

# AGRICULTURAL ALTERNATIVES

## Cut-Flower Production

The specialty cut-flower business may fit well into a small-scale and part-time farming operation. New growers can control startup costs by entering the business slowly through increasing investment and production as their businesses and markets grow. According to the 2009 Census of Horticultural Specialties (which is conducted by the National Agricultural Statistics Service every ten years) production of cut flowers is worth over \$400 million annually in the United States. More than 90 percent of that production was sold on the wholesale market to florists and other outlets. These data do not reflect the contributions of small-scale and part-time growers with sales less than \$10,000. Many growers are producing a small amount of cut flowers to enhance their direct-marketing product mix. With few exceptions, most producers grow fewer than 5 acres of flowers.

At present, the vast majority of cut flowers are imported from overseas. Leading producers include the Netherlands, Columbia, Kenya, and Israel. Flowers imported from overseas are largely roses, carnations, Gerbera daisies, garden mums, and orchids. These flowers ship reasonably well and make up the bulk of the flowers used in arrangements by most florists. Most of the flowers that local growers focus on are those that do not ship well or have shorter postharvest vase lives. These flowers have come to be termed “specialty cut flowers.” Examples of specialty flowers include sunflowers, zinnia, lisianthus, dahlia, ageratum, and peonies to name but a few on this long list. Local growers can readily develop a market niche with these flowers by using the advantage of longer vase life if produced locally, higher percentage of usable flowers, and a wider choice of colors and varieties.

Increasing demand for a wide variety of locally grown, fresh-cut flowers has kept this market growing in volume for years. Producing fresh-cut flowers is not for everyone, however, as they have special production requirements, as well as a fairly short shelf life. Any grower considering cut-flower production should also be aware of the relatively short field growing and marketing season, especially those in the northern United States.



## Marketing

Fresh-cut flowers are generally sold either by the bunch, in prearranged bouquets, or individually. Some growers will set up u-design displays at markets along with premade bouquets. Six basic marketing alternatives are available to the cut-flower grower: wholesale markets, direct to florists, pick-your-own operations, roadside stands, farm markets, and subscription. Floral cooperatives, while standard in much of the rest of the world, have yet to take root here. Because freshness is always a consideration, astute cut-flower growers should always seek to streamline the process from the farm to final consumer. As with marketing most annual crops, entering the market early with a quality product will help attract (and retain) customers to your business and usually command a higher selling price.

When planning production, first consider your ability to market. You should conduct some market research because growers often overestimate their ability to sell in a given market. Production of less than one acre of many floriculture crops is typical for most growers.

*Portions of the information for this publication were obtained with support from the Northeast Sustainable Agricultural Research and Education program.*

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With the wholesale option, you typically either deliver your crop to a distributor or have them pick up the flowers at your farm. Wholesalers generally buy and resell your flowers for a predetermined price that can change during the season. This marketing alternative is subject to the greatest price fluctuation as product rapidly moves in and out of the wholesale marketplace. Wholesale prices also vary based on regional, national, and international flower inventories.

Florists should always be a primary consideration when developing your flower marketing plan. Market surveys indicate that many florists show at least some willingness to purchase locally grown cut flowers. With the generally high quality and wide selection available through florists' regular market channels, their expectations for service and quality are high. Emphasis on a broad selection and freshness may open florists' doors to locally produced cut flowers. Some growers start selling to florists by bringing a vanload of flowers to their shop and inviting the staff out to check out their selection.

Pick-your-own, roadside stands, and farm markets (both on the farm and at organized farmers markets) have the potential to generate substantially higher prices for the grower. Most new growers enter flower marketing through one of these avenues as they provide the greater level of inventory flexibility that new growers will likely need as their production skills develop. For more on establishing a roadside market, see *Agricultural Alternatives: Developing a Roadside Farm Market*.

