ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Eggs

Are there opportunities to expand egg production in Vermont? Can Vermont achieve egg self-sufficiency? Which came first, the chicken or the egg?

From Egyptian records documenting the use of eggs as a binding agent for sauces, to Roman recipes for egg custard sprinkled with pepper and *hard-boiled eggs with pine-nut sauce*, to the present day where chefs like *Wiley Dufresne* stretch the molecular boundaries of eggs with *cubed fried hollandaise sauce*, humans have long enjoyed the culinary delights of eggs.[1]

Egg production throughout history remained relatively unchanged until the middle of the 20th century. For example, up until the 1940s it was common for farmers and families in the United States to have small flocks of chickens roaming fields and backyards, many of which were managed by women who used egg sales as a source of "pin money."[2] Two key factors triggered the standardization and subsequent consolidation of the egg production industry in the 1950s and 1960s: significant innovation in food processing and manufacturing that started at the turn of the century, and changes in husbandry practices including the adoption of indoor caged housing.[3]

Management has shifted from raising small, free roaming flocks outdoors to housing large flocks indoors where feeding, egg collection, washing, and packaging could be efficiently controlled by new automated technologies. With production shifting to larger, centralized farms, an impetus to integrate other aspects of the production cycle around these facilities emerged. Rapid vertical consolidation soon followed.[4] For example, only 2% of table eggs were produced under production contracts (i.e., the farmer does not own the hens, feed or eggs, but is rather paid for supplying the building and labor) or vertically integrated operations in 1955. **By 1977 that number had already increased to 81%, and by 2002 more than 90% of eggs were produced under contracts or in vertically integrated operations.[5] To date, 179 egg producing companies with flocks of 75,000 laying hens or more manage approximately 95% of all the layers in the United States.[6]**

Farmer with baskets of eggs, date unknown.

PHOTO CREDIT: UVM Special Collections

The pronounced loss of small flock egg producers that has occurred nationally due to consolidation of the industry is clearly evident in Vermont: Vermont went from having 4,448 egg producing farms in 1950 to 839 in 2002, losing 2,677 egg farms alone in a fourteen year period between 1950 and 1964.[7] **The significant decline of egg producing farms in Vermont can be stated simply: eggs from elsewhere became too cheap to compete with.**

Over the last two decades trends have emerged that indicate a gradual increase in the number of small and even some mid-sized laying flocks. Coupled with increasing consumer demand for locally and humanely raised food products, conditions are right in Vermont for more medium sized flocks to emerge.

GETTING TO 2020

Goals 7 and 13 of the F2P Strategic Plan focus on increasing food production, including egg production, for local, regional, national, and even international markets.

Goal 7: Local food production—and sales of local food—for all types of markets will increase.

Goal 13: Local food will be available at all Vermont market outlets and increasingly available at regional, national, and international market outlets.

PHOTO CREDIT: UVM Special Collections

Vermont free range chickens with farmer, date unknown.

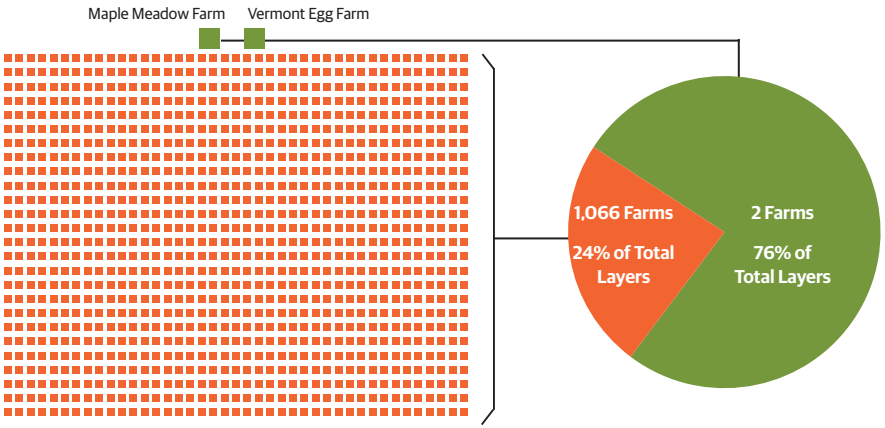
CURRENT CONDITIONS

According to the 2007 Census of Agriculture, Vermont had 1,068 farms managing an inventory of 223,605 laying birds on December 31, 2007. The *National Agricultural Statistics Service* (NASS) reports that Vermont averaged 206,000 layers from December 1, 2006 through November 30, 2007 and that these birds produced approximately 59,147,000 million eggs (i.e., each bird averaged 283 eggs in 2007).[8] **The management of laying flocks in Vermont is highly skewed: 98% of reporting farms managed flocks that range from 1 to 399 birds, but these farms only managed about 13% of total layers in the state. In contrast, Vermont has two egg producing farms (0.2% of reporting farms) with flocks of between 50,000 and 99,000 birds that managed 76% of total layers in the state (Figure 3.3.1).** One of these farms, *Maple Meadow Farm* in Salisbury, is Vermont owned, and has a total flock size of 71,000 layers (65,000 caged layers and 6,000 cage-free). The other, *Vermont Egg Farm* in Highgate Center, has nearly 100,000 layers, but does not distribute in local markets and sells its eggs primarily to Canada.[9]

