilizer, weed control and disease lead to poor fibre yield. The Institute, therefore, has come out with improved varieties of the crop, developed effective control measures of pests and diseases and popularizing processing methods of the core fibre. This production guide will assist resource-poor farmers in production and utilization of this crop.

2.0 CHOICE OF LAND

- A well drained sandy loam, silty loam, sandy clay loam or loamy soil preferably with neutral pH.
- Fertile soils with relatively good topography.
- Relatively low fertile soils but friable enough to allow seed germination and plant development that the fertility can be enhanced with fertilizer application.
- But if in doubt, contact your nearest Extension Office or Agro-Service Center.

2.1 Land Preparation

2.1.1 Land under fallow

- Use any method (Mechanical, Chemical and Manual) that can adequately remove existing trees, shrubs and weeds.
- Keep the soil loose for good seedbed.
- As much as possible, incorporate residue of the existing plants into the soil.
- CAUTION: For large scale planting, minimum tillage should be adopted during clearing to ensure preservation of the topsoil when uprooting and clearing trees mechanically.
- Consult the nearest Extension Office or Agro-Service Center.

2.1.2 Land under cultivation

Use any of these methods:

- **Mechanical** (ploughing, harrowing and ridging) recommended for deep and hard soils.
- **Chemical** (pre-emergent and post-emergent herbicides).
- **Manual** (slashing and hoeing).
- As much as possible, incorporate residue of the previous crops into the soil.
- Making seedbeds is recommended for riverine farm land to reduce water logging in poorly drained soils.

3.0 RECOMMENDED/IMPROVED VARIETIES

- Cuba 108
- Tianung 1 & 2
- Ife Ken 100
- Ife Ken 400
- Ex-Shika 24

4.0 TIME OF PLANTING

4.1 Early season:

4.1.1 Forest zone

- The optimum planting date is between March 15 and April 1, although planting could be done as soon as rainfall becomes steady.

4.1.2 Derived Savannah zone

- Plant any time in April, as soon as the rainfall becomes steady.

4.1.3 Guinea Savannah zone,

- Planting could still be done as late as May to July, depending on rainfall.

4.2 Late season

Late season kenaf is recommended only for areas where rainfall is likely to be adequate.

- Planting should be done preferably between August 1 to 5.
- Kenaf for seed and core production is best planted in the late season where proper drying could be easily effected for optimum production.

5.0 METHODS OF PLANTING

- Kenaf can be planted by broadcasting or drilling.
- Kenaf can be planted on flat, moulds or beds.
- Where drainage is a problem, planting is done on crest or peak of moulds.
- Depth of planting is between 3-5cm
- Plant immediately after land preparation to allow kenaf to get ahead of weeds.
- When the land is ploughed mechanically, the depth of planting should not be more than 5 cm (2 inches).

6.0 SEED RATE

- 15 kg/ha for fiber production
- 10 kg/ha for seed production

6.1 Plant Population

- The optimum plant population is in the range of 250,000 to 400,000 plants/ha.
- Sowing at 20 by 50 cm at rates of 15 kg/ha has given reasonable stands with a population of between 270,000 and 300,000 plants/ha (germination is between 85 and 90%).

- Lower populations result in branching and an increase in stem thickness which may make harvesting difficult.
- Populations higher than 400,000 can lead to a reduction of stem diameter and this in turn may cause lodging of the crop.

Caution: Always use certified seeds of recommended varieties for good crop establishment.

7.0 FERTILIZER APPLICATION

Kenaf is a highly productive crop and therefore takes up considerable quantities of nutrients from the soil. The crop has high requirements for nitrogen, potassium, calcium and magnesium.

7.1 Fiber and Seed Production

Forest fallowed land

- Apply 200 kg (4 bags) of NPK 20-10-10 per hectare at planting as band or broadcast application (equivalent to 40 kg N, 20 kg P₂O₅ and 20 kg K₂O per hectare).

Forest land under cultivation

- Soils under continuous cropping: Apply 350 kg (7 bags) of NPK 20:10:10 at planting as band or broadcast application (equivalent to 70 kg N, 35 kg P₂O₅ and 35 kg K₂O).

