



University of Tennessee, Knoxville Trace: Tennessee Research and Creative Exchange

Animals/Livestock

UT Extension Publications

1-3-2012

W284 The Tennessee Dairy Industry and Its Value-Added Opportunities

Jonathan Moss

Kim Jensen

Burton English

Rob Holland

Follow this and additional works at: http://trace.tennessee.edu/utk_agexani

 Part of the [Animal Sciences Commons](#)

Recommended Citation

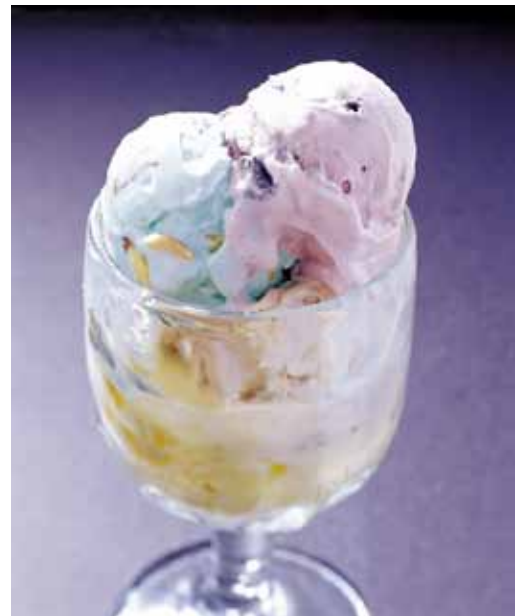
"W284 The Tennessee Dairy Industry and Its Value-Added Opportunities," Jonathan Moss, Kim Jensen, Burton English, and Rob Holland,
W284
, http://trace.tennessee.edu/utk_agexani/108

The publications in this collection represent the historical publishing record of the UT Agricultural Experiment Station and do not necessarily reflect current scientific knowledge or recommendations. Current information about UT Ag Research can be found at the [UT Ag Research website](#).

This Dairy Cattle is brought to you for free and open access by the UT Extension Publications at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Animals/Livestock by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

The Tennessee Dairy Industry and Its Value-Added Opportunities

By Jonathan Moss, Kim Jensen, Burton English and Rob Holland*



The development of this publication was funded in part by the Tennessee Department of Agriculture.

*Graduate Research Assistant and Professors, Department of Agricultural & Resource Economics, University of Tennessee, and Director, University of Tennessee Center for Profitable Agriculture

Contents

Foreword	4
I. Tennessee Dairy Industry Overview	5
Dairy Farms and Milk Production	5
Goat/Sheep Milk Production	7
Costs of Producing Milk	7
Dairy Marketing and Processing	8
Economic Impacts from the Dairy Industry	10
Future Prospects	11
Production and Farm Structure	11
Demand Growth	12
Population Centers and Demographics	12
Consumer Demographics and Preferences	15
Potential Market Outlets	16
<i>Take-Home Messages</i>	17
II. Adding Value through Dairy Products for Tennessee Dairy Farmers	17
Value-Added in the U.S. Dairy Industry	17
Methods for Adding Value	18
Value-Added Considerations	19
Feasibility Study	20
<i>Take-Home Messages</i>	21
III. Milk Labeling in Tennessee	21
Location-Oriented Labeling	22
Pick Tennessee Products	22
Tennessee Farm Fresh	23
Locally Grown	25
Process-Oriented Labeling	25
Natural	25
Raw	26
Grass-Fed	27
non-rBST	28
Farm Practices	29
<i>Take-Home Messages</i>	31
IV. Summary	31
References Used	32

List of Figures

Figure 1. Number of Dairy Cows on Grade A Dairies in Tennessee, by County, 2011.....	3
Figure 2. Tennessee Milk Production, 1990-2009	3
Figure 3. Tennessee Average Milk Production per Cow, 1990-2009.....	3
Figure 4. Tennessee Number of Dairy Cows, 1990-2009.....	4
Figure 5. Number of Dairy Goats/Sheep on Grade A Dairies in Tennessee, by County, 2011	5
Figure 6. Federal Milk Marketing Orders.....	6
Figure 7. Total Dairy Operating Costs, 2009, the U.S. and TN.....	7
Figure 8. Federal Orders Milk Received: Appalachian and Southeast Order.....	8
Figure 9. Percent Class I Utilization: Appalachian and Southeast Orders, 2009	9
Figure 10. Federal Milk Marketing Order Uniform Prices, 2009: Appalachian, Southeast, and All U.S.	9
Figure 11. Tennessee Milk Production and Consumption	10
Figure 12. Dairy Products Manufacturing Facilities in Tennessee, 2010.....	11
Figure 13. Percent of Farms and Head by Herd Size for Grade A Dairies in Tennessee	13
Figure 14. Projected Population Change from 2000-2030, Selected Southeastern States.....	14
Figure 15. 2009 Median Household Income for Five Tennessee Metropolitan Areas.....	16
Figure 16. Number of Farmers’ Markets, by County, 2010.....	19
Figure 17. Number of Specialty Stores/Markets, by County, 2010.....	19
Figure 18. Elements of a Feasibility Study.....	24
Figure 19. Examples of Potential Labels on Milk	25
Figure 20. Pick Tennessee Products Logo	26
Figure 21. The Tennessee Farm Fresh Logo.....	27
Figure 22. “Locally” Grown Regions for the Major Metropolitan Areas in Tennessee	29
Figure 23. The USDA Organic Seal	32

List of Tables

Table 1. Overview of Tennessee Milk Production.....	2
Table 2. Projected Economic Impacts from the Milk Production and Processing in Tennessee, 2010.....	12
Table 3. Population Growth Projections for the Five Metropolitan Areas, 2010-2015, 2015-2020	15
Table 4. Selected Demographics for Five Tennessee Metropolitan Areas	17

Foreword

In 2010, we in the Center for Profitable Agriculture launched an effort to conduct some preliminary analyses and publish information that would be useful for Tennessee dairy farmers related to value-added enterprises, such as packaging milk for sale to consumers and making cheese. Initial funding for this effort was allocated from the Center and supplemented by the Tennessee Department of Agriculture. The coordination of the planned studies and publications was provided through a graduate student assistantship in the UT Agricultural and Resource Economics department. The project was launched in August 2010 through an initial collaboration and planning meeting by the following:

*Mr. Tommy Burch, Food Science and Technology
Dr. Burt English, Agricultural and Resource Economics
Mr. Rob Holland, Center for Profitable Agriculture
Dr. Kim Jensen, Agricultural and Resource Economics
Dr. Alan Mathew, Animal Science
Mr. Jonathan Moss, Agricultural and Resource Economics
Mr. Hal Pepper, Center for Profitable Agriculture
Mr. Dan Strasser, Tennessee Department of Agriculture
Dr. Emmit Rawls, Agricultural and Resource Economics
Mr. Tim Woods, UT Extension*

Three of the overall objectives of the project include:

- (1) Development of a “general overview of adding value for Tennessee dairy farmers”*
- (2) Development of a “summary of the Tennessee dairy industry”*
- (3) Development of a “review of production, marketing and label claims for dairy products”*

These objectives serve as the primary subject matter for this publication. Three independent and stand-alone fact sheets were originally drafted and then later combined under a single cover as published here.