Subscription sales are an offshoot of the Community Supported Agriculture (CSA) movement. Most CSAs are based around produce sales with each member purchasing a share of a farm's production. This is a contract between the growers and their members that provides for a weekly portion of fruit and vegetables based on production and subscription level. If a crop is lost, everybody loses; if there is a bumper crop, everybody wins. Some CSAs provide flower shares as part of the contract or as an option. Another option under subscription sales is in providing vase service to restaurants, country clubs, and professional offices.

Most flower prices are quoted for bunches of ten with specific stem lengths or individually for large flowers, such as sunflowers, or very expensive items, such as orchids.

Generally, prices paid are substantially higher at growers markets in urban or suburban areas than those paid in rural markets. A direct-market grower should provide only the freshest, highest-quality product in order to develop a solid niche in locally grown flowers. A list of commonly grown cut flowers grown for sale in the United State is provided below.

#### **Common types of cut flowers grown for sale in the United States:**

- Alstroemeria (stems)
- Anthurium (stems)
- Aster (stems)
- Bird of paradise/Strelitzia (stems)
- Calla lilies (stems)

- Carnation (stems)
- Chrysanthemum (bunches)
- Daffodil/narcissus (stems)
- Delphinium/larkspur (stems)
- Freesia (stems)
- Gerbera daisy (stems)
- Ginger and heliconia (stems)
- Gladioli (spikes)
- Godetia (stems)
- Gypsophila (bunches)
- Heather (bunches)
- Heliconia (stems)
- Iris (stems)
- Leptospermum (stems)
- Liatris (bunches)
- Lily (stems)
- Limonium (bunches)
- Lisianthus (stems)
- Marguerite daisies (stems)
- Orchid (blooms)
- Protea (stems)
- Rose (stems)
- Snapdragon (spikes)
- Statice (bunches)
- Stephanotis (blooms)
- Stock (stems)
- Sunflower (stems)
- Tulip (stems)
- Zinnia (stems)

## **Getting Started**

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The basic equipment needed to start producing cut flowers is very similar to that needed by a small direct-market vegetable grower. Small equipment such as rototillers, a low-horsepower tractor, and irrigation equipment are typically the only major purchases outside of growing materials that you will need. As many annual, perennial, and woody plants are worthy of consideration for production, planning your planting takes some care.

## **Production Considerations**

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### **Site Selection**

The vast majority of cut flowers prefer a well-drained site. Having deep, fertile soils will greatly simplify the process of site development, but soils can be improved through cover cropping, the application of composts and manures, and other soil-building practices. Conducting a soil test prior to planting and applying lime and fertilizer according to the soil test recommendations is highly recommended. Soil test kits may be obtained at your local extension office. Installing drain tile or building raised beds may offer an adequate solution for sites with poor drainage or very shallow soils. Raised beds are fast becoming a standard practice in growing higher-value produce and flowers.

They provide for an earlier crop by allowing the beds to be heated by the sun on the sides as well as on the top. They can also boost production by increasing the depth of topsoil. When used with plastic covering for weed control and drip tape for fertigation, raised beds can greatly decrease weed pressure and simplify fertilizer application.

## Planting

Most new growers begin by planting everything by hand. The need to plant many different flowers in small plots over a long time period tends to keep planting largely a hand operation. Plants such as sunflowers are both direct seeded and transplanted, while others are best started as plugs (starting the plant in a greenhouse or cold frame in flats with small cells in a planting medium) and then transplanted to the field or bed. While traditional vegetable transplanters can easily do double duty in planting many types of cut flowers, many growers continue to place all their plugs by hand. Spacing between plants varies widely within each species and sometimes by individual cultivar as some plants are much larger than others. In general, cut flowers are planted closely together to encourage growth of longer stems. New growers will want to learn the specific demands of each flower in order to get the best production.

## Irrigation

Any high-value crop should be irrigated to ensure more reliable production. Most flower growers use drip irrigation tape either under plastic or laid on top of the ground to maximize water efficiency, keep water off the leaves and flowers (this improves overall quality as it prevents foliar diseases and chemical stains), and provide for fertilizer or chemical application. In addition, a steady, reliable supply of water ensures production of the longest stems possible.

