

AGRICULTURAL ALTERNATIVES

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Strawberry Production

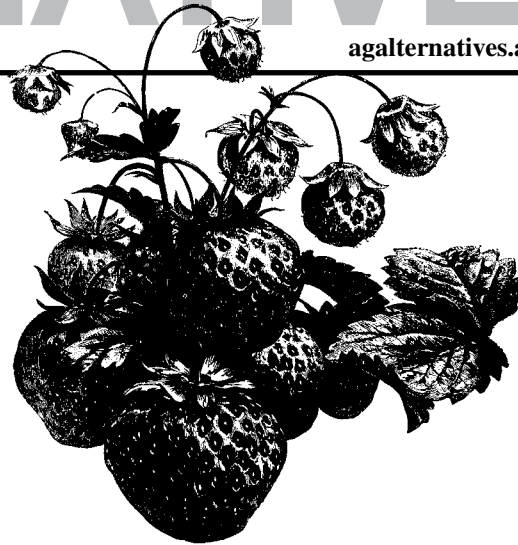
Strawberry production can be a good fit for many small-scale and part-time farming operations. The high value of strawberries creates potential for significant profit from a small planting; however, management of this crop is intensive and there is the likelihood of encountering a number of production difficulties.

Most strawberries produced in the United States are consumed fresh. As recently as 1980, more than 40 percent of strawberries produced in the United States were processed, but in recent years this figure has declined to about 20 percent. In Pennsylvania and surrounding states, nearly all strawberries are used for fresh-market sales.

Strawberries are grown on more than 55,000 acres in the United States today. The leading strawberry-producing states are California, Florida, Oregon, North Carolina, Washington, Pennsylvania, Michigan, Wisconsin, New York, and Ohio. The United States ranks first in the world for strawberry production, followed by China and Spain.

Marketing

Because they are so perishable, strawberries are well suited to roadside stand and pick-your-own operations, where time from harvest to sale can be kept to a minimum. Roadside stands (either your own or another grower's) and pick-your-own operations provide opportunities to receive relatively high prices for your strawberries, 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 must also be willing to accept some waste.



Grower-harvested berries are most commonly sold in open quart and pint containers, such as pulp, wooden, or plastic baskets (rather than plastic clamshells). When berries are sold through local retailers, such as a grocery store, it may be wise to discuss preferred containers prior to harvest. Containers like clamshells protect berries from handling by others and may provide greater food safety, but they may also give consumers the initial impression that berries are not locally produced. Prominent signage indicating the origin of the produce may help to remedy this situation.

When selling through local retailers, you must take the time to contact produce managers and must provide good-quality strawberries when stores require them. Recently, widespread interest in buying local has resulted in increased opportunities to work with local retailers.

Other marketing alternatives available to the strawberry grower include other types of wholesale markets such as auctions, cooperatives, and processing firms. In wholesale marketing, either you or a shipper can take your crop to the market. Shippers generally sell and transport strawberries for a predetermined price. Wholesale marketing is subject

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to the greatest price fluctuations. Marketing cooperatives generally use a daily pooled cost and price, which spreads price fluctuations over all participating producers. Depending on your location, processors may or may not be a marketing option. Processors are less likely to contract with small-acreage growers. For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*.

In recent years, the price received by Pennsylvania growers has been either the highest or the second highest among states for which this information is available. This high price may be partially attributable to high demand and proximity to markets, as the highest prices are typically received near population centers. However, there is also a strong correlation between price and quality, and growers should take note that the effort put into producing a high-quality product is likely to pay off.

Prices in Pennsylvania range from \$0.80 to \$2.00 per pound for pick-your-own strawberries, and from \$3.00 to \$6.00 per quart for picked strawberries. An open-top quart of strawberries averages about 1.4 pounds, but the weight varies with cultivar and berry size. Prices for strawberries for processing are much lower and are subject to greater fluctuation because of international supply-and-demand conditions. Processing prices have ranged from around \$0.25 to \$0.60 per pound in recent years.

Depending on the type of plant grown, plants may be fruited during the typical early summer strawberry season or off-season during the summer and fall. Growers should evaluate supply and demand before planting large areas to strawberries. Off-season fruit production can either give you a competitive advantage or leave you with fruit having little or no market, depending on consumer preference and market channels in your area.

Strawberry Plant Growth: Effects on Production Options

Strawberry varieties fall into two main types, June bearing and day neutral. In Pennsylvania and nearby states, June-bearing strawberries produce their fruit in the late spring and early summer, hence their name. However, they may produce their fruit in May, June, or early July, depending on variety, production methods used, and location. June-bearing varieties are well adapted to all parts of the region and constitute much of the current strawberry acreage.

