



Broiler Production Management for Potential and Existing Growers

Broiler production is the largest agricultural revenue generator in Maryland. A broiler is a chicken produced specifically for meat production. Broiler production includes small fryer- to large roaster-type chickens. Approximately 35 percent of cash farm income in Maryland was from broilers in 2016. Maryland ranked eighth nationally in the number of meat chickens produced, and tenth in the number of pounds of meat chickens.

Broiler production has grown dramatically in the past 28 years to \$3.21 billion in 2016 compared to \$426 million in 1986. Maryland ranks tenth in the nation in value of production. Five counties on the Eastern Shore of Maryland are among the leaders in U.S. broiler production, ranking in the top 100. Contract broiler production is concentrated in all nine counties on the Eastern Shore of Maryland.

The Delmarva Peninsula ranks in the top 10 largest poultry producing areas in the U.S. The success of contract broiler production is directly related to the success of poultry companies (integrators) and grain farmers located on Delmarva. (All or most production aspects are owned and controlled by an individual company or integrator.) Typically, corn and soybeans grown in this region are used by the local poultry companies for broiler feed. Delmarva has benefited from the integrators' expansion to capitalize on increased consumer demand for poultry products.

Commercial broiler production used to be concentrated in a relatively small radius around an integrator's feed mill and other facilities, but now the radius has increased to approximately 75 miles. Because the costs of building a hatchery, feed mill, and processing facilities can run several million dollars, integrators will not likely build facilities in a new area. The poultry company will, if possible, operate multiple shifts and maximize use of their existing plant capacity. Since the integrator's facilities tend to be centrally located, an expansion of the grower territory means higher transportation costs for the delivery of chicks and feed and for hauling broilers from the grower to the processing facilities.

This bulletin discusses factors that someone evaluating broiler production as a farm enterprise or as an alternative or complementary farm enterprise should

consider. Current broiler producers also might find this bulletin helpful. Among the factors producers need to consider are the availability of an integrator, nutrient management, and environmental requirements. This bulletin discusses these management issues along with other considerations important for broiler management and production.



Photograph courtesy of Edwin Remsburg, University of Maryland

Virtually all Broilers Grown on the Delmarva are Produced under Contract between Integrator and Grower

The poultry company furnishes chicks, propane, and feed, supervises growth of the broilers through a field service representative, and may also provide an energy allowance during the summer months. The grower provides the land, broiler house, equipment, labor, and normal operating expenditures.

Compensation to the broiler producer includes performance pay based on the number of pounds of meat moved, birds produced, fuel (propane) usage, and feed conversion. Feed conversion is the amount

of feed consumed by the bird per unit of body weight and is expressed as pounds of feed per pound of gain. Producers compete against one another at time of settlement and are ranked based on their flock's performance.

Before agreeing to produce broilers under contract, the grower should thoroughly examine the contract and be familiar with its terms. Contracts protect both the producer and the integrator and should clearly spell out all important details. These details should include terms of grower payments, production practice requirements, incentive clauses, and production items to be furnished by each party and those to be jointly furnished.

A potential grower should be aware of the details and responsibilities while considering the possibility of such events as a flood, snowstorm, hurricane, power outage or any catastrophic event destroying a broiler house, or an integrator deciding to reduce broiler production. Growers should obtain firm written answers to any questions about the integrator's role or expectations prior to signing. A well-written contract that is clearly understood by both parties is an essential beginning for successful long-term broiler production.

Advantages and Disadvantages of Contract Production can be Evaluated from Grower's, Lender's, and Integrator's Perspectives

Producer (contract grower) -- The advantages of contract production for producers are reduced market price risk, management assistance provided as part of the contract, and predictable cash flow is expected. The possible disadvantages for producers include elimination of extra profit opportunities, sharing or giving up some control of management decisions, and no equity in the birds, because the birds are owned by the integrator.

Flock of 14-day old chicks



Photo courtesy of Edwin Remsburg

When an integrator's profit margins are being eroded, a legitimate concern may be whether the company will continue to supply birds, or how many flocks the integrator will provide per year, especially until the broiler house is paid for. The producer assumes sole responsibility for nutrient management which includes

utilization of the poultry litter, biosecurity, and environmental practices that are subject to county, state and federal regulations.

Lender -- The grower's lender may perceive the decrease in market risk and management assistance as positive. The negative aspects of contract broiler production, from the lender's perspective, include the lack of equity in animals and the dependence on contract continuation for loan repayment.

From the integrator's viewpoint, contract production provides security with respect to production capacity, allows fast expansion of the company, requires less capital for growth (reduced land, building or equipment investments), and may make growers more productive because company representatives provide management assistance. Contract production allows the company to maximize the use of plants and mills (thus reducing overhead costs per unit of production) by keeping all phases of the operation running at full capacity. The disadvantages for the integrator may include taking all the short-term risk of low market prices and growers who may or may not be highly productive. Integrators are also being pressured to assume increasing responsibility for environmental, animal welfare, and biosecurity issues.

Financing for Broiler Buildings and Equipment

Lenders have historically preferred to make broiler facility loans to a diversified farm operator who has been successful in other enterprises. Such an operator has other income to rely on in the event an integrator decides to reduce the number of flocks per year or does not renew the grower's contract. Today's lenders are making loans to producers that are not diversified. In either situation, a reliable source of farm or off-farm income may be necessary to assure a lender that the grower can repay the broiler facility loan because returns from broiler production may not be sufficient in the early years to cover both family living expenses and debt retirement.

The cost of a broiler house varies with size and specifications. An estimate for construction of fully equipped houses is \$10.95 per square foot (see Table 1). This figure does not include the cost of land and may vary with different building designs, equipment, and location with reference to water, roads, and available electric power.