Egg production over the last 60 years in Vermont has mirrored national trends: there has been a "hollowing out of the middle"—a loss of medium sized egg farms. In 1978, the earliest year that the Census of Agriculture categorized egg farms by flock size, Vermont had 30 farms with flocks between 399 to 50,000 birds. Sixteen had flocks of 400 to 3,199 birds, five had flocks of 3,200 to 9,999 birds, four had flocks of 10,000 to 19,999 birds, and five had flocks of 20,000 to 49,999 birds. By 2007, Vermont only had 14 farms that managed flocks larger than 399 birds and smaller than 50,000 birds. Thirteen of these farms, about 93% of mid-sized producers, were managing flocks of 400 to 3,199 birds, with the remaining farm managing a flock of 10,000 to 19,999 birds (Figure 3.3.2).

Trends over the last two decades indicate, however, an increase in the number of small and even some mid-sized laying flocks. For example, **from 1987 to 2007, farms with flocks of between 1 and 99 birds increased 63%, from 610 farms to 993 farms. Over the same period, flocks of 100 to 399 birds increased 228%, from 18 farms to 59 farms. Though Vermont has seen an overall decline in mid-sized egg farms, farms with flock sizes of 400 to 3,199 birds increased from 1992 to 2007 by 550%, from 2 farms to 13 farms.**

Figure 3.3.1: Inventory of Vermont Egg Farms, 2007

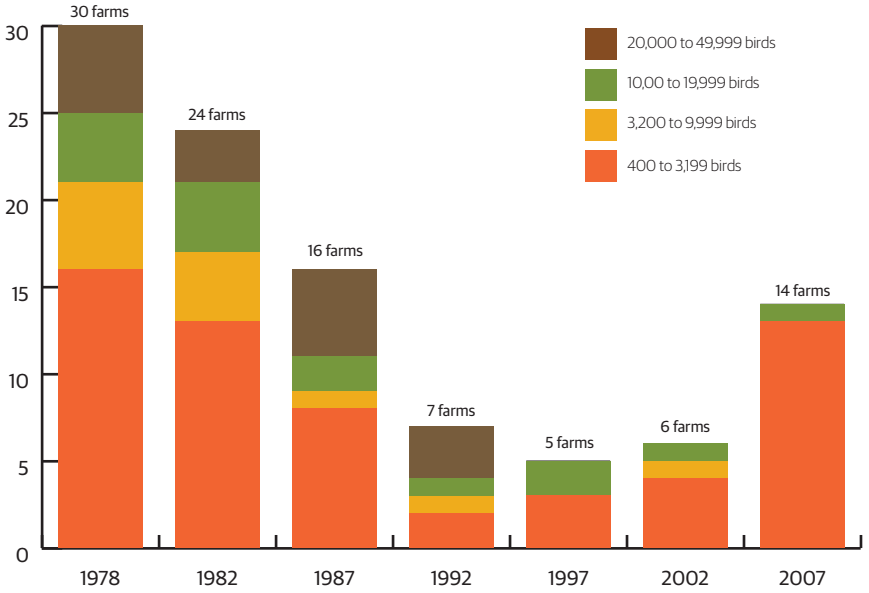


Source: USDA Census of Agriculture, 2007, http://www.agcensus.usda.gov/Publications/2007/index.php.

The lack of growth beyond the 400 to 3,199 flock size can in part be explained by the reluctance of farmers to trigger inspection regulations that fall under the *USDA Shell Egg Program*. Under the USDA Shell Egg Program, which is administered in Vermont by the *Vermont Agency of Agriculture Food and Markets Consumer Protection Division*, quarterly inspections are undertaken of hens and egg-grading facilities for cleanliness, washing and grading procedures, and packaging procedures to ensure consistency of egg quality and to safeguard public health. The program regulates processing and distribution to prevent the movement or sale of eggs that are misbranded, or otherwise in violation of the Egg Products Inspection Act.

Farms of 3,000 layers or more are required to register with the USDA under this program. Eric Rozendaal, owner of *Rockville Market Farm and Eric's Eggs*, reported that when deciding to scale up from his starting flock of 500 layers, he was looking for a flock size that would justify investment in egg-washing equipment but would fall under the 3,000 bird regulatory trigger of the Shell Egg Program.[10] Vermont has only 3 farms registered under the program: (1) the *Vermont Egg Farm* (2) *Maple Meadow Farm* and (3) *Mansfield Valley Poultry* which has no layers but rather repacks eggs purchased from other producers. Though some farmers may view the regulation as something to be avoided, Jackie and George Devoid of *Maple Meadow Farm* in Salisbury view the federal surveillance program as critical to their success because several of their clients require this level of inspection.[11]

Figure 3.3.2: Mid-Sized Egg Farms, 1978-2007



Source: USDA Census of Agriculture, multiple years, www.agcensus.usda.gov.