## Wind Protection

Producing high-quality cut flowers requires preventing wind damage since bent flower stems have little or no value. Therefore, wind protection through both site selection and use of windbreaks is necessary when planning your operation. Windbreaks can be live plants, such as an evergreen hedge, or fencing materials, such as split bamboo or board-on-board planking. Whatever method you choose, it is important to consider how far the most distant flowers are from the windbreak. The farther away the windbreak is, the less effective the protection. Sometimes, multiple windbreaks are required. Many cut flowers require stem support as well. Several wide-mesh products are available that can be used as a grid for the flowers to grow through, thus giving them support. Support mesh also prevents damage by keeping flower stems upright during heavy rain.

## High Tunnels and Greenhouses

The short outdoor production season in the northern United States has encouraged the adoption of growing structures to lengthen the marketing season. Having overhead cover also prevents damage to blossoms due to rain. Unheated greenhouse frames, such as high tunnels, can meet this need with a modest investment. These structures provide ventilation by rolling up the sides and, if equipped, through roof or ridge vents. The additional radiant heat stored in a high tunnel allows for a planting date 4–6 weeks prior to the outdoor season and may allow another 4–6 weeks of production in the fall after the first frost. Some growers place small heaters in their tunnels to allow for an additional 2 or more weeks of season extension.

A greenhouse is a climate-controlled environment with heat and ventilation carefully managed for maximum plant growth. Greenhouses can look very similar to high tunnels, but they are much more expensive to construct and maintain due to their more sophisticated structure and environmental controls. Producing flowers in a cost-effective manner may not be possible in a greenhouse due to the high cost per square foot of production area. Many growers use smaller greenhouses to produce transplants for use outdoors or in high tunnels versus using the space for flower production.

## Pest Control

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Cut flowers represent a wide group of plants. There is a significant difference in pest problems among each genus, species, and cultivar. Discussion of the range of pest-management options available to cut-flower growers is beyond the scope of this publication. As a new grower, you will want to do some careful research into each plant that you choose for your operation. When possible, select those that are indicated as relatively pest free. Keep careful records of those that you do select and scout your plants often for pest problems. Detecting a pest problem early will usually make controlling it easier and less costly.

## Insects

While a wide variety of insects will inhabit any flower planting, only a few are recognized as causing economic damage, including aphids and thrips. There are wide differences in not only pests but also tolerance to specific pests. Biological, biorational, and synthetic chemical controls are available. Pest populations can also be controlled by naturally occurring parasites and predators. Avoiding cover sprays of broad-spectrum insecticides will help maintain these populations. Beneficial insects, such as lacewings, can also be purchased from biological control companies. Biorational controls include horticultural oils, insecticidal soaps, and plant extracts such as neem oil. These typically have short residuals and minimal impact on beneficial organisms. It may be necessary to use syn-

thetic chemicals for insect control at times. Always use products labeled specifically for the use you intend and seek to use materials that have the lowest toxicity to bees.

## Diseases

Fungal diseases can have a major impact on cut-flower plantings. While many diseases will not kill the flowers, they can drastically reduce their marketability. Powdery mildew can be a real problem in zinnias and many other flowers. Many seedlings are susceptible to damping off, and a number of leaf spot fungi can also reduce the value of certain species. Good crop rotations, careful selection of cultivars, maintenance of optimal growing conditions, and control of weeds and insects will significantly reduce the incidence of diseases.

## Weeds

Weeds are generally controlled best through good preplant soil preparation. Using a cover crop will not only add valuable organic matter to increase soil tilth, but many cover crops will also outcompete or suppress weeds. Cereal rye, for example, can provide significant weed control through smothering and suppression from natural herbicides produced by the rye. Other cover crops, such as hairy vetch, will add significant nitrogen to the soil and attract many beneficial insects as well. These cover crops are traditionally planted the prior year and are usually tilled under prior to planting your flower crop.

