

CASSAVA

(Kamoteng Kahoy, Balinghoy)

Cassava is a perennial shrub which sometimes reaches the size of a small tree. Its stems vary in color from pale to dirty-white to brown marked by numerous nodes formed by scars left by fallen leaves. Pale to dark-green leaves are fan-shaped, with 5 to 9 lobes.

Roots of cassava plants are few and shallow and some become storage roots. These are clustered around the base of the plant and extend about 60 cm on all sides. It is for these roots which contain from 15 to 40 percent starch that the crop is cultivated.

Under favorable conditions, a single root may weigh as much as four (4) kilos. The number of roots per plant at harvest varies from 2 to 7 each averaging 27.7 to 43.3 cm long and from 4.5 to 7.4 cm in diameter.

NUTRITIONAL CONTENT PER 100 GRAMS OF EDIBLE PORTION

Tubers	Leaves	Part of Plant
62.0	71.0	water (ml)
149.0	91.0	calories
1.2	70.0	protein (g)
0.2	1.0	fat (g)
35.0	18.0	carbohydrates (g)
1.1	4.0	fibre (g)
30.0	11.775	Vit. A (ug)
31.0	311.0	Vit. C (mg)
1.9	7.6	Iron (mg)
68.0	303.0	Calcium (mg)

VARIETIES

Plant only high yielding varieties and according to needs. For starch, VC-1, VC-2, VC-3, Datu, Lakan or Golden Yellow can be used. For food, or feeds, use only Lakan or Golden Yellow varieties.

SITE SELECTION

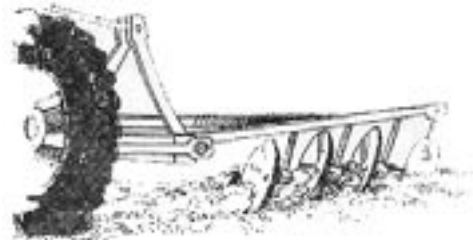
Cassava is a tropical and subtropical plant. It grows in regions with more or less evenly distributed rainfall throughout the year. An ambient temperature that ranges from 25°-30°C.

Select an open field with sandy loam or clay loam soil. Be sure that the area is not prone to water-logging; it must be a well-drained soil. Also consider the soil fertility with pH range of 5.5-6.5.

Cassava thrives at sea level to 845 meters above sea level. It grows best when planted at the start of the rainy season.

LAND PREPARATION

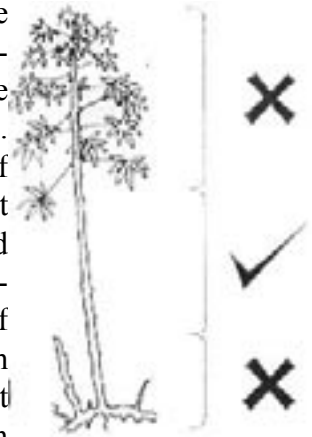
Prepare field by plowing two to three times, followed by harrowing when there is enough soil moisture. Make ridges with 15-20 cm high and 75-100 cm distance between furrows.



PREPARATION OF PLANTING MATERIALS

Select only fresh, mature or healthy stems. Fresh if the latex or sap comes out within six (6) seconds after cutting. Mature if the diameter of the pith or cork is not more than

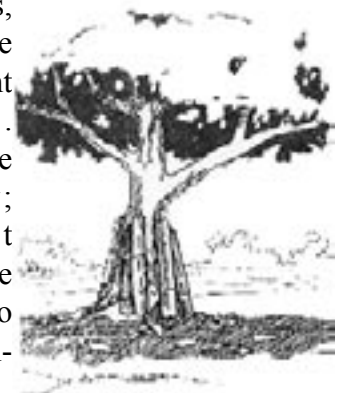
half the diameter of the cortex. Healthy if it is pest free and the diameter of the stem is not less than 1.5 cm.



Obtain stalks from a healthy stand which is at least eight (8) months old. Remove other varieties that are mixed with the recommended varieties; if any. Use a saw or sharp bolo to separate cuttings 20-30 cm long.