Building and Equipment Requirements

Each integrator will have specific building design and equipment specifications, and location requirements. Poultry houses are built on a level pad above ground level, have a smooth level area at the end of the building for a mechanical loader, and must be accessed by a well-graveled roadway

with turnaround for large tractor trailers. Houses must be sufficiently insulated to prevent heat loss in winter and minimize heat build-up in summer. They must also have sufficient ventilation for year-round comfort of the birds.

Integrators prefer multiple house operations in order to minimize feed, chick delivery, and broiler transportation costs. Integrators attempt to fill all broiler houses on a farm with chicks of the same age so that the integrator can deliver one kind of feed, make a minimum number of deliveries or pick-ups, and minimize transportation costs.

End of chicken house with heavy use area



Each integrator, depending on the size of bird being produced, has a requirement for the amount of floor space per square foot per chick. Most poultry houses currently being built are 60 to 66 feet wide and up to 600 feet long. The houses listed in Table 1 are each 36,000 square feet, which is within this range.

Additionally, an integrator may place more birds per square foot in the winter months compared to the summer months, due to bird heat production. Each poultry farm must have a stationary generator, since power outages can occur during a storm or due to a traffic accident knocking down a power line. The generator is sized by kilowatts according to the size of the poultry and farm operation.

The integrator will provide the required specifications for feeders, water nipples, heating and cooling systems, vent boxes, fans, and lights. Integrators may specify equipment brands. Growers should always check the energy efficiency of all equipment purchases (for fans, check Bess labs www.bess.illinois.edu/).

Labor and Management Requirements

The success of a broiler grower will depend, to a great extent, upon how well he/she carries out an integrator's management program. The grower is responsible for management of the broiler house with the assistance of the field service representative provided by the integrator. The service person may assist the grower on decisions not specifically covered in the contract, such as ventilation, litter management, rodent and fly control. Broilers need daily attention and new producers will need to work closely with their field service representative to develop an appropriate care schedule. It may be appropriate to have several family

members familiar with the poultry operation so that they can substitute for the primary caretaker, if necessary. Extra labor may be required at different points throughout the production period.

Daily chores for the broiler grower include checking mechanical equipment to ensure correct operation, adjusting pressure in water lines, height of water and feed lines and ventilation, monitoring feed bins, removing dead birds, disposing of dead birds and keeping records. Other routine chores include cleaning and repairing equipment, cleaning out houses, monitoring rodent control, ordering feed, preparing for chick arrival, and preparing for shipment to the processing plant.

Growers should Carefully Consider the Types of Equipment Needed for the Poultry Operation

Growers will need a tractor with a loader for handling manure and collecting and composting dead birds. Local Soil Conservation offices can provide information on State low-interest rate programs or state tax credits on manure handling equipment. After chickens are removed from the poultry house, growers will need to take off the top layer of litter (a process known as crusting) or windrow the litter (an in-house manure handling practice that partially composts the litter and may help reduce disease), depending on the litter condition.

House sanitation is important between flocks. Some producers purchase their own cleaning equipment, such as a backpack blower and/or a pressure washer; others hire a custom operator. Maintaining the property is very important. Growers can use a box scrape for leveling new shavings and the litter (shavings & manure) before each flock is placed, as well as road/lane maintenance. A blower is helpful for cleaning a poultry house between flocks. Labor-saving equipment is also available, including equipment to help place feed in supplemental feeders.

State Law Requires Operations to have a Nutrient Management Plan

The Water Quality Act of 1998 requires all Maryland agricultural producers of eight or more animal units (an animal unit is defined as 1,000 pounds of live animal weight) or with a gross income of \$2,500 to

Skid loader cleaning out chicken house



Photograph courtesy of Bud Malone (retired), University of Delaware

have a Maryland Nutrient Management Plan prepared for their farming operation.

The components of the plan include:

- a soil and manure analysis;
- a general description of the farming operation;
- a map of the farm designating fields with acres;
- an estimate of the amount of manure generated by the poultry farm;
- a manure and fertilizer recommendation for the crops to be grown on the farmland; and,
- a record-keeping system.

This plan can be written by the Nutrient Management Advisor at a local University of Maryland Extension (UME) office at no charge. Growers also can hire private nutrient management consultants to prepare the plan but should request an estimate of the fee in advance. A list of certified nutrient management consultants can be found at: http://mda.maryland.gov/resource_conservation/Pages/Certified_Consultants.aspx

Counties in Maryland will require a copy of the nutrient management plan when applying for the poultry building construction permit. The producer will also need a copy of the nutrient management plan when participating in any cost share programs with Soil Conservation office

and/or USDA's Natural Resource Conservation Service (NRCS).

Litter and Mortality Management are Important Components of Poultry Production and are the Grower's Sole Responsibility

Current state regulations require growers to manage all litter and dead birds, to assure beneficial use of the litter and mortality and also to prevent adverse environmental effects. Some growers may not recognize that mortality and litter management costs should be included in standard production budgets. Poultry litter is a valuable byproduct because it contains nutrients that can be utilized in field crop production. At 2016 fertilizer prices (2016), Table 2 values the litter at \$12/ton. Additionally, some growers contract out to a third party, who manages the litter between flocks and during cleanout in return for the litter.

The poultry operation's nutrient management plan will include approximate poultry litter production amounts and the final destinations of the poultry litter, whether it is on a farm field or transferred to another farmer. The poultry producer must maintain records of poultry litter removed from the farm and/or land-applied on the premises. Litter application records must show rates and dates of application along with documentation of a manure spreader's calibration each year. The grower must also keep records of any poultry litter sold or given to other individuals, including the date of removal,

manure analysis with nutrient value of the litter, the name and address of the recipient, and the amount removed from the operation.