A number of factors may be contributing to the incremental growth of small (i.e., 1 to 399 bird flocks) and mid-sized flocks in the 400 to 3,199 bird range. The growth in direct marketing outlets like farmers' markets and CSAs has given smaller producers greater access to consumers with a willingness to pay price premiums for local food products, especially in Vermont where per capita direct sales are the highest in the country.[12] As a result, smaller farms can quickly respond to consumer demand and diversify their operations by, for example, adding a modest number of layers without having to compete with high volume low-margin national producers in larger grocery stores.

As the consumer base of smaller farms selling through direct markets increases, farmers who already have small flocks are able to expand their laying flock with relatively low risk and additional cost (i.e., up to the point where no major infrastructure is needed).

Meeting the Demand?

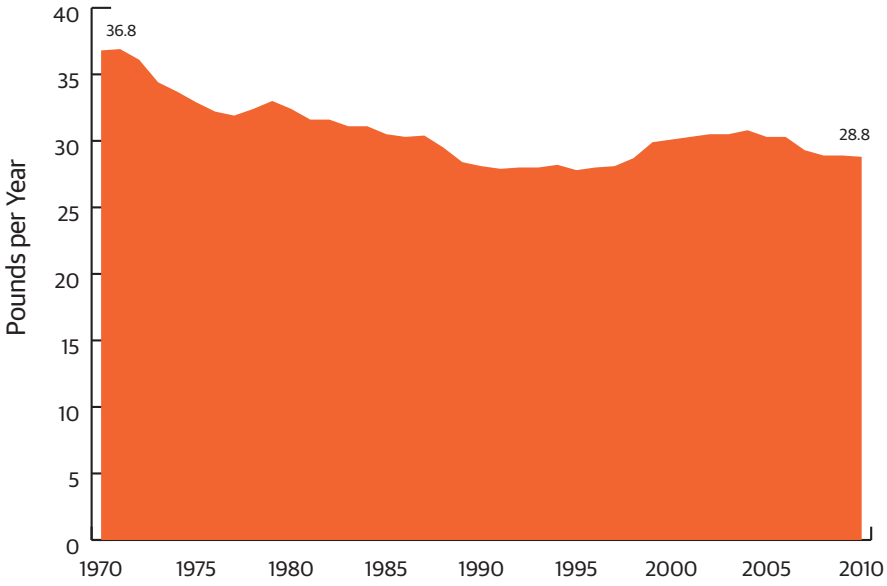
Many Vermonters are interested in whether we can feed ourselves with local food production. Unfortunately, no comprehensive data exist to indicate exactly how much and what type of food—including eggs—is currently being consumed by Vermonters. While we do not know how much of the maple syrup produced in Vermont is consumed in Vermont, throughout the F2P Strategic Plan we use the *food availability per capita estimates* of the *USDA Economic Research Service* and the *MyPlate dietary guidelines* of the USDA to contextualize current Vermont production.

Food availability per capita is commonly used as a proxy for food consumption, even though it does not measure actual consumption. The ERS calculates food availability per capita by adding total annual national production, imports, and beginning stocks of a particular commodity and then subtracting exports, ending stocks, and nonfood uses. This number is then divided by population estimates for the area of interest to arrive at per capita estimates of available food for any particular year. The ERS also attempts to account for food losses, from farms to retailers to consumers (e.g., spoilage and waste). Across the F2P Strategic Plan we use the **consumer weight** to reflect the state of a product at the time of purchase.

The per capita availability of eggs decreased over 21% from 1970 (36.8 pounds) to 2010 (28.8 pounds), likely due to concern about cholesterol and cardiovascular disease. Depending on the assumptions used, Vermont would need to roughly increase its laying inventory and production by 2.5 to 4.5 times current levels in order to reach per capita availability numbers. Putting this into perspective, **if the production gap was solely met by farms with 2,000 bird flocks, Vermont would need to add an additional 168 to 220 farms** (assumes each bird conservatively lays 260 eggs per year).