Keep the stalks for not more than five days, under shade in upright position. Handle carefully; Don't throw the cuttings to avoid dam-

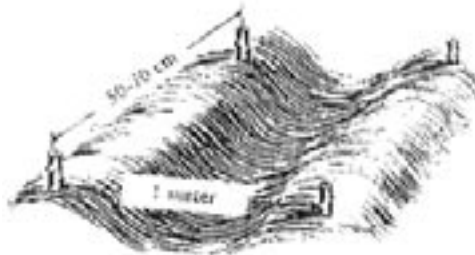


age to the nodes. Don't use cuttings stored for more than 5 days.

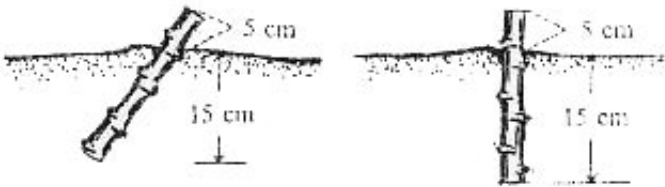
PLANTING

Plant cuttings in furrows one meter apart, each cutting set at 0.75 to 1 meter apart between ridges and 0.50 to 0.75m between hills. Re-plant missing hills 2 weeks after planting. Weed the cassava plant within 2 months after planting.

Plant in a slanting position at an an-

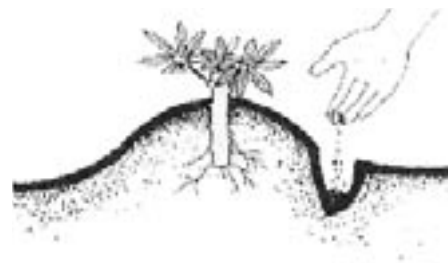


gle of 45° when the soil is fairly dry, and in vertical position when planting is done during the wet season,



at least 15cm of the cutting should be buried or covered with soil.

FERTILIZER APPLICATION



Analyze the soil prior to planting to determine the amount and kind of fertilizer needed. The general recommendation for soils which have not been analyzed is eight (8) sacks of complete (14-14-14) fertilizer per hectare. Apply fertilizer 2-6 weeks after planting at 5-10 cm depth and 15-20cm away from the plant. The use of compost or organic fertilizer is highly recommended.

WEEDING AND CULTIVATION

At least 80% of failed croppings of cassava is due to inadequate weeding. Cultivate when weeds begin to grow. Weed the plant within two (2) months after planting. If possible, do off-barring and spot weeding 3-4 weeks after planting to effectively control weeds. Then weed the plant 4-5 weeks after planting. Hill-up ridges 7-8 weeks after planting followed by spot weeding.

PEST CONTROL

there is no serious pest that attacks the cassava plant and the use of chemicals is not practical or economical. To avoid the attack of pests, apply crop rotation or burn all the infested or infected plants.

TIPS:

NAMI EXTRACT FOUND MOST EFFECTIVE TO PROTECT CASSAVA AND UBI SEED PIECES

Studies show that when cassava or kamoteng kahoy seed pieces (planting materials) are infested with the white fish scale, a major pest of cassava, the populations of the pest increase rapidly causing yield loss reaching as high as 20%.

On the other hand, stored yam or "ubi" tubers infested with mealybugs and scale insects shriveled and germination efficiency is reduced.

The most immediate form of control is the use of chemical pesticides. But, very few farmers treat their seed pieces (planting materials) with chemical pesticides because these are very expensive and have dangerous side effects.



Researchers at the Visayas College of Agriculture (VISCA) in Baybay, Leyte studied several plant species with pesticidal properties to find a cheap, readily available, and environmentally safe substitute for chemical pesticides.

VISCA researchers found that of the plants evaluated and bioassayed, the water-based extract from the tuber of the asiatic bitter yam (*dioscorahispida dennst*) was found the most effective in the pre-planting treatment of cassava cuttings and yam setts (planting materials).

Asiatic bitter yam or intoxicating yam known as “Nami” in Tagalog, “Gayos” in Bisaya, and “Karat” in Iloko is the chief famine food or tropical Asia. Its tuber is poisonous, having a high content alkaloid dioscorine. In fact, a piece of “Nami” as big as an apple is sufficient to kill a man.