In Maryland, Poultry Producers Spreading Poultry Litter on more than 10 Acres Annually Must Obtain Nutrient Applicators Voucher

The Maryland Department of Agriculture (MDA), Nutrient Management Department develops rules and enforces the Water Quality Improvement Act of 1998. University of Maryland Extension (UME) is responsible for developing training curricula and conducting the training.

Channel composter



Growers can obtain the voucher by attending educational classes provided by a local UME office. When calling the office, ask for the Agriculture Extension Educator. The initial two hours of training covers all aspects of litter and compost management,

and two hours of update training is required every three years thereafter.

UME offers a day-long composting certification course provides information on approved techniques of composting dead birds. Growers need this certification to obtain cost share funds from MDA or NRCS for the construction of the manure and composting facility.

A poultry producer who is planning to apply any restricted-use pesticide must obtain a private pesticide applicators license. For more information, call the local UME office.

Poultry Producers Can Take Advantage of Cost Share Opportunities

Contact your local Soil Conservation Office and the NRCS office for information on the following cost share programs:

- Manure storage building;
- Composting structure;
- Heavy-use areas (cement pads at end of poultry houses or manure storage building);
- Vegetative environmental buffers; and
- Poultry litter amendments (to help lower ammonia).

NRCS periodically offers special programs to poultry producers through the Environmental Quality Incentives Program (EQIP) and Agricultural Management Assistance (AMA) Program. When

applying or signing up for these programs, growers should be sure that they understand all the conditions. Once these contracts are signed, funds are set aside and participating growers will not be able to change their minds or back out of the program. Cost-share money received from any of these programs must be reported as income when filing Federal and State taxes.

Growers can contact the Delmarva Poultry Industry, Inc. for information on any of their cost-share programs and download their policy for Best Management Practices for Good Neighbor Relations at <http://www.dpichicken.org/v eb/>

Producers Must Follow Rules Regarding Environmental Considerations

All growers must send a poultry litter sample to a lab yearly for analysis as part of the information required for the farm's nutrient management plan. For more information on litter testing, contact the local UME office. The amount of poultry litter that may be land-applied on the poultry operation premises is limited according to nutrient management guidelines established by the University of Maryland. These guidelines only allow growers to use litter as a beneficial organic locally produced slow release fertilizer (plant food) on pasture or cropland, not as a disposal system.

If poultry litter cannot be used according to nutrient management guidelines on the

premises, the producer must arrange to have it moved to a location where it can be used properly. In some cases, the producer may sell or give the poultry litter to crop producers in trade for crusting, windrowing, or clean-out services.

Manure storage structure



Maryland's Manure Matching Service connects farmers who have excess animal manure with nearby farmers or alternative use projects that can use the manure as a valuable resource. MDA's Manure Transportation Program also helps poultry producers with the cost of transporting excess manure off their farm. For more information or for a registration form, call 1-877-7MANURE or go to the web at: http://mda.maryland.gov/resource_conservation/Pages/manure_management.aspx.

In addition to state programs, there are other options available for removing litter from poultry farms. There is a Maryland Farmers Exchange page on Facebook which is a free exchange for farmers and others to buy, sell and trade manure, compost, livestock, farm equipment and

commodities. Social media is always an option. Producers can usually sell litter to nearby farmers. Perdue's AgriRecycle, LLC is the first large-scale litter pelletizing plant in the U.S. They provide clean-out services to Delmarva poultry producers who do not have adequate land for litter application or to producers looking for an alternative to land application.

The proper disposal of poultry carcasses to prevent environmental and health problems is also very important. Acceptable disposal methods include approved composting, incineration, on-farm freezing of birds (<http://www.greener-solutions-llc.com/>) and disposal in a rendering plant.

Guidelines for approved dead bird disposal are available from the local UME office. Growers have expressed considerable interest in composting dead birds because this method is inexpensive and when managed properly, produces a product that, like litter, can be a valuable fertilizer and soil conditioner.

The MDA Nutrient Management Division inspects poultry operations routinely for any violations of environmental regulations. They may also investigate pollution complaints alleging a disposal problem. If inspectors find that a poultry operation is disposing of litter or mortality in such a manner that contaminates surface or groundwater, the grower will be required to implement management

practices to correct the problem. Check local, state, and federal regulations pertaining to animal feeding operations (AFO). The Maryland Department of Environment (MDE) website, <http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/AF/O/Pages/index.aspx>, also has state regulations for AFOs and concentrated animal feeding operations (CAFO).

Environmental Permits/Requirements: Concentrated Animal Feeding Operation Regulations

The Maryland General Discharge Permit for Animal Feeding Operations, applicable to CAFOs and Maryland Animal Feeding Operations (MAFOs), became effective December 1, 2009. Maryland Department of the Environment (MDE) defines a CAFO as a medium (37,500 - 124,999 chickens and less than 100,000 ft²) or large (more than 125,000 chickens or greater than or equal to 100,000 ft²) animal feeding operation that discharges or "proposes to discharge" manure, litter or process wastewater from the production area to waters of the state. MDE defines a MAFO as a large animal feeding operation that does not discharge manure, litter, or process wastewater.

A Notice of Intent (NOI) must be submitted to MDE and constitutes notice to MDE that the applicant intends to be authorized by a State/National Pollutant Discharge Elimination System (NPDES) General Discharge Permit issued for the discharges from the animal feeding operation

identified in the NOI. Once MDE notifies the applicant that the NOI is accepted, authorization to discharge will begin.

MDE also has New Source Performance Design criteria for poultry operations that should be used when new poultry houses are constructed. A complete list of these standards can be found at:

<http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/AF/O/Pages/index.aspx>.

All CAFOs must have a Comprehensive Nutrient Management Plan (CNMP) developed for their operation in accordance with NRCS technical standards. A CNMP is a conservation plan that contains additional components not found in a nutrient management plan. A MAFO needs a Nutrient Management Plan plus a Soil Conservation Water Quality Plan.