Day-neutral strawberries bloom and fruit repeatedly, usually in flushes, throughout the spring, summer, and fall. Day-neutral varieties generally perform best in cooler regions. Either type of plant can be grown in a matted-row production system or in raised beds using plastic mulch. These systems are described in brief under “Production Systems,” with greater detail provided in the *Mid-Atlantic Berry Guide for Commercial Growers*.

The aboveground portion of the strawberry plant consists of a crown, leaves, runners, flowers, and fruit. The crown is a compressed stem from which leaves, runners, and flowers arise, and may contain smaller branch crowns in addition to the original crown. Runners are long stolons on which daughter plants are produced and may be used to fill in a bed. Temperature and day length determine which plant parts are being grown and how quickly. This affects the timing and relevance of cultural steps in different production systems.

The strawberry plant has an extremely shallow root system, with roots extending only about 6 inches deep in clay loam soils. Because of this shallow root system, and because flower blossoms can be killed by spring frosts, irrigation is either strongly recommended or a necessity, depending on the production system. For more information on crop irrigation, consult *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production*.

Site Selection

Strawberries can be grown on a variety of soils. Choose a well-drained site that receives plenty of sun and is close to an irrigation source. The slope of the site should be no greater than 12 percent. The term “well drained” refers to drainage through the soil profile. A sloping site is not necessarily well drained.

Soil should have a pH of 6.0 to 6.5 and should be tested the fall before planting is intended. Do not use a site in undisturbed sod because it can harbor root-feeding grubs that can damage the strawberry roots. Also, strawberry plantings should not follow verticillium-susceptible crops such as peppers, eggplant, potatoes, or tomatoes. Soil that has been used to grow these crops should be either planted with a non-verticillium-susceptible cover crop for 5 to 8 years or fumigated before planting. Cover cropping for at least a year with a crop such as rye or sudangrass is highly recommended to help control weeds before strawberry beds are planted. In addition, cover crops can be plowed under to add organic matter to heavy soils. Fertilizer requirements vary with soil type, location, and production system, and thus are not discussed in this brief publication.

Production Systems

Matted-Row Production for June-bearing Varieties

Matted-row production relies on the establishment of a filled-in row of strawberry plants through runner and daughter plant proliferation. The original mother plants are planted on a relatively wide spacing. This is a relatively low-cost system for producing strawberries. Matted-row production was the standard strawberry production system in the region for many years, and it is still the system used for most of the strawberry acreage. It is frequently used for pick-your-own operations.

In matted-row production, dormant crown strawberry plants usually are planted 18 to 24 inches apart in rows 36 to 48 inches apart. Spacing decisions depend on the size of your equipment. Growers should purchase cultivars resistant to red stele and verticillium wilt from a reputable nursery (Table 1). These plants should be set in April as soon as the soil can be worked. Flower blossoms should be removed during the first season. This practice sacrifices the first year's crop, but it enables growers to establish a bed of vigorous plants. It is especially important to closely monitor and control pests in the first year. During mid- to late summer, the original plants will begin to produce runners and daughter plants that should be moved into the rows. After daughter plants fill in a 12- to 18-inch-wide bed, runners and daughter plants that begin to fill the aisles may be removed during cultivation operations.

Four inches of clean straw mulch (about 2 tons of straw per acre) should be applied when the plants are dormant, usually between late November and late December. This practice protects the strawberry plants from sudden temperature fluctuations and helps prevent frost heaving, which can

break roots and expose crowns to cold temperatures. The straw should be removed during the following March when the soil temperature reaches 40 degrees at a 4-inch depth. Plants flower in April to May depending on location. Fruit matures 26 to 30 days after flowering.

After fruiting is complete, the beds are renovated (mowed, narrowed, fertilized, and treated with herbicides in conventional production) and the fruiting cycle begins again. Fruit size decreases with the age of the bed, and overall yield declines after about 2 to 3 years.

In the mid-Atlantic states, a well-maintained matted-row strawberry planting of June bearers should produce an average of 10,000 pounds per acre, though yields range widely from half to twice this much.

Plasticulture Production for June-bearing Varieties

This system works best in warmer regions with a relatively long growing season. High yields are dependent on plants' producing branch crowns rather than daughter plants. Low yields are common in cooler areas (zones 6a and cooler) due

Table 1. June-bearing and day-neutral cultivars for various production systems.

