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Republic of the Philippines
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REGIONAL FIELD UNIT NO. 02



SITAO

Production Guide

Sitao (pole and bush type) are vegetable legumes widely grown in the country. These crops provide good source of income and cheap substitutes of animal protein. Aside from their food value, dried seeds of sitao can serve as raw materials for the preparation of animal feeds. They are also valuable to agriculture because of their ability to improve soil condition through nitrogen fixation.



Sitao is easy to grow and it takes only about one and half months to harvest.

SOIL AND CLIMATIC REQUIREMENTS

Sitao are non-seasonal crop. It can be grown throughout the year. They can thrive in various types of soil. However, a fertile, friable, well-drained soil with high organic matter and pH value between 5.5 to 6.8 is the best soil suitable for successful growing. The temperature range for optimum growth is 20 to 35°C.

CULTURAL MANAGEMENT PRACTICES

Selection of Varieties

Select varieties that are high yielding, resistant to pests and diseases, non-seasonal, adapted to local climatic conditions and acceptable to the consumers to gain optimum yield and profit.

Several improved varieties are listed in the *Guide in Selecting Lowland Vegetable Varieties* included in this kit for your reference.

COST AND RETURN ANALYSIS

PARTICULARS	BUSH SITAO	POLE SITAO
Estimated /Ha	10,000	15,000
Estimated Gross Income	80,000.00	15,000.00
Estimated Gross Margin	26,691.75	91,516.75
Return on Investment (ROI)	50.07%	156.48%
Breakeven Price (kg)	5.33	3.90

REFERENCES

1. Technopackage for Vegetable Legumes. Agricultural Pilot Center, DA-CVLMROS, Iguig, Cagayan.
2. Bush Sitao Production Guide. Agricultural Communication Section, Department of Agriculture Regional Field Unit No. 02, Tuguegarao City
3. Gintong Ani Production Guide for Bush Sitao. Department of Agriculture Regional Field Unit No. 02, Tuguegarao City

Test the viability of the seeds before planting.

COST AND RETURN ANALYSIS FOR SITAO

Per Hectare Basis for CY 2008

PARTICULARS	BUSH SITAO				POLE SITAO			
	UNIT	QTY	UNIT COST (P)	TOTAL COST (P)	UNIT	QTY	UNIT COST	TOTAL COST
A. LABOR INPUTS								
1. Land Preparation								
a. 1 st Plowing	MAD	7	300	2,100		7	300	2,100
b. 1 st Harrowing	MAD	6	300	1,800		6	300	1,800
c. 2 nd Plowing	MAD	6	300	1,800		6	300	1,800
d. 2 nd Harrowing	MAD	3	300	900		3	300	900
f. Furrowing	MAD	3	300	900		3	300	900
2. Basal Fertilizaion	MD	4	150	600	MD	4	150	600
3. Planting	MD	8	150	1200	MD	8	150	1200
4. Staking					MD	12	150	1,800
5. Weeding/cultivation	MAD	15	150	2,250	MAD	15	150	2,250
6. Control of Pest and Diseases	MD	8	150	1,200	MD	8	150	1,200
7. Harvesting (4x)	MD	12 x 4	150	7,200	MD	14 x 4	150	8,400
8. Sorting and Packing	MD	4 x 2	150	1,200	MD	4 x 2	150	1,200
9. Hauling (4x)	MD	4	150	600	MD	4	150	600
Sub-total				21,750				24,750
B. INPUTS								
1. Seeds (OPV)	kg	25	300	7,500	kg	20	420	8,400
2. Fertilizer								
- Complete (14-14-14)	bag	3		5,700	bag	3	1,900	5,700
- Organic Fertilizer	bab	20		4,000	bab	20	200	4,000
- Foliar Fertilizer	box	9		1,755	box	9	195	1,755
3. Insecticide	liter	3		2,550	liter	3	850	2,550
4. Fungicide	kg	2		1,100	kg	2	550	1,100
5. Polyethylene	sack	100		500	sack	100	5	500
6. Miscellaneous				1,500				1,500
Sub-total				24,605				25,505
Sub-total (A&B)				46,355				50,255
Contingency (15% of the total labor and material inputs)								
GRAND TOTAL								

MD - man days

Land Preparation

Start preparing the land 3 to 4 weeks before planting. Plow the field to a depth of at least 20 cm. For better plant growth and development, plow and harrow the field 2 to 3 times at one week interval.