Please call Gary Kelman at 410-537-4423 or send an e-mail to gkelman@maryland.gov for more information on the Maryland CAFO/MAFO programs.

Producers Must Obtain General Permit for Stormwater Associated with Construction Activity Permit before Starting any Construction

In addition to CAFO/MAFO requirements, projects that disturb one or more acres must apply for either a General or Individual Permit for Stormwater Associated with Construction Activity. For more information, go to:

http://www.mde.maryland.gov/programs/Permits/WaterManagementPermits/WaterDischargePermitApplications/Pages/Permits/watermanagementpermits/water_applications/gp_construction.aspx.

Projects will be posted in MDE's database for a minimum 45-day public participation period for sites with three acres or more of disturbed area or a 30-day period for sites with one to less than three acres of disturbed area. During this time, citizens may ask to review the available erosion and sediment control and stormwater management plans. Additional information can be found at:

<http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Pages/Programs/WaterPrograms/SedimentandStormwater/swm2007.aspx>.

Producers will also need a Stormwater Management Plan and an Erosion and Sediment Control Plan. Please call MDE Compliance Program at 410-537-3510 with any questions.

Producers May Also Need Water and Other Permits

Growers using more than 10,000 gallons of water a day (the average for the year) need to obtain a water appropriation and use permit.

http://www.mde.state.md.us/programs/Permits/WaterManagementPermits/WaterDischargePermitApplications/Pages/Permits/WaterManagementPermits/water_permits/index.aspx

Producers submitting permit applications should always make copies and mail permits with a return receipt requested to keep for their records.

County Permits

Growers should check with their local Environmental Health office or the Department of Health for any special county permits needed. Ask about any special electrical requirements and plumbing permits. What inspections does the county require? Check on the location of the well on the property. Does the well have setback requirements from buildings and does it need a check valve?

For more information on the *Process to Successfully Build a Poultry Operation* go to: http://www.mascd.net/resources/Poultry%20House%20Construction%20Checklist_English.pdf

Biosecurity is Critical

Biosecurity is a set of practices designed to keep disease from a farm and prevent transmission of disease from an infected farm to neighboring farms. An inadequate biosecurity program increases the risk of disease, which may result in high flock mortality and loss of farm income.

Ideally, a grower should construct new poultry houses at least one to two miles from other commercial or private poultry facilities. However, this may not always be practical, especially in a densely poultry-populated region such as the Delmarva

Peninsula. Growers should build new houses as far as possible from roadways that handle high volumes of poultry vehicles.

A good biosecurity program is composed of six components:

- risk assessment of your farm;
- traffic control;
- sanitation;
- pest control;
- communication; and
- audits

First, producers must identify all main biosecurity risks. For each biosecurity risk, producers will need to determine the appropriate biosecurity measure and implement it. Once these measures are in place, growers should periodically monitor risks and measures to ensure adequate protection is maintained. If necessary, producers should adjust biosecurity efforts to address any new or changing risks.



Signs available at local extension offices.

The farm should maintain a list of contacts if a significant infectious disease occurs.

Communication is a key component of any biosecurity program. The U.S. Poultry and Egg Association has designed an excellent biosecurity training program that is available free on CD to growers and others involved in the poultry and egg industry (http://www.uspoultry.org/animal_husbandry/biosecurity.cfm).

Poultry Biosecurity Checklist

1. Restrict entry to poultry area.
2. Wear dedicated boots and coveralls when working with flocks.
3. Wash and disinfect boots at the entrance to the poultry area.
4. Wear disposable gloves or wash hands thoroughly before and after handling birds.
5. Use footbaths and change disinfectant in footbaths regularly.
6. Visitors should use disposable boots and coveralls when visiting flocks.
7. If possible, provide shower facilities for visitors.
8. Remove poultry mortality daily. Dispose of them in an approved method.
9. Eliminate contact with poultry from an outside flock.
10. Minimize entry of equipment, supplies, etc. and take appropriate precautions such as disinfecting, removing shipping boxes, etc.
11. Maintain a strong vector control program for insect, mammalian and avian vectors. Maintain bait stations,

clean up feed spills, prevent entry by wild animals (rats, birds, insects) or pets (dogs, cats). Use screens in windows, air inlets, etc.

12. Maintain minimal vegetation and no debris around poultry facilities to lessen food and shelter opportunities for vectors.
13. Ensure that feed, water and bedding sources are free from infectious agents.
14. Review biosecurity plan and flock health program, including vaccination protocols, with veterinarian on a regular basis.

Profitability and Cash Flow Tables can Help Growers Make Decisions

Table 1 shows farm broiler production fixed investment costs that indicate the investment amounts for four houses of a particular size and various other management factors. Note that site preparation depends on the topography and soil types. The cost of a manure building and composter assumes that the grower will qualify for cost sharing from MDA or NRCS. If cost sharing is not available, add \$100,000 to the fixed investment cost.

Table 2 provides a cash flow statement that shows total cash revenue and cash costs along with cash flow from the operation. The cash flow statement provides an estimate of the cash available from production to make loan payments and to

pay other farm cash requirements. The statement also includes revenue, variable and fixed costs, and required investments on a square footage basis, which is an industry standard for costs, revenue and investments.

While the numbers in Table 2 are believed to be reasonable, contracts will vary among integrators and over time. Costs and investments will also vary among growers because houses differ in square footage. Growers must carefully study information provided by the integrators and their lenders about their potential revenues and costs and modify the fixed investment cost and cash flow statements as needed to determine potential returns. To do these modifications, the square footage values in the financial statements can be multiplied by different house sizes.