The poison in “Nami” is often extracted and used as bait for animals or for eliminating unwanted fish from fishponds. The poison, however, may be removed by soaking the slices of granulated boiled tubers in running water for an extended period or repeated changes of salt water. These are the methods used in tropical Asia.

Comparison on the effectiveness of the extract and commercial insecticides, like dimethoate in controlling scale insect infestation, showed that mortality of the weevil and the yam scale showed that mortality of the weevil increased with higher extract concentrations while toxicity was enhanced by prolonging the soaking period.

Field evaluation of the effectiveness of “Nami” and dimethoate against the scale insects showed comparable results. “Nami” treated setts, however, turned in the highest root yield and net profit.

Source: PCARRD Farmnews

HARVESTING

Cassava is a highly perishable crop. It start to deteriorate as early as one to three days after harvest see harvest cassava at the right time and in the proper way. To prolong its shelf-life, store it properly.

Harvest cassava at full maturity or 6-7 months after planting. Harvesting too early results in low yield and poor eating quality.

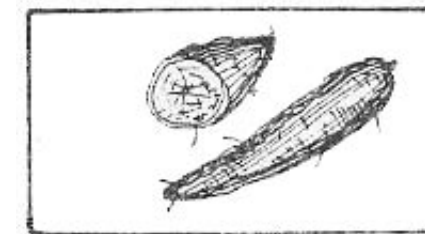
On the other hand, leaving the roots too long in the soil exposes

them to pests. It also ties the land unnecessarily to one crop.

Do not harvest cassava right after a heavy rain or when the soil is too wet.



At this time, the roots have high water content which make them difficult to store.



Also, wet soil particles would stick easily to the roots especially if the soil is clayey, thus, making the roots hard to clean.

Harvest cassava during relatively

dry weather so that you can easily remove the soil particles from the roots.

HOW TO HARVEST

If the soil is compact, loosen it first. Use a wooden tool be-

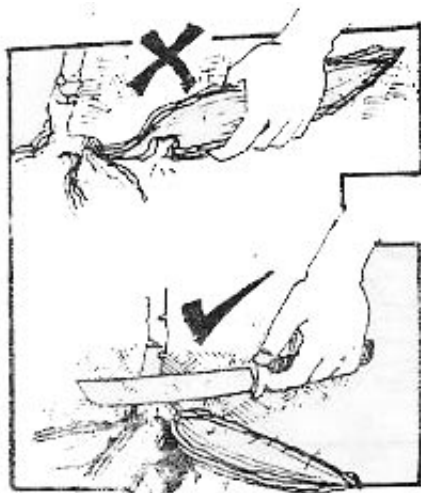


cause this can cause lesser root damage than metal tools.

Pull the plant gently and don't drag the roots. Dragging can cause bruises and cuts to roots which may lead to early deterioration.

In separating the root from the plant, do not just break it off because this method can also cause root damage.

Instead, separate the roots from the stem using a sharp knife or bolo. Cut each root as close to the stem as possible.



Do not keep cassava in a waterlogged area because roots will decay easily.



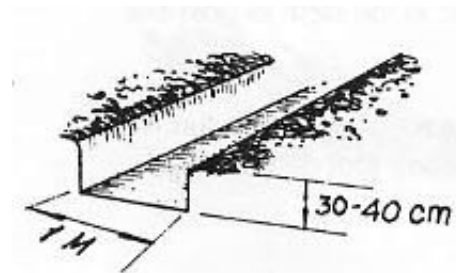
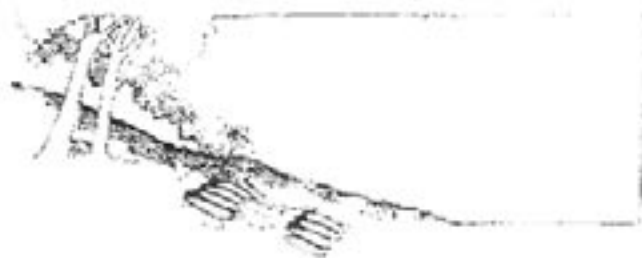
In the selected area, dig trenches measuring one meter in width and 30-40 cm in depth. The length of the trench varies according to the volume of roots to store. A meter long trench can contain 70-80 kg roots.

