
AGRICULTURAL ALTERNATIVES

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Snap Bean Production

Snap beans are a vegetable crop in the legume family that lend themselves well to small-scale and part-time farming operations. Initial investment is relatively low, and many field operations, such as land preparation, planting, and mechanical harvesting, can be custom hired. Equipment needs on a small-acreage farm are not very great, and most of the equipment can be used for other purposes.

Snap beans originated in southern Mexico, Guatemala, Honduras, and Costa Rica. By 1492, they had spread northward to the southwestern United States and then spread eastward from Florida to Virginia. U.S. farmers began breeding the bean around 1890 because of interest in bean varieties with stringless pods.

The United States harvested snap beans for two basic purposes: processing and fresh marketing. In 1998, the U.S. produced 191,000 acres of processed snap beans with a value of \$119 million and produced 87,500 acres of fresh-market snap beans, valued at \$233 million. (USDA Statistical Services bases value of production on total acres harvested times average price.) Pennsylvania produced 6,000 acres of processed snap beans with a value of \$4.7 million and produced 2,000 acres of fresh-market beans, valued at \$4 million.

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Marketing

Fresh market snap beans usually are produced in Pennsylvania from June through October. Snap bean cultivars recommended for Pennsylvania are listed in Table 1. Six basic marketing alternatives are available to snap bean growers: wholesale markets, cooperatives, local retailers (grocery stores), roadside stands, pick-your-own operations, and processing firms.

In wholesale marketing, producers often contract with shippers to market and ship their snap beans for a predetermined price. If you do not use a contractor and ship your crop to the wholesale market yourself, your product will be subject to the greatest price fluctuations. Marketing cooperatives generally use a daily pooled cost and price, which spreads price fluctuations over all participating producers. Local retailers are another possible market, but you must take the time to contact produce managers and provide high-quality snap beans when stores require them. Roadside

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stands (either your own or another grower's) and pick-your-own operations provide opportunities to receive higher than wholesale prices for your snap beans, but you may have some additional expenses for advertising, building and maintaining a facility, and providing service to your customers. With pick-your-own operations, you save on harvest costs, but you also must be willing to accept some waste. Depending on your location, processors may or may not be a marketing option. Processors are less likely to contract with small-acreage growers (those with less than 5 acres). For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*.

Table 1. Recommended snap bean cultivars for Pennsylvania.

VARIETY	DAYS TO MATURITY
Green	
Bronco	53
Derby	57
Gator Green	53
Mustang	58
Opus (RR)	53
Podsquad	53
Provider (NY 15)	48
Roma II (Italian flat pod)	58
Strike (BV-1, NY 15)	55
Wax (yellow)	
Eureka	56
Golden Rod	46
Goldkist	55
Gold Mine	53
Goldrush	53

BV-1—resistant to bean common mosaic virus.

NY 15—resistant to NY15 strain of bean common mosaic virus.

RR—rust resistant.

Production Considerations

Snap beans (green beans, bush beans, and string beans) grow best on soils that hold water well and have good air and water filtration. Soil should have a pH of 5.8 to 6.6. Snap beans require a constant supply of moisture during the growing season. If you grow snap beans on sandy soil, irrigation is important to ensure optimum plant growth, a uniform pod set, and robust development. Water deficiency or stress, especially during the blossom-pod set period, can cause blossoms and pods to drop, resulting in a poor-quality crop and reduced yields. However, excess water at any time during growth can increase the plant's susceptibility to root rot infection, which also can reduce yields. For more information on crop irrigation, consult *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production*.

Snap beans are sensitive to cold temperatures and will die from a slight frost. The best average temperature range for the growing season is between 60° and 70°F; temperatures above 80°F or below 50°F will slow the growth and maturation of the crop.

Planting and Fertilization

Snap beans can be planted in the spring when the soil temperatures reach at least 55°F and ambient air temperatures are at least 60°F. With adequate soil moisture, which is essential for optimum germination, seeds usually emerge in less than 7 days. Successive plantings can occur every two weeks through August. The seeds should be planted 0.5 to 1.0 inch deep, but if soil is very dry in June or July, place the seeds 1.5 inches deep so that they will obtain adequate moisture and will germinate within a reasonable number of days after seeding.

Snap beans can be planted at low or high densities, depending on the variety, soil type, pest management practices, and available equipment. With low density plantings, plant 75 to 90 pounds of seed per acre in rows spaced 30 to 36 inches apart with 6 to 10 plants per linear foot of row. For high density plantings, plant 100 to 140 pounds of seed per acre in rows spaced 18 to 24 inches apart with 5 to 7 plants per linear foot of row.