The purpose of this publication is to provide an overview of the dairy industry in Tennessee, identify value-added opportunities and examine some of the most common milk labeling issues for the state. This publication gives a brief background about the state’s dairy industry, information about potential value-added opportunities and requirements to market and sell value-added milk products in Tennessee. The subject matter here serves as initial and introductory reading for farmers first considering a value-added dairy enterprise.

Each dairy farmer has his or her own unique situation, and will need to consider value-added dairy opportunities that best meet individual circumstances and needs. This publication is not intended to answer all the questions involved with considering, evaluating or planning a value-added dairy enterprise. This publication is intended to provide basic and background information regarding the Tennessee dairy industry and to introduce basic concepts of adding value by processing, packaging and marketing.

Appreciation is extended to the following for their contributions in the review process of this publication:

*Ms. Megan Bruch, Center for Profitable Agriculture
Mr. John Campbell, UT Extension
Dr. Clark Garland, Agricultural and Resource Economics
Dr. Ray Humberd, Associate Dean Emeritus, UT Extension
Dr. Peter Krawczel, Animal Science
Dr. Dan McLemore, Professor Emeritus, Agricultural and Resource Economics
Mr. Hal Pepper, Center for Profitable Agriculture
Dr. Emmit Rawls, Agricultural and Resource Economics
Ms. Wanda Russell, UT Institute of Agriculture Marketing and Communications*

We would also like to thank Mr. John Sanford, Tennessee Department of Agriculture, for his assistance with information about licensed dairies in Tennessee. Finally, special recognition is extended to Wanda Russell and Richard Maxey for their dedicated service to the editing, layout and graphic design of this publication.

Rob Holland, Director
Center for Profitable Agriculture

I. Tennessee Dairy Industry Overview

Dairy Farms and Milk Production

As of May 2011, there are 450 Grade A dairies operating in 65 of Tennessee’s counties with 42,340 dairy cows, or about 94 cows per dairy (TDA 2011). This represents a loss of nearly 14,000 cows since 2009 (**Table 1**). The average herd size also decreased from 2009 to 2011; in 2009 the average herd size in Tennessee was 106 (USDA-NASS 2010a).

Table 1. Overview of Tennessee Milk Production		
	2009	Rank Among All States
Number of Dairy Cows	56,000	29
Milk Production Per Cow (pounds)	16,232	41
Total Milk Production (million pounds)	909	30
Average Receipts (\$/ cwt)	\$14.10	22
Total Cash Receipts from Farm Marketings (\$1,000)	\$127,605	31

(USDA-NASS 2010b)

Tennessee’s dairy farms are located primarily in Middle and East Tennessee (**Figure 1**). As of May 2011, the counties with the largest numbers of dairy cows on Grade A dairies are Greene (3,345), McMinn (2,975), Monroe (2,834), Marshall (2,346), Loudon (2,035), Robertson (1,764) and White (1,752) (TDA 2011).

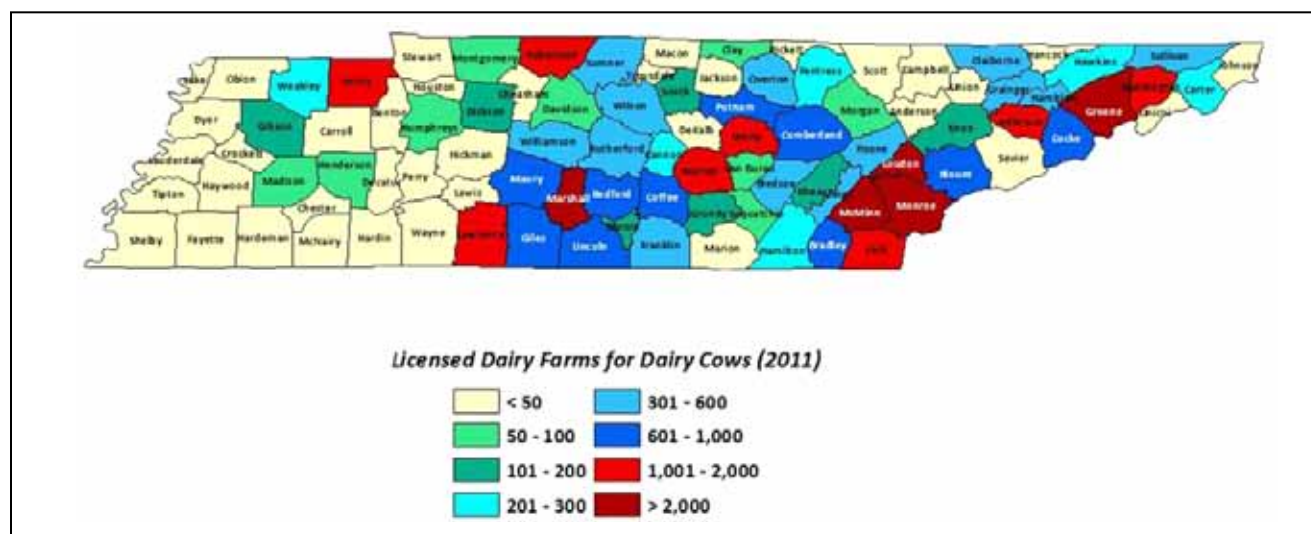


Figure 1. Number of Dairy Cows on Grade A Dairies in Tennessee, by County, 2011 (TDA 2011)

Overall milk production in the state, like much of the Southeast, has been on the decline (**Figure 2**; USDA-NASS 2010b). A key contributing factor to this trend is the decline in the number of dairy farms, with a nearly 50 percent decrease in the number of Grade A licensed dairies in the nine-year span between 2002-2010 (Sanford 2010 and USDA-NASS 2010b). Significant gains in production per cow have been made through technology and improved management practices. While gains have been made in milk production per cow, progressing from 11,825 pounds per year in 1990 to 16,232 in 2009 (**Figure 3**), the state's milk production per cow still falls below the U.S. average of 20,576 pounds per cow per year. Increases in production per cow are not able to offset the declines in numbers of dairy cows in Tennessee (**Figure 4**). Despite these changes, the dairy industry still remains 7th in cash receipts among farm commodities in the state (TDA 2010).