Cultivar	Season	Comments
June-bearing cultivars for matted-row production		
Earliglow	Early	Standard cultivar. Great flavor, good disease resistance. Moderately productive; size declines quickly over time.
L'Amour	Early-mid	Nicely shaped fruit with good size, medium color, and above-average flavor.
Honeoye	Early-mid	Large fruit, high yields, "perfumy" flavor. Better in cooler regions. Quickly loses flavor during hot weather.
Darselect	Mid	Nice size, shape, and flavor. Very susceptible to foliar diseases and fruit anthracnose.
Allstar	Mid	Standard cultivar. Productive. Berries light in color, good size and shape. Susceptible to angular leaf spot.
Jewel	Mid-late	Standard cultivar. Productive. Large, firm fruit with good color.
June-bearing cultivars for plasticulture production		
Sweet Charlie	Early	Low yields. Sweet. Grown primarily for early fruit.
Wendy	Early	Nice size, shape, and flavor. New cultivar, for trial.
Camarosa	Mid	Very firm fruit, but can produce high yields with good management.
Chandler	Late	Standard for this system. Good flavor, high yields, has a long harvest season. Susceptible to fruit anthracnose.
Day-neutral cultivars for matted-row or plasticulture production		
Seascape		The current standard. Sweet, medium-sized fruit with a medium red color. Skin splits when wet.
Everest		Productive, but dark and soft. Susceptible to fruit anthracnose and verticillium wilt.
Evie-2		Light color, soft fruit, average flavor.
Albion		Huge fruit with great flavor and color, but yields tend to be low and trickle in over the season.
Tribute		Small, tart, firm fruit, but less tart than Tristar. Vigorous.
Tristar		Flavor is good but tart. Firm fruit; size is small in hot weather.

to a shorter period of suitable conditions for plant growth and flower bud initiation in the fall. Capital input into this system is fairly high, though yields and fruit quality also have the potential to be high.

Many growers who raise strawberries using plastic mulch use the same bedding equipment that they already have for vegetable production, though the strawberry plants would benefit from higher beds that drain easily and warm more quickly. Plug plants (actively growing plants grown in cell trays) are planted through the plastic mulch late enough to discourage excessive runner formation, but early enough to promote plant establishment and branch crown formation. This is early to mid-September in warmer locations (USDA hardiness zones 6b and warmer) and mid- to late August for colder sites (zone 6a).

Alternatively, dormant bare-root crowns can be used. These are planted during mid- to late July in warmer locations and from mid-June to mid-July in cooler areas (later than for matted-row production to minimize runners, which need to be removed). A good spacing for plants is in double rows 12 inches apart on each bed, with plants staggered 12 inches apart within each row.

Floating row covers are applied in the fall when daytime highs are in the low seventies to keep plants actively growing and to encourage more branch crowns and flower buds to form. The row covers also provide winter protection, as they reduce wind desiccation and buffer the planting from temperature extremes. In more northern locations, straw mulch (added under the covers) in addition to row covers may be needed. In the spring, straw should be removed from the beds and placed in the walkways as soon as the plants resume growth. Row covers should then be pulled back on if early fruiting is a goal. Row covers should be removed as soon as the plants begin to bloom to allow pollinators access to the blossoms.

Since establishment-year inputs are high and following-year inputs are quite low with the plasticulture system, many growers hold their plantings over for a second year of harvest. Yields from carryover plantings can be high. Plantings are renovated by mowing off the leaves, thinning the crowns, and resuming watering and fertilization to encourage new growth. Row covers are not applied until winter for protection of carryover plantings.

In lieu of carrying plantings over, double-cropping with another crop (replacing the strawberry plants using the same plastic) can be accomplished using warm-season crops in warmer areas and cool-season crops where the growing season is shorter.

The goal is to produce marketable yields of about 1 pound per plant, or over 14,000 pounds per acre. However, most growers in the region find yields of 0.75 to 0.9 pound per plant to be more attainable. If yields are below 0.5 pound per plant, a different production system may need to be considered.

Matted-Row Production for Day-neutral Varieties

Day-neutral strawberries can be grown in a matted-row system as described for June bearers, with some differences. The intention is to establish plants quickly that can produce fruit in the first season, so day-neutral strawberry plants are planted at a close spacing, with plants 5 to 10 inches apart in the row. Runners are removed throughout the first season and flowers should be removed for the first 6 weeks after planting. Mulching day-neutral plants with 4 inches of clean straw is essential since mulch prevents large fluctuations in moisture availability and temperature.

