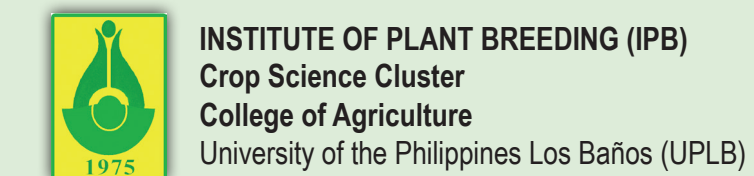
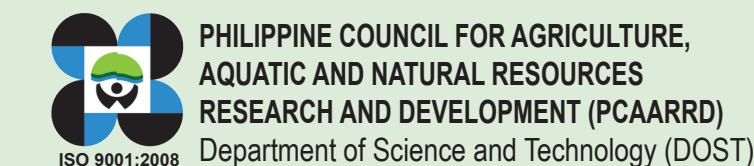


# Organic Pole Sitao Production



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## Cost and return analysis for one-season production of organic pole sitao.

Items	Amount in Total (P/ha)
<b>Variable Costs</b>	
<b>A. Labor (P250/MD; P500/MAD)</b>	
Plowing (5 MAD)	2,500
Harrowing (3 MAD)	1,500
Planting (4 MD)	1,000
Organic fertilizer application (10 MD)	2,500
Irrigation (20 MD)	5,000
Hilling up (4 MD)	1,000
Trellising (6 MD)	1,500
Vine training (3 MD)	750
Weeding (10 MD)	2,500
Spraying of FPFS (10 MD)	2,500
Harvesting (10 X 30 MD)	7,500
Miscellaneous (20 MD)	5,000
<b>Sub-total</b>	<b>33,250</b>
<b>B. Materials</b>	
Seeds (15 kg/ha)	9,000
Trellising materials	30,000
Organic fertilizer (2 t)	10,000
FPFS	2,500
Bio-pesticide	500
Net bags, crates, and knives	5,000
Miscellaneous	5,000
<b>Sub-total</b>	<b>62,000</b>
<b>Sub-total (A+B)</b>	<b>95,250</b>
<b>C. Contingencies (15%)</b>	<b>14,287.50</b>
<b>Grand Total Cost (A+B+C)</b>	<b>109,537</b>
<b>Gross Income (range)<sup>a</sup></b>	<b>-375,000</b>
	<b>140,462.50</b>
<b>Net Income (range)</b>	<b>-265,462.50</b>
	<b>128.23</b>
<b>% ROI (range)</b>	<b>-242.35%</b>

<sup>a</sup>With marketable yield of 10–15 t/ha at farm gate price of P25/kg.  
 Costs are based on 2013 prices.  
 FPFS - fermented plant food supplement  
 MAD - man-animal days  
 MD - man-days



Extract seeds and sun-dry to around 10% moisture content. To determine if the moisture content is acceptable, put ½ kg seeds inside a plastic bag and expose it to sunlight. If condensation occurs after 30 minutes, continue sun-drying the seeds. Pack the dry seeds in moisture-proof containers, label with the name of the variety and date then store in a cool, dry place. If properly stored, seeds can remain viable for up to 2 years. Small quantities of seeds can be stored in the refrigerator. Seeds may be treated with dry wood ash or rice hull ash to protect against weevil. Chopped or powdered turmeric may be added. Repeat wood ash treatment for three consecutive weeks if weevil infestation is high.



Diseases	Recommendations
Pole sitao mosaic virus	Use resistant or tolerant varieties such as Sandigan and CSL-19.
Cowpea rust	Use resistant varieties such as Sandigan and CSL-19. Prune infected leaves.
Fusarium root rot	Use resistant varieties such as Sandigan. Plant in well-drained soils. Practice crop rotation with other crops except legumes.

The recommended organic varieties, 0116-1-1-0-0, 1096-1-1-0-0, 10421-0-0, and 0801-5-1-1-0 are resistant or tolerant to pests and diseases. Sandigan and CSL-19 are also generally good for organic conditions. Use biological sprays only as a last resort. Other measures include crop rotation, planting of pest repellent crops and attractants of beneficial insects, pruning of infected plant parts, roguing of severely infected plants, and providing adequate space between plants for good air circulation.

## Harvesting

Pole sitao is harvested 50–60 days from planting, depending on the pod diameter and toughness permitted in the market. It is harvested by hand every 3–4 days for up to 30 times during the growing season. Harvest early in the morning (6–8 a.m.) to avoid weight loss. The harvest should be kept under the shade and handled properly to prevent bruising.

