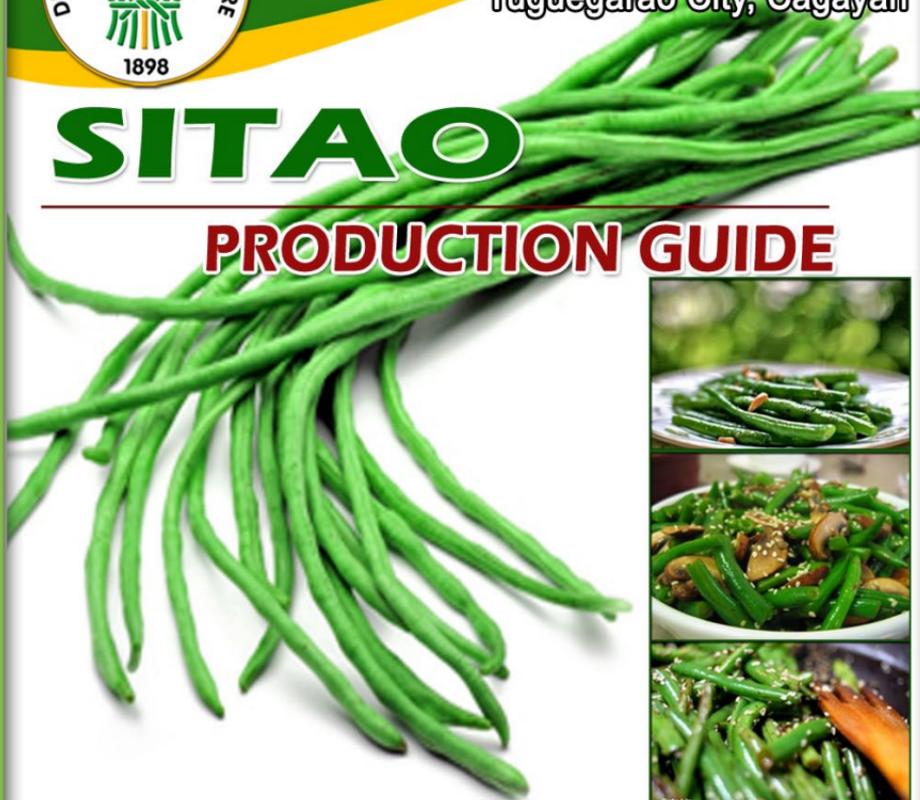




DEPARTMENT OF AGRICULTURE
Regional Field Office No. 02
Tuguegarao City, Cagayan

SITAO

PRODUCTION GUIDE



INTRODUCTION

Sitao is a vegetable legume widely grown in the country. There are two types of sitao: pole and bush. Both types provide good source of income and cheap substitutes of animal protein. Aside from its food value, dried seeds of sitao is also serve as raw materials for the preparation of animal feeds. Being a leguminous crop, it is also valuable to agriculture due to its ability to improve soil condition through nitrogen fixation.

Sitao is easy to grow. It takes only about one and half (1 1/2) months to harvest. Sitao has numerous nutritional and health benefits. It is an excellent source of vitamins K and C, good source of folic acid, molybdenum, protein, riboflavin, thiamin and niacin. It is also rich in fiber which lowers cholesterol and helps prevent blood sugar level from rising.

ADAPTATION

Soil and Climatic Requirements

Sitao is a non-seasonal crop that can be grown throughout the year. It thrives in various types of soil. However, a fertile, friable, well-drained soil high in organic matter and a pH value of 5.5-6.6 is best suitable for successful sitao production. The temperature range for optimum growth is 20° to 35°C.

Selection of Varieties

Select varieties that are high yielding, resistant to pests and diseases, adapted to local conditions and acceptable to the consumers. Several improved varieties are listed in Table 1.



Sitao

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 **Sitao Production** in Region 02.

November 2012

Table 1. Recommended Varieties of Sitao Adapted in Region 02

Variety	Maturity (DAT)	Fruit Type		Features
		Pod Length	Color	
A. Pole Sitao				
NSIC PS 03 BPI CSN-19	45	57 cm	Light Green	Good pod quality and longer pod length
Sandigan	50	20-40 in		High yielding all year round
Sierra Madre	50	50-55 cm	Dark Green	Good pod quality, smooth appearance and fleshy texture
Tri-Star	Early Maturing		Dark green	Resistant to bean rust and aphids tolerant to leaf miner
B. Bush Sitao				
NSIC BS 05 (Higikhhik) OPV	46	23.81 cm	Green	Could be grown for both dry and wet seasons
NSIC BS 04 (Amihan)	47	24.3 cm	Dark Green	High yielding and longer pod length

CULTURAL MANAGEMENT PRACTICES

Land Preparation

Prepare the field thoroughly to obtain good crop stand and optimum yield. Plow the field at a depth of 15-20 cm 2 -3 times at one week interval to prevent growth of weeds. Harrow every after plowing to pulverize the soil and level the field. A well-pulverized soil promotes good soil aeration and enhances root formation. Set furrows after the last harrowing at the distance of 2.5 – 3.0 meters apart.