Plants fruit from mid-August through the first hard frost during the first year. In subsequent years in warm areas, plants produce three crops—an average-sized spring crop, a small summer crop, and a heavy fall crop. In cooler areas, plants may produce more consistently through the year. Fertilizer requirements are higher than for June bearers. In a matted-row system, day-neutral plantings are normally kept for only 2 to 3 years, as berry size decreases quickly. Day-neutral cultivars suitable for production in the mid-Atlantic region are described in Table 1.

Plasticulture Production for Day-neutral Varieties

This system is best suited to cooler areas of the region, as high temperatures can cause plants to cease flowering or negatively affect pollination. In areas where the summer becomes hot (highs in the high eighties and nineties) the highest yields are obtained in the fall, and little production occurs from late July to late August. In areas that are cool throughout the summer, such as high-elevation areas (maximum temperatures typically reaching the low to mid eighties), the highest yields are obtained during the summer. Plantings are typically kept for only one year, or carried over to include a spring harvest in the second year. Fruit size drops off considerably after this time.

After the soil is prepared, plastic-mulched beds and trickle irrigation tape are laid as for June-bearer plasticulture production. A reflective or white-on-black plastic (white side up) plastic is preferred to keep soil temperatures cool.

Planting occurs in late spring rather than summer as with June bearers on plastic, using large-size plug plants that are produced from dormant plants in a greenhouse. This allows rapid plant establishment and quick fruit production. Details on producing these types of plants are outlined in the *Mid-Atlantic Berry Guide for Commercial Growers*. Dormant bare-root plants may also be used, although yields may be slightly reduced owing to slower establishment. A common plant spacing is double rows 12 inches apart with plants 12 inches apart within each row in a staggered pattern. Production may be extended into the fall if row covers are pulled on during early frost events.

Yields of day-neutral varieties are typically higher than those of June bearers because of the extended harvest season. Yields of 0.75 to 1.25 pounds of fruit per plant are reasonable for a high-yielding cultivar that is suited to your site.

Harvest and Postharvest Handling

Strawberries must be picked and handled very carefully. Berries are harvested at least three times per week. The fruit must be firm, well colored, and free from rot. When harvested at the right time and handled properly, strawberries will remain in good condition for a few days. Proper postharvest handling of strawberries is essential. Cooling the berries removes field heat and lengthens their shelf life. Harvesting early in the day while temperatures are cool and then precooling the fruit before selling or shipping extends shelf life significantly.

Pest Management

Several insect pests and diseases can cause crop losses; therefore, it's important to monitor and control pests. Some pests affect the flowers and fruit, while others attack the foliage, stems, crowns, and roots of the plant. Pest management involves many aspects of production, with pesticide application being only one. Learn to correctly identify pests, incorporate scouting into your routine to catch problems early, and become familiar with the pests' biology. Many pest problems can be avoided or greatly reduced by proper site selection, crop rotation, judicious timing of various operations, and the use of disease-free plants.

Birds can be a serious problem on many strawberry farms. Netting, chemical repellents, scare tactics, and noise devices may be required to protect the crop. Deer also can cause extensive damage to the plants by trampling and eating the plants and ripening berries. Hunting, fencing, and repellents all can reduce deer damage.

Weeds must be controlled, as strawberries have shallow root systems that put them at a disadvantage when competing for water and nutrients. Many weed problems can be greatly reduced by avoiding sites with persistent weed problems and eliminating weeds before planting. Shallow cultivation and herbicide application can control weeds after establishment, but persistence is needed. Few herbicides are available for strawberries, but if they are applied appropriately and if hand and machine cultivation is employed when chemical controls cannot be used or fail, a strawberry planting can be very profitable.

Sample Budgets

Included in this publication are strawberry production budgets for June-bearing matted row production and June-bearing plasticulture production, as these systems are the two most widely used. Day-neutral production costs are similar to costs of June-bearing production for either system, with the exceptions that plant costs and fertilizer costs are somewhat higher, harvest container and labor costs should be higher due to higher yields (only if berries are sold as already picked), and timing of some operations is different.

Table 2 summarizes the costs of land preparation, establishment, and mature production for a matted-row planting of June-bearing strawberries. Table 3 summarizes the costs of land preparation, establishment, and mature production for a June-bearing plasticulture planting. These budgets assume that your berries will be sold in containers. If you intend to sell berries as pick-your-own, you can subtract costs for harvesting and containers. 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 then make appropriate adjustments in the "Your Estimate" column to reflect your specific growing and resource situation.