Savanna zone

- Apply 500 kg (10 bags) of NPK 20:10:10 per hectare at planting as band or broadcast application, to give 100kg N, 50 kg P₂O₅ and 50 kg K₂O.

Caution: Soil testing is important to determine nutrient status of the soil and determine fertilizer inputs. If the above fertilizer recommendation has been used repeatedly on the same field for more than four years, it is advisable to submit soil samples for testing before further application.

Note: Soil testing service is available at I.A.R.&T., Moor Plantation, PMB 5029 Ibadan.

8.0 WEED CONTROL

8.1 Hand weeding

- First weeding 1421 days after planting or as soon as necessary. A second weeding will be done as at when due before weeds outgrows kenaf.

8.2 Herbicide application

- Apply Atrazine, Codal, Stomp and Premextral pre-emergence at the rate 1 small milk tin full/4.5 liters (1 gallon) of water on a clean seed bed.
- Application of 50% flowable (PW) at the rate of 1 small tomato tin full/4.5 liters (1 gallon) of water.
- Application of 80% wettable powder at the rate of one standard match box full/4.5 liters (1 gallon) of water.

8.2.1 Volume of Water to be used

Ideally, the sprayer should be calibrated to determine the spray volume. As a guide, however:

- For tractor-mounted Boom Sprayer, use 200-225 litres of water per hectare.
- For pressurized knapsack sprayer (C.P.3), use 400 litres of water per hectare.

Note

- Where grass weeds predominate, use primextra, 2.5 kg active ingredient (a.i.) per hectare or Lasso/Atrazine, 2.5 kg ai/ha (5 L/ha of commercial product).
- Where sedges pose a problem, use Butylate (Sutan) at the rate of 3 - 4 kg active ingredient (a.i.) per hectare or Stomp (Pendimethalin) at the rate of 1 - 2 kg a. i. /ha (2 - 4 liters of product/ha) pre-plant incorporated herbicide.
- Where corn grass (*Rottboellia cochinchinensis*) predominates, use a mixture of Atrazine (2 kg) and Pendimethalin (Stomp, Prowl; at 1.5 kg a.i./ha).
- Broadleaf weed control is likely to be a bigger problem, as commonly available broadleaf herbicides will kill the kenaf. For broadleaf weed control, it is recommended to avoid planting kenaf in overly weed infected fields.

9.0 PESTS AND DISEASES

9.1 Pests

- (i) The main pests of concern are those which defoliate plants and so reduce growth rates and stem yields.
- (ii) The main insects causing defoliation of kenaf are the red-shouldered leaf beetle and a number of looper caterpillar species.
- (iii) Kenaf grown for seed is usually attacked by *Heliothis helicoverpa*, green vegetable bugs (*Nezara* spp.) and harlequin bugs (*Tectocoris* spp.).
- (iv) Root-knot nematodes (*Meloidogyne* spp.) can cause galling on kenaf roots and this restricts water and nutrient uptake.
- (v) The nematodes are more common on sandy soil types and are unlikely to be a problem in clay soils.

9.1.1 Pests Control

- (i) Use insecticides like Karate at a rate of 2.2 L/ha to control red-shouldered leaf beetle (*Monolepta* spp.).

- (ii) Chemical control of nematodes would not be cost-effective. A non-host break crop must be included in the farming system so that soils will not build up root-knot nematodes, or other pathogens, to economic threshold levels. Consult the nearest Extension Office or Agro-Service Center for proper advice.

9.2 Diseases

9.2.1 *Some important diseases of kenaf are:*

- Dry rot, Leaf spot, Damping off and Root knot nematodes
- The diseases vary between kenaf varieties depending on their susceptibility.

9.2.2 Control

Good crop management as well as crop rotations play an important role in reducing the incidence and severity of many diseases affecting kenaf.

10.0 HARVESTING

10.1 *Time and Method*

The highest quality fibre is obtained when plants are harvested at the onset of the flowering period (25% flowering).