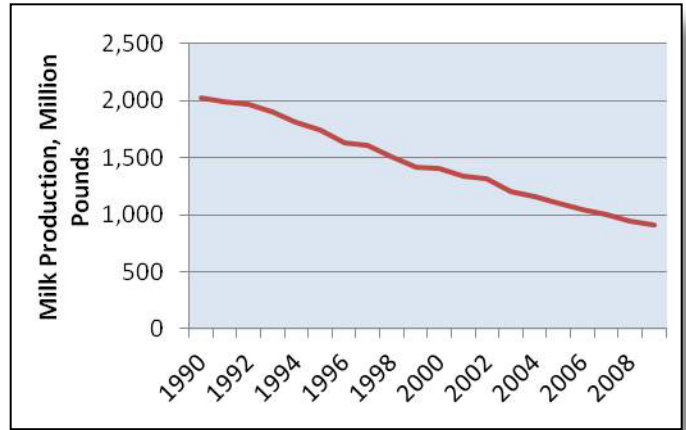


Figure 2. Tennessee Milk Production, 1990-2009

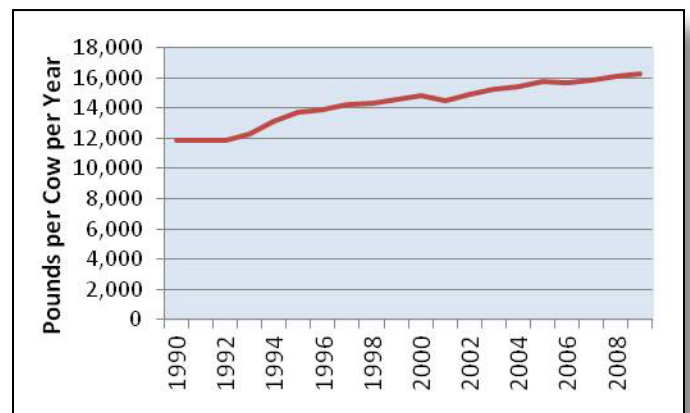


Figure 3. Tennessee Average Milk Production per Cow, 1990-2009

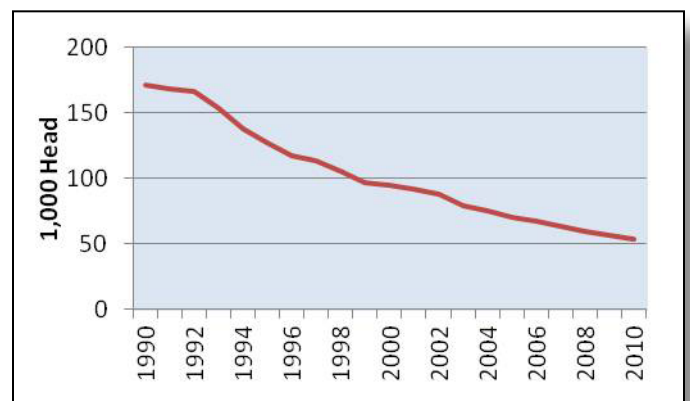


Figure 4. Tennessee Number of Dairy Cows, 1990-2009

Goat/Sheep Milk Production

In addition to milk production from dairy cattle, Tennessee also has goat milk production. As of May 2011, there were three Grade A goat dairies with 115 milk goats (**Figure 5**; TDA 2011). Dairy goats may average 6 to 8 pounds of milk daily during a 10-month lactation. Hence, about 1,800 to 2,400 pounds of milk per year per goat might be expected. The milk generally averages 3.5 percent butterfat (American Dairy Goat Association 2004).

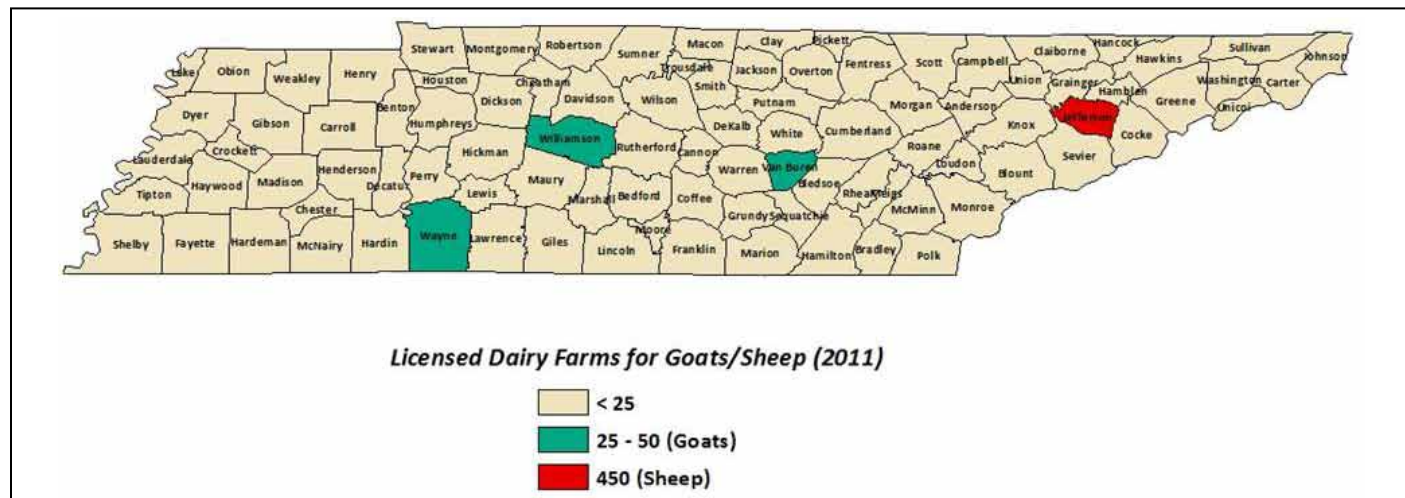


Figure 5. Number of Dairy Goats/Sheep on Grade A Dairies in Tennessee, by County, 2011 (TDA 2011)

In the South Central Region (including Tennessee), based on data from a 2008 goat milk processor survey, there were 17 processors, with about 88 percent selling soft cheese and 47 percent selling hard cheese (USDA-NASS 2008). About 60 percent acquired their milk from within 100 miles of the plant. Specialized dairy sheep breeds produce about 400 to 1,100 pounds of milk per lactation (Thomas 1996). Sheep’s milk is lower in lactose than cow’s milk and therefore may be more digestible for lactose-intolerant individuals. In addition, sheep’s milk is higher in milk solids than goat’s milk; hence, a gallon of sheep’s milk will yield more cheese. Estimates of the number of sheep dairies across the U.S. are from 75 to 100 farms (Agricultural Marketing Resource Center, 2011). **Figure 5** displays the county locations of licensed dairy farms with goats or sheep.