## Postharvest Handling

Classify pods as marketable and non-marketable. Grade marketable pods according to size and quality. First grade pods are unblemished, tender, straight, long, and at the right maturity. Second grade pods are short, have minimal blemishes and distortion, and slightly over the picking stage. Unselected pods are considered non-marketable but can still be consumed. Optimum storage conditions are 5–7.5 °C and 95–100% relative humidity. Soaking the pods in coconut water can help prolong shelf life.

## Packing

Pack harvested pods in thickly lined bamboo baskets or plastic crates to minimize damage. Wrapping the pod bundles with fresh banana leaves also helps protect the pods and prolong shelf life.

## Seed Production

Pole sitao is self pollinated. Select plants that are vigorous and free of damage from pests and diseases. Allow pods to dry and turn brown before harvesting. Select dry pods from the middle portion and hang pods for further drying. Pods that are harvested 20 days after pollination will give the best quality seeds.

## Introduction

Pole sitao, *Vigna unguiculata* (L.) Walp. cv. group *Sesquipedalis*, is also known as asparagus bean, Chinese long bean, garter bean, snake bean, yard long bean (English), ‘tao-fak-yao’ (Thai), ‘kacangpanjang’ (Indonesian, Malaysian), ‘daudau’ (Vietnamese), ‘lobia’ (Hindi), ‘daugok’ (Chinese), and ‘sasage’ (Japanese). Locally, it is known as ‘sitaw’ in Tagalog, ‘utong’ in Ilocano, ‘hantak’ in



Waray, ‘batong’ in Cebuano and ‘latuy’ in Marinduque. It is a climbing herbaceous crop raised primarily for its pods, although shoots and young leaves are also edible. Pods are slender, 30–60 cm long and somewhat

inflated with many seeds whose color depends on the variety. It is a subtropical/tropical plant that is widely grown in Southeastern Asia.

### Uses and Nutritional Value

The succulent young pods of pole sitao can be steamed, sautéed, buttered or cooked along with other vegetables. The nutritional value of pole sitao is presented below.

Properties	Amount
Water (g)	88.9
Energy (kcal)	43.0
Protein (g)	3.1
Fat (g)	0.2
Dietary Fiber (g)	2.2
Carbohydrates (g)	7.2
Ash (g)	0.6
Calcium (mg)	61.0
Phosphorus (mg)	47.0
Iron (mg)	0.9
Vitamin A (µg)	42.0
Thiamine (mg)	0.12
Riboflavin (mg)	0.11
Niacin (mg)	1.0
Ascorbic acid (mg)	22.0

Source: The Philippine Food Composition Tables, 1997. Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST).

## Production Management

Pole sitao is easy to grow organically. However, conventional growers spray a lot of pesticides even at the seedling stage. Such practice sets the stage for more destructive pod borer infestation. To grow pole sitao organically, use varieties suitable for organic conditions, avoid monocropping, and grow plants such as cosmos, marigold, lemongrass, ginger, and pigeon pea around the area. These plants can help minimize pest infestation.

### Varieties

Among the varieties that can grow well under organic conditions are CSL 19, Sandigan, and Acc 228. Among the new potential varieties selected under the project ‘Variety Development, On-farm Trials and Seed Production of Organic Vegetables in Southern Luzon’ funded by DOST-PCAARRD are 0116-1-1-0-0, 1096-1-1-0-0, 10421-0-0, and 0801-5-1-1-0.

### Climate and Soil Requirements

Pole sitao is well adapted to lowland tropics at a temperature range of 20–35 °C. It grows best under full sunlight although it can tolerate partial shading. Adequate water supply and a friable, fertile soil promote healthy growth and good quality pods.

A woman in a red shirt and black pants stands in a field of tall, green pole sitao plants, likely engaged in maintenance or harvesting.

Planting is done in October and November to achieve higher percentage of pod set. Although it can be grown throughout the year, some varieties tend to be overly vegetative during the wet season.

### Land Preparation

Plow and harrow the field twice. For single row planting, make furrows 0.75–1.0 m apart and dig shallow holes 30 cm apart along the furrows. For double row planting, prepare raised beds 20 cm high and 1 m wide. Dig holes 30 cm between hills and 30 cm between rows. Mix decomposed animal manure well and/or compost during bed preparation.

A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

Plastic mulch may be used to suppress weed growth and conserve soil moisture. After making the raised beds and incorporating manure, roll out the plastic mulch with the silver side up. Secure one end by covering it with soil. At about 1 m before the end of the plot, pull the plastic mulch without rolling out to ensure that it is fully stretched. Cover the ends and the sides with soil instead of using bamboo clips. Make holes using heated tin cans 7–10 cm in diameter. The holes may be spaced at 30–50 cm between hills and 50 cm between rows. The plastic mulch can be used for up to four croppings, which saves on land preparation and weed control activities.

## Planting

One hectare of pole sitao requires 10 kg seeds or 10 g/10 m<sup>2</sup>. After basal fertilization with organic fertilizer, directly sow 2–3 seeds/hill, cover lightly with soil, and apply mulch using grass clippings or rice straw. If plastic mulch is to be used, sow 2–3 seeds/hole and cover lightly with soil.



A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

### Trellising

Vertical trellis is used for single row plots. Use bamboo poles 3 m apart along the rows and secure them on top with GI wire. Use nylon string or synthetic straw at two to three lines parallel to the GI wire at the top. Tie straw lines vertically 25 cm apart. For double row plots, use A-type trellis. A network of wires and straws can also be used for the pole sitao vines to cling on.



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## Fertilization

Organic vegetable farming uses organic fertilizers and plant food supplements prepared from natural sources.

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The general fertilizer recommendation for pole sitao is 135 kg/ha N, 135 kg/ha P<sub>2</sub>O<sub>5</sub> and 112 kg/ha K<sub>2</sub>O. The rate may vary depending on the results of soil analysis. Use of well-decomposed animal manure or vermicompost at 3–5 t/ha will contribute an equivalent of 60–100 kg NPK and micronutrients. The balance can be supplied from available nutrients in the soil, N fixation, side dressing with organic fertilizers, drenching with manure tea, and use of natural farm inputs such as fermented plant juice (FPJ), fermented fruit juice (FFJ), fish amino acid (FAA), and calcium phosphate.

A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

To prepare manure tea, soak ¾ sack (30 kg) of dried cow or horse manure in a plastic drum with 180 L water. Soak for 5–7 days with frequent stirring. To prepare FPJ, mix three parts chopped plant shoots or banana trunk with one part raw sugar or molasses. Ferment the mixture for 5–7 days. Dilute the FPJ or manure tea at one part tea to 20–40 parts water. Drench the plots with the diluted solution or use it as foliar fertilizer. The rate and frequency of fertilization depend on the plants’ vigor.

A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

To prepare FFJ, mix overripe fruits and peelings with 1/3 part raw sugar and molasses and ferment for 7 days.

A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

For FAA, mix fish trashes with equal part molasses. Ferment the mixture for around 2 weeks.

A person is shown working in a field of pole sitao plants, likely engaged in maintenance or harvesting.

Calcium phosphate is prepared from egg shells, fish bones and animal bones. Char and grind these materials and mix with 10 parts natural vinegar then allow to stand for 2 weeks.

### Irrigation

Pole sitao requires constant supply of moisture throughout the growing period. Regular watering will increase flowering and pod setting. Avoid too much water that can cause root rot and too little water that can result in flower and pod drop.

### Weed Management

Keep the plants weed-free from planting up to the third week. Hill up after 3 weeks to cover the side-dressed organic fertilizer and suppress weed growth. Regular spot weeding is recommended but a minimum level of weed growth maybe allowed along the alleys to protect the soil. With plastic mulch, hilling up is not necessary.

## Pest and Disease Management

Pole sitao is a host to many pests and diseases, but these can be controlled using botanical pesticides, bio fungicides, bio pesticides, bio insecticides, and other cultural management schemes.

Pest and disease management options in pole sitao.	
Pests	Recommendations
Beanfly ( <i>Ophiomyia phaseoli</i> )	Spray with soap solution (4 tbsp soap/16 L water).
Aphids ( <i>Aphis craccivora</i> )	Spray with hot pepper extract (100 g macerated hot pepper/ 16 L water) and soap solution. Use ‘Langkawas’ ( <i>Alpinia pyramidata</i> ) extract spray.
Leafhopper	Avoid clean culture. Spray with soap solution or <i>Metarrhizium</i> . To prepare <i>Metarrhizium</i> culture, mix sterilized palay and conidial suspension thoroughly. Incubate mixture for 1–2 weeks. Prepare conidial suspension for spraying by adding 200 mL of 0.05% soap solution (a mixture of 0.5 g all-purpose detergent and 1 L water) to each bag of palay substrate. Place 1000 mL of the conidial suspension in the spray tank and bring the water level to 16 L. Five bags of 200 g palay substrate yield 1 L spore suspension. Spray early in the morning (around 6–8 a.m.) or late in the afternoon (around 4–6 p.m.) to avoid desiccation of the spores.
Pod borer	Grow repellent crops such as basil, onion, and marigold around the planting area. Spray with commercially available <i>Bacillus thuringiensis</i> (Bt) or Nuclear Polyhedrosis Virus (NPV). Collect NPV-infected pod borer larvae and store in the freezer for later use. These can be macerated then diluted at 12 infected larvae/6 L water. Spread earwigs to feed on pod borers.
Leaf miner	Conserve natural enemies such as spiders, lacewings, and syrphid flies. Intercrop with okra, eggplant, tomato or other suitable vegetables. Maintain low weed population along alleys to minimize the pest.