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### Initial Resource: Lisianthus

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- Land: 1,000 sq ft
  - Labor: \$1,000–1,200
  - Capital: \$2,300–2,500
  - Equipment:
    - Rototiller or small tractor (20–30 hp)
    - Sprayer
    - Bed shaper
    - Mulch layer
    - Planting tools or equipment
    - 5-gallon buckets (for harvesting)
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### Initial Resource: Sunflower

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- Land: 1,000 sq ft
  - Labor: \$1,200–1,400
  - Capital: \$2,500–2,800
  - Equipment:
    - Rototiller or small tractor (20–30 hp)
    - Sprayer
    - Bed shaper
    - Mulch layer
    - Planting tools or equipment
    - 5-gallon buckets (for harvesting)
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Using a preemergence herbicide labeled for use in flowers is another avenue worth considering. Only a handful of herbicides are currently labeled for flower production. In general, it is very easy to find an herbicide to control both pre- and postemergent grasses in flowers, but the choices for broadleaf weed control are very limited because many flowers are closely related to these weed types. Planting plugs alleviates much of this problem as well-chosen preemergent herbicides seldom damage well-established plants. The Penn State Extension publication *Controlling Weeds in Nursery and Landscape Plantings* (available for free through your local extension office) is a good source of information on herbicide use in flower production. Make sure you read the product label and understand the proper uses of any herbicides before you apply them.

Many growers decide to use plastic mulch for weed control. This has many advantages over herbicides in that it works on all weeds and will prevent mud from splashing onto the flowers as well. Until recently, the only choice was black plastic, which worked well. Now research is exploring many of the new, colored plastic mulches. In vegetable production, research conducted on some of these colored mulches has shown them to increase yield and decrease pest populations.

Some of the pesticides that may be used in cut-flower production are restricted-use pesticides and require a pesticide license to purchase. Pesticide applicators tests are usually administered at county extension offices, so you should contact your local office for dates and times of these examinations. 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 both to you and your employees.

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## Harvest and Postharvest Handling

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Flowers are best harvested in the morning after the dew has dried but before the heat of the day because the flowers are cooler and will suffer less heat stress and better retain their quality. Packing damp flowers close together for shipping will promote the development of *Botrytis* (gray mold), which will render the flowers unfit for sale. Rapidly cool the harvested flowers or at least remove them from direct sunlight. Many flowers benefit from the use of floral preservatives. Some flowers, such as yarrows, are best harvested as soon as pollen is evident, while sunflowers are best harvested as soon as the flower is almost completely open. Again, knowing the characteristics of each flower you decide to grow is critical to producing a high-quality product. Planting small test plots prior to entering actual production will aid in the flower-selection decision-making process.

## Environmental Impacts

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In the normal course of operations, farmers handle pesticides and other chemicals, may have manure to collect and spread, and use equipment to prepare fields and harvest crops. Any of these routine on-farm activities can be a potential source of surface water or groundwater pollution. Because of this possibility, you must understand the regulations to follow concerning the proper handling and application of chemicals and the disposal and transport of waste. Depending on the watershed where your farm is located, there may be additional environmental regulations regarding erosion control, pesticide leaching, and nutrient runoff. Contact your soil and water conservation district, extension office, zoning board, state departments of agriculture and environmental protection, and local governing authorities to determine what regulations may pertain to your operation.

## Risk Management

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You should carefully consider how to manage risk on your farm. First, you should insure your facilities and equipment. This may be accomplished by consulting your insurance agent or broker. It is especially important to have adequate levels of property, vehicle, and liability insurance. You will also need workers' compensation insurance if you have any employees. You may also want to consider your needs for life and health insurance and if you need coverage for business interruption or employee dishonesty. For more on agricultural business insurance, see *Agricultural Alternatives: Agricultural Business Insurance*.

Second, check to see if there are multiperil crop insurance programs available for your agricultural enterprises. There are crop insurance programs designed to help farmers manage both yield risk and revenue shortfalls. However, individual crop insurance coverage is not available for all crops. If individual coverage is not available for what you grow, you may be able to use the AGR/AGR-Lite program to insure the revenue of your entire farm operation. To use AGR-Lite you must have five years of Internal Revenue Service (IRS) Schedule F forms. 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](http://extension.psu.edu/crop-insurance).