The cash flow statement presented in Table 2 is a tool for potential growers to use in analyzing expected receipts and costs. In this example, the cash flow (given stated assumptions and relatively high utility costs) suggests that during the loan repayment period, cash flow may be a problem for shorter-term loans.

Adapting the farm broiler production fixed investment and the cash flow statement to a particular situation will help a grower determine if broiler production is possible.

Required Investments Vary Depending on Size of Operation

The investments to start broiler production are included at the bottom of Table 1. The house and equipment is the largest item, estimated to cost \$332,000 per house. The total cost for four houses and equipment is \$1,328,000. The next largest expenses are the site preparation, generator, wiring and alarm. Site preparation can vary considerably from site to site. Tractor and farm equipment, as well as the manure shed, composter, vegetative shelterbelt, well and watering system, and stone for a farm road are also included. Total investment is \$1,576,900.

Some of the investments may vary for growers, based on their current situation. If the grower owns a tractor and farm equipment, this investment is not necessary. In addition, if current roadways on the farm are well graveled, stone expense outlays may be less.

Gross Income Includes Payments for Chickens and Litter

Broiler producers are paid based on pounds of meat produced and transported to the processing facility. Estimates of receipts are frequently based on a contract amount that assumes an average production cost for all growers. The amount actually paid depends on whether the grower's production efficiency is above or below the average.

New poultry houses



New poultry houses will have a guaranteed 15-year contract. Most grower contracts have a stated floor price that the grower is guaranteed regardless of production efficiency. The contract price is paid on pounds moved; thus, high death loss can substantially affect a grower's income. The grower contract price used in Table 2 is \$.33 per square foot per flock, which reflects average payment from the integrator for a newly constructed operation. Growers have an opportunity to earn bonus pay for above-average performance. Growers should check with the integrator about different bird programs ranging from a small bird (fryer) to a large bird (roaster).

The budget in Table 2 includes gross income from payments from the integrator for growing chickens and from the sale of litter. Gross income totals \$327,456 for four poultry houses. This budget includes 6.8 flocks of birds grown per year. This reflects a small-bird program in which birds are raised for 35–40 days or approximately five weeks. Each house is 36,000 square feet and has a bird density of 0.8 square feet per bird. Income from grower payments is \$323,136. Selling 360 tons of litter at \$12/ton gives an income from litter sales of \$4,320. If the litter is used on the farm, it

would not result in a cash flow, but would probably reduce fertilizer purchases.

Expenses are Grouped into Variable and Fixed Costs

Variable costs change with the level of output (number of birds produced) and do not occur when the producer does not grow broilers. Variable costs include money outlays for purchased inputs used in a production period, such as electricity, telephone and alarm service, repairs, house clean out and crust out, and supplies. For the production situation depicted in Table 2, the budget includes \$73,600 for total variable costs. Utilities are the largest expected variable cost. Check with the electric supplier for savings during peak demand. Some growers have participated in electric buying groups to help reduce electricity costs. These are all cash costs and so are the same as variable costs. Growers must either have the cash or be able to borrow funds to cover these costs.

Fixed costs, on the other hand, do not change with the level of production. In fact, fixed costs remain the same even if no birds are produced. Table 2 lists fixed costs. The largest costs are buildings and equipment, other investments, and the mortgage payment. Owner's labor is not included.

With this production situation, total costs are \$233,182-- variable (cash) costs of \$73,600 and fixed costs of \$159,582.

Total cash expenses are slightly below one third of total costs, which is less than most agricultural production enterprises.

Variable costs are a smaller share of total costs for broiler producers because integrators furnish feed and veterinary services that are variable cash costs for most other animal producers. This is an important advantage for broiler production; the grower does not have to finance these major inputs while the broilers are being produced.

Profitability: Profits Equal Net Income Minus Variable and Fixed Costs

With the gross income and cost levels in Table 2, net income over variable and fixed costs is \$94,274--a net income of approximately \$23,500 per broiler house. Net income is obtained by subtracting total variable and fixed costs from total gross income. Net income indicates that broilers are profitable under the conditions described in Table 2. This profitability explains why so many farmers produce broilers.

To determine the profitability of their potential poultry operations, growers must substitute the income and costs into Table 2 that are consistent with the actual farm production being considered in order to have an accurate calculation for a specific farm.

Factors most likely to affect a broiler producer's profitability are:

1. The grower's management skills, which impact the broiler growth rate and death losses. From a management standpoint, an operator can increase profits by watching for feed waste and making the necessary adjustments to reduce it, observing for leaking drinker nipples, keeping the litter dry and clean, staying alert to fan breakdowns, and paying attention to signs of stress and disease.
2. If offered, the bonus that the grower receives affects profitability. For example, a bonus may be paid if the production efficiency is better than average cost of production for the group of producers contracting with a particular integrator in a specific time period. The bonus reflects a producer's management ability versus that of an average grower, but of the other growers who sell birds the same week. If a grower is unfortunate enough to market birds at the same time as several above-average producers, he/she may not receive a bonus. In fact, the grower may be penalized for below middle cost efficiency.

Net Cash Flow Includes Cash Receipts, Cash Expenses, and Mortgage and Equipment Payments

Total cash expenses of \$73,600 are subtracted from total cash receipts of

\$327,456 to obtain net cash flow of \$253,856 (Table 2). Cash flow is the amount available to finance a loan to purchase the broiler house and other investments. Alternatively, part of cash flow could be used for other farm or personal expenditures. When the loans for the house and other investments are repaid, the net cash flow would be the cash profits from the broiler production.