Additional strawberry budgets can be found in the *Mid-Atlantic Berry Guide for Commercial Growers*. More information on the use of crop budgeting in farm management decision-making can be found in *Agricultural Alternatives: Enterprise Budget Analysis*.

Local Regulations

All agricultural operations in Pennsylvania, including small and part-time farming enterprises, operate under the Pennsylvania Clean Streams Law. A specific part of this law is the Nutrient Management Act. Portions of the act may or may not pertain to your operation, depending on the number and/or sizes of animals you have. However, all operations may be a source of surface or groundwater pollution. Because of this possibility, you should contact your local Soil and Water Conservation District to determine what regulations may pertain to your operation.

Risk Management

You may wish to consider several risk-management strategies for your operation. First, you should insure your facilities as well as your animals. This may be accomplished by consulting your insurance agent or broker. Second, you may want to insure your income through a crop insurance program called AGR-Lite.

To use AGR-Lite you must have 5 years of Internal Revenue Service (IRS), Schedule F, forms. If your business structure is either a C or an S Corporation, the necessary information can be entered into a Schedule F for crop insurance purposes. You can then contact an agent who sells crop insurance and insure the income of your operation. For more on agricultural business insurance, please see *Agricultural Alternatives: Agricultural Business Insurance*. For more information concerning crop insurance, contact a crop insurance agent or check the Pennsylvania crop insurance education website at extension.psu.edu/crop-insurance.

When using any pesticides in your enterprise, remember to follow all label recommendations regarding application rates and personal protection equipment (PPE) requirements. Also remember that any Worker Protection Standards (WPS) apply to the owner as well as to employees.

Table 2. Fresh-market strawberry production budget.

Per-acre costs for land preparation, establishment, and mature production (harvest costs based on 7,000 qts) for June-bearing matted-row production.

	Land preparation (year 1)	Planting establishment (year 0)	Mature planting (year 1+)	Your estimate
Variable costs				
Custom hire*	\$49.50	\$56.00	\$9.20	_____
Soil test	\$10.00	—	—	_____
Fertilizer and lime	\$48.00	\$99.57	\$44.01	_____
Herbicides	\$17.50	\$109.31	\$131.55	_____
Insecticides	—	\$69.81	\$275.80	_____
Fungicides	—	\$56.74	\$311.07	_____
Seed	\$8.75	—	—	_____
Plants	—	\$910.00	\$0.00	_____
Overhead irrigation	—	\$200.00	\$200.00	_____
Overhead operating	—	\$360.00	\$480.00	_____
Plant analysis kit	—	—	\$24.00	_____
Mulch (straw)	—	\$180.00	\$300.00	_____
Labor (hired)	\$6.75	\$729.00	\$465.75	_____
Labor (operator labor)	\$9.06	\$120.18	\$74.67	_____
Labor (harvest)	—	—	\$4,200.00	_____
Harvest supplies (clamshells and trays)	—	—	\$2,240.00	_____
Fuel	\$5.30	\$24.75	\$41.59	_____
Repairs and maintenance	\$3.88	\$15.10	\$29.12	_____
Interest	\$3.47	\$122.66	\$311.51	_____
<i>Total variable costs</i>	\$162.21	\$3,053.12	\$9,130.26	_____
Fixed costs				
Equipment	\$6.25	\$30.06	\$57.51	_____
Land	\$150.00	\$150.00	\$150.00	_____
<i>Total fixed costs</i>	\$156.25	\$180.06	\$207.51	_____
Total costs	\$318.46	\$3,233.18	\$9,337.77	_____

Profitability Price received (\$/qt)	Yield (qt/A) ¹					Breakeven yield (qt)
	5,000	6,000	7,000	8,000	9,000	
\$1.50	-\$1,182	-\$602	-\$22	\$558	\$1,138	7,037
\$2.00	\$1,318	\$2,398	\$3,478	\$4,558	\$5,638	3,779
\$2.50	\$3,818	\$5,398	\$6,978	\$8,558	\$10,138	2,583
\$3.00	\$6,318	\$8,398	\$10,478	\$12,558	\$14,638	1,962
\$3.50	\$8,818	\$11,398	\$13,978	\$16,558	\$19,138	1,582
Breakeven price²	\$1.74	\$1.60	\$1.50	\$1.43	\$1.37	

Notes:

1. A quart of strawberries weighs approximately 1.4 pounds.

2. Breakeven price calculations include prorated land preparation and planting costs based on a productive life of 1 year.