The dietary guidelines of the USDA provide another lens for looking at this question. The USDA's MyPlate program provides dietary guidelines by age and gender. In *Chapter 3, Section 1: Understanding Consumer Demand*, we use two age categories—20 to 49 and over 50—for men and women to account for the needs of about 76% of Vermont's population (i.e., 475,486 people). The MyPlate dietary guidelines for protein for females in these age categories ranges from 5.0 to 5.5 ounces of protein per day, or 114 to 125 pounds per year. The MyPlate dietary guidelines for males in these age

Figure 3.3.3: U.S. Per Capita Availability of Eggs, 1970-2010



Source: USDA ERS, *Food Availability (Per Capita) Data System*.

categories ranges from 5.5 to 6.5 ounces of protein per day, or 125 to 148 pounds per year. With 475,486 men and women over 20 in Vermont, 59,116,677 pounds of protein would be required to meet the MyPlate dietary guidelines (Table 3.3.2). We estimate that egg production equals somewhere between 23% to 48% of the amount of available protein from animal sources produced in Vermont—the second highest amount after beef. Protein available from egg production alone is estimated at 12% (7.3 million pounds) of protein required to match MyPlate dietary guidelines. **If all eggs produced in Vermont were consumed in Vermont, then about 11.8 pounds would be available for each person—equal to 8% to 10% of the protein needs of adult women and men. Of course, not all of the eggs produced in Vermont stay in Vermont, many people do not eat eggs, and people should not get all of their protein just from eggs. Nevertheless, there is a sizable protein gap that could partially be bridged with expanded local egg production.**

	U.S. per capita availability (consumer weight adjusted for loss) (2007)	Amount required if Vermont matched per capita availability	How much does Vermont produce? (2007)	Vermont per capita availability
	Pounds	Pounds	Pounds	Pounds
Total Protein (includes meat)	**221.2**	**138,413,909**	**>7,375,000**	**>11.8**
Selected protein	**29.3**	**≈18,334,211**	**≈7,375,000**	**≈11.8**
Eggs	≈29.3 or 19.5 dozen eggs	≈18,334,211	≈7,375,000 7,512,820	≈11.8 or 7.9 dozen eggs
USDA MyPlate dietary guidelines	**Annual recommendations**	**Amount required if Vermont matched guidelines**	**How much does Vermont produce? (2011)**	**Surplus or deficit?**
	Pounds	Pounds	Pounds	Pounds
Protein (includes meat and eggs)				
Males (ages 20 - 49)	137 to 148	16,940,779	≈15,487,509 to 26,081,325 (includes 7,375,000 pounds of eggs)	≈33,035,352 to 43,629,168 deficit
Males (ages 50+)	125	13,876,969		
Females (ages 20 - 49)	114 to 125	14,283,427		
Females (ages 50+)	114	14,015,502		
	Subtotal	**59,116,677**	**≈12,722,400**	**≈8,625,409 deficit**

Institutional Markets and Manufacturing

One important impediment, beyond scaling up production, for Vermont egg producers looking to supply processors, retailers, and large institutional buyers is that they tend to use what is commonly referred to as "breakers", which are liquefied pasteurized eggs, rather than whole uncracked eggs. Roughly 30% of annual egg production in the United States is consumed as breaker eggs.[13]

Vermont producers would need egg processing and pasteurization machinery to supply larger processors, retailers, and institutions with breakers. Egg processing machinery is designed to handle very large quantities of eggs per hour. Even smaller start-up processing machinery is capable of handling volumes that would require many small producers to aggregate their supply to justify equipment capitalization and operational costs. For example, **a small egg pasteurizer can handle approximately 250 dozen eggs *per hour*. A small producer with a flock of about 1,600 layers, like *Jericho Settlers Farm*, produces about 100 dozen eggs *per day*. A facility capable of pasteurizing 250 dozen eggs per hour, operating for 8 hours each day, would need roughly 20 farms at the 1,600 layer size supplying it with their total daily production.** Beyond the challenge of reaching supply levels for even small-scale processing needs, further equipment and logistical coordination would be required to aggregate and haul supply from many decentralized small-scale

egg producers. Several years ago, Jackie and George Devoid of *Maple Meadow Farm* developed a proposal to break and pasteurize eggs for use by a major Vermont ice cream manufacturer. They were quickly discouraged when they calculated that the expense of the equipment and building would exceed $2 million.

Though supplying pasteurized liquid eggs to institutions presents capital intensive processing and manufacturing challenges, data from the *NOFA Vermont/VT-FEED study Scaling Up Vermont's Local Food Production, Distribution, and Marketing* suggests that there is still an institutional market demand that can be met by Vermont egg producers without significant capital investments for processing equipment. The study highlights the important fact that institutions in Vermont still have a considerable demand for unpasteurized shell eggs. For example, 81% of responding institutions surveyed (152 out of 188) use fresh, whole, unpasteurized eggs. Sixty-two percent (62%; 117) of the responding institutions indicated they would like to source eggs locally. Total expenditures on eggs amongst the 188 institutions were $345,000, with $90,991 (26%) spent on local eggs. The difference between total expenditures and local expenditures represents what the study calls an opportunity gap of $254,009 for local egg producers. The opportunity gap for these 188 institutions equals about 7% of Vermont egg producers' total sales in 2010.[14] These are all conservative figures, representing only the demand and expenditures for 188 out of 541 responding institutions. In this respect, the study gives producers a glimpse of total institutional demand, while identifying interested institutional markets that can be approached now.