Costs of Producing Milk

In 2009, the total operating costs per hundredweight of cow’s milk in the U.S. was \$14.14. In Tennessee, these total operating costs averaged about \$19.69, about 1.4 times higher than the national average (USDA-ERS 2010a). In comparison with costs, the average uniform price for 2008-2010 in the Appalachian Order was \$17.26 per cwt and \$17.46 per cwt in the Southeast Order (USDA-AMS 2009). Federal Milk Marketing Orders are regions in which producers sell their milk in an orderly, dependable process. Tennessee falls within two Federal Milk Marketing Order Areas, the Southeast and Appalachian (**Figure 6**) (USDA-AMS 2010a). The Southeast Order encompasses West and Middle

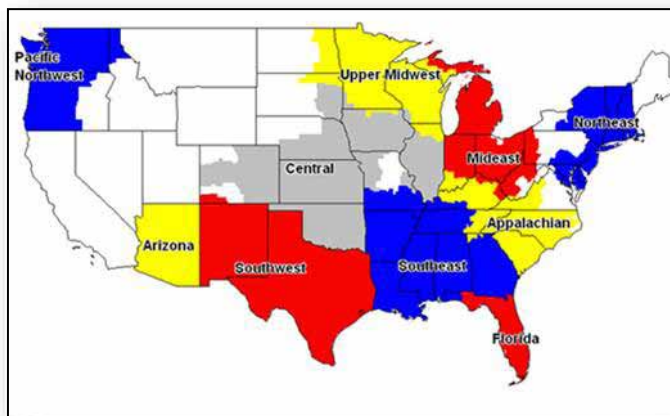


Figure 6. Federal Milk Marketing Orders

Tennessee, while the Appalachian Order includes the eastern part of the state.

On average, Tennessee producers spent 11 percent more on homegrown feed costs, relative to the U.S. average (Figure 7). However, their average expenditure on purchased feeds was 9 percent less than the U.S. average.

Dairy Marketing and Processing

According to the most recent Census of Agriculture (2007 Census), Tennessee sales of milk and other dairy products was \$180.5 million (USDA-NASS 2007). This is an increase of more than \$7.5 million from the 2002 Census of Agriculture value, which was \$173 million (USDA-NASS 2002). Tennessee ranks 29th in the U.S. in terms of dollar value sales of dairy products (USDA-NASS 2007).

In 2009, the utilization of producer milk in Class I was 70 percent in the Appalachian Order and 66 percent in the Southeast Order. The uniform price in the Appalachian Order was \$14.00 per cwt and \$14.23 per cwt in the Southeast Order (USDA-AMS 2009). By comparison, the all-market average for the U.S. was \$12.44.

In Tennessee, as in the Southeast, milk production tends to have a seasonal pattern that is not mirrored by a seasonal pattern in demand. The milk-received data for the Appalachian and Southeast Orders show a distinct seasonal pattern, with the highest amount received in the spring months and the lower amounts received in the late summer through fall months (Figure 8; USDA-AMS 2009).

Sometimes seasonal imbalances between supply and demand are generated. The percent Class I utilization (fluid milk) is at its highest in the fall, when school begins and milk received is at one of its seasonal low points (Figure

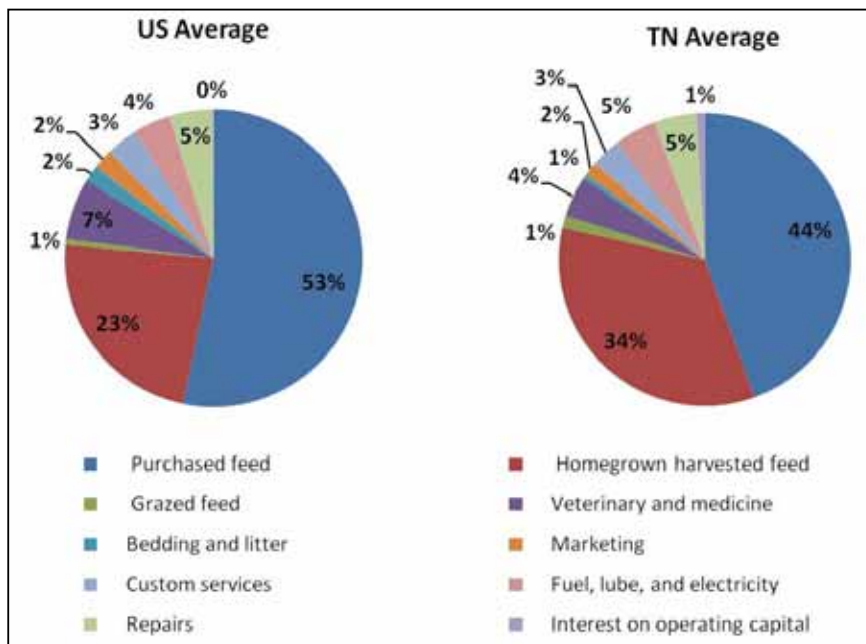


Figure 7. Total Dairy Operating Costs, 2009, the US and TN (USDA-ERS 2010a)

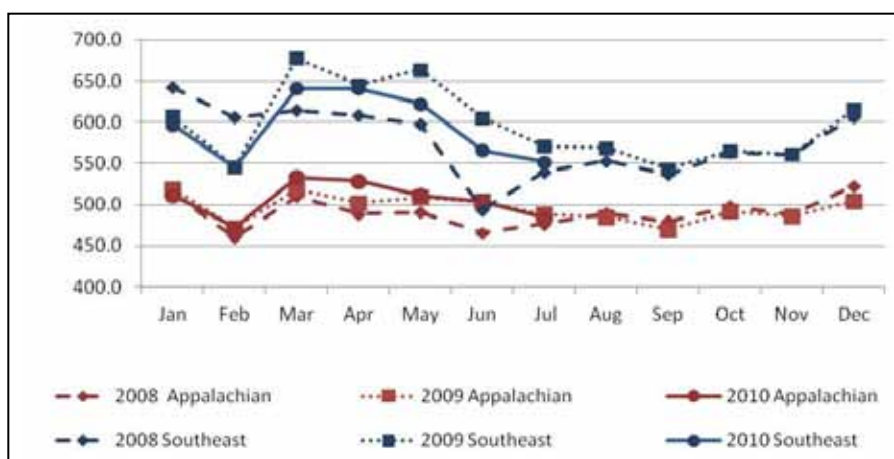


Figure 8. Federal Orders Milk Received: Appalachian and Southeast Order

9). An outcome of these seasonal imbalances is that costs of balancing occur: these are costs from disposing of seasonal surpluses and the seasonal costs of bringing in milk from outside the federal order to local processors when local supplies cannot meet the local demands. Seasonality of supply and demand are reflected in the price patterns for milk, with seasonal lows occurring in spring and price peaks occurring in late fall (Figure 10). Tennessee milk processors tend to ship milk towards the south, especially during seasonal peak demand periods. As this milk is shipped south, milk is often brought in from the Great Lakes and Western regions.