* Custom hire costs are used in the event the owner does not have the necessary equipment to complete the operations. These figures include soil testing, lime application, plowing, disking, and harrowing.

Table 3. Fresh-market strawberry production budget.

Per-acre costs for land preparation, establishment, and mature production (harvest costs based on 7,000 qts) for plasticulture production.

	Land preparation (year 1)	Planting establishment (year 0)	Mature planting (year 1+)	Your estimate
Variable costs				
Custom hire*	\$49.50	\$115.30	—	_____
Soil test	\$10.00	\$10.00	—	_____
Plant analysis kit	—	—	\$24.00	_____
Fertilizer and lime	\$48.00	\$72.67	\$111.00	_____
Herbicides	\$17.50	\$262.08	\$4.24	_____
Insecticides	—	—	\$85.17	_____
Fungicides	—	—	\$273.61	_____
Seed	\$8.75	—	—	_____
Plants	—	\$3,883.00	—	_____
Overhead irrigation	—	—	\$200.00	_____
Overhead operating	—	—	\$120.00	_____
Drip tape	—	\$182.70	—	_____
Trickle operation	—	\$270.00	\$240.00	_____
Mulch (black plastic)	—	\$580.00	—	_____
Row covers	—	\$1,500.00	—	_____
Labor (hired)	\$6.75	\$222.75	\$357.75	_____
Labor (operator labor)	\$9.06	\$90.00	\$24.78	_____
Labor (harvest)	—	—	\$4,800.00	_____
Harvest supplies (clamshells and trays)	—	—	\$2,560.00	_____
Plastic mulch disposal	—	—	\$50.00	_____
Fuel	\$5.30	\$11.44	\$9.45	_____
Repairs and maintenance	\$3.97	\$5.86	\$7.49	_____
Interest	\$3.47	\$115.28	\$163.39	_____
<i>Total variable costs</i>	\$162.30	\$7,319.36	\$9,030.88	_____
Fixed costs				
Equipment	\$6.25	\$11.55	\$15.19	_____
Land	\$150.00	\$150.00	\$150.00	_____
<i>Total fixed costs</i>	\$156.25	\$161.55	\$165.19	_____
Total costs		\$7,480.91	\$9,196.07	_____

Returns above total costs for various price and yield combinations (harvest cost adjusted for yield)

Profitability Price received (\$/qt)	Yield (qt/A) ¹					Breakeven yield (qt)
	6,000	7,000	8,000	9,000	10,000	
\$2.50	-\$155	\$1,425	\$3,005	\$4,585	\$6,165	\$6,098
\$3.00	\$2,845	\$4,925	\$7,005	\$9,085	\$11,165	\$4,632
\$3.50	\$5,845	\$8,425	\$11,005	\$13,585	\$16,165	\$3,735
\$4.00	\$8,845	\$11,925	\$15,005	\$18,085	\$21,165	\$3,218
\$4.50	\$11,845	\$15,425	\$19,005	\$22,585	\$26,165	\$2,691
Breakeven price²	\$2.53	\$2.30	\$2.12	\$1.99	\$1.88	

Notes:

1. A quart of strawberries weighs approximately 1.4 pounds.

2. Breakeven price calculations include prorated land preparation and planting costs based on a productive life of 1 year.

* Custom hire costs are used in the event the owner does not have the necessary equipment to complete the operations. These figures include soil testing, lime application, plowing, disking, harrowing, and laying plastic mulch.

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Associations

North American Strawberry Growers Association
30 Harmony Way
Kemptville, ON K0G 1J0
Canada
E-mail: info@nasga.org
Website: www.nasga.org

Pennsylvania Vegetable Growers Association
815 Middle Road
Richfield, PA 17086
E-mail: pvga@pvga.org
Website: www.pvga.org

Online Resource

National Arboretum—USDA Plant Hardiness Zone Map
www.usna.usda.gov/Hardzone/ushzmap.html

Initial Resource Requirements:

- Land: 1 acre
- Labor
 - Land preparation: 4 hours
 - Establishment: 60–65 hours
 - Production: 55–60 hours
 - Custom harvest labor (mature): \$4,000–\$6,000
- Capital
 - Land preparation: \$300–\$400
 - Strawberry plants: \$900–\$4,000
 - Mulch: \$180–\$300 per year
 - Fuel, repairs, maintenance, and depreciation of machinery: \$100 per year

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