When the soil moisture is just right for planting, make furrows at 20 cm deep with the following recommended row spacing:

Type	Spacing (cm)
Pole Type	100
Bush Type	75

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, they also need other elements aside from nitrogen in order to survive. To determine this, have your soil analyzed at the Soil Laboratory nearest you.

In the absence of soil analysis, apply three bags of complete fertilizer (14-14-14) and 20 bags of organic fertilizer or compost per hectare at basal during the dry season. Apply this amount uniformly into the furrows just before planting. Cover the fertilizer with 2 to 3 cm fine soil before planting to protect the seeds from getting in contact with the fertilizer. Supplement with foliar fertilizer during flowering stage. For wet season planting, apply only foliar fertilizer during flowering stage.

Planting

Leguminous vegetables vary in their growth habits, hence they are planted at different methods and spacing.

For pole and bush sitao, the following spacing, plant population and seed requirement per hectare is recommended:

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

Methods of Planting:

- 1. Drill Method.** Plant 18 to 20 seeds per linear meter. Distribute the seeds uniformly in the furrows. Cover the seeds lightly with 3 to 4 cm fine soil.
- 2. Hill Method.** Plant 2 to 3 seeds per hill using the specified distance indicated in the table. Cover the seeds lightly with 3 to 4 cm fine soil.



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

Water Management

If soil moisture is not sufficient during planting time, water the field immediately after planting to ensure uniform germination. Frequency of irrigation depends on soil type and weather condition. Sandy loam soil need more frequent irrigation. Construct drainage canal if the area has poor drainage.

SEED PRODUCTION TECHNOLOGY

Certified seeds of vegetables are expensive. However, the purity is guaranteed. For commercial scale production, using 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 to 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 they have reached 8 to 12 percent moisture content.
- 7** Treat the seeds with recommended insecticides to kill 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 fungicide to prevent seed-born fungus diseases.
- 9** Store the seeds in a glass jar, 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

- Sundry harvested pods immediately until they become brittle.
- Thresh the pods using a mechanical thresher or manually with the feet or with a wooden flail.
- Clean the seeds by winnowing. Discard damaged and immature seeds.
- Sundry the seeds to 10 to 12 percent moisture content (MC). Spread the seeds evenly on drying nets or canvas. Turn the seeds every 30 minutes to attain uniform drying. It takes 1 to 3 days at 3 to 4 hours drying per day to dry the seeds depending on the initial MC of the seeds and the intensity of sunlight.
- Bite the seeds to determine the dryness. 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



Practice furrow irrigation as soon as plants exhibit signs of water stress. Wilting in the morning or evening indicates moisture stress.

It is important to program the planting period so that moisture stress or water logging will be avoided.

Staking Pole Type Sitao

Provide stakes for pole sitao 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 to 2 cm, stems of “*talahib/runo*” or splitted bamboo as staking materials.



Place 1.5 to 2 meters long stakes between plants within the furrows in slanting position so that the top of the stakes intersects 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 plants can also serve as biological trellis for pole sitao. Plant corn and pole sitao alternately at a distance of 100 cm between furrows and 30 cm between hills.

Train the pole sitao vines to climb the trellis as they grow.



Care of the Plants

Thin the plants 5 to 7 days after emergence (DAE) leaving 15 to 18 plants per linear meter in the drill method and 2 plants per hill in the hill method.



Keep the field weed-free since they compete with the crop for light, moisture and nutrients. Do interrow cultivation at 10 to 15 DAE to control weeds. Hill-up at 25 to 30 days after emergence. Spot weed after hilling-up.

Bush and pole sitao are commonly attacked by cutworms, bugs, beanfly, aphids and pod borer. Observe the field at 3 to 10 DAE for occurrence 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. For effective control, please refer to the *Pest and Disease Management Guide for Lowland Vegetables* included in this kit.

Harvesting and Postharvest Operation

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 Production

- Harvest pods when these 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 so that pods are fresh.

- Place the pods in a shaded area to minimize deterioration.
- Clean the pods and sort them according to size, color and maturity.
- Separate damaged, insect-infested or diseased pods.
- Pack the produce in suitable containers preferably crates, baskets or boxes lined with fresh banana leaves or newspaper to maintain freshness and minimize damage during transport.
- Refrigerate unconsumed or undisposed harvested pods or keep them in a moistened clay jars to maintain its freshness for about three days before marketing.



Bean Yield Production

- Pods are ready for harvest when these turn brown. Harvest the crop by priming or hand picking the dried pods in the morning when the