The fluid milk deficit that Tennessee now experiences can be illustrated by graphing production and estimated consumption over time (Figure 11). Estimated milk consumption was found by using the national average per-person consumption of milk and multiplying this value by the Tennessee population. As can be seen from green shaded area of the Figure 11, consumption has outstripped production for the past several years.

Milk marketing cooperatives play a role in Tennessee's dairy industry, as well as nationwide. About 83 percent of the fluid milk marketed in the U.S. takes place through cooperatives (Ling 2007). The share of milk marketed through cooperatives varies by region, but the regional share of milk for the South Central region, which includes Tennessee, was about 89 percent, while the South Atlantic

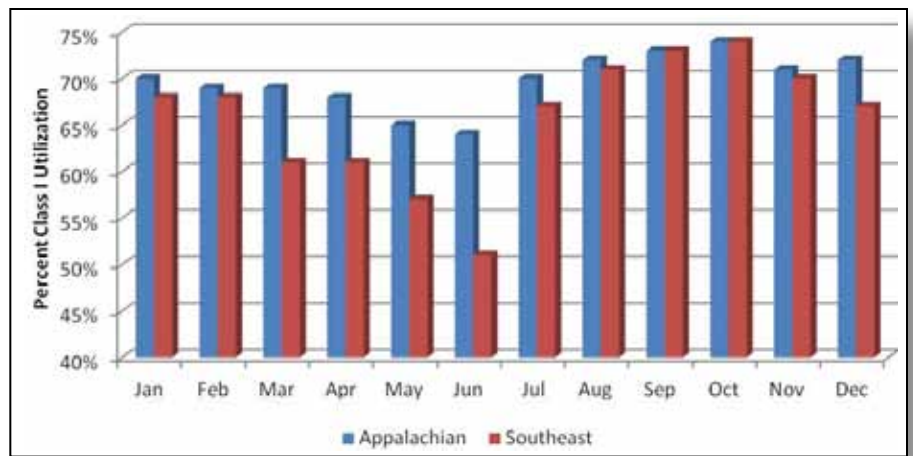


Figure 9. Percent Class I Utilization: Appalachian and Southeast Orders, 2009

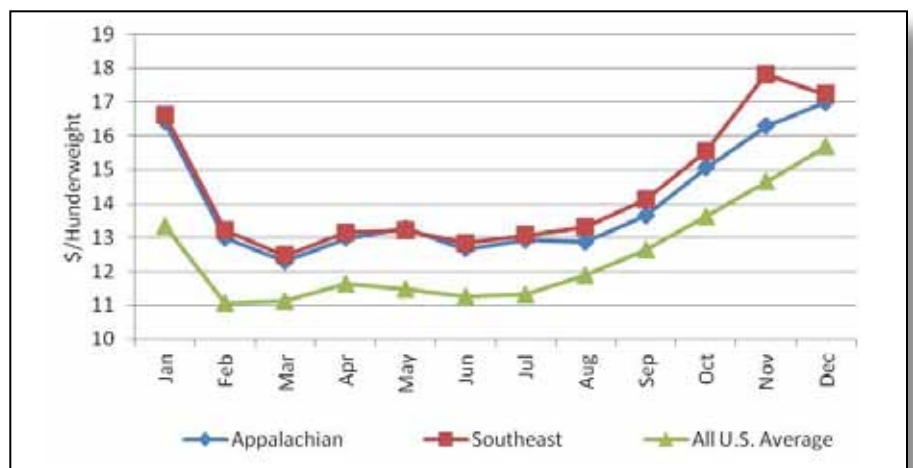


Figure 10. Federal Milk Marketing Order Uniform Prices, 2009: Appalachian, Southeast and All U.S.

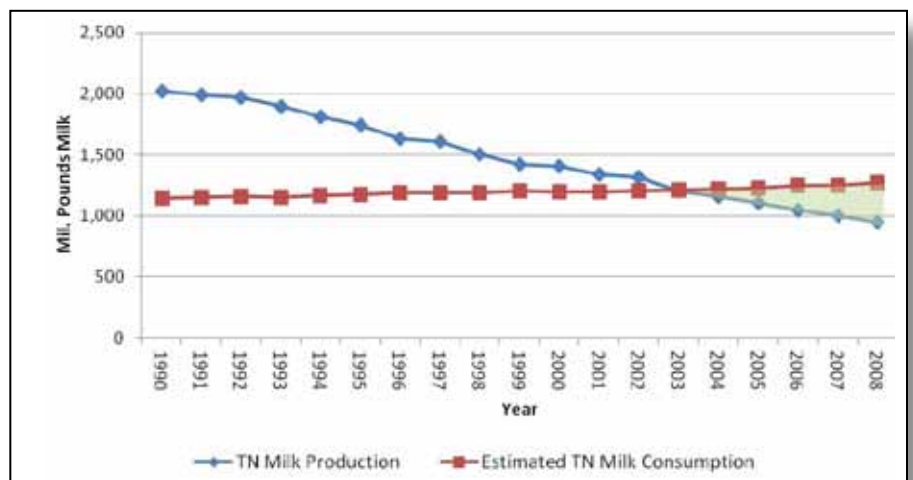


Figure 11. Tennessee Milk Production and Consumption (USDA-NASS 2010a; USDA-ERS 2010c; U.S. Census Bureau 2010a)

region, which includes states that received Tennessee fluid milk, was about 90 percent marketed through cooperatives (Liebrand 2007). When looking at the number of producers who sell through cooperatives, of the licensed milk cow dairies in Tennessee, 49 percent of the producers sell their milk through a cooperative, while 51 percent are independent producers (Sanford 2010).