Finally, the USDA Farm Service Agency has a program called the Non-Insured Assistance Program (NAP) that is designed to provide a minimal level of yield-risk protection for producers of commercial agricultural products that don't have multiperil crop insurance coverage. NAP is designed to reduce financial losses when natural disasters cause catastrophic reduction in production. NAP coverage is available through your local USDA Farm Service Agency office. The application fee for this program may be waived for eligible limited-resource farmers.

## Sample Budget

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Included in this publication are two sample cut-flower production budgets. These budgets utilize custom hire for some of the field work. Hiring custom operators and labor may be a more viable option for small-scale or beginning producers considering the large capital expenditures required for equipment. You should also investigate renting specific pieces of equipment like plastic mulch layers. Producers who own equipment should substitute equipment costs for the custom-hire costs in the budgets. The budgets summarize the receipts, costs, and net returns of a cut-flower enterprise producing sunflowers and lisianthus. These sample budgets should help ensure that all costs and receipts are included in your calculations. These budgets can also be used as the basis for developing budgets for other types of cut flowers.

Costs and returns are often difficult to estimate in budget preparation because they are numerous and variable. Therefore, you should think of this budget as an approximation and make appropriate adjustments in the "Your Estimate" column to reflect your specific production and resource situation. More information on the use of crop budgets can be found in *Agricultural Alternatives: Enterprise Budget Analysis*.

## For More Information

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### Publications

- Armitage, A. M., and J. M. Lushman, *Specialty Cut Flowers: The Production of Annuals, Perennials, Bulbs, and Woody Plants for Fresh and Dried Cut Flowers*, 2nd ed. (Portland, Ore.: Timber Press, 1993).
- ATTRA, *Field Grown Cut and Dried Flower Production and Marketing* (information pkg). Phone: 800-346-9140.
- Byczynski, L., and R. Wimbiscus, *The Flower Farmer: An Organic Grower Guide to Raising and Selling Cut Flowers* (White River Junction, Vt.: Chelsea Green Publishing, 1997).
- Gill, S., E. Dutky, R. Balge, W. MacLachlan, and S. Klick, "Production of Celosia as Cut Flowers," "Production of Yarrows as Cut Flowers," "Production Annual Sunflowers as Cut Flowers," and "Production of Asiatic and Oriental Lilies as Cut Flowers" (Riverdale: University of Maryland Cooperative Extension Service).
- Sellmer, J., and T. Harpster, *Controlling Weeds in Nursery and Landscape Plantings* (University Park: Penn State Extension, 2012).
- Sturdivant, L., and P.S. McRae, *Flowers for Sale: Growing and Marketing Cut Flowers: Backyard to Small Acreage (A Bootstrap Guide)* (Friday Harbor, Wash.: San Juan Naturals, 1994).

## Periodical

### *Growing for Market*

Monthly newsletter covering many small farm issues, very strong in cut-flower production and marketing (subscription is \$33/year)  
PO Box 3747  
Lawrence, KS 66046

## Association

Association of Specialty Cut Flower Growers  
155 Elm Street  
Oberlin, OH 44074  
Newsletter: *The Cut Flower Quarterly*  
Web: [www.ascfg.org](http://www.ascfg.org)

