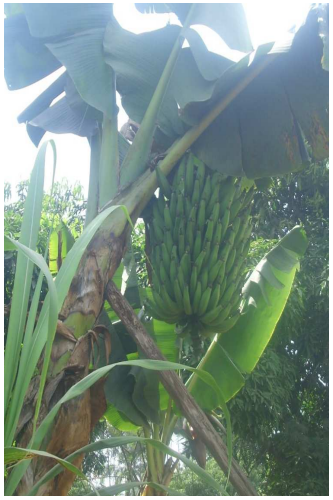
very small last leaf as this will dry as soon as it is opened). Another sign is when the plant has 6 or less of the functional/alive leaves.

- To harvest, cut a notch halfway into the stem, on the same side with the bunch.
- Carefully let the stem bend and cut off the bunch.
- Cut the stem in half with a horizontal cut halfway up the main stem after harvest. Take care of the next sucker. This time you can continue the desuckering process by removing the unwanted suckers of the previous fruited plant. Now you can dig out all the suckers of the follower, do the same desuckering process described earlier. You could also transplant the unwanted sword suckers, if any, and destroy water suckers. After a month, more or less, dig out the dead stump and chop it into pieces. Be careful not to harm the corm of the follower.



A bunch of dwarf plantain

A bunch of PHIA 23 banana/plantain

We wish you a good harvest!

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PLANTING GUIDE

for growing

Banana and Plantain Plantlets

in Cameroon

NDEF, 2012

I— Introduction

Plantain is grown in seven regions of Cameroon and part of Adamawa Region; namely, Centre, South, Littoral, South West, East, North West, West and Mayo Banyo in Adamawa Region. Four (4) local varieties of plantains are planted namely, French Giant, medium French, False horns and True Horns plus various types of bananas.

Traditionally, suckers are propagated by extracting them from one field to another. This method lends itself to two weaknesses:

- Diseases and pests are spread easily in the process,
- Large quantities of specific varieties of planting materials are not easy to acquire within short intervals.

To surmount these two major hurdles of **quality** and **quantity** of planting materials in the production of banana/ plantains, research has developed techniques to rapidly produce large quantities of pest and disease-free suckers called plantlets just within six months or so with high yielding potentials (they are hybrids).

Briefly speaking, three of these research methods are:

In Vitro techniques which make use of laboratories wherein cells are cultured to produce plantlets. This is quite expensive and out of the reach of local farmers.

In vivo techniques have to do with bending the pseudo stem and decapitation. There is a great problem of disseminating diseases and pests if the mother plants are infested, but not treated with chemicals in the process.

In vivo horticultural techniques of propagation are used to avoid major loopholes inherent in the above two techniques.

These include:

- Multiplication of decorticated stem.

up the poles to form a letter “X”. Let the banana/ plantain stem rest on the short end. Push upwards a little bit to create pressure and bury the other ends of both poles. Tamp very firmly.

Look for the main flower.

The banana or plantain plant flowers after 12 months depending on your climate (usually it takes 9 months in the coastal and hot lowlands of Cameroon). A sign of flowering is when the foliage (last leaf) decreases in length, compared to other leaves.

- Remove the main flower/bud 3-4 days after the first appearance of the last hand. This is a sterile, male flower called the “banana heart”. The odour is quite strong.
- It may be advisable to remove the last hand because it has a bigger chance of wilting.
- Remove all any obstacles that touch or damage the bunch, and relocate the plant supports.

VI— Optional (and if you have the time)

- **Cover the bunch with blue plastic.** Nylon rice sacks also work well. Remember that the plastic/sack must have holes at the bottom for drainage of water. Tie the sack with soft twine several inches from the first hand. Covering the whole banana fruit with a big blue sack when it is about 2 months old is good practice. It makes the fruits get bigger and also gives good protection from the birds, bats and squirrels which like the banana fruit very much. The bag will help to hold available heat (a miniature greenhouse of sorts) as well as trap the ethylene oxide released by the fruits, which accelerates ripening.

Harvesting

- Harvest the bunch 60-90 days after bagging the bunch, or if the last short leaf starts to die (do not consider the

elements. Here, we still advise you to consult you Agric Post, officials of Phytosanitary Brigade or the Fertiliser Sub Sector Reform Program in Cameroon.

V— Supporting or propping

Support the plant to avoid toppling or falling due to strong winds or bunch weight. There are three(3) easy ways of doing this.