The bottom of Table 2 shows potential loan payments to finance the broiler production system. All investments in Table 1, excluding the tractor, are financed with a 15-year loan at 5.5-percent interest. The loan repayment period is the same as the life of the equipment. Total annual mortgage payments are \$151,627 with quarterly payments of \$37,907. This payment is less than annual cash flow so the loan is feasible. Table 2 also includes a payment for a short-term loan for equipment, which includes a tractor, loader, box scraper and a mower. This loan is for \$35,000 and it is financed for six years at 5-percent interest. This loan has total annual payments of \$7,955. This loan is also paid quarterly; the payment can be determined by dividing the total annual payment by four. Adding the payments for these loans together, total loan payments are \$159,582 each year.

These loans are feasible because the total payments are less than the net cash flow of \$94,274. Thus, the producer has cash flow greater than the payments as a cushion for

lower receipts or higher expenses. If not needed for broiler production, it can be used for other purposes.

Producers can finance the production system with loans with a shorter period of time. With a shorter repayment period, payments would be higher so part of the payment would have to come from other farm operations, off-farm work, or other sources.

For more poultry farm broiler cash flows on various types of broiler growing programs visit: <http://extension.umd.edu/poultry>.

From Water Sources to Zoning, There are Many Other Issues Growers Must Consider

Two to four sources of water are preferred to ensure an adequate supply of water for

Vegetative buffer around poultry house



Photograph courtesy of Bud Malone (retired), University of Delaware.

broiler houses. Other factors a potential broiler grower must consider are rural zoning, air pollution laws, and “nuisance” lawsuits if neighbors are close to planned building sites. Developing and maintaining good neighbor relations is important for all poultry producers. Some issues that may arise include odor, dust, noise, insects and other pests. Getting to know your neighbor, proper manure handling, and maintaining farm appearance can help build and maintain good neighbor relations.

The Delmarva Poultry Industry, Inc. (DPI) has a vegetative environmental buffer (VEB) program available for poultry growers. The program provides guidelines for growers for installing and maintaining a VEB around poultry houses. VEBs help alleviate dust and ammonia, support biosecurity, and improve farm appearance. For more information on DPI’s VEB program, go to <http://www.dpichicken.org>.

Potential Broiler Growers Should Talk to Local Growers and Integrators before Deciding on Becoming a Poultry Producer

Potential broiler growers should:

- determine whether an integrator services the area and if the integrator is accepting new growers;
- contract with an integrator before buying land;
- study contracts carefully to determine if the terms are acceptable;

- contact a lender to determine the availability and terms of financing for a broiler enterprise;
- discuss and evaluate with their families how the broiler enterprise fits into short- and long-term family and business goals;
- determine the family’s willingness to commit time and energy to a seven-day per week operation with breaks limited to periods between flocks of birds; and
- understand that, because broiler houses are a specialized facility, the commitment to production must be long term in order to ensure that investment costs are recouped.

For more information, please visit the UME Maryland Poultry website at:

<http://extension.umd.edu/poultry>

Poultry Glossary

Animal Feeding Operations (AFO) -

Animals stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period. Crops, forage or post-harvested residues are not sustained in the normal growing season over any portion of the lot or facility.

Bedding - An absorbent material, usually wood shavings or sawdust, used to cover the floor in poultry houses.

Best Management Practices (BMPs) -

Conservation practices or a system of practices and management measures that control soil loss and reduce water quality degradation caused by nutrients, animal wastes, toxics, and sediment. Agricultural BMPs include strip cropping, terracing, contour striping, grass waterways, animal waste structures, ponds, minimal tillage, grass and naturally vegetated filter strips, and proper nutrient application measures.

Between flocks - A period of time from the day the chickens leave the farm for processing until the day new chicks are placed on the farm.

Biosecurity - A management system to minimize the disease exposure of flocks. A system of procedures and other means to reduce or eliminate exposure of poultry flocks to any type of infectious viral, bacterial, fungal, or parasitic agent.

Black bugs - Known as a Darkling beetles or lesser mealworm beetles, they are pests found in poultry litter. They can cause structural damage to wood structures and insulation materials. Additionally, black bugs can serve as a reservoir for some bacteria and viruses.

Black-out house - Poultry houses that do not allow any natural light into the building.

Broiler - Meat-type chicken of any size.

Cake -The material that is removed from the poultry house that is made up of moist manure and moist bedding and may contain spilled feed. Cake is on top of litter, typically only a few inches deep. Also known as crust.

Cash flow - The transfer of cash into (income) or out of (expenses) a business. Cash flow is usually measured during a specified time period.

Chick - A young male or female chicken.

Composting - A natural decomposition process for organic wastes.

Comprehensive Nutrient Management Plans (CNMP) - A conservation plan unique to animal feeding operations that incorporates environmental practices to utilize animal manure and organic byproducts as a beneficial resource to ensure that both production and natural resource protection goals are achieved.

Concentrated Animal Feeding Operations (CAFO) – A medium or large AFO (see **Animal Feeding Operation**) that discharges, or proposes to discharge, contaminated wastewater to a surface stream. For chickens (other than laying hens), that means at least 37,500 animals per flock.

Contract – The agreement between the grower/producer and the integrator (the poultry company). Also called an agreement.

Contract grower - The person or business entity which provides housing, equipment, labor, and electricity, and cares for the chickens during growout. The contract grower does not own the chickens, but receives compensation for their services.

Crust - See **cake**.

Cruster – A piece of equipment used to remove the crust/cake from the poultry house.

Delmarva - The peninsula of land where Delaware (3 counties), Maryland (9 counties), and Virginia (2 counties) converge. This area is situated between the Atlantic Ocean and the Chesapeake Bay, which is also referred to as the "Eastern Shore."

Delmarva Poultry Industry, Inc. (DPI) - The nonprofit trade association working for the continued progress of the broiler chicken industry in Delaware, the Eastern

Shore of Maryland, and the Eastern Shore of Virginia.

Environmental control - Temperature control in poultry houses by computers.

