



DEPARTMENT OF AGRICULTURE

Regional Field Office No. 02

Tuguegarao City, Cagayan

SWEET POTATO

PRODUCTION GUIDE



INTRODUCTION

Sweet potato is considered as one of the important crops in the Philippines. It is used in the manufacture of industrial products like flour and starch and as raw material in the commercial production of animal feeds. Moreover, sweet potato can be processed into different food products with higher economic value than fresh roots.

Because of its many uses, the demand for sweet potato has significantly increased. This demand, however, has not been realized because of the recurrent problem on low farm productivity.

Site Selection

- Have a flat or undulating slope (0-5%). If the area to be planted is very steep (>30%), use soil and water conservation measures such as the Sloping Agriculture Land Technology (SALT).
- Be an open field.
- Have an ambient temperature that ranges from 25°C-30°C.
- Have a well-drained soil. Newly planted cuttings rot when the soil is waterlogged for more than 24 hours. Also roots of mature sweet potato shall rot when subjected to prolonged waterlogging.
- Have at least medium soil fertility with pH ranging from 5.5-6.5. Soil analysis is strongly recommended to get the exact amount of fertilizer to be applied. This process is usually undertaken by the Soils Laboratories of the DA-RFO 02 located at Regional Office Tuguegarao City and CVIARC, Ilagan City, Isabela.



Sweet Potato

Production Guide

This Publication is a project of the **Department of Agriculture, Regional Field Office No. 02, High Value Crops Development Program**. It contains the most recently available and locally adaptable technical information on **Sweet Potato Production** in Region 02.

November 2012

LAND PREPARATION

- Plow deeply and harrow the field twice for clay loam soil or once for sandy loam soil using a tractor or carabao. This is done to aerate the soil and kill the roots and weeds. Do this when there is enough soil moisture (not so wet and not so dry).
- Make ridges about 15-20 cm high, spaced at 75-100 cm (for sandy loam soil, ridging is not necessary).



SELECTION OF VARIETIES

Varieties are commercially available in agricultural input stores.

Use high yielding varieties according to your need/purpose:

- VSP 1, VSP 3 and VSP 5 and VSP 7 for ketchup, jam, beverage, and fried chips.
- PSBSp 17, PSBSp 19, PSBSp 22 and PSBSp 24 for Pinoy (sweet potato) fries.
- New recommended varieties such as PSBSp 20, PSBSp 21, PSBSp 22, PSBSp 23, NSIC Sp 24, and NSIC Sp 26 for food, starch, flour and animal feed.

SELECTION AND PREPARATION OF PLANTING MATERIALS

- Use only the apical and healthy portion of the vines as this will grow easily.

- Cut the vines 25-35 cm long from the tip. If the planting materials will be transported to other places, the vines should be cut longer (35-50 cm long from the tip) to give enough space in securing the bundles with a straw.
- Remove the leaves, leaving only 2-3 leaves from the tip of the vines to minimize bulkiness and damage during transport.
- In mass producing planting materials, cut the vines shorter so that secondary cutting or even a tertiary cutting could be accommodated.
- The cuttings should have at least 6-8 nodes.
- Prepare the cuttings 1-2 days prior to planting.

Plant Density

Below is the recommended planting density and distance:

Between Hills	Between Ridge / Furrow	Density/ha
25 cm	100 cm	40,000
30 cm	75 cm	44,000
30 cm	100 cm	33,000

- If necessary, store the cuttings under the shade in a vertical position. Cuttings should not be stored for more than 5 days.
- Preplanting treatment
 - Dip the cuttings first in an insecticide for 3 minutes then in fungicide for another 3 minutes.



- Strictly follow the recommended rate of these chemicals found in the label.

PLANTING

- Follow the planting season in your place.
- Plant 1 cutting per hill vertically on furrows for sandy loam soil and on ridges for clay loam soil. Depth of planting is 10-15 cm in moist soil and 15-20 cm in a little bit dry soil.
- Bury about ½ of the cutting into the soil when there is enough soil moisture and 2/3 when the soil is a bit dry. Planting may be done in a letter “L” or letter “U” position.
- Space the plants at 25-30 cm between the hills and 75-100 cm between rows.
- Monitor missing hills 1-2 weeks after planting. Replant if the number of missing hills exceed 15% of the total crop stand.

FERTILIZER APPLICATION

- Determine the amount and kind of fertilizer to be applied based on the result of soil analysis which is being conducted by the Soil Laboratories of DA-RFO 02.
- If soil analysis reveals that 45 kg NPK is needed per hectare, apply all the fertilizer at planting. If the recommendation is more than 45 kg/ha split the recommendation into two, apply half at planting time and the other half at one month after planting.

In the absence of soil analysis:

- Apply a mixture of 6-8 sacks of complete fertilizer (14-14-14) per hectare by drill method during planting. The holes should be 10-15 cm away from the plant and depth of holes should be 5-10 cm. Cover the fertilizer with thin layer of soil.

FOR ORGANIC FERTILIZER APPLICATION

- Apply 5-10 metric tons per hectare of organic fertilizer before planting. It should be incorporated to the soil during the last harrowing.

WEEDING AND CULTIVATION

- Off-bar the field 2 weeks after planting to loosen the soil and kill the weeds. If the field is dry, irrigate the field immediately before hilling-up.
- Hill-up the plants 2-4 weeks after planting before the canopy closes.

PEST MANAGEMENT

Hereunder are various types of diseases and insects with their symptoms and recommended control measures.

Diseases

SCAB (Symptoms)

- Small, yellowish to reddish brown spots found mainly on leaf veins.
- Infected leaf veins stop growing, the leaves curl and become contorted or twisted.

Control

- If infection is severe, spray the plants with benomyl (1.0 g/l), copper oxychloride or maneb (2.08 g/l) every 10-14 days.
- Use healthy and clean planting materials.
- When there is infection at the source of planting materials, soak with fungicide before planting.

VIRUS COMPLEX (Symptoms)

- Vein clearing and yellowing of main veins
- Mosaic pattern in leaves
- Purple to brown veins in older leaves
- Curling, malformation and reduction in size of leaves
- Shorter internode
- Generally stunted
- Reduce yield from 18-100% depending on severity of infection

Control

- Use virus-free planting materials.
- Rogue infected plants and volunteer crops left in the field after harvest.
- Remove host weed species of vectors and alternate host of virus.

Vector Control

- Spray the plants especially those to be used as planting materials with insecticides containing pyrethroids or nicotinoids during high vector population.
- Use 3 or more kinds of insecticides to delay development of resistant biotype vector.

INSECTS**Weevil**

- The most serious insect pest that attacks sweet potato. The infected roots are bitter and cannot be eaten by humans and animals.
- Damage in vines, stems and tubers are characterized by feeding punctures on the surface and small tunnels.
- Level of infestation is from 20-100% inside the tuberous roots.

Control

- Burn infested vines and roots after harvest.
- Remove weevil-infested debris in the field.
- Use only healthy cuttings as planting materials.
- Use terminal cuttings as planting materials since tender portions of vines are rarely deposited with eggs of weevils.
- Practice hilling-up and proper cultivation.
- Practice crop rotation.
- Use pheromone traps when available. This is used to mass trap adult male weevils. Install 10-12 traps per hectare.

HARVESTING

- Harvesting depends on the need and the variety planted. Recommended varieties are usually harvested 3-4 months after planting.
- Harvest the plants preferably during sunny days.
- In wide areas, use the animal-drawn or tractor-drawn sweet potato harvester. A spading fork or a bolo can be used in smaller areas.
- Remove the soil from the roots before storing or transporting them. Don't wash the roots because excess moisture will cause rotting during storage.
- Do not throw the roots to prevent damage.
- Do not expose the harvested roots to sunlight to maintain good quality of harvest.
- Discard the weevil infested and damaged roots. Classify the roots according to the size as desired by the market or use.
- Place the roots in baskets, sacks, wooden or plastic crates and boxes cushioned and covered with paper, banana leaves or sweet potato vines to prevent bruises during transport.