In 2010, Tennessee had six Federal Order distributing plants in Tennessee (Figure 12). These were located in Powell, Athens, Nashville with two plants, Murfreesboro and Memphis (Southeast Order). The state also had three cheese plants (Greeneville, Philadelphia and Sequatchie), three ice cream plants (Athens, Memphis and Wildersville), one yogurt plant (Murfreesboro) and one sour cream plant (Antioch). The state was also home to six on-farm fluid milk plants in Wildersville, Franklin, Orlinda, Murfreesboro, Pikeville and Knoxville. These on-farm fluid milk plants may use direct marketing, in some cases selling through farmers' markets or with on-farm sales. Several goat and sheep on-farm milk manufacturing facilities were found across the state. On-farm goat cheese facilities were located in Pikeville, Waynesboro and Franklin and sheep's on-farm cheese facilities in Knoxville and Townsend. In addition to the plants discussed above, as of 2010, three large projects were under construction. These were ice cream (Covington), cheese (Humboldt) and yogurt (Murfreesboro) plants.

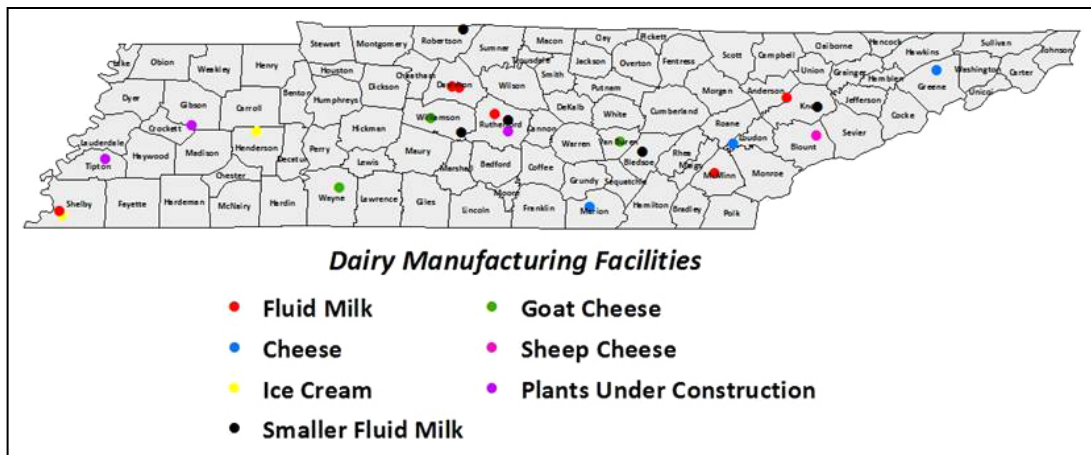


Figure 12. Dairy Products Manufacturing Facilities in Tennessee, 2010

In 2009, Tennessee plants produced more than 14 million pounds of cottage cheese, 11.5 million gallons of ice cream and 284 million gallons of yogurt (TDA 2010). According to the 2008 Annual Survey of Manufacturers (U.S. Census Bureau 2008a), the dairy products manufacturing industry employed more than 2,000 people with an annual payroll of greater than \$91 million. The total value of shipments was \$1.3 billion. Much of the employment, about 1,500 workers, is found in fluid milk manufacturing (Census Bureau 2008b).

Economic Impacts from the Dairy Industry

Tennessee's dairy farms produce economic impacts not only through the milk they sell, but also through the goods and services these farms use and the incomes associated industries generate. The direct economic impacts of farm sales of milk and dairy for

2010 are projected at \$200.2 million with 4,460 jobs (Table 2; IMPLAN 2010). When multiplier effects are included, the economic impacts of farm level sales are \$278.2 million and 5,113 jobs.¹

Beyond farm-level sales, the state’s fluid milk and dairy products processing industry also generates economic impacts. The direct economic output from the fluid milk and dairy products processing industry is projected at \$1.86 billion, with 2,212 jobs. When the multiplier effects are included, the projected economic impact is \$2.89 billion and 7,811 jobs.

Table 2. Projected Economic Impacts from the Milk Production and Processing in Tennessee, 2010		
Impact Type	Employment (Jobs)	Output
Farm Level Milk and Dairy Production (2010\$)		
Direct Effect	4,460	\$200,153,049
Total Effect	5,113	\$278,198,666
Fluid Milk and Dairy Products Processing (2010\$)		
Direct Effect	2,212	\$1,855,355,548
Total Effect	7,811	\$2,890,921,682

Future Prospects

Production and Farm Structure

The dairy industry in Tennessee is likely to retain its structure of many small farms, but with medium-sized farms comprising the largest percentage of the state’s dairy herd. The majority of Grade A licensed dairy cow farms in Tennessee have less than 100 head (Figure 13). Large farms, those with 500 cows or greater, comprise around 1 percent of farms. The majority of head, however, are on farms between 100 and 499 head.

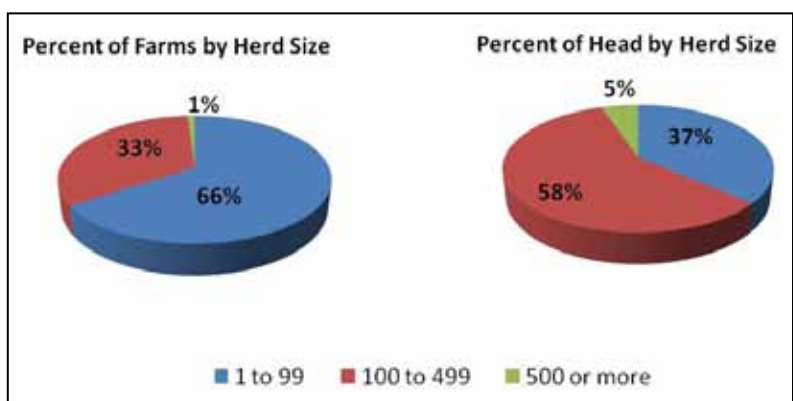


Figure 13. Percent of Farms and Head by Herd Size for Grade A Dairies in Tennessee

From 1990 to present, milk production in Tennessee declined by an average of 4.1 percent per year. Given 2009 milk production of 909 million pounds, if the industry follows the same rate of change, by 2015, the statewide production would be about 707.1 million pounds. Like much of the Southeast, Tennessee will likely continue to be a fluid milk deficit region, as illustrated in Figure 11. This means that higher milk prices in the areas south of Tennessee will attract milk from Tennessee, leaving the state in a milk deficit, and milk for Tennessee will be drawn in from areas to the west and Midwest. Opportunities to supply the demand for fluid milk to the south and east of Tennessee will continue. Population changes will drive much of these changes in demand and are discussed in the following section.

¹ Direct impacts are those that occur directly from economic activity in the milk production and dairy processing industries. Multiplier effects are of two types: indirect and induced impacts. Indirect impacts occur from the purchases of inputs and services by the milk production and dairy processing industries. Induced impacts occur from household expenditures in the state due to the new household income earned by these workers as a result of the direct and indirect changes in economic activity.