One challenge facing producers who currently utilize direct or specialty markets and are looking to sell shell eggs to institutional markets is that the price per dozen received from institutions is likely well below prices they receive in direct and specialty markets. Based on the *NOFA Vermont/VT-FEED* study, responding institutions purchased 78,983 dozen locally sourced eggs for $90,991, which comes out to about $1.15 per dozen. This price is well below the average price of $3.88 for conventional eggs sold at farmer's markets revealed in *NOFA Vermont's 2011 price comparison study*. Eric Rozendaal has described the demand for locally produced eggs as a "bottomless pit," so there is still a strong incentive for producers to continue to seek out direct market sales to a point of saturation before considering expanding into the institutional market. However, selling through a devoted distributor reduces marketing and transaction costs that may make institutional markets desirable for some producers in the near term or in combination with direct market sales.

Animal Welfare

Free range eggs.

PHOTO CREDIT: John Churchman

Coinciding with the emergence of direct marketing has been increasing consumer demand for organic and humanely raised animal products. **Organic markets in general have been steadily increasing over the past decade, and organic egg sales from 2000 to 2005 averaged a growth rate of 19 percent.**[15] Campaigns calling for more humane treatment of livestock from animal rights groups, such as bringing attention to the treatment of birds housed in small battery cages in large confinement facilities, have helped to increase consumer purchases of humanely raised animal products. Health concerns about centralized conventional egg production have also been triggered by the 2010 nationwide salmonella outbreak that originated from just two Iowa egg farms.[16]

In the United States, animal treatment standards are currently left to individual states, though a surprising agreement between the *Humane Society of the United States* and the *United Egg Producers* emerged in 2011 that seeks to phase out battery cages and establish federal labeling standards. To date, the agreement has not been able to gain traction in Congress.[17] Two states, California and Michigan, have passed laws that gradually phase-in battery cage bans, and one other—Ohio—has placed a moratorium on the construction of new cage egg production facilities. The European Union instituted a ban on battery cages in 2012, and many interested stakeholders are observing the outcome of the ban closely to see how it effects egg prices and supply.

Despite the lack of federal standards, large food processors and retailers, including *Ben & Jerry's* and Burger King, have begun to respond to consumer demand for humanely sourced eggs by announcing cage-free policies that will be phased in over

time. One constraint on faster implementation is a lack of supply of cage-free eggs. Nationally, conventional egg producers have been slow to add cage-free production due to implementation costs and uncertainty about the overall demand trend.[18] *Maple Meadows Farms*, the largest Vermont owned egg farm in the state, however, added 6,000 cage-free layers in 2006 to respond to growing demand for cage-free eggs. Additionally, most Vermont producers—by virtue of managing small flocks—raise cage-free birds, but production levels are typically not high enough to consistently meet large processor and retailer demand. Some mid-size producers, such as *Savage Gardens* of North Hero, which has a flock of 2,000 birds, have established retail accounts of varying size. *Savage Gardens*, for instance, delivers to area restaurants such as Wally's Place and has an account with Hannaford's in Williston. Producers with flocks of this size, producing about 100 to 120 dozen eggs per day, appear capable of supplying retail outlets while still selling through direct markets.

The demand for cage-free eggs will only grow as larger processors and retailers continue to phase out battery-cage sourced eggs, which may offer a long-term market opportunity for Vermont egg producers who already have experience with cage-free management systems.

What are Battery Cages?

Battery cages are wire-cage housing units, lined in long stacked rows, that are about the size of a filing cabinet drawer. They were developed to integrate with automated feeding and egg collection equipment, and to decrease the transmission of soilborne parasites.

Each cage houses 8 to 10 birds, giving each bird on average less space than a standard 8.5 x 11 inch piece of paper. Battery cages prevent hens from performing natural behaviors such as nesting, perching, and dustbathing. With an average wingspan of 30-32 inches, laying hens in battery cages cannot fully spread their wings.

☼ Climate Change Impacts on Egg Production

The *USDA* and the *U.S. Global Change Research Program* indicate that climate change will produce detrimental effects on most crops, livestock, and ecosystems that will vary somewhat by region in the century ahead. Crop sector impacts from weather are likely to be greatest in the Midwest, and these impacts will likely expand due to damage from crop pests. Decreased yields in the major corn and soybean supplying region of the country will, of course, have ripple effects, including impacting the cost and availability of animal feed in Vermont.

Livestock production systems are vulnerable to temperature stresses, rapidly changing weather conditions, and exposure to different diseases and parasites. The direct effect on laying flocks, particularly those in pasture based systems, may include lowered feed efficiency, reduced forage productivity, costs associated with modifying housing to reduce thermal stress, and costs associatied with increasing the supply of drinking water. Temperature stresses can be mitigated for animals raised indoors but hotter summer temperatures may require new thermal environment control systems and the cost and availability of animal feed will likely be a problem in the years ahead—an issue that already has a significant impact on the organic egg sector. Many diversified producers are interested in adding pasture-raised egg production to their farms. It is unclear how temperature stresses will impact the expansion of pasture based egg production in Vermont, but the USDA states that the negative effects of hotter summers will likely outweigh the benefits of warmer winters. More rain in the Northeast and a longer growing season may lead to an expansion of forage production in Vermont, but increased concentrations of carbon dioxide in the atmosphere effects plant nitrogen and protein content, impacting the quality of the forage.[19]

ANALYSIS

Egg Market Development Needs

Marketing and Public Outreach Strategies

In *Chapter 3, Section 1: Understanding Consumer Demand* we recommend viewing food purchases as a set of behaviors that move along an adoption curve—from unsure to influenced, from influenced to proactive, and from proactive to committed—and that vary by combinations of **attitudinal factors** (e.g., values); **socio-demographic factors** (e.g., where a person grew up); **habits** (e.g., brand loyalty); **personal, household, and organizational capabilities**; and **contextual factors** (e.g., nutrition environments). For example, research has revealed consumers are willing to pay for price premiums for non-caged and alternatively raised eggs, but there is still inconsistency between stated preferences and actual purchasing behavior.[20] In part, this can be explained by a lack of awareness regarding the different types of management practices and the overall lack of awareness regarding the prevalence of battery cage management. **According to one study, only 37% of consumers believe that eggs are produced in conventional cages, when the actual figure is around 95%.**[21]

Increasing purchases for locally produced eggs will require better marketing and consumer education about production systems, production costs—which are higher in alternative systems—and bird housing conditions. The task of differentiating eggs in retail environments has become especially difficult over the years with the proliferation of labeling targeted at consumers concerned with animal welfare, such as "naturally raised," "hormone-free," "cage-free," and "free range." Research by psychologists has revealed that consumers can be debilitated by too much choice. If the effort needed to acquire and adequately process information in order to make an optimal decision is too great, the consumer will either not make a decision at all or resort to a default decision.[22] In the face of too many choices, it is reasonable that consumers select the option they are most familiar with because it is the choice that requires the least amount of energy. In the case of eggs, the phenomenon is compounded by the fact that the familiar choice is also the cheapest choice.

Producers themselves can improve consumer capacity by clarifying management practices and clearly differentiating their product for consumers through their marketing materials. Eric Rozendaal has said that one of the major reasons for the popularity of his eggs comes down to having a unique and attractive label. Rozendaal had a local artist create a whimsical illustration evoking his chickens in a field amongst sunflowers, along with a brief description of how the flock is raised on pasture for the majority of the year and kept in greenhouses during the winter months. In this way, Rozendaal creates a level of transparency and comfort for the consumer, and encourages them to learn more by visiting his website. *Jericho Settlers Farm* also uses labeling to differentiate their eggs, emphasizing that the flock summers on pasture and winters in the greenhouse. *Jericho Settlers Farm* also highlights its commitment to renewable energy by calling the eggs "Settlers Solar Eggs," a reference to the fact that the farm produces electricity from solar power. In each instance, the farms are providing a tangible image of the conditions their flocks are raised, using simple language Vermonters can easily identify with.

What's in a Label?

Confused by the different labels on egg cartons? A brief rundown of what each label means:

Cage Free: Hens that are not kept in battery cages, have continuous access to food and water, and have sufficient space to express natural behaviors. They do not necessarily have access to the outdoors.

Free Range: Along with meeting cage free standards, free range hens must have continuous access to the outdoors unless there is a health risk. There are no requirements, however, regarding the conditions of the outdoor area (a screened concrete walkway could qualify).

Organic: Birds are cage free with outdoor access (though access is loosely defined). They cannot be given antibiotics, and feed must grown without genetically engineered seeds, synthetic pesticides or fertilizers.

Pasture Raised: Not a USDA regulated term, but implies that hens receive a portion of their diet from freely foraging on plants and bugs in pasture.

Humanely Raised: There is no standard USDA definition for "humanely raised". Three primary labels exist. **"Animal welfare approved"** means that flocks are no larger than 500 birds, spend all their time on pesticide free pasture, and do not have their beaks trimmed. **"Certified humane raised and handled"** and **"American humane certified"** are similar. Hens are kept cage free, perches and nesting boxes are provided, forced molting is prohibited and hen density is lower than battery cage facilities.

Egg carton labels for Rockville Market Farm and Jericho Settlers Farm.

If excess choice makes decisions difficult for consumers because of a need for better information, then providing information at the point of sale can also play a part in getting consumers to purchase more local eggs. While producers can play their part through on-carton marketing, so too can retailers, particularly small and medium sized independent retail outlets that emphasize local selection, by providing simple information displays. In doing so, they can change the context of the consumer nutrition environment (*See Chapter 3, Section 1: Understanding Consumer Demand*)

Direct consumer education about management systems, animal treatment, and production costs can occur at multiple leverage points. Farm-to-School programs can introduce children to the concepts of humanely raised animals in the classroom, and visit farms that utilize these practices on field trips. Colleges and Universities can include animal ethics classes or discussions in either food system program curriculum or in existing core curriculum classes that deal with ethics. A statewide media campaign with short public services announcements and information displays highlighting humane practices could be conducted to reach the general public and enter the issue more broadly into public discourse (*See Chapter 3, Section 3: Food Production: Livestock* for further information on humane certified marketing and branding).

Technical Assistance and Business Planning Strategies

The recent reappearance of mid-sized egg producers in Vermont has occurred on farms willing to experiment with integrating laying hens into diversified vegetable or livestock production. With the historical loss of medium sized egg farms and *University of Vermont Extension* staff, the new cadre of egg producers has had to rely on personal ingenuity rather than established in-state knowledge networks. The reason for adding layers are numerous. Laying hens not only provides an additional revenue stream for

PHOTO CREDIT: Alan Lankin

Pastured poultry at Green Mountain College's Carridwen Farm.

diversified farms, but also important services like soil fertilization, weed control, and insect control. Eric Rozendaal says that when you consider all of these benefits to the farm, adding layers is a "no brainer." However, Rozendaal remarked that though egg production is fairly simple, there is still a learning curve that would benefit from more direct information sharing between experienced and interested farmers.

For example, Rozendaal gained more knowledge by spending two weeks with an experienced egg producer in Texas than he did in two years of experimenting on his own. Rozendaal also stated that pasture-based egg production in Europe is much more advanced than it is in Vermont. As Rozendaal pointed out, Vermont cheese makers have learned considerably from European artisanal producers. He suggests that the same information exchange could occur between interested Vermont diversified farmers and European farmers with pasture-based egg production. These insights point to the fact that egg production in Vermont could be accelerated by providing other diversified farms, or farms looking to diversify production, with more technical

assistance and field days focused on integrating laying hens into existing management practices.

The Vermont Farm Viability Program (VFVP) can assist diversified growers in developing business plans for egg production. Estimated capital costs for egg production include:

- **Portable housing for pasture management:** Up to ≈$5,000 per mobile unit for units moving flocks of 1,000 birds or more
- **Permanent housing for non-pasture management or winter housing:** depends on existing infrasturcure, but permanent or winter housing can cost up to $15,000 for 2,000 to 2,500 bird mid-size flocks
- **Egg washing equipment for packaging and distribution:** ≈$8,000 for used equipment, starting at ≈$11,000 for new small-scale washers[23]

VFVP can help assess these costs for farmers and assist in identifying the optimal scale of production, both from a revenue perspective and an operational perspective. Some producers, like Rozendaal, have decided to invest in egg washing equipment, while others like Hugo Gervais of *Savage Gardens* have devised efficient hand washing systems that can clean 75 dozen eggs per hour.[24] With more knowledge to draw on now that there is an established group of mid-sized producers, new egg producing farms can better determine, in consultation with a VFVP business advisor, the system that best works for them. VFVP and VAAFM can also consult and inform farmers about the requirements of the USDA Shell Egg Program, as current avoidance of triggering the regulation may be preventing some producers from reaching optimal scale. Another issue that will need to be addressed, and could benefit from additional technical assistance, is what to do with "spent hens"—hens that are no longer laying. Rozendaal identified this as his biggest management challenge for which there are not any good options currently available for mid-sized producers. Meat could be used for soups or stews but, to date, there is no market for this type of meat.

Egg production is a potential route to diversification for dairy farms as well. Much of the infrastructure and land requirements exist on dairy farms to convert wholly or partially to either conventional or organic egg production. Marlin Wadel of Wolcott, who at one time raised heifers, recently built a poultry barn to produce humanely raised organic eggs for *Pete & Gerry's Organic Eggs*.[25] With the organic egg market growing at a healthy rate, opportunities for Vermont producers to enter the market themselves, or to supply companies like Pete and Gerry's, will likely continue. For rotational pasture based dairies, hens rotated into pasture, after cows, will eat parasite larva, providing an additional benefit to the farm beyond just egg production.

The demand for shell eggs in the institutional market is another opportunity for dairy diversification into egg production. The infrastructure and land holdings of dairy farms in the state lends itself well to larger mid-sized egg production that could provide area institutions with a consistent supply of eggs. Because many institutions want to maintain existing purchasing relationships with wholesalers like *Black River Produce*, marketing costs are reduced for new producers selling to institutions through these trusted wholesalers. Additionally, revenue streams are consistent when selling to a dedicated institutional buyer, making it easier to receive financing for capital costs.

Natural Resource, Physical Infrastructure, and Technology Strategies

In 2012, the Vermont Legislature passed the *Universal Recycling bill (Act 148)*, which requires all organic materials to be diverted from landfills by 2020. *The Close the Loop Coalition* has been formed to help ensure that the resource value of food scraps supports the viability and growth of Vermont's food system. The bill is significant for egg production in the state because diverted food scraps can provide enough protein for an estimated 300,000 laying hens.[26]

Karl Hammer of the *Vermont Compost Company* has demonstrated that food scraps are a viable and cost effective feed for laying flocks. Hammer maintains a flock of approximately 1,300 birds, of which about 900 to 950 are active laying hens.[27] No commercial grain is fed to the flock. They feed on the inputs to Karl's composting business and material he terms "rescued community, farm, and forest residuals." As a result, his expenses for housing, manure management, and feed are minimal.

The Close the Loop Coalition has begun identifying critical regions where diverted food scraps can be efficiently hauled and processed. The replicability of Hammer's model will be dependent upon identifying farmers who want food scraps diverted to their farms for agricultural purposes, and ensuring that feed quality and food safety standards are met. By touting the use of food scraps as a feedstock for laying hens, the Close the Loop Coalition hopes to generate interest amongst diversified growers in critical areas to add or expand laying flocks. In this way, the Coalition hopes to make an important contribution to expanding Vermont's egg production.

PHOTO CREDIT: Bill Revill

Poultry in compost pile.

GETTING TO 2020

Although Vermont is not a significant egg producing state, there has been a convergence of developments in the state that have created favorable conditions for expansion in egg production. Strong direct markets, growing demand for organic eggs and humanely raised flocks, interested institutional buyers, and a recycling bill that could provide farmers with an opportunity to raise medium sized flocks with low input costs are all factors that present opportunities for growth. Realizing the potential of these opportunities will require more consumer education, coordinated technical assistance, and knowledge sharing between a growing network of medium sized diversified producers.

Table 3.3.2: Objectives and Strategies for Expanding Egg Production in Vermont

OBJECTIVE	STRATEGY
Research Strategies	
To help Vermont farmers and technical assistance providers adapt to climate change.	Climate change will directly impact Vermont's poultry and egg farmers through 1) feed-grain production, availability, and price; 2) change in pastures and forage crop production and quality; 3) animal health, growth, and reproduction; and 4) disease and pest distributions. Farmers and technical assistance providers (including educational institutions) should begin exploring adaptation strategies.
To study food safety and feed quality of food scraps to create a replicable foodscrap chicken feed model for egg production.	More certainty needs to exist around proper hen management and egg handling in flocks that use food scraps as a feedstock. Research should identify prospective food safety concerns and assist the development of appropriate food safety protocals to ensure the public that eggs produced in this environment are safe to eat, while preemptively reducing the risk of outbreaks that would compromise the viability of the foodscrap model. Hen health and nutritional needs should also be examined and provided to farmers.
Natural Resource, Physical Infrastructure, and Technology Strategies	
To increase local egg production to meet 50% of local demand by 2020.	Encourage the development and scaling-up of poultry laying farms to flocks sizes ranging from 1,000 to 3,000 birds to significantly increase the supply of locally produced eggs.
To increase the number of egg producing farms using diverted foodscraps as a feedstock.	Identify, reach out, and provide technical assistance to farmers that are located in critical compost hauling regions to advance the goals of the Close the Loop Coalition and Act 148.
To develop liquid-egg processing infrastructure to increase market access to institutional buyers.	Conduct an economic feasibility analysis to determine equipment costs and distribution infrastructure needs for a small-scale liquid egg pasteurization facility.
Marketing and Public Outreach Strategies	
To increase the number of local and regional consumers who understand why local, source-verified eggs cost more to produce than conventionally produced eggs, so they are more willing to pay for it.	Conduct a media campaign (including in-store retail advertising) to educate consumers and institutional buyers about the benefits of purchasing, and the costs associated with producing, local, source-verified eggs.
	Hold marketing workshops for producers around brand development to improve product labeling and messaging.
	Create animal welfare curriculum for K-12 schools, emphasizing field trips to farms that use humane practices. Integrate animal ethics courses into college and university core curriculum or food system programs.
Technical Assistance and Business Planning Strategies	
To increase the resources available to provide technical assistance to egg farmers.	Provide specialized scaling-up technical assistance and business planning services for farmers seeking to expand their flock or serve larger markets.
	Increase the number of workshops focused on integrating laying hens into diversified vegetable and livestock operations, connecting experienced egg producers with interested smaller scale egg farmers and those who are just starting out.
To close the opportunity gap and increase shell-egg sales to institutional markets.	Provide matchmaking services to link institutions with local producers, using findings from the *NOFA Vermont/VT-FEED* study to identify regional opportunities.

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ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Eggs

Vermont Sustainable Jobs Fund

farm to plate STRATEGIC PLAN

farm to plate NETWORK

VERMONT FOOD SYSTEM ATLAS

Credits

3.3 Food Production: Eggs was prepared by Jake Claro, Louise Calderwood, and Kit Perkins.

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