After harvesting, don't leave the roots under the sun. Too much heat causes weight loss and early root deterioration.

HOW TO STORE CASSAVA

There are several methods of storing cassava. Among these are the soil storage method and storage of roots in wooden crates.

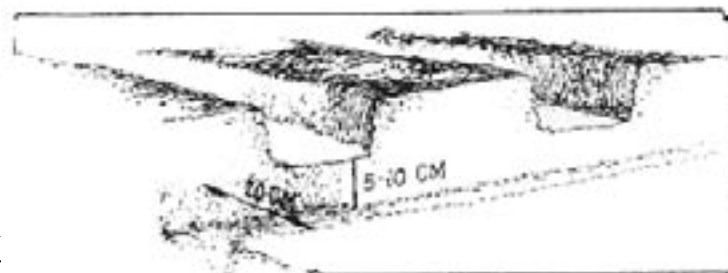
Select a suitable storage site which is well-drained, preferably shaded, and slightly sloping.



Dig the trenches in such a way that their length will be running downhill. At the lower end of the trench, make a drainage canal, which should be at least 20 cm wide and 5 cm to 10 cm deeper than the storage trench.

Arrange mature, undamaged roots inside the trenches. Cover each layer or roots with soil,

preferably riversand or seasand. If these types of soil are not available, clayloam can be used provided it is not too wet. Absolutely, do not use heavy wet clay to cover the roots because this type of soil could just enhance root deterioration.



of starch or flour. Roots for animal feeds need not be peeled, however.

Cut the roots into thin slices not more than 5 mm thick.



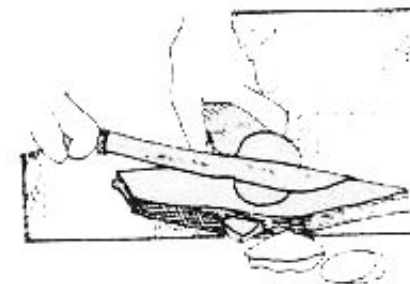
MANUAL METHOD:

PROCESSING OF CASSAVA CHIPS

wash the roots with water remove soil particles and other foreign matter that may contribute to low quality of the end-products. Cut the woody portion of the roots using a sharp knife or bolo.

Use the sharp knife or bolo to peel roots intended for the manufacture

Hold the root on a slanting position in a clean chopping board or any clean chopping board or any piece of wood if to be used

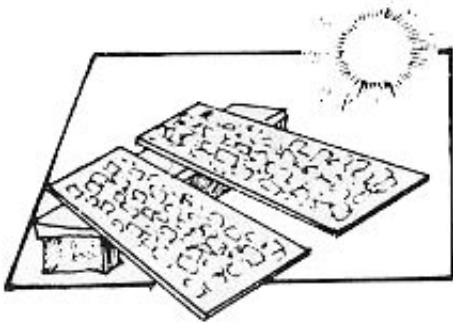


in feed formulation. slice thinly using a sharp knife or bolo.

DIRECT SUN DRYING:

Lay bamboo or other woven mats on a flat cleared ground fully exposed to sunlight. Spread the chips evenly but not too thickly on the mats.

STORING DRIED CHIPS:



When dried chips are not milled right-away, store them properly to prevent moisture re-absorption. Place the chips either in pails with cover or sacks with cellophane lining (like thoroughly washed fertilizer sacks), in jute sacks or containers that can be closed.

CASSAVA FLOUR AND STARCH

Use tubers that are not fibrous, about 10 months old and not later than 16 months old after planting. They should be used within 24 hours after harvesting.

PREPARATION:

1. Wash, peel and re-wash tuber after peeling.
2. Slice thinly or shred by means of a papaya shredder.
3. Soak or wash in enough water to remove part of the starch and should be allowed to settle. Drain the shredded cassava.
4. Line a "bilao" or basket with sinamay cloth and spread the shredded cassava. Dry under the sun until crisp or brittle.
5. Grind through a cornmeal grinder and pass through a No. 120-mesh sieve. This is the cassava flour. Pack in air-tight container, preferably plastic bags and seal.
6. The water where the cassava was soaked contains the starch (Step 3). Decant off the water and completely dry the starch under the sun. Pack in dry containers.