Demand Growth

Tennessee and several other states in the Southeast were projected to be among the highest population growth (Figure 14; U.S. Census Bureau 2005). Population projections for Tennessee for 2015 are around 6.5 million. Using the change in per capita consumption of fluid milk of about -.75 percent per year, the projection for 2015 is about 193.3 pounds per year per person (or about 22.4 gallons per person at 8.6 pounds per gallon). This provides a projection of about 1,257 million pounds total consumption of fluid milk and cream in Tennessee for 2015, which is greater than the projected milk production (707.1 million pounds).

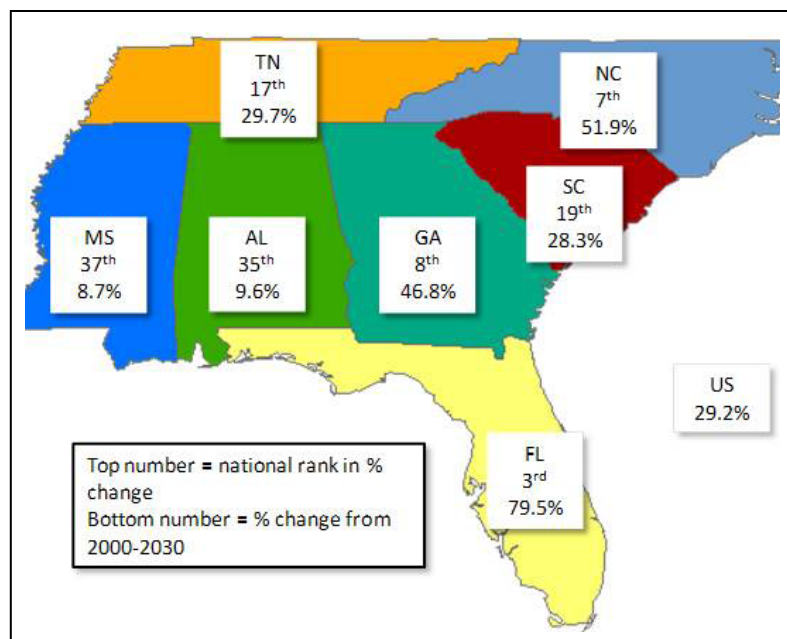


Figure 14. Projected Population Change from 2000-2030, Selected Southeastern States

Population Centers and Demographics

As was shown in Figure 12, many dairy products processing facilities were located within one or two counties of the five major metropolitan areas (Memphis, Nashville, Chattanooga, Knoxville, Tri-Cities).² Hence, the population and demographic trends of these metropolitan areas are of interest. The population of each of the major metropolitan areas is projected to grow with the exception of Memphis (Table 3). The highest growth rates are projected for the Nashville and Knoxville areas.

Year	Population Growth Projections (Percent Growth)				
	Memphis	Nashville	Chattanooga	Knoxville	Tri-Cities
2010-2015	-.9%	13.1%	0.9%	7.7%	3.6%
2015-2020	-.3%	8.3%	0.5%	4.8%	2.0%

^aMiddleton and Murray (2009).

The household income levels of these population centers ranged from a low of \$29,854 in Carter County (Tri-Cities) to a high of \$87,474 in Williamson County (Nashville) in 2009 (Figure 15). The highest median household income in the Memphis area was Fayette County, the highest in the Nashville area was Williamson County, the highest in the Chattanooga area was Hamilton, the highest in the Knoxville area was Loudon County, and the highest in the Tri-Cities area was Washington County.

² The clusters of counties considered in each area are those of the Metropolitan Statistical Area (MSA) that are located within the state. The clusters are as follows: Memphis-Fayette, Shelby and Tipton; Nashville-Cannon, Cheatham, Davidson, Dickson, Hickman, Macon, Robertson, Rutherford, Smith, Sumner, Trousdale, Williamson and Wilson; Chattanooga-Hamilton, Marion and Sequatchie; Knoxville-Anderson, Blount, Knox, Loudon and Union; Tri-Cities-Carter, Hawkins, Sullivan, Unicoi and Washington.