Environmental Protection Agency (EPA) – An agency of U.S. government that was formed Dec 2, 1970 under the Nixon administration; their charge is to protect human health and the environment. The agency writes and enforces regulations based on laws passed by Congress. There are 10 regional offices. (MD, DE, VA are in Region 3).

Evaporative cooling pad - An evaporative cooling system which uses wetted pads with fans to move the air into or out of the house.

Farm Bureau – A nonprofit, nonpartisan organization dedicated to promoting, protecting, and representing the interests of U.S. farmers and ranchers.

Farm Service Agency (FSA) – An agency of the U.S. Department of Agriculture responsible for administering federal farm programs. FSA programs include farm loans, conservation, disaster assistance, energy, commodity and many more.

Grower - The person or business entity which bears responsibility for production. The grower shares the risk by having a contract/agreement with an integrator (a poultry company).

Growout – A period of time between when chicks are placed on the farm and leave the farm as a meat-type bird ready for processing.

Integrator – Poultry companies use vertical integration, in which stages of production are combined in a single enterprise. A poultry company provides the chicks, propane for heating, and technical service to the grower. The grower provides housing, equipment, labor, and electricity to raise the chicks. The poultry company provides the processing and marketing of the grown birds.

Litter – A combination of bedding (sawdust or shavings), manure, moisture, and sometimes, spilled feed.

Manure – The excreted feces and urine from animals.

Maryland Animal Feeding Operation (MAFO) - A large **Animal Feeding Operation** that does NOT discharge or propose to discharge contaminated wastewater to a surface stream. For chickens (other than laying hens), that means at least 125,000 animals per flock or a total housing size of 100,000 ft² or more.

Maryland Department of Agriculture (MDA) - Many activities of the MDA are regulatory in nature, others are assigned to a category of public service and some are educational or promotional in scope. All are intended to provide the maximum

protection possible for the consumer as well as promote the economic well-being of farmers, food and fiber processors, and businesses engaged in agricultural-related operations.

Maryland Department of the Environment (MDE) - Created in 1987 to protect and restore the quality of Maryland's air, water, and land resources, while fostering smart growth, economic development, healthy and safe communities, and quality environmental education for the benefit of the environment, public health, and future generations. MDE regulates Concentrated Animal Feeding Operations (CAFO) and Maryland Animal Feeding Operations (MAFO).

Mechanical ventilation - The use of fans to circulate air through poultry houses.

National Chicken Council (NCC) - Based in Washington, D.C., NCC is the national, nonprofit trade association representing the U.S. chicken industry. NCC is a full-service trade association that promotes and protects the interests of the chicken industry and is the industry's voice before Congress and federal agencies. NCC member companies include chicken producer/processors, poultry distributors, and allied industry firms. The producer/processors account for approximately 95 percent of the chickens produced in the United States.

Natural Resources Conservation Services (NRCS) - An agency of the U.S.

Department of Agriculture which provides products and technical services that enable people to be good stewards of their soil, water, and related natural resources. With NRCS's assistance, people are better able to conserve, maintain, or improve their natural resources. The agency provides cost sharing for manure storage buildings, composting structures, heavy use areas, poultry litter amendments, vegetative buffers, Comprehensive Nutrient Management Plans and more.

Nutrient management - A best management practice designed to minimize the contamination of surface and ground water by limiting the amount of nutrients (usually nitrogen and phosphorus) applied to the soil to no more than the crop is expected to use. This may involve changing fertilizer application techniques, placement, rate, or timing. The term fertilizer includes both commercial fertilizers and manure.

Partial clean out - To better manage the depth of litter in the chicken house, a grower will remove a portion of the litter and spread out the remainder in the house.

Producer - See **Grower**.

Production Enterprise Budget - Provides a listing of all income and expenses associated with a particular enterprise. It is used to estimate the profitability of the

enterprise, to compare the profitability of various enterprises on the farm, and as an aid in preparing whole farm or cash flow budgets.

Shelter Belt - See **Vegetative environmental buffer**.

Soil Conservations Districts - Affiliated with the **Maryland Department of Agriculture** (MDA), a soil conservation district provides a comprehensive education and information program directed toward all citizens – both urban and rural – which looks at human impacts on the environment and how people can lessen those impacts. The districts provide cost share for manure storage structures, help farmers implement best management practices, update soil conservation and water quality plans, promote the Maryland agricultural water quality cost-share program to help farmers pay to install water quality improvements.

Tunnel ventilation - Placement of large fans at one end of a chicken house and appropriately sized air inlets are located at the opposite end. Air is drawn down the length of the house at velocities of 350-450 feet per minute.

Total clean out -The removal of all litter from the chicken house. Some poultry companies have their growers clean out once a year and others may only clean out after several years.

University of Maryland Extension (UME) -

A statewide, non-formal education system within the College of Agriculture and Natural Resources, College Park and the University of Maryland Eastern Shore. UME educational programs and problem-solving assistance are available to citizens and are based on the research and experience of land grant universities such as the University of Maryland, College Park to teach citizens.

Vegetative environmental buffer (VEB) --

A multiple row planting of suitable trees and shrubs around poultry houses and any other structures. There are four objectives: (1) to foster good neighbor relations, (2) to maximize environmental stewardship, (3) to support biosecurity on the farm, and (4) to enhance the aesthetic value of the property.

Ventilation – A system that delivers fresh air throughout the chicken house and in doing so, removes excess heat, moisture, and undesirable gases that are present.

Washdown – Most often occurs after a total clean out. A pressure washer is used to clean and disinfect the chicken house.

Windrowing – A process of composting litter between flocks to extend the life of bedding material. This is a relatively new practice on Delmarva, also known as in-house composting, litter reconditioning, composting, pasteurization or recycling.