Fertilizer rates should be based on annual soil test results. If you are unable to conduct a test, the recommended N-P-K application rates are 30-60-120 pounds per acre broadcast or 15-30-60 pounds per acre banded at planting. Growers also should check boron levels in their fields, because snap beans are sensitive to high soil boron levels.

Pest Control

Weed control can be achieved with herbicides and a good crop rotation system. Snap beans compete well with weeds, but they should be kept weed free until they have developed a good crop cover. Several preplant and postemergence herbicides are available for snap beans, depending on the specific weed problem and the bean growth stage. If infestation levels are mild, cultivation can minimize weed problems.

Insects can be a major problem in snap bean production. Aphids, leafhoppers, and European corn borer all can cause crop losses. Monitoring insect populations with traps or by scouting will help you determine when you should use pesticides and how often you should spray.

Several diseases, such as root rot and white mold, can reduce snap bean yields. These diseases can be controlled by using disease-resistant varieties and by having a good crop-rotation system and soils with good air and water filtration.

Harvest and Storage

Snap beans contracted for processing, as well as many of the fresh market beans grown on larger acreage (more than 5 acres), are mechanically harvested. Harvesting snap beans with hand labor is not cost-effective. Regardless of the harvesting method, growers should check the beans for pod size, weed debris, worms, and insects to ensure marketing a high-quality product.

Proper postharvest handling of snap beans is essential if you are to be a successful marketer. Cooling the beans after harvest will remove field heat, which improves shelf life and keeps the beans from wilting. You should refrigerate the beans immediately after harvest to maintain quality. Snap beans will retain good quality for approximately seven days if stored at 90 to 95 percent humidity and 45°F.

Budgeting

Included in this publication are two annual single-crop (56-day growing period) snap bean production budgets. Both budgets utilize custom hire for most of the field work, which could be more economical for small-acreage growers. Producers who own equipment should substitute equipment costs for custom hire costs. The first budget summarizes the receipts, costs, and net returns of snap beans contracted for processing. The second budget summarizes the receipts, costs, and net returns of fresh market snap beans. These sample budgets should help ensure that all costs and receipts are included in your calculations. Costs and returns are often difficult to estimate in budget preparation because they are numerous and variable. Therefore, you should think of these budgets as an approximation and make appropriate adjustments in the "Your Estimate" column to reflect your specific production and resource situation. Growers can use this method to develop multiple-cropping snap bean budgets. More information on the use of crop budgets can be found in *Agricultural Alternatives: Enterprise Budget Analysis*.

For More Information

Brewer, T., J. Harper, and G. Greaser. *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*. University Park, Pa.: Penn State Cooperative Extension, 1994.

Greaser, G. and J. Harper. *Agricultural Alternatives: Enterprise Budget Analysis*. University Park, Pa.: Penn State Cooperative Extension, 1994.

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Lorenz, O. A. and D. M. Maynard. *Knott's Handbook for Vegetable Growers*. New York, N.Y.: John Wiley & Sons, Inc., 1988.

MacNab, A. A., A. E. Sherf, and J. K. Springer. *Identifying Diseases of Vegetables (AGRS-21)*. Penn State College of Agricultural Sciences, 1994.

Pennsylvania Commercial Vegetable Production Guide (AGRS-28). Penn State College of Agricultural Sciences, 2000.

Seelig, R. A. and C. Lockshin. "Snap Beans." *Fruit & Vegetable Facts & Pointers*. Alexandria, Va.: United Fresh Fruit and Vegetable Association, 1979.

Association

Pennsylvania Vegetable Growers Association
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Initial resource requirements for contracted snap beans

- Land: 5 acres
- Total labor: 4 hours
- Harvesting is done by the contractor
- Capital: \$300 to \$400 per crop
- Depreciation on equipment: \$20 to \$25 per acre

Initial resource requirements for fresh market snap beans

- Land: 2 acres
- Total labor: 4 hours
- Harvesting, grading, and packing: \$45 per acre
- Capital: \$600 to \$650 per crop
- Depreciation on equipment: \$20 to \$25 per acre

Processed Snap Beans Budget

Summary of estimated costs and returns per acre.