Other Important Points to Consider

- For sequential cropping practice, be sure that planting materials must be secured first before disposing the vines.
- In case the area is not yet ready or available, leave a small portion of the field unharvested as source of planting materials for the next planting.



COST AND RETURN ANALYSIS

A. Labor Inputs/Hectare

Particulars	Unit	Quantity	Unit Cost	Total (P)
A. Labor Inputs / hectare				
1. Land Preparation (P200/MD,P400/MAD)				
• Plowing	MAD	6	400	2,400
• Harrowing	MAD	4	300	1,200
• Furrowing	MAD	5	300	1,500
• Organic Fertilizers Application	MD	6	200	1,200
Sub Total				6,300
2. Crop Establishment				
• Planting	MD	10	200	2,000
Sub Total				2,000
3. Cultivation				
• Off Barring	MAD	5	300	1,500
• Hilling Up	MAD	5	300	1,500
Sub Total				3,000
4. Harvesting				
• Digging / Picking	MD	10	200	2,000
• Sorting	MD	3	200	600
Sub Total				2,600
Total Labor				13,900.00

B. Material Inputs

Particulars	Unit	Quantity	Unit Cost	Total (P)
1. Planting materials	pcs	44,444	0.25	11,111
2. Organic fertilizer	Kg	5,000	2	10,000
3. Fuel and Oil	L	20	73	1,460
4. Snacks		100	10	1,000
Total				23,571.00

C. Contingency

Particulars	Unit	Quantity	Unit Cost	Total (P)
C. Contingencies - 15% of Labor and Material Cost				5,620
Grand Total A+B+C				43,091.00

<i>Estimated yield/ ha. (kgs)</i>	<i>10,000.00</i>
<i>Estimated Group Income @ 10.00 / kg</i>	<i>100,000.00</i>
<i>Less : Gross Expenses</i>	<i>43,091.00</i>
<i>Estimated Net Income</i>	<i>56,909.00</i>
<i>Returned on Investment (ROI)</i>	<i>132 %</i>
<i>Break Even Price (per kilo)</i>	<i>4.309</i>



Sweet Potato Recipes

SALMON POTATO PATTIES

(3 servings)

- 1 cup, potato, boiled
- ½ cup salmon, canned
- ½ tbsp calamansi juice
- 1 tbsp onion, minced
- 1 egg, beaten
- 1 tbsp milk, evap
- ½ tsp. salt
- 1/16 tsp. pepper
- ¼ tsp. vetsin
- 1 tbsp. flour
- 1 cup cooking oil



Procedure

Mash potato and set aside. Break salmon apart with a fork and sprinkle with calamansi juice. Combine all ingredients except oil. Mix well. Shape into patties and dust with flour. Fry until golden brown on both sides.

BOTSE

(4 servings)

- 1 1/3 cup sweet potato, mashed
- 4 tsp sugar
- ¼ cup water
- ½ cup rice flour
- 1 egg, beaten
- 1/3 cup sugar, brown
- 1 cup oil



Mix sweet potato and 4 teaspoons sugar. Shape into round flat cookie sizes and set aside. Combine water, remaining sugar, rice flour and egg to form batter. Dip the cookies in the batter. Fry in hot oil until golden brown on both sides.

SWEET POTATO DOUGHNUTS*(10 servings)*

- 2 eggs
- 2/3 cup sugar
- 2 cups sweet potato, boiled and mashed
- ½ cup milk
- 2 tbsp margarine, melted
- 3 cups flour, all purpose
- 3 tsp baking powder
- 2/3 tsp salt
- 2 cups cooking oil

**Procedure**

Beat eggs well and add sugar slowly while beating constantly. Add milk and margarine and blend well. Stir in sifted dry ingredients and mix thoroughly. Roll out dough on floured board about 6/8 inch thick and cut with doughnut cutter. Fry in deep hot oil until golden brown.