Table 1.

Farm Broiler Production Fixed investment costs include housing and equipment

FOUR HOUSES 60' X 600'

SQUARE FEET OF ALL 4 HOUSES	144,000	FLOCKS/YEAR	6.8
SQUARE FEET PER HOUSE	36,000	BIRD DENSITY	0.8
NUMBER OF BIRDS/HOUSE	45,000	BIRDS/YEAR	1,224,000
NUMBER OF BIRDS/FLOCK	180,000	NUMBER OF HOUSES	4

FIXED INVESTMENT	UNIT	QUANTITY	PRICE	TOTAL	DOLLAR/SQFT
HOUSE & EQUIPMENT	HOUSE	4	\$332,000	\$1,328,000	\$9.22
GENERATOR, WIRING, & ALARM	HOUSE	4	\$8,400	\$33,600	\$0.23
GENERATOR & SWITCH	FARM	1	\$26,500	\$26,500	\$0.18
SITE PREPARATION****	HOUSE	4	\$25,000	\$100,000	\$0.69
TRACTOR LOADER BLADE & MOWER	FARM	1	\$35,000	\$35,000	\$0.24
MANURE STORAGE & COMPOSTER**	FARM	1	\$2,500	\$2,500	\$0.02
VEGETATIVE SHELTERBELT**	FARM	1	\$1,300	\$1,300	\$0.01
WELL AND WATER SYSTEM	HOUSE	4	\$5,500	\$22,000	\$0.15
STONE	FARM	1	\$28,000	\$28,000	\$0.19
TOTAL INVESTMENT				\$1,576,900	\$10.93

**Assumes cost share is obtained from NRCS, etc.

***Cost will depend on soil types.

****Does not include land investment cost.

FOUR HOUSES 60' X 600'

SQUARE FEET OF ALL FOUR HOUSES	144,000	FLOCKS/YEAR	6.8
SQUARE FEET EACH HOUSE	36,000	BIRDS/YEAR	1,224,000
NUMBER OF BIRDS/HOUSE	45,000	BIRD DENSITY	.8
NUMBER OF BIRDS/FLOCK	180,000	NO. OF HOUSES	4

ITEM	UNIT	QUANTITY	PRICE	TOTAL	\$/SQFT
CASH RECEIPTS					
GROWER PAYMENTS*	PER SQUARE FOOT	144,000	\$0.33	\$323,136	\$2.24
LITTER	TONS	360	\$12	\$4,320	\$0.03
GROSS INCOME (TOTAL CASH RECEIPTS)				\$327,456	\$2.27
CASH (Variable) EXPENSES					
ELECTRICITY	FLOCK	6.8	\$5,294	\$36,000	\$0.25
TELEPHONE/ALARM		1	\$1,200	\$1,200	\$0.01
SUPPLIES AND MISCELLANEOUS	HOUSE	4	\$1,250	\$5,000	\$0.03
BUILDING & EQUIPMENT REPAIRS	HOUSE	4	\$1,250	\$5,000	\$0.03
CRUST OUT/WINDROW/ CLEANOUT	FLOCK	6.8	\$1,500	\$10,200	\$0.07
PROPERTY TAXES	YEAR	1	\$9,000	\$9,000	\$0.06
INSURANCE	YEAR	1	\$7,200	\$7,200	\$0.05
TOTAL CASH (Variable) EXPENSES				\$73,600	\$0.51
FIXED EXPENSES					
MORTGAGE PAYMENT	15 YEARS	QUARTERLY	5.5%	\$151,627	\$1.05
EQUIPMENT PAYMENT - TRACTOR, LOADER, BLADE, MOWER	6 YEARS	QUARTERLY	5%	\$7,955	\$0.06
TOTAL LOAN PAYMENTS (FIXED COSTS)		YEARLY		\$159,582	\$1.11
NET INCOME		YEARLY		\$94,274	0.65
NET INCOME		PER HOUSE		\$23,568.53	\$0.16

*Guaranteed payment from integrator

Resources

University of Maryland Extension Poultry web site: <http://extension.umd.edu/poultry>

University of Maryland Agricultural Nutrient Management
Program: <http://extension.umd.edu/anmp>

Delmarva Poultry Industry, Inc.: <http://www.dpichicken.org>

University of Maryland, College of Agriculture and Natural Resources: <http://agmr.umd.edu/>

Maryland Department of Agriculture: <http://www.mda.state.md.us/>

University of MD Extension Publications: <http://extension.umd.edu/learn/pubs>

Maryland Department of Agriculture offers a Manure Matching Service call 1-877-7MANURE or on the web at: http://mda.maryland.gov/resource_conservation/Pages/manure_management.aspx

Natural Resources Conservation Service: www.nrcs.usda.gov/

Maryland Department of Environment website: <http://www.mde.state.md.us/>

Environmental Protection Agency (EPA): <http://www.epa.gov/>

U.S. Poultry and Egg Association biosecurity training program:
http://www.uspoultry.org/animal_husbandry/biosecurity.cfm

Vegetative environmental buffer program: <http://www.dpichicken.org>

MDA Nutrient Management Consultant List:
http://mda.maryland.gov/resource_conservation/Pages/Certified_Consultants.aspx

MDA Poultry Registration: <http://mda.maryland.gov/animalHealth/Pages/poultry.aspx>

USDA's National Agricultural Statistics Service: <https://www.nass.usda.gov/>

References

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This publication, *Broiler Production Management for Potential and Existing Growers* (EB-431), is a series of publications of the University of Maryland Extension and the [Maryland Poultry](#). The information presented has met UME peer review standards, including internal and external technical review. For more information on related publications and programs, visit: <http://extension.umd.edu/poultry>. Please visit <http://extension.umd.edu/> to find out more about Extension programs in Maryland.

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