Item	Quantity or number of operations	Unit	Price	Total	Your Estimate
Variable costs					
Custom					
Applying calcium lime	0.5	ton	\$25.00	\$12.50	_____
Pest scouting	4	acre	\$10.00	\$40.00	_____
Pesticide spraying	4	acre	\$7.20	\$28.80	_____
Machine harvesting	1	acre	\$55.00	\$55.00	_____
Fertilizer					
Nitrogen	15	pound	\$0.22	\$3.30	_____
Phosphorus	30	pound	\$0.28	\$8.40	_____
Potassium	60	pound	\$0.15	\$9.00	_____
Fungicide					
Ridomil Gold	1.5	pint	\$89.00	\$133.50	_____
Benlate	2	pound	\$16.99	\$33.98	_____
Herbicide					
Dual M	0.31	gallon	\$93.90	\$29.10	_____
Basagram	0.19	gallon	\$75.00	\$14.06	_____
Poast	0.31	gallon	\$110.00	\$34.10	_____
Insecticide					
Lannate	0.25	gallon	\$49.00	\$12.25	_____
Orthene 75s	1	pound	\$11.40	\$11.40	_____
Other variable costs					
Disking and harrowing	1	acre	\$11.90	\$11.90	_____
Disk plowing	1	acre	\$10.40	\$10.40	_____
Cultivation	3	acre	\$8.30	\$24.90	_____
Snap bean seed	80	pound	\$1.00	\$80.00	_____
Labor	10	hour	\$10.00	\$100.00	_____
Fuel	15	gallon	\$0.93	\$13.95	_____
Repair and maintenance					
Tractors and implements	1	acre	\$15.00	\$15.00	_____
Interest charge	1	acre	9.5%	\$16.19	_____
<i>Total variable cost</i>				\$697.74	_____
Fixed costs					
Tractors	1	acre	\$15.86	\$15.86	_____
Implements	1	acre	\$12.32	\$12.32	_____
<i>Total fixed cost</i>				\$28.18	_____
Total cost				\$725.92	_____

Net returns for five different yields and prices.

Price	Yield (tons)				
	1.5	2	3.5	3.5	4.5
\$200	-\$426	-\$326	-\$26	-\$26	\$174
\$212	-\$408	-\$302	\$16	\$16	\$228
\$225	-\$388	-\$276	\$62	\$62	\$287
\$230	-\$381	-\$266	\$79	\$79	\$309
\$240	-\$366	-\$246	\$114	\$114	\$354

Fresh Market Snap Beans Budget

Summary of estimated costs and returns per acre.

Item	Quantity or number of operations	Unit	Price	Total	Your Estimate
Variable costs					
Custom					
Applying calcium lime	0.5	ton	\$25.00	\$12.50	_____
Pest scouting	4	acre	\$10.00	\$40.00	_____
Pesticide spraying	4	acre	\$7.20	\$28.80	_____
Fertilizer					
Nitrogen	15	pound	\$0.22	\$3.30	_____
Phosphorus	30	pound	\$0.28	\$8.40	_____
Potassium	60	pound	\$0.15	\$9.00	_____
Fungicide					
Ridomil Gold	1.5	pint	\$89.00	\$133.50	_____
Benlate	2	pound	\$16.99	\$33.98	_____
Herbicide					
Dual M	0.31	gallon	\$93.90	\$29.10	_____
Basagram	0.19	gallon	\$75.00	\$14.06	_____
Poast	0.31	gallon	\$110.00	\$34.10	_____
Insecticide					
Lannate	0.25	gallon	\$49.00	\$12.25	_____
Orthene 75s	1	pound	\$11.40	\$11.40	_____
Other variable costs					
Disking and harrowing	1	acre	\$11.90	\$11.90	_____
Disk plowing	1	acre	\$10.40	\$10.40	_____
Cultivation	3	acre	\$8.30	\$24.90	_____
Snap bean seed	80	pound	\$1.00	\$80.00	_____
Machine harvesting	1	acre	\$55.00	\$55.00	_____
Packing and grading	1	acre	\$65.00	\$65.00	_____
Cartons	200	thsd	\$0.90	\$180.00	_____
Labor	15	hour	\$10.00	\$150.00	_____
Fuel	10.21	gallon	\$0.93	\$9.50	_____
Repair and maintenance					
Tractors and implements	1	acre	\$15.00	\$15.00	_____
Interest charge	1	acre	9.5%	\$23.09	_____
<i>Total variable cost</i>				\$995.18	_____
Fixed costs					
Tractors	1	acre	\$15.86	\$15.86	_____
Implements	1	acre	\$12.32	\$12.32	_____
<i>Total fixed cost</i>				\$28.18	_____
Total cost				\$1,023.36	_____

Net returns for five different yields and prices.

Price	Yield (tons)				
	1.5	2	3.5	3.5	4.5
\$600	-\$123	\$177	\$477	\$1,077	\$1,677
\$700	\$27	\$377	\$727	\$1,427	\$2,127
\$800	\$177	\$577	\$977	\$1,777	\$2,577
\$900	\$327	\$777	\$1,227	\$2,127	\$3,027
\$1,000	\$477	\$977	\$1,477	\$2,477	\$3,477

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