Soil and Fertilizer Management

To achieve optimum yield, apply the right kind and amount of fertilizer at the right time. Although leguminous crops can fix nitrogen, sitao still needs other elements aside from nitrogen for

better growth and development. Submit soil samples for analysis at the Department of Agriculture, Regional Field Office No. 02, Regional Soils Laboratory at Tuguegarao City, Cagayan and at Ilagan Soils Laboratory, Ilagan City, Isabela to determine the fertilizer requirement of sitao.

In the absence of soil analysis, apply three (3) bags of complete fertilizer (14-14-14) and 20 bags of organic fertilizer or compost per hectare. During the dry season, apply the fertilizer uniformly into the furrows and cover with fine soil before planting to protect the seeds from getting in contact with the fertilizer. Spray the plants with foliar fertilizer during the flowering stage. For wet season planting, apply only foliar fertilizer during the flowering stage.

Planting

Leguminous vegetables vary in growth habits and are planted at different methods and spacing as presented in Table 2.

Table 2. Spacing, plant population and seed requirement of sitao.

Type	Spacing (cm)		Plant Population/ha	Seed Requirement/ ha (kg)
	Row			
Pole	100	50	40,000	10 - 20
Bush	75	25	53,333	25 - 30

Methods of Planting

Sitao can be planted either drill or hill method.

1. Drill method. Drill 18-20 seeds per linear meter. Distribute the seeds uniformly in the furrows and cover with 3-5 cm of fine soil.
2. Hill method. Plant 2 - 3 seeds per hill following the recommended planting distance indicated in the Table 2.

During the wet season or in areas where drainage is poor, plant sitao in beds or ridges raised about 10-30 cm high.

Water Management

Water the field immediately after planting to ensure uniform germination. Frequency of irrigation depends on soil type and

weather condition. Sandy loam soil needs more frequent irrigation. Construct drainage canal if the area has poor drainage. Practice furrow irrigation to provide the water requirement of the crop.

Staking

Pole sitao requires trellis or stakes to support the climbing vines. Provide stakes when the plants begin to climb or just after hilling up but not later than 25 days after emergence (DAE). Use ipil-ipil stems with a diameter of 1-2 cm, stems of talahib/runo or bamboo slats as staking materials.

Place 1.5 - 2 meters long stakes between plants within the furrows in slanting position so that the top of the stakes intersect with the opposite stake in the adjacent furrow. Place bamboo slats or ipil-ipil stem horizontally on top of the intersection and tie the stakes to this.

Corn can also serve as biological trellis for pole sitao. Plant the corn alternately with pole sitao at a distance of 100 cm between furrows and 30 cm between hills. Train the pole sitao to climb to the corn plant as they grow.

Care of the Plants

Thin the plants 5 - 7 DAE leaving 15-18 plants per linear meter in the drill method and two (2) plants per hill in the hill method. Keep the field weed-free especially during the first 30 days of the plants. Weeds compete with the crop for light, moisture and nutrients. Undertake interrow cultivation at 10 - 15 DAE to control weeds. Hill-up at 25-30 DAE. Spot weed after hilling-up to remove remaining weeds in between plants.

Bush and pole sitao are commonly attacked by cutworms, bugs, beanfly, aphids and pod borer. Observe the field at 3-10 DAE for the presence of beanfly. Apply appropriate control measures if infestation is severe. Common diseases include fusarium wilt, stem and root rot, bean rust, bean mosaic and powdery mildew.

To prevent the occurrence of pests, practice the following:

1. Crop rotation.
2. Field sanitation.
3. Plant resistant varieties

Harvesting and Postharvest Operations

Timely harvesting is necessary to attain good yield and quality harvest. Harvesting depends on the purpose of the grower whether it is for green pod or dry seed production.

Green pod

- Harvest when the pods are still green and immature. Do not allow the pods to become fibrous and fully grown with prominent seeds before harvesting.
- Harvest green pods twice a week, in the morning or late in the afternoon when the temperature is low to maintain the freshness of the pods.
- Place the pods in a shaded area to minimize deterioration.
- Clean and sort the pods according to size, color and maturity.
- Separate damaged pods.
- Pack the produce in suitable containers preferably crates, baskets or boxes lined with fresh banana leaves or newspaper to maintain the freshness and minimize damage during transport. Refrigerate the unconsumed or undisposed harvested pods or keep them in a moistened clay jars to maintain its freshness for about three days.

