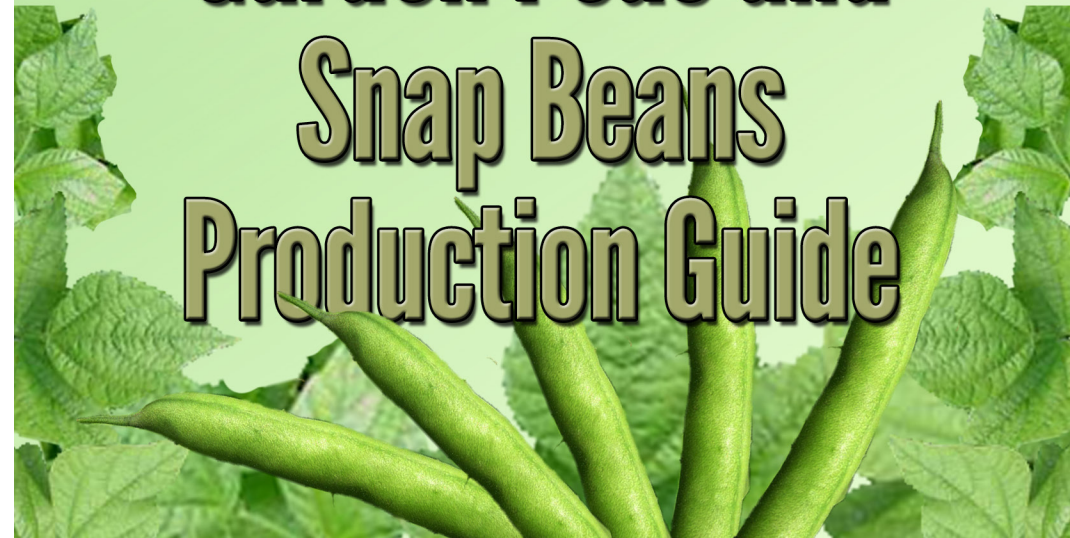




Republic of the Philippines  
Department of Agriculture  
AGRICULTURAL TRAINING INSTITUTE



# Garden Peas and Snap Beans Production Guide



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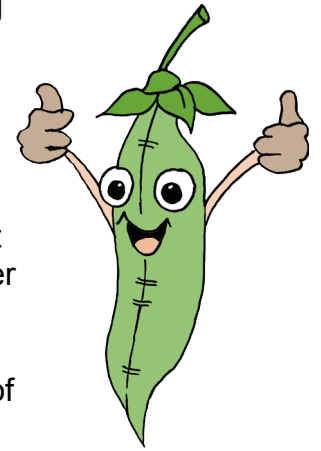
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## IMPORTANCE OF GARDEN PEAS AND SNAP BEANS

- Economic importance – Growing snap bean (*Phaseolus vulgaris* L.) and Garden pea (*Pisum sativum* L.) is a profitable venture. Actual recording show that an area of 1,000 sq. m. that was planted to beans gave a net profit of P17,802.10. On the other hand, one cropping of garden pea gave a net profit of P14,000 in a hectare with a selling price of P5.00 to P6.00 per kg.



COMPOSITION	SNAP BEAN	GARDEN PEA
Moisture (%)	90.5	81.9
Food Energy (cal)	34.0	57.0
Protein (g)	2.0	3.3
Fat (g)	0.1	0.3
Carbohydrates (g)	6.8	13.0
Fiber (g)	1.0	1.2
Ash (g)	0.6	1.5
Calcium (mg)	72.0	76.0
Phosphorous (mg)	38.0	45.0
Potassium (mg)	182.0	112.0
Sodium (mg)	2.0	2.0
Iron (mg)	0.8	1.4
Vitamin A (I.U)	525.0	305.0
Thiamine (mg)	0.07	0.14
Riboflavin (mg)	0.10	0.09
Niacin (mg)	0.7	0.9
Ascorbic Acid (mg)	15.0	77.0

\* Food Composition Table, Handbook No. 1, FNRC Vitamins and Minerals and What They Can Do For You

- Legumes can fix nitrogen in the soil in symbiosis with some specie of bacteria. It was estimated that about 132 kg. of Nitrogen is fixed in the soil per hectare per year . Legumes are recommended for crop rotation and green manuring. It was also estimated that about 132 kg of Nitrogen is fixed in the soil per hectare per year when peas and beans are planted.
- Nutritional importance – Snap beans and garden peas are high in protein content, vitamins and minerals. Legumes in general are dubbed as “poor man’s meat.” Below are the composition of immature pods per 100g of edible portion.

Cultivar Yield/Hectare	Pod Length (cm)	Computed (ton)
1. Valentine (Alno)	14.3	18.68
2. Stonehill (Patig)	17.6	22.40
3. Burik	13.3	18.48
4. Canaya	15.4	20.86
5. Blue Lake	13.7	23.02
6. Violeta	13.7	25.65
7. Macarao	10.79	26.70

\* Data from studies of Atos,1987, Tandang, et.al., 1989, and Bolislis, 2004

## VARIETIES

### SNAP BEANS

- Pole snap beans – climbing or indeterminate type which requires trellis for support.
- Blue Lake shows higher resistance to bean rust. From observation, snap bean with light green beans are more resistant to bean rust than those with dark green leaves.
- Bush snap bean – non-trailing or determinate type



Bush Snap Bean or “Kabayan”.

- First grade – In beans, the pods should be unblemished, straight and properly green mature. Pea pods should be free from black spots, properly green mature and erect.
- Second grade – Snap bean pods free from worm or insect damage, less blemished and less distorted. Pea pods without black spots, but some pods that are bent, properly green matured and erect are graded second.
- Third grade – Bean pods have numerous blemishes and distortions, but generally have good appearance. In peas, pods may be over matured a bit or spotted or may be bent.

In snap beans, pods less than 5 cm long and over matured are rejected.

- Packaging – The containers commonly used in packing bean pods and peas are thick laced bamboo baskets, plastic sacks, polyethylene bags or *buri* palm bags, depending upon the distance to the point of sale.



- Storage – Considering that the shelf-life of beans and pea pods are only two weeks, these should be sold immediately after harvest. However, pods can be temporarily stocked 1 to 2 days before these are shipped to the markets depending on the distance to the point of sale.

## Regrowth (Ratoon) Production

Some farmers are observed to allow their bean plants to produce lateral branches after the last harvest from the mother plants.

- Studies show an additional yield of 4.79 to 7.67 kg. per plot or 9,580 to 15,380 kg. marketable pods per hectare from regrowth plants of Black Valentine (Alno) beans.
- It was observed that this snap bean cultivar is the most productive in regrowth among the six cultivars studied.
- The most profitable snap bean cultivar for regrowth production are Black Valentine (Alno) and N2643 while Stonehill (Patig) incurred a negative income. Harvesting pods from regrowth may start 30 to 40 days depending on the cultivar.
- Garden pea cv. Kalantao was observed to produce regrowth, but not as good as snap beans. It may produce an additional yield of 2,132 kg. per hectare but will not give a net profit.

## Postharvest Handling (Grading)



Pods are not usually graded but at times of bumper harvest resulting to a temporary market glut, the following grades may be done:

Cultivar	Plant height (CM)	Pod Length (CM)	Computed yield/ha (Ton)
1. Beeline	29.16	14.1	13.09
2. Gator Green	36.1	16.4	13.29
3. Derby	34.39	15.2	13.74
4. Early Riser	30.87	14.2	12.77
5. Blue Night	24.79	14.3	14.20
6. Tidal Wave	32.61	13.5	15.42
7. True Blue	37.50	13.5	14.24
8. Tender Lake	36.14	14.9	15.54
9. Bush Blue Lake	40.96	14.5	15.69
10. Blue Lake	40.46	15.6	13.85
11. Javeline	34.68	15.4	14.01

\*Data from the varietal evaluation trial of Kudan, 1991.

## GARDEN PEAS

- Giant type – These are the peas that grow from 1.5 to 2.0 meters high or more with broad pods with an average length of 9 to 12 cm. Examples of cultivars under this type are: Kalantao, Melting Sugar Mammoth and Chinese.
- Dwarf type – These are the peas that grow from less than a meter to 1.5 meters high having narrow pods with an average length of 7 to 9 cm. These are mainly grown for processing. Examples are Wondo, Alaska and Onward, but these are not commonly grown yet in the Cordillera.

Recently, Banda-ay (1996) evaluated some of the pea lines produced by Institute of Plant Breeding - Benguet State University (IPB-BSU) which showed promising results. These are presented with the old time favorites below:

Varieties	Yield Potential (Tons/Ha)
1. Kalantao	5 to 6
2. Chinese Dark Green	4 to 5
3. Chinese White	4 to 5
4. CGP No. 27	10
5. CGP No. 20A	9
6. CGP No. 98	8
7. CGP No. 18B	8
8. CGP No. 18A	8

### Importance of Selecting the Appropriate Cultivar

- Varietal selection is not only important in beans and garden peas, but also in other vegetable crops. Planting the variety not adapted to the environmental condition will only result to a waste of resources such as money, time and labor.
- Under La Trinidad, Benguet condition for example, studies consistently show that Kalantao and Chinese have better performance in yield and resistance to pests compared to the other varieties evaluated (Manghi, 1980; Colas, 1981; Rosa, 1984).



*Chinese Cultivar*

is the critical stage where tremendous reduction in yield occur if weeds compete with the plants for nutrient elements, moisture, light and space.

### Harveting Pods



The harvesting method is mainly done by priming (selecting the green mature pods by hand). The method of determining green mature pods is through visual or “feel.”

- Visual method – When the seed zones become prominent and the seeds are developed to their half-full size the pod is green mature. This is about 16 days from pod set. Some cultivars have pods that turn light green from dark green when green mature.
- “Feel” method – Green mature pods of beans easily snap in two when bent and garden pea pods easily snaps of at the abscission zone when harvested. The tender seeds are easily crushed between the thumb and forefinger.



- Pea Wilt – This is a serious disease of garden pea where the whole area may be infected and the plant turns yellow and dry-up. The stem at the soil line downward will rot when infected with pea wilt.

Crop rotation is necessary when the soil is infected. The application of organic fertilizer may also help especially when trichoderma is antagonistic to fungus causing pea wilt. The use of resistant variety of pea may also be used.

Weed – Weeds of snap beans and garden peas are basically controlled by hand weeding, hoeing and hilling-up. The important thing to remember in controlling the weeds is not to allow weeds to compete with the plants from 7 to 40 days after emergence. This period



*Fresh pods must be harvested at the appropriate stage of maturity (green mature) because over mature pods have short storage life and are non marketable. If marketed, the selling price is very low.*

## SOIL AND CLIMATIC ADAPTATION

### Soil Requirement

- Snap bean and garden peas can grow in any type of soil, but best results are obtained from well-drained, heavy rich loams with a pH range of 5.5 to 6.8.



### Temperature requirement

- The optimum soil temperature for germination is 15.5 to 29.5 degree celsius for snap beans while 4.5 to 24.0 degree celsius for garden peas.

## CULTURAL MANAGEMENT PRACTICES

### Land Preparation

The area should be cleaned from weeds and dug 1 to 2 weeks before planting. Plots may be prepared in two ways:

- Plot or elevated bed - The plot measures 1.2 meters wide by 10 to 12 meters long and 15 to 20 cm. higher than the ground level with double rows. This technique of plot preparation is advisable during rainy days for drainage and ease of operation.
- Flat or furrow system – The area is dug and leveled. The rows are established using a hoe or a plow. Double rows or single row may be used. This technique is recommended during dry season for plots do not easily dry up.



The depth of tillage determines the penetration of roots and growth of plants. Root concentration is on the upper 30cm layer of the soil so this should be dug. In digging plots, it should be along the contour and not following up the slope. This will minimize soil erosion by surface run-off in sloping areas.

### **Seed Treatment (Cold Storage)**

- While preparing for the area, the seeds may be stored in refrigerator for 45 days. Snap beans and garden pea seeds are placed in plastic bags and carefully closed by tying the openings with string or rubber band. This will be placed inside the refrigerator running at 5 degree celsius for 45 days.
- This treatment increases the yield of peas by 18.3% due to more and longer pods compared to the untreated seeds. This practice promotes the production of more lateral branches, early flowering and longer pods.

### **Plot Orientation**

- In the study of Polon (1981) on plot orientation, orienting the plant rows of snap beans northwest to southeast increased the yield to about 23% while orienting the rows east to west and north to south appeared to enhance the greatest flower abscission resulting to low pod set.
- Row orientation is not necessary for bush snap beans. Orienting the plots of peas from northwest to southeast enhance higher yield because the plants are exposed to longer duration of sunlight on both sides (Dolique, 1982).

### **Fertilizer Application**

To sustain production, the continuous application of organic fertilizer is necessary. This will not only build up the fertility of

- Bean Weevil – Proper pest control in the field is important because this pest is transferred to the storage. Proper drying of the seeds is also important to prevent the pest from thriving. Store the seeds in a cold storage if this is available. Bean seeds for planting material should be stored in cans or plastic containers with cover.

### **Disease**



- Bean Rust – This disease is prevalent during the dry season when it is warm and moist. Apply fungicide following the direction on the label of the container.
- White Mold – Treat the seeds with Benomyl at the rate of ½ tbsp. per kilogram seeds before planting. Spray Ridomil or Benomyl by following the instruction on the container when the disease is observed.
- Powdery mildew – This disease usually occur during the reproductive stage of garden pea. If it becomes severe, the whole pea plant turns white. The most effective fungicide to control powdery mildew is wettable sulfur. The container has the dosage and direction of application.



## Crop Protection

This is keeping the crop from infestation or interference from destructive insects, diseases and weeds.

- Cutworm – This insect pest is destructive during the seedling stage of beans and peas. Spraying Methamidophos at 2 to 3 tbsp. per 16 liters of water late in the afternoon can easily control this pest.
- Leaf Miner – This is a serious pest of Garden Pea during the dry season. The larvae tunnel into the leaf and eat the chlorophyll leaving only the epidermis. Application of systemic insecticides such as Methamidophos and Triazophos at the rate of 2 to 3 tbsp. per 16 liters of water is effective in the control of leaf miners.
- Maggots – A problem pest encountered during dry season planting of snap beans. The young plants wilt and the bark of the stem at the soil line is destroyed. Use Methamidophos at 2 to 3 tbsp. per knapsack sprayer.
- Thrips and Aphids – These pests infest beans and peas at any stage of growth. Aphids attack pea pods causing them to curl. These are sucking insects thus systemic insecticides like Methamidophos and Triazophos are applied.
- Tomato fruitworm – This insect eats the pods of peas and beans. Apply 2 tbsp. of Triazophos per knapsack sprayer.
- Pod borer – This pest is observed to be prevalent during the start of the rainy season in beans. Application of Triazophos at 2 to 3 tbsp per 16 liters of water should start during flower formation up to pod formation.

the soil, but also encourage the growth and multiplication of beneficial organisms in the soil. The application of fertilizers for beans and peas can be done in two ways:

- Basal application – After digging the plots during land preparation, construct the furrows on each plot. Broadcast the chicken dung on the furrows of the plots at the rate of one can (16 L capacity) per plot of 1m x 10m and mix with the soil properly to avoid rotting of seeds especially fresh chicken manure. The application of one can per plot requires 250 sacks per hectare if each sack contains four cans.
- Sidedress application – Beans and peas require the application of 100-100-100 kg N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O per hectare (14 sacks) or 714. 29 grams of 14-14-14 per plot of 1m x 10m. Apply this amount two to three weeks after emergence followed by hilling-up.

## Seed Inoculation

- To inoculate, put the seeds in a container – *batya*, or plastic bag. Moisten the seeds slightly and add inoculant at the rate of one gram per kilogram seeds. Mix thoroughly until all the seeds are evenly coated with the inoculant. If possible, plant the seeds immediately.
- Do not expose the inoculated seeds direct to sunlight for this will kill the inoculants.

## Planting Bean and Peas

Snap beans and garden pea are directly planted mainly by hand and both crops can be planted the whole year round. However, one cannot plant during the typhoon months. Snap bean is a short day plant.



Higher planting percentage of pod set (62.5%) is obtained during October to November while March to May (second cropping) have a pod set percentage of 30 to 40.

- **Seeds required** – An area of one hectare requires 55 to 60 kg. of Snap bean seeds and 50 to 55 kg. of garden pea seeds.
- **Plant spacing** – 20 cm x 20 cm both ways, with 2 to 3 seeds per hill is best for Snap bean and Garden pea. This will yield a plant population of 280,000 of Snap beans and 204,000 to 250,000 plants of Garden pea per hectare.

### ***Irrigation***

- Irrigate twice a week on the plots up to saturation point from planting to 50 days after planting, and may be done once a week.
- Stressing bean plants 10 to 40 days after emergence reduce tiller number, final height and yield, and even shorten the shelf-life of pods.
- In Garden pea, the stage most sensitive to moisture stress is from flowering to seed development. When plants are stressed during this stage, yield is tremendously reduced.



### ***Hilling-up***

- Two to three weeks after planting, apply sidedress fertilizer followed by hilling-up. This is to cover the sidedress fertilizer and at the same time cover the young



growing weeds. It will also anchor the plants and direct them to the middle of the plots, which will make them easy to climb the trellise



*Trellis Garden Pea*

### ***Training***

- Just after hilling-up, put the trellises at the middle of each plot interwoven perpendicularly. Each plot of 10 meters long requires about 60 sticks when spacing is at 30 cm each. Bush snap bean and the dwarf type of peas do not require trellis for growth.
- In Garden pea, bind the vines with plastic twine, unraveled plastic sacks or jute, when the vines are about 20 cm. high to train them to follow the trellis. The “tying” of the vines may consist of four to six depending on the height of the crop. Allowing the vines to creep or bend from the trellis will reduce the yield.