There are four main options for the mechanical harvesting of kenaf:

- Windrow the crop, leave it to dry and then pick it up from the windrow. Avoid picking up soil with stems not to contaminate the sample.
- Direct harvesting of the green standing crop using a forage or cane harvester.
- Direct harvesting of the green standing crop using a cutlass to cut the stems at ground level.
- Direct harvesting of the dry standing crop using a combine header.

10.2 *Expected Yield*

If the above recommendations are followed and rainfall is adequate expect the followings:

Whole plant biomass: A yield range of 19.6 to 25.5 t/ha.

Fiber: A yield range of 4.6 to 5.5 t/ha.

Seed: A yield range of 1.0 to 1.5 t/ha.

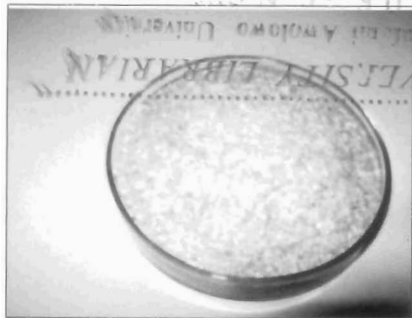
11.0 STORAGE

11.1 Seed storage

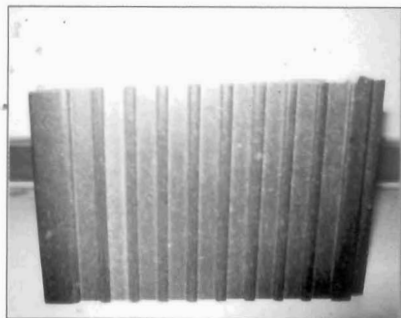
- Store properly under air conditioner to maintain seed viability.

11.2 Fiber storage

- Store properly in an enclosure under a favorable room temperature with dry and low humidity air to maintain fiber quality.



Powder



Polypropylene

12.0 UTILIZATION

12.1 Whole kenaf plant can be ground and used as raw materials for:

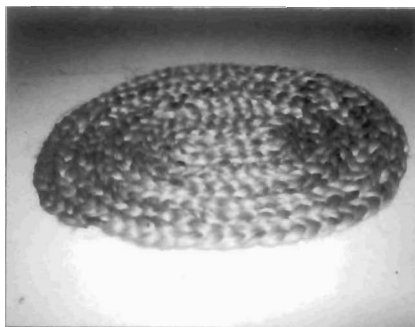
- Kenaf powder
- Kenaf-polypropylene composite
- Insulator
- Livestock feed



Rope



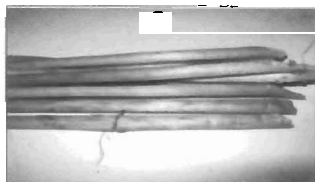
Bag



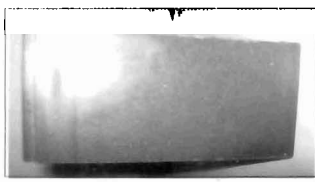
Weaved kenaf fibre

12.2 Kenaf bast fiber can be used for:

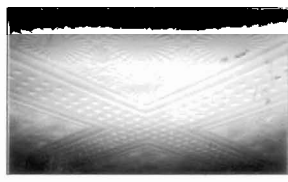
- Automobile interiors
- Ropes
- Tea filters
- Weaved kenaf fibre
- Textile and clothing
- Carpet backing
- Bags



Kenaf core



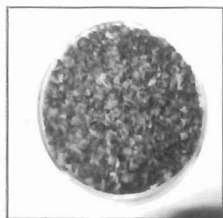
Kenaf low density particle board



Ceiling tile containing 5% kenaf fibre

12.3 Kenaf core can be used for:

- Pulp and paper manufacture
- Biocomposite panels
- Ceiling tiles
- Low density particle boards
- Oil spills bioremediation



Kenaf seed



Kenaf seed oil

12.4 Kenaf seeds can be used for:

- Propagation
- Extraction of oil
- Livestock cake after oil extraction

**For Further Information Contact
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