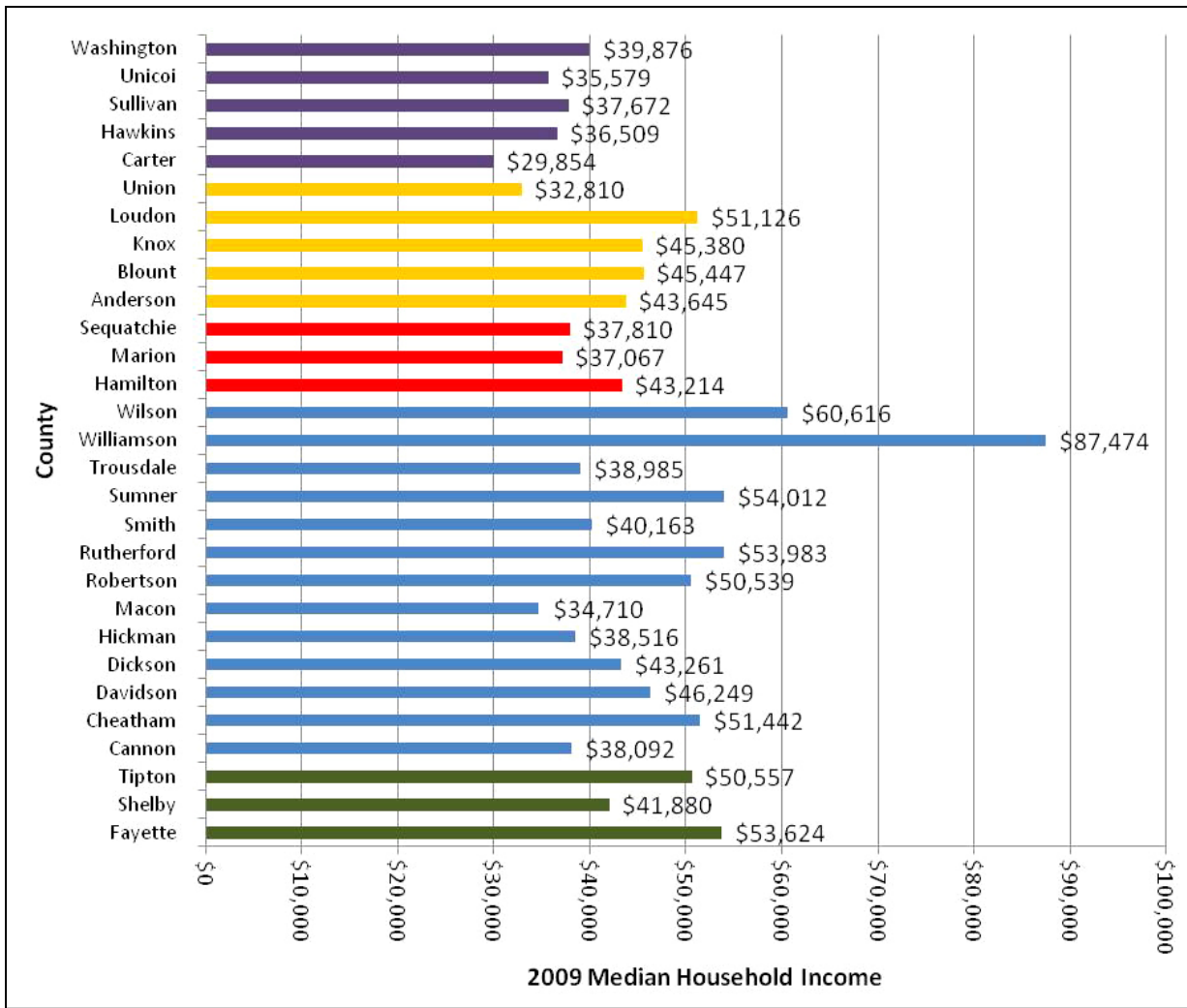


Figure 15. 2009 Median Household Income for Five Tennessee Metropolitan Areas (U.S. Census Bureau, 2010b)

Table 4. Selected Demographics for Five Tennessee Metropolitan Areas ^a

Area	County	Population	Female	Median Age	25 yrs or older, Bachelor's Degree or Higher Education
		(Persons)	(Percent)	(Years)	(Percent)
Memphis	Fayette	38,413	50.4	41.9	12.8
	Shelby	927,644	52.3	34.6	25.3
	Tipton	61,081	51.0	36.6	10.8
Nashville	Cannon	13,801	50.5	41.1	8.4
	Cheatham	39,105	50.0	39.3	15.1
	Davidson	626,681	51.6	33.9	30.5
	Dickson	49,666	50.9	38.7	11.3
	Hickman	24,690	47.5	40.0	6.7
	Macon	22,248	50.7	38.7	5.6
	Robertson	66,283	50.8	37.6	11.9
	Rutherford	262,604	50.6	32.2	22.9
	Smith	19,166	50.8	39.9	9.3
	Sumner	160,645	51.2	38.6	18.6
	Trousdale	7,870	50.3	39.5	8.9
	Williamson	183,182	51.2	38.5	44.4
Wilson	113,993	51.0	39.3	19.6	
Chattanooga	Hamilton	336,463	51.9	39.3	23.9
	Marion	28,237	50.9	42.3	9.5
	Sequatchie	14,112	41.6	40.6	10.2
Knoxville	Anderson	75,129	51.7	42.6	20.8
	Blount	123,010	51.6	41.4	17.9
	Knox	432,226	51.4	37.2	29.0
	Loudon	48,559	50.9	46.0	17.0
	Union	19,109	50.2	40.1	5.8
Tri-Cities	Carter	57,424	51.1	42.2	12.8
	Hawkins	56,833	51.0	42.1	10.0
	Sullivan	156,823	51.6	43.6	18.1
	Unicoi	18,313	51.1	44.9	10.6
	Washington	122,979	51.1	39.3	22.9

^aData from the Census Bureau American Fact Finder (<http://factfinder2.census.gov/>). Population, gender mix and median age are from the 2010 Census, while educational attainment is from the 2000 Census.

In addition to household income, several other demographics are examined, including county population, gender mix, age and educational attainment (**Table 4**). See Table 4 on page 14. The highest population counties were Shelby, Davidson, Knox, Hamilton, Rutherford, Williamson, Sumner, Sullivan, Blount, Washington and Wilson. Shelby, Hamilton, Anderson, Davidson, Blount and Sullivan had the highest share female populations among the counties examined. Among the lowest were Sequatchie and Hickman counties. The median age was lowest for Rutherford, Davidson, Shelby, Tipton

and Knox counties, while the highest median ages were in Sullivan, Unicoi and Loudon counties. The counties with the highest percentage of adults 25 or older having a bachelor's degree or higher educational attainment were Williamson, Davidson, Knox, Shelby and Hamilton. The counties with the lowest educational attainment among the five metropolitan areas examined were Macon, Union, Hickman, Cannon and Trousdale. Hence, some of the higher population counties tended to have the higher percentage female populations, lower median ages and higher educational attainment.

Consumer Demographics and Preferences

It is important to note that while no consumer studies are available specifically for the metropolitan areas examined in this report, several studies have evaluated how demographics and regional location may influence milk and dairy products consumption. Davis, et al. (2011) found household size, college-educated female heads of household who are age 40 and older, residing in the South have positive effects on consumers' cheese purchases for at-home food purposes. Several studies have found higher consumption of whole milk relative to lowfat milk in the South compared with other regions (Huang and Rauniker (1983); Boehm (1975); Boehm and Babb (1975); and Salathe (1979)).

Several other studies that examine specialty products can provide good insights into the influence of demographics on preferences for these types of products. Wolfe, Escalante and McKissick (2006) developed a consumer profile for interest in purchasing locally produced products. Based on their study, the demographics of consumers most interested in purchasing locally produced milk product are male, 48 years old, household income averaging \$56K, with a post-graduate degree. They also examined consumers' attitudes toward grass-fed milk. Respondents who classify themselves as generic-, brand- or health-conscious consumers are more interested in grass-fed milk than value-conscious or other respondents (Wolfe et al. 2006). The demographics of consumers who had greatest interest in purchasing a grass-fed milk product are male, 48 years old, household income of \$25 to \$30K, with a college degree. In addition, Wolfe et al. examined consumer preferences for organic milk. The profile for a consumer most interested in purchasing organic milk is female, aged 35 to 44, average household income of \$50K, with a post-graduate degree. Olynk et al. (2010), examined consumer preferences for greater animal welfare practices in producing milk for milk. Consumers with stronger preferences for this type of specialty milk are on average 52.6 years old, female, married, between \$20-\$40K household income and attended college with no degree earned. The results from the studies mentioned above suggest that consumers with moderate to higher incomes, with higher education and in their mid-30s to early 50s will be most interested in purchasing specialty dairy products. As can be seen from the previous section, which discussed demographics in the metro areas, a number of counties within each of these regions are home to consumers with higher incomes and higher education levels.

Potential Market Outlets

In addition to direct on-farm marketing, potential markets for these products include specialty or gