

# AGRICULTURAL ALTERNATIVES

## Small-Scale Egg Production (Organic and Conventional)

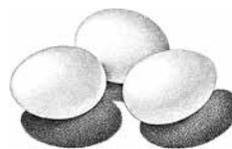
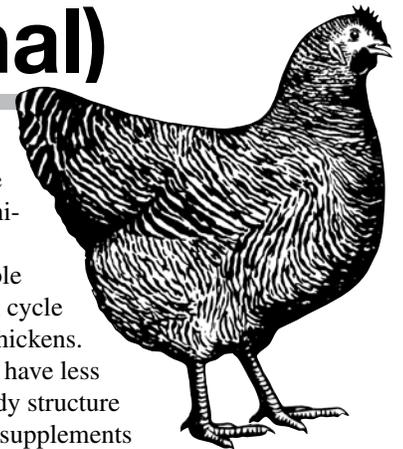
Egg production on a small scale is one of the oldest animal farming enterprises in recorded history. In this system, birds are fed some grain and allowed to forage for the balance of their diet. Birds can be used for egg production and may be harvested later for food.

In the United States, egg production followed these principles until early in the twentieth century. Then new systems emerged for producing eggs in more specialized facilities, making the operation more efficient. In addition, population shifts from farms to towns and cities increased the demand for fresh products. These changes encouraged many dairy farmers to include egg production as an additional enterprise.

The late 1950s and 1960s saw drastic changes in the industry. Co-ops, feed companies, and other private firms organized egg production into a coordinated industry. This meant that egg production on a farm changed from a secondary to a primary enterprise with specialized production methods. The result was virtual elimination of small-scale egg farming.

Small-scale layer production has made a comeback since the 1980s because of changing consumer demands. Back-yard egg producers may see a local market for their surplus eggs. New markets are continually being developed to supply specific niche market needs, especially for organi-

cally produced brown eggs (although white eggs also are popular). Layers raised organically and used for producing organic eggs are more valuable at the end of their production cycle and can be sold as roasting chickens. Conventionally grown layers have less value because of size and body structure and are sold to make protein supplements for pet food or sold to a live bird market as a stewing hen.



Many states and private organizations certify organically produced meat and eggs. Check the USDA (United States Department of Agriculture) Certified Organic website to find the certifying body for your state or area. To obtain organic enterprise certification in Pennsylvania, contact Pennsylvania Certified Organic at 814-422-0251 ([www.paorganic.org](http://www.paorganic.org)) for more information.

### Marketing

As with any new enterprise, you should research markets before starting production. You should conduct some market research because growers often overestimate their ability to sell in a given market. The major markets for eggs from small flocks are specialty stores, farmers' markets, roadside stands, and neighbors. Additional niche markets exist for

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*This publication was developed by the Small-scale and Part-time Farming Project at Penn State with support from the U.S. Department of Agriculture-Extension Service.*

people who want organic, fertilized, or free-range eggs. Since very little information about these markets is available for any given geographic area, developing them requires research and time. Check with your state department of agriculture and local cooperative extension office to see if a local marketing support program exists to help register you as a vendor of locally produced food.

## Getting Started

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One of the most practical ways to get started is to begin with a flock of up to 1,000 birds and use existing facilities when feasible. A unit of this size allows you to learn the necessary production and marketing skills without making a large investment. Costs are limited to a layer house, nests, and feed and watering equipment.

Start your flock with young pullets (16–18 weeks old) from a reputable dealer. Buy birds that are ready to begin producing eggs. Make sure they are certified by the National Poultry Improvement Plan (NPIP) to be free of *Salmonella pullorum*, *Salmonella typhoid*, *Salmonella enteritidis*, and mycoplasma. A list of NPIP hatcheries is available from USDA and can be found at <https://npip.aphis.usda.gov/npip/openParticipantSearch.do>. Before your pullets arrive, check that their litter is dry and all feeders and drinkers are clean and in good working order.

Check for any local ordinances that may prohibit the keeping of poultry at your location. Often these ordinances prohibit the type or number of birds you can keep in one location. Residential associations for some communities may have even more restrictions on the keeping of livestock within their jurisdictions. Please review these ordinances for any concerns prior to starting your enterprise.

More than 60 breeds of chickens are used for commercial poultry production. Many breeds lend themselves to either egg or meat production and some breeds may be used for both (i.e., dual purpose). Most breeds producing white eggs efficiently tend to be lean, light in weight, and do not lend themselves to meat production. Most breeds producing brown eggs are larger, heavier bodied, and when finished laying can be used as roasting chickens.

## Production Considerations

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You will need at least 1.5 square feet of floor space per bird, covered with clean straw, wood shavings, or sawdust. One feed pan usually provides enough space for 20 birds. Sufficient watering equipment should be available for 20 birds per cup, 12 birds per nipple, or one bird per linear inch of trough space. Birds do not lay eggs at the same time, so nests can be supplied at the rate of one nest per five hens. Nest box bedding should be different from floor litter and must be kept clean and dry.

Lighting stimulates hens to lay eggs. If you want to produce eggs year-round, you will need to install adequate

lighting in your facility. Gradually increase the length of time hens are exposed to light when they arrive at your farm. Start with 12 hours of total light per day at an indoor intensity that just allows you to read the fine print of a newspaper at night (0.5- to 1.0-foot candles). Increase daylight length by 30 minutes per week until you reach 16 hours of light per day. Additional outside light exposure is fine; you should just have the supplementary lights begin and remain on before and after dawn and dusk.

Ventilation of poultry enclosures is necessary so that adequate air exchange can take place to keep littered floors dry. Ventilation needs will vary with ambient temperature. If the temperature is too hot or cold for you, it will be for your layers as well. Misting water around the outside of poultry enclosures may be necessary to keep your layers cool during the extreme heat of summer months. Additional litter materials may be necessary to provide insulation during the winter can aid to protect hens from cold floors and drafts.

Conventional layer mash feed can be purchased at your local feed store. Certified organic feeds are also available, but they are sometimes more difficult to find and are more costly. All hen mash should contain at least 3.5 percent calcium and 16 percent crude protein. Additional free-choice calcium may be provided after birds are 45 weeks old to aid in good shell formation, especially during hot weather. Water should be given free choice, and container-based watering systems should be emptied and cleaned every other day at a minimum. Use a bucket to carry waste water away from living areas to reduce the potential for disease and to prevent the litter from becoming damp or wet.

This publication outlines conventional and organic cage-free production methods. The conventional method recommends molting the flock to stimulate a return to laying. Molting involves resting the hen for a short period of time with cessation of lay. This is done by reducing the hours of daily light back to the day length utilized during pullet rearing (10 hours) and feeding a lower energy and calcium diet—more like a pullet's diet. This modification in feed and light will result in an involution of the oviduct and a rebuilding of this organ. After a period of rest and rebuilding, normal feeding and light schedules are resumed. This production practice extends the flock's productive life without replacing the flock. Molting also increases egg size and quality for a period of time. Flocks may be molted more than one time, but this is not recommended for small flocks.

Many breeds are suitable for producing organic eggs. However, usually the brown egg layers with larger, heavier body types have better value as meat value and greater return after laying has ceased.

## Health Considerations

Biosecurity and sanitation are necessary to prevent disease outbreaks. Biosecurity involves isolating birds by age-group, restricting human access to buildings, keeping the buildings clean, and properly disposing of dead birds. To prevent the introduction of diseases, new birds should be isolated and observed for disease symptoms for one month before allowing contact with other birds.

Because of cannibalistic tendencies often seen in birds, housing of flocks should be done in an all-in, all-out fashion so that birds kept together are of the same age and size. If smaller birds are being raised as replacements, they should be kept in separate housing and seen first each day. Dead birds should be composted in a compost pile large enough to cover the birds with 6 inches of composting material surrounding the body or double-bagged if disposed of in municipal waste receptacles.

Beak trimming should be done at between 7 and 14 days of age in the flock. Dog toenail trimmers can be used to remove  $\frac{1}{16}$  inch of the upper beak to render the tip of the beak dull. This will keep the birds from injuring neighboring birds if they do peck. Shiny objects such as plastic soda bottles and pie pans can be hung in the house for flocks that are exhibiting aggressive behavior toward one another.

Consulting a veterinarian regularly is a good management practice. If high mortality suddenly appears in your flock with no apparent cause, contact your veterinarian and your state department of agriculture immediately. Most states have veterinary diagnostic laboratories that could aid in the diagnosis of any disease problems with your flock. In Pennsylvania, contact the Pennsylvania Department of Agriculture (PDA) at the Bureau of Animal Health and Diagnostic Services (717-772-2852). In Pennsylvania the diagnostic laboratory system can be found at [www.padls.org](http://www.padls.org). Remember, if antibiotics are prescribed, follow all label directions. Viral diseases do not respond to antibiotics, so their use is not normally recommended.