Dry seed

- Harvest when the pods turned brown. Harvest in the morning by priming or hand picking.
- Sundry harvested pods immediately.
- Thresh the pods manually with the feet or with a wooden flail or by using a mechanical thresher.
- Clean the seeds by winnowing. Discard damaged and immature seeds.

- Sundry the seeds for 1-3 days at 3-4 hours drying per day to attain 10-12% moisture content (MC). Spread the seeds evenly on drying nets or canvass. Turn the seeds every 30 minutes to attain uniform drying.
- To determine the correct dryness, bite the seeds. If it gives a cracking sound, the seeds are dried.
- Another practical method of determining the dryness of the seeds is to place one half kg seeds in a plastic bag. Tie the bag tightly and expose under the sun. If water gathers in the plastic in 30 minutes to one hour, the MC of the seeds is still high.
- Store dried seeds in moisture-proof containers to prevent moisture accumulation and maintain good quality seeds.

SEED PRODUCTION TECHNOLOGY

Certified seeds of vegetables are expensive. However, the purity is guaranteed. For commercial scale production, the use of certified seeds every planting season is more profitable. For home gardens, it is advisable to produce your own planting materials from certified seeds.

To produce good seeds, follow these steps to minimize degeneration of the variety:

1. Select a site for seed production preferably at the center of the field.
2. Plant one seed per hill following the recommended distance for sitao. Follow the recommended cultural management practices for the crop.
3. Evaluate the performance of each hill as to productivity and reaction to insect pests and diseases. Rogue hills that are not productive, susceptible to insect-pests and diseases and not true-to-type.
4. Use only the harvest from the first and second priming for seed purposes.
5. Sundry harvested pods for 2-3 days but not too long to expose to high heat intensity. Turn occasionally to ensure uniform drying.
6. Shell the pods after drying. Separate abnormal and deformed

- seeds from good ones. Dry the good seeds until moisture content (MC) of 8-12% is attained.
7. Treat the seeds to eliminate minute larvae of bean weevil. If fruits of hot pepper are available, slice the ripe fruit and mix with the seeds before drying.
 8. Treat the seeds with fungicides to prevent seed-born fungal diseases following the manufacturer's recommended dosage.
 9. Store the seeds in glass jars, plastic bags, cotton or nylon net or any suitable container. Fill at least 10 percent of the container with charcoal as desiccant. Label the seeds and keep in a dry and cool place.
 10. Test the viability of the seeds before planting.

COST AND RETURN ANALYSIS FOR POLE SITAO PRODUCTION

PARTICULARS	Quantity 1/		Total (P)
	Man - days	Man-animal-days	
1. Land Preparation			
a. 1st Plowing		7	2,100.00
b. 1st Harrowing		6	1,800.00
c. 2nd Plowing		6	1,800.00
d. 2nd Harrowing		3	900.00
e. Furrowing		3	900.00
2. Basal Fertilization	4		600.00
3. Planting	8		1,200.00
4. Staking	12		1,800.00
5. Weeding cultivation	15		2,250.00
6. Control of pests and diseases	8		1,200.00
7. Harvesting (4 x)	56		8,400.00
8. Sorting and packing	8		1,200.00
9. Hauling (4x)	4		600.00
Sub-Total			24,150.00

B. Material Inputs

PARTICULARS	Quantity 2/		Total (P)
	Man - days	Man-animal-days	
1. Seeds (OPV)	25 kg	300.00	8,400.00
2. Fertilizer			
- Complete (14-14-14)	3 bags	1,900.00	5,700.00
- Organic Fertilizer	20 bags	200.00	4,000.00
- Foliar fertilizer	9 boxes	195.00	1,755.00
3. Insecticide	3 liters	850.00	2,550.00
4. Fungicide	2 kg	550.00	1,100.00
5. Polyethylene	100 pieces	5.00	500.00
6. Miscellaneous			1,500.00
Sub-Total			25,505.00
Sub-Total (A&B)			49,655.00
C. Contingency (15% of the total labor & material inputs)			7,448.25
GRAND TOTAL			57,103.25
Yield /ha (kg)	15,000 kgs		
Gross Income (8/kg)		3/ 12.00/kg	180,000.00
Net Income			122,896.75
Return on Investment (ROI)			215.22

1/ Man-days = P150

MAD = P300

2/ Cost of items as of September 2012

3/ Farm Gate Price

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