CASSAVA BIBINGKA.

INGREDIENTS:

- 1 cup grated fresh cassava
- 1/2 cup scraped "buko"
- 1/2 cup pure coconut milk
- 3 tbsp melted shortening
- 2 pcs eggs
- 3/4 cup sugar
- 4 tsp grated cheese

PROCEDURE:

Beat egg, add sugar, melted butter, and coconut milk. Mix cassava and coconut milk. Add 2 tbsp cheese and mix well. Line a round pan with banana leaves and pour in the mixture. Bake in moderate "palayok oven". When almost brown, brush with butter and sprinkle top with a little sugar and remaining cheese and bake further until golden brown.

CASSAVA SUMAN

INGREDIENTS:

- 1 cup grated cassava
- 1/2 cup grated or chopped coconut meat
- 3/4 cup sugar
- Banana leaves for wrapper

PROCEDURE:

Mix all ingredients and wrap mixture in banana leaves to desired size. Tie by twos with string. Boil in water till done.

CASSAVA - PINIPIG COOKIES

INGREDIENTS:

- 3 cups cassava flour
- 3 cups fried pinipig
- 1 tsp baking powder
- 1 tsp vanilla (optional)
- 1 cup margarine
- 1 cup sugar
- 3 pcs eggs

PROCEDURE:

1. Sift cassava flour and baking powder. Mix with pinipig.
2. Cream margarine and sugar.
3. Add eggs one at a time. Continue creaming until all eggs have been added.
4. Add flour mixture and mix well. Add vanilla.
5. Drop by teaspoon on greased cookie sheets. Bake until brown at 177°C (350°F).

CUCHINTA

INGREDIENTS:

1 cup cassava flour
1 cup brown sugar
1 1/2 cups water
1 tsp lye
few drops of yellow food color or
achuete

PROCEDURE:

1. In a mixing bowl, blend all the ingredients until thoroughly fine.
2. Pour into cuchinta molders or ungreased muffin tins.
3. Steam for 5 to 20 minutes.
4. Let it cool for 5 minutes and remove from pans.
5. Serve with frated coconut.

STARCH COOKIES

INGREDIENTS:

5 cups cassava atarch
1 cup sugar
1 tsp baking powder
5 pcs egg yolks
3 pcs egg whites
230 gms butter
1 cup margarine

PROCEDURES:

Creame the butter or margarine, add sugar, when fine, beat egg one at a atime. Add one (1) flour sifted with baking powder. Lastly fold well-beaten eggwhites. Pour 1 tsp. of mixture on well-greased cookie sheets and bake.

BUTTER CAKE

INGREDIENTS:

1 3/4 cups cassava flour
1 3/4 cups wheat flour
1 cup butter
2 cups sugar
8 pcs eggs less two (2) whites
1 cup diluted milk
4 tsp baking powder

PROCEDURE:

Sift cassava flour and wheat flour separately, mix and add baking powder. Sift three (3) times. Cream butter, add until fine and fluffy. Add sifted flour mixture alternately with milk. Fold well-beaten eggwhites in the butter mixture. Pour in well-greased nin (9) inch baking pans. Bake for 20-25 minutes.

UPSIDE DOWN CAKE

INGREDIENTS:

1 1/2 cup cassava flour
1/4 cup butter and one (1) cup brown sugar
6 pcs eggs
1 cup sugar
6 slices canned pineapples
6 halves canned peaches or mingo

PROCEDURE:

Place butter, brown sugar and 1/2 cup syrup of canned fruits in a deep baking pan. Place over slow fire until brown sugar is melted. Remove from the fire. arrange fruits in the pan. Separate the yolks from whites of the eggs. Beat eggwhites with 1/2 cup sugar until stiff. Beat egg yolk until fluffy. Add 1/2 cup of sugar and 2 tbsp of water with calamansi juice. Beat both mixture. Fold in flour. Pour butter over fruit in pan. Bake in moerate oven. When done, turn upside down on cake plate.

*Source: Philippine Root Crops
Information Service VISCA, bay-
bay, Leyte
Reference: Storing and Process-
ing of Cassava DA-RFU 9*