## Regulations for Selling Eggs

The Pennsylvania Department of Agriculture regulates the sale of eggs from small flocks. If an egg producer has fewer than 3,000 laying hens, sells the eggs within five days from the date of lay, and sells the eggs predominantly within a 100-mile radius of the production or processing facility, then the following summary of regulations applies:

1. All eggs must be maintained at 60°F or less from the time of gathering to the time of sale. This also applies to eggs sold at farmer markets or at roadside stands. All commercial flocks of more than 3,000 hens are required to store eggs at no less than 45°F.
2. Each carton, flat, or container of eggs must be labeled with the producer's name and address, date of lay, state-

ment of identity (eggs), net contents (in  $\frac{3}{16}$ -inch-high letters), and "Keep Refrigerated."

3. If you do not weigh the eggs, or if they are of mixed size, and you do not wish to assign a grade, they must be labeled as "Unclassified." You also must remove dirty, leaker, or loss eggs. Loss eggs are inedible or contaminated eggs discovered when held to a bright light (candling).

There are three consumer grades of eggs—Grade AA, Grade A, and Grade B. To market your eggs on these terms, they must meet the requirements for the consumer grade. If you would like to grade your eggs and need further information for consumer graders, contact the Pennsylvania Department of Agriculture's Egg Division at 717-787-5107, or write to Pennsylvania Department of Agriculture, Eggs, Fruits, and Vegetables Division, 2301 North Cameron Street, Harrisburg, PA 17110 or find them online at [www.agriculture.state.pa.us](http://www.agriculture.state.pa.us).

### Weight Class

SIZE	PER DOZEN	PER 30 DOZEN	MINIMUM WEIGHT
Jumbo	30 oz	56 lb	2.42 oz
Extra Large	27 oz	51 lb	2.17 oz
Large	24 oz	45 lb	1.97 oz
Medium	21oz	39.5 lb	1.92 oz
Small	18 oz	34 lb	1.42 oz
Peewee	15 oz	28 lb	—

## Local Regulations

All agricultural operations in Pennsylvania, including small-scale and part-time farming operations, operate under the Pennsylvania Clean Streams Law. A specific part of this law is the Nutrient Management Act (also known as Act 38). Portions of this law may or may not pertain to your operation due to the number and/or size of animals you have. However, all operations may be a source of surface water 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

There are several risk management strategies you may employ for your operation. You should insure your facilities as well as your flock. This may be accomplished by consulting your insurance agent or broker. You may also insure your income through a crop insurance program called AGR-Lite. To use AGR-Lite you must have five years of Internal Revenue Service (IRS) Schedule F forms. You can

then contact an agent who sells crop insurance and insure the income of your operation. For more on agricultural business insurance, see *Agricultural Alternatives: Agricultural Business Insurance*.

## Sample Budgets

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Sample enterprise budgets for small-scale production of conventional and organic eggs, plus information on initial resource requirements, are included in this publication. The budgets assume the purchase of 1,000 birds, a 1,500-square-foot building, nests, and feed and watering equipment. All other budget factors not listed in the budgets (e.g., land) are considered to be constant over time and are not listed. The budget assumptions for each production system are as follows:

- Conventional small-scale production: Assumes that birds are housed at 18 weeks of age, molted at 70 weeks of age (after 52 weeks of production), and sold at 110 weeks of age (providing an additional 30 weeks of production). Feed for the entire period amounts to 142 pounds per bird. Spent layers are then sold as stewing hens.
- Organic small-scale production: Assumes that birds are housed at 18 weeks of age and sold at 70 weeks of age (a total of 52 weeks of production). Feed for the 52 weeks amounts to 90 pounds per bird. Spent layers may be sold as organic roasting chickens and are more valuable than commercial stewing hens. Mortality is estimated at 4 percent of the flock.

These budgets should help ensure that you include all costs and receipts in your calculations. Costs may be difficult to estimate in budget preparation because they are numerous and variable. Therefore, think of these budgets as an approximation, then make appropriate adjustments using the “your estimate” column to reflect your specific production situation. More information on using livestock budgets can be found in *Agricultural Alternatives: Enterprise Budgeting Analysis*.

(Text continued on page 7)