- **Wire/Rope and Bottle Method:** Cut off the bottom of a plastic bottle. Insert a very long wire or very strong twine through the mouth and bottom of the bottle. Fold the bottle to make it bendable and soft. Let the plantain stem rest on the bent plastic bottle and pass the wire through the stem and pull the stem a little bit backwards and tie the rest of the string to a strong support (e.g. strong tree post) and tie tightly. OR instead of both ends of the rope being free, one end can be tied against itself to make a small loop big enough not to crush the pseudostem. In this method, only one end of the rope is free, but this is only necessary if the rope is too short. Make sure that the rope is strong enough to support the leaning plant and bunch.
- **Single Bamboo Method:** Use a 3m to 5m long bamboo pole. Cut a piece of slingshot-shaped wood 10cm thick and 60cm long. Insert the “handle” of the slingshot-shaped wood into one end of the bamboo. Let the stem rest on the middle of the “Y” and push the bamboo upwards a little bit so the stem is wedged into the “Y” tightly. Bury the other end of the bamboo (the base) deeply into the ground. Tamp very firmly.
- **Double Bamboo Method:** Use two 3m to 5m long bamboo poles. On top ends of the poles, tie them together with strong wire 30cm from the ends. Open

- Plants coming from stem bits (**PIF**). This is the most widely used method and what NDEF is practising and advocating as best practice for farmers.

Note that plantlets are quite fragile and have small bulb sizes, thus little food reserves to sustain themselves for long periods. This is unlike suckers. Planting plantlets needs special care and treatment, hence the need for this manual to guide planters.

II— The steps to follow

1. **Select your planting site.** The areas you set aside for banana/plantain plantlets should be large enough to accommodate their eventual vegetative growth and leaf area (canopy). Banana/plantain plants are often mistaken for trees because of their thick, sturdy pseudo stem looks a lot like a trunk, and the entire plants can get quite large. (7.6m tall, with leaves up to 2.7m long). There should also be enough sunlight for the leaves and, more importantly, to keep the soil surrounding the roots warm (over 20 C) or else the plant will dramatically slow down its growth.
2. **Clear the planting site**. Remove any plants or weeds that are growing on the land.
3. **Peg the selected site.** Pegging depends on your objectives. Classically, you could adopt one of the following methods: a) **3m x3m** gives you 1,111 plants per hectare; b)3m x 2m gives you 1,666 plants per hectare; c) 2.5m x 2m gives you 2,000 plants per hectare and d) 2m x 2m gives 2,500 plants per hectare
4. **Dig holes** with width 50cm, length 50cm and a depth of 50cm. While digging, keep top black soil on one side and harder soil on the other side of the hole.
5. **Pour 5 litres of decomposed fowl dropping (fowl manure) in the hol**e. Push in the top black soil and mix up evenly with your hands or with a spade. If your

manure is not decomposed and is hot, it may burn the plant's roots and kill the plant instead of helping it to grow. Do not use any other forms of manure or fertilizers at this stage. Use any of them from two or three months afterwards.

6. **Select your planting materials**. Go for clean plantlets and emphasise on the varieties of plantains or bananas that **you want to eat, sell or use**. Contact NDEF Office to make a choice after having a look at a mature bunch.

7. **Open the mixture of soil and manure in the middle of the hole and put in the plantlet**. Remember to remove polypots from the plantlet before planting. It should be in a standing position. Cover it with soil, tamping down firmly, but not too much. Let the hole be at least 15cm empty so as to collect water for the plant.
8. **Water the plantlets daily** if the soil is dry. No need to water if it's wet.
9. **Feed your plants with enough fertilizer (organic or inorganic) every three months** after planting. Since bananas are rich in nutrients, they are heavy feeders, drawing up a lot of nutrients from the soil (especially potassium).
   - Chop up spent banana plants (pseudo stem) and use them as mulch to return potassium to the soil.
   - Consider citrus fertilizer combined with a high-potassium product.
   - If you are growing the bananas organically, apply both compost and organic fertilizers. Only apply the recommended amounts. Too much will burn the plants.

10. **Remove all the dry leaves and those that are diseased**. If diseased plants are discovered, treat them immediately, or uproot and destroy them. Insects and pests should also be controlled as soon as they are found.

11. **Desucker young plants.** This is important to control the plant population, to get bigger bunch sizes and healthier plants, and limit disease pressure. Choose only one sword sucker for next year, usually the first sword sucker to emerge. This is called the successor. All the suckers should be cut off at ground level and scooping the center then covering with soil. If the sucker grows back, simply repeat the process but this time, instead of just scooping the growing point, slice or deeply penetrate the growing point using an iron bar or wooden stick. This should be done if suckers are 1 foot high. If the selected follower (successor) has suckers, just follow the desuckering process. Always remember to choose the third successor. When the mother plant shoots out the flower, stop the desuckering process and leave it to grow.

III— Pest and Disease Control

Plantains, in particular, are quite susceptible to diseases and pests. Therefore, at this time you must be thinking of measures to pre-empt the emergence of such pests and diseases. You could either use locally prepared pesticides or inorganic ones procured from agric shops. Consult the Agric Post or Phytosanitary Brigade in your area. Refer to specific instructions on their use. Alternatively, you could use wood ash to pour under the plants. If you have neem, you could mix it up with other herbs to treat your plants. Contact NDEF on the use of neem to make insecticide and pesticide.

IV— Fertilisation

The success of your project greatly depends on how rich your soil is. Rich soils lead to more yields, more income and more investments. Poor soils would require you to apply much manure (organic) and/or chemical fertilizers (inorganic). Usually, you need fertiliser with components of Nitrogen, Potassium, Calcium (NPK) and other trace