## Sample Budget

Summary of estimated costs per 1,000 square feet of production of **Lisianthus**

Item	Quantity	Unit	Price	Total	Your estimate
<b>Variable Costs</b>					
Lime	660	lb	\$0.01	\$6.60	_____
Fertilizer					
Nitrogen	65	lb	\$0.85	\$55.25	_____
Phosphorus	200	lb	\$0.62	\$124.00	_____
Potassium	300	lb	\$0.55	\$165.00	_____
Pesticides					
Safer soap (3%)	30	oz	\$0.81	\$24.30	_____
Bravo Weather Stik	15.6	oz	\$0.28	\$4.37	_____
Soil test	1	kit	\$10.00	\$10.00	_____
Black plastic mulch	250	feet	\$0.03	\$7.50	_____
Dripline	500	feet	\$0.02	\$10.00	_____
Drip irrigation operation	12	inches	\$16.00	\$192.00	_____
Transplants	1,500	plugs	\$0.15	\$225.00	_____
Transplanting labor	8	hour	\$12.00	\$96.00	_____
Hand weed control	1	hour	\$12.00	\$12.00	_____
Trellis labor (staking and training)	1	hour	\$12.00	\$12.00	_____
Stakes	100	stakes	\$0.53	\$53.00	_____
Flower netting	1,000	sq ft	\$0.01	\$10.00	_____
Machinery repair and maintenance	1	each	\$26.18	\$26.18	_____
Machinery operator labor	5.7	hour	\$15.00	\$85.50	_____
Fuel	10	gallon	\$3.75	\$37.50	_____
Harvest labor	51	hour	\$12.00	\$612.00	_____
Harvest containers	50	each	\$2.00	\$100.00	_____
Marketing					
Grading/packaging labor	30	hour	\$12.00	\$360.00	_____
Flower sleeves	900	bunch	\$0.11	\$99.00	_____
Flower bands	900	bunch	\$0.06	\$54.00	_____
Plastic clean up labor	5	hour	\$12.00	\$60.00	_____
Interest on operating capital				\$20.88	_____
<i>Total variable costs</i>				\$2,462.08	_____
<b>Fixed costs</b>					
Machinery and equipment				\$15.52	_____
Land				\$25.00	_____
Irrigation system				\$63.65	_____
<i>Total fixed costs</i>				\$104.17	_____
<b>Total costs</b>				\$2,566.25	_____

Due to the high volatility of commodity prices and input costs, be sure to make necessary adjustments to the budget using the "Your Estimate" column. You should monitor local commodity markets and contact local suppliers to determine current prices for all items contained in this sample budget.

## Sample Budget

Summary of estimated costs per 1,000 square feet of production of **sunflowers**

Item	Quantity	Unit	Price	Total	Your estimate
<b>Variable Costs</b>					
Lime	660	lb	\$0.01	\$6.60	_____
Fertilizer					
Nitrogen	150	lb	\$0.85	\$127.50	_____
Phosphorus	80	lb	\$0.62	\$49.60	_____
Potassium	160	lb	\$0.55	\$88.00	_____
Pesticides					
Safer soap (3%)	30	oz	\$0.81	\$24.30	_____
Bravo Weather Stik	15.6	oz	\$0.28	\$4.37	_____
Soil test	1	kit	\$10.00	\$10.00	_____
Black plastic mulch	250	feet	\$0.03	\$7.50	_____
Dripline	500	feet	\$0.02	\$10.00	_____
Drip irrigation operation	12	inches	\$16.00	\$192.00	_____
Transplants	4,000	plugs	\$0.15	\$600.00	_____
Transplanting labor	22.2	hour	\$12.00	\$266.40	_____
Hand weed control	1	hour	\$12.00	\$12.00	_____
Trellis labor (staking and training)	1	hour	\$12.00	\$12.00	_____
Stakes	100	stakes	\$0.53	\$53.00	_____
Flower netting	1,000	sq ft	\$0.01	\$10.00	_____
Machinery repair and maintenance	1	each	\$26.18	\$26.18	_____
Machinery operator labor	5.7	hour	\$15.00	\$85.50	_____
Fuel	10	gallon	\$3.75	\$37.50	_____
Harvest labor	55	hour	\$12.00	\$660.00	_____
Harvest containers	100	each	\$2.00	\$200.00	_____
Marketing					
Grading/packaging labor	30	hour	\$12.00	\$480.00	_____
Flower sleeves	350	bunch	\$0.11	\$38.50	_____
Flower bands	350	bunch	\$0.06	\$21.00	_____
Plastic clean up labor	5	hour	\$12.00	\$60.00	_____
Interest on operating capital				\$20.02	_____
<i>Total variable costs</i>				\$3,094.34	_____
<b>Fixed costs</b>					
Machinery and equipment				\$15.52	_____
Land				\$25.00	_____
Irrigation system				\$63.65	_____
<i>Total fixed costs</i>				\$104.17	_____
<b>Total costs</b>				\$3,198.51	_____

Due to the high volatility of commodity prices and input costs, be sure to make necessary adjustments to the budget using the "Your Estimate" column. You should monitor local commodity markets and contact local suppliers to determine current prices for all items contained in this sample budget.

Prepared by Steven M. Bogash, extension educator, Franklin County; Thomas G. Ford, extension educator, Blair County; Lynn F. Kime, senior extension associate; and Jayson K. Harper, professor of agricultural economics.

Returns above total costs for various price and yield combinations for fresh-market production of **Lisianthus**

Price received (\$/bunch)	Yield (bunches/1,000 square feet of production)*						
	800	850	875	900	925	950	975
\$2.00	\$(830.14)	\$(798.19)	\$(782.22)	\$(766.25)	\$(750.28)	\$(734.30)	\$(718.33)
\$2.50	\$(430.14)	\$(783.75)	\$(344.72)	\$(316.25)	\$971.25	\$(259.30)	\$1,096.25
\$3.00	\$(30.14)	\$1,208.75	\$92.78	\$133.75	\$1,433.75	\$215.70	\$1,583.75
\$3.50	\$369.86	\$1,633.75	\$530.28	\$583.75	\$1,896.25	\$690.70	\$2,071.25
\$4.00	\$769.86	\$2,058.75	\$967.78	\$1,033.75	\$2,358.75	\$1,165.70	\$2,558.75
\$4.50	\$1,169.86	\$2,483.75	\$1,405.28	\$1,483.75	\$2,821.25	\$1,640.70	\$3,046.25
\$5.00	\$1,569.86	\$2,908.75	\$1,842.78	\$1,933.75	\$3,283.75	\$2,115.70	\$3,533.75
\$5.50	\$1,969.86	\$3,333.75	\$2,280.28	\$2,383.75	\$3,746.25	\$2,590.70	\$4,021.25
\$6.00	\$2,369.86	\$3,758.75	\$2,717.78	\$2,833.75	\$4,208.75	\$3,065.70	\$4,508.75

\*All prices are for bunches of ten flowers.

Returns above total costs for various price and yield combinations for fresh-market production of **sunflowers**

Price received (\$/bunch)	Yield (bunches/1,000 square feet of production)*						
	700	800	900	1,000	1,100	1,200	1,300
\$2.00	\$(1,378.66)	\$(1,318.61)	\$(1,258.56)	\$(1,198.51)	\$(1,138.46)	\$(1,078.41)	\$(1,018.36)
\$2.50	\$(49.01)	\$(918.61)	\$(808.56)	\$(698.51)	\$(588.46)	\$(478.41)	\$(368.36)
\$3.00	\$300.99	\$(518.61)	\$(358.56)	\$(198.51)	\$(38.46)	\$121.59	\$281.64
\$3.50	\$650.99	\$(118.61)	\$91.44	\$301.49	\$511.54	\$721.59	\$931.64
\$4.00	\$1,000.99	\$281.39	\$541.44	\$801.49	\$1,061.54	\$1,321.59	\$1,581.64
\$4.50	\$1,350.99	\$681.39	\$991.44	\$1,301.49	\$1,611.54	\$1,921.59	\$2,231.64
\$5.00	\$1,700.99	\$1,081.39	\$1,441.44	\$1,801.49	\$2,161.54	\$2,521.59	\$2,881.64
\$5.50	\$2,050.99	\$1,481.39	\$1,891.44	\$2,301.49	\$2,711.54	\$3,121.59	\$3,531.64

\*All prices are for bunches of ten flowers.

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Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Code #EE0047

Rev3M12/12mpc3995