SWEET POTATO FRITTERS*(3 servings)*

- 1 cup sweet potato, boiled and mashed
- 1 cup oats, rolled
- ¾ cup water
- ¼ cup peanuts, roasted and chopped
- ½ tsp salt
- 2 tbsp margarine, melted
- 1/3 cup sugar
- 3 tsp baking powder

**Procedure**

Combine first 3 ingredients. Blend in the rest of the ingredients. Place mixture in a well greased loaf pan. Bake at 400oF for 30 minutes.

SWEET POTATO IN BLANKETS*(4 servings)*

- 6 pcs sweet potatoes
- ¼ cup milk, evaporated
- 2 tbsp margarine
- 1/3 cup cheese
- ¼ tsp salt
- 1/16 tsp pepper

Procedure

Bake the sweet potatoes for 45 minutes. Cut into halves lengthwise. Scoop out pulp from each half and mash. Add milk, margarine and ½ of the cheese to the mashed pulp and blend well. Fill each sweet potato shell with the mixture. Spread remaining cheese on top. Bake at 450oF for 5 minutes or until tops are lightly browned and cheese melts. Serve hot.

SWEET POTATO MACAROONS*(3 servings)*

- 1 egg, beaten
- 1 cup sweet potato, boiled and mashed
- 2 tbsp cheese, grated
- 1/8 tsp pepper, ground
- ½ cup cooking oil

**Procedure**

Beat egg. Mix all ingredients together except the oil. Shape into fritters and fry until golden brown. Serve warm.

SWEET POTATO SPONGE*(4 servings)*

- 12 slices sweet potato
- 2 tbsp calamansi juice
- ¼ tsp salt
- 12 slices bacon
- 2 cups cooking oil

Procedure

Wash, pair and slice sweet potato crosswise to about ¼ cm thick. Marinate in calamansi – salt mixture for 10 minutes. Fry slices and drain. Wrap each slice with bacon strip and fasten with a toothpick. Fry again until bacon becomes crisp.

STUFFED SWEET POTATO*(12 servings)*

- 1 egg, beaten
- ½ cup suagr, granulated
- ½ tsp vanilla
- ½ cup coconut, grated
- ½ cup sweet potato, bolied and mashed
- ¼ cup peanuts, roasted and chopped

**Procedure**

Beat eggs for 2 minutes or until lemon colored and set aside. Combined sweet potato, peanut, coconut, sugar and vanilla. Add sweet potato mixture to to egg and blend well. Drop by teaspoonfuls into greased cookie sheets and bake at 400oF for 7 minutes or until delicately brown.

SWEET POTATO BREAD*(5 servings)*

- 1 cup sweet potato flour
- ¼ cup margarine
- ¼ cup sugar, granulated

**Procedure**

Toast flour for 5 minutes or until brown. Set aside to cool. Cream margarine and sugar. Add toasted sweet potato flour to margarine mixture and blend well. Mold with a polvoron molder. Serve at once or wrap in thin paper if to be served later.

SWEET POTATO POLVORON*(2 servings)*

- 1 1/3 cup sweet potato, boiled
- 2 eggs, separated
- ¼ cup cream, whipped
- ¼ cup sugar, brown
- ¼ cup raisins
- ¼ tsp nutmeg
- 1 cup margarine, melted

**Procedure**

Mash sweet potato. Add the rest of the ingredients except egg white. Beat egg white until stiff. Fold in sweet potato mixture. Pour into a lined baking pan. Baked at 350oF for 30 minutes.

HOT SWEET POTATO SALAD

(4 servings)

2 cups sweet potato, boiled
1 cup cooking oil
2 tbsp onion, chopped
1 tbsp flour
¼ cup water
4 tbsp calamansi juice
1 tbsp sugar
½ tsp salt
¼ tbsp calamansi rind, grated
¾ cup cucumber, diced



Procedure

Cut boiled sweet potato into 1 centimeter cubes and set aside. Saute onions until delicately brown. Dissolve flour in water and calamansi juice and add to onions. Blend well. Add sugar and salt. Heat to boiling, stirring constantly until smooth and thick. Add rind and cucumber. Stir gently till they are coated with sauce. Pour boiling cucumber mixture on sweet potato. Serve at once.

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