## Sample Budget for Conventional White Egg Flock

1,000 hens kept to 110 weeks of age and selling 900 spent hens at \$0.25 each

Item	Quantity	Unit	Price	Amount	Your Estimate
<b>Receipts</b>					
Jumbo and extra large	9,806				
Large	15,043				
Medium	7,431				
*Receipts from eggs	37,500	dozen	\$2.00	\$75,000.00	
Fowl sold	900	per bird	\$0.25	\$225.00	
<i>Total receipts</i>				\$75,225.00	
<b>Variable Costs</b>					
Pullets	1,000	bird	\$5.00	\$5,000.00	
Feed	1,354	cwt.	\$20.00	\$27,080.00	
Auto, truck, misc. supplies				\$1,614.00	
Repairs and maintenance				\$301.90	
Electricity				\$200.00	
Shavings	380	bales	\$7.00	\$2,660.00	
Medications/diagnostic services				\$75.00	
Advertising				\$450.00	
Marketing				\$45.00	
Egg cartoning and packaging	37,500	dozen	\$0.20	\$7,500.00	
Labor (egg collection and packing)	1,215	hours	\$10.00	\$12,150.00	
Interest				\$1,735.83	
<i>Total variable costs</i>				\$58,811.73	
<i>Returns above variable costs</i>				\$16,413.27	
<b>Fixed Costs</b>					
Insurance and taxes				\$151.95	
Egg and cooling room	\$4,650	10 years		\$465.00	
Building	\$9,000	10 years		\$900.00	
Equipment	\$4,052	10 years		\$405.20	
Manure handling	\$10,750	10 years		\$1,075.00	
Interest				\$849.45	
<i>Total fixed costs</i>				\$3,846.60	
<b>Total Costs</b>				\$62,658.33	
<b>Net Returns</b>				\$12,566.67	

\*Eggs sold as unclassified.

Assume birds are housed at 18 weeks of age and sold at 110 weeks of age (an additional 30 weeks of production).

Feed fed during the 52 weeks = 142 lb/bird.

Mortality estimated at 8 percent.

Price/dozen	Total dozens produced				
	28,000	30,000	32,000	34,000	36,000
\$0.75	\$(39,140.21)	\$(38,899.27)	\$(38,658.33)	\$(38,417.39)	\$(38,176.46)
\$1.00	\$(32,140.21)	\$(31,399.27)	\$(30,658.33)	\$(29,917.39)	\$(6,513.33)
\$1.25	\$(25,140.21)	\$(23,899.27)	\$(22,658.33)	\$(21,417.39)	\$2,486.67
\$1.50	\$(18,140.21)	\$(16,399.27)	\$(14,658.33)	\$(12,917.39)	\$11,486.67
\$2.00	\$(4,140.21)	\$(1,399.27)	\$1,341.67	\$4,082.61	\$29,486.67
\$2.50	\$9,859.80	\$13,600.73	\$17,341.67	\$21,082.61	\$47,486.67

## Sample Budget for Organic Brown Egg Flock

1,000 organic hens kept to 70 weeks of age and selling 966 spent hens at \$1.00 each

Item	Quantity	Unit	Price	Amount	Your Estimate
<b>Receipts</b>					
Jumbo and extra large	8,311				
Large	9,638				
Medium	3,981				
Receipts from eggs	24,900	dozen	\$3.50	\$87,150.00	
Fowl sold	966	each	\$1.00	\$966.00	
<i>Total receipts</i>				\$88,116.00	
<b>Variable Costs</b>					
Organic pullets	1,000	bird	\$6.00	\$6,000.00	
Organic feed	910	cwt.	\$39.00	\$35,490.00	
Electricity				\$220.00	
Shavings	380	bales	\$7.00	\$2,660.00	
Auto, truck, misc. supplies				\$1,097.00	
Repairs and maintenance				\$301.90	
Advertising				\$400.00	
Marketing				\$45.00	
Egg cartoning and packaging	24,900	dozen	\$0.20	\$4,980.00	
Labor (collecting and packaging)	574	hours	\$10.00	\$5,740.00	
Interest on operating capital				\$1,976.22	
<i>Total variable costs</i>				\$58,910.12	
<i>Returns above variable costs</i>				\$29,205.88	
<b>Fixed Costs</b>					
Insurance and taxes				\$150.95	
Egg and cooling room	\$4,650.00	10 years		\$465.00	
Building	\$9,000.00	10 years		\$900.00	
Equipment	\$4,052.00	10 years		\$405.00	
Manure handling equipment	\$10,750.00	10 years		\$967.50	
Interest				\$849.45	
<i>Total fixed costs</i>				\$3,737.90	
<b>Total Costs</b>				\$62,648.02	
<b>Net Returns</b>				\$25,467.98	

Assume birds are housed at 18 weeks of age and sold at 70 weeks of age (52 weeks of production).

Feed fed during the 52 weeks = 90 lb/bird.

Mortality estimated at 4 percent.

Feed and egg prices from USDA/NASS and U.S. Egg Industry Center.

New cartons available from [www.eggcartonsource.com](http://www.eggcartonsource.com) and [www.eggcartons.com](http://www.eggcartons.com).

Price/dozen	Total dozens produced				
	18,000	20,000	22,000	24,000	26,000
\$1.50	\$(33,618.02)	\$(31,633.02)	\$(29,648.02)	\$(27,663.02)	\$(25,678.02)
\$2.00	\$(24,618.02)	\$(21,633.02)	\$(18,648.02)	\$(15,663.02)	\$(12,678.02)
\$2.50	\$(15,618.02)	\$(11,633.02)	\$(7,648.02)	\$(3,663.02)	\$321.98
\$3.00	\$(6,618.02)	\$(1,633.02)	\$3,351.98	\$8,336.98	\$13,321.98
\$3.50	\$2,381.98	\$8,366.98	\$14,351.98	\$20,336.98	\$26,321.98
\$4.00	\$11,381.98	\$18,366.98	\$25,351.98	\$32,336.98	\$39,321.98

## For More Information

Bureau of Food Safety and Laboratory Services  
Pennsylvania Department of Agriculture  
2301 North Cameron Street  
Harrisburg, PA 17110-9408

Department of Animal Science  
The Pennsylvania State University  
213 Henning Building  
University Park, PA 16802

### Associations

Penn Ag Industries Association Poultry Council  
2215 Forest Hills Dr., Suite 39  
Harrisburg, PA 17112

Pennsylvania Certified Organic  
Leslie Zook, Executive Director  
106 School Street  
Suite 201  
Spring Mills, PA 16875  
Phone: 814-422-0251  
Fax: 814-422-0255  
www.paorganic.org  
Email: info@paorganic.org

### Mills Selling Organic Feed

These mills also sell organic pullets, but they may not sell to producers whose goal is less than a 1,000-bird laying flock.

Powls Feed Mill  
1934 Lancaster Pike  
PO Box 15  
Peach Bottom, PA 17563

Kreamer's Feed Mill  
PO Box 38  
Kreamer, PA 17833

Organic Unlimited  
120 Liberty Street  
Alglen, PA 19310

### Publications

"Proper Handling of Eggs from Hen to Consumption," by Phillip J. Clauer, Poultry Extension Specialist, Virginia Tech. This article will discuss how you can ensure that your eggs will be of the highest quality and safe for consumption.

"Rearing Chicks and Pullets for the Small Laying Flock," by Melvin L. Hamre, Department of Animal Science, University of Minnesota. Good layers develop from healthy, well-bred chicks raised under good feeding and management programs. Buying the right type of chick is important for the most economical production.

"Small Laying Flock," by Melvin L. Hamre, Department of Animal Science, University of Minnesota. A well-planned

and well-managed small laying flock can be a source of fresh eggs, personal pleasure, and, sometimes, profit.

"The Small Laying Flock," by Fred Thornberry, Extension Poultry Specialist, Texas A&M University.

"Small Poultry Flocks" (requires Acrobat Reader). Very good older USDA publication. Covers all aspects of small-scale poultry production.

### Websites

Ithaca College: [www.ithaca.edu/staff/jhenderson/chooks/chooks.html](http://www.ithaca.edu/staff/jhenderson/chooks/chooks.html)

Penn State Extension Layer Chicken Resources Website: [extension.psu.edu/animals/poultry/topics/layer-chickens](http://extension.psu.edu/animals/poultry/topics/layer-chickens)

Mississippi State: [www.poultry.msstate.edu/extension/pdf/breeds\\_varieties.pdf](http://www.poultry.msstate.edu/extension/pdf/breeds_varieties.pdf)

University of Purdue: [www.ces.purdue.edu/extmedia/as/as-518.pdf](http://www.ces.purdue.edu/extmedia/as/as-518.pdf)

#### Initial resource requirements— white egg flock

- Land: 2 acres (needed land includes building and waste disposal)
  - Labor: 1,040 hours
  - Egg collection and grading costs: \$11,200–12,000 per flock
  - Capital:
    - Pullets: 1,000 birds x \$5.00 = \$5,000
    - Buildings, equipment (including egg cooler): \$26,800–28,000
- Total capital investment: \$42,000–45,000**

#### Initial resource requirements— brown egg flock

- Land: 2 acres (needed land includes building and waste disposal)
  - Labor: 820 hours
  - Egg collection and grading costs: \$5,700–6,200 per flock
  - Capital:
    - Pullets: 1,000 birds x \$6.00 = \$6,000
    - Buildings, equipment (including egg cooler): \$26,000–28,000
- Total capital investment: \$38,000–41,000**

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Prepared by Paul H. Patterson, professor of poultry science; Gregory P. Martin, extension educator in poultry; Lynn F. Kime, senior extension associate; and Jayson K. Harper, professor of agricultural economics.

**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.**

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied.

This publication is available in alternative media on request.

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Produced by Ag Communications and Marketing

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**Code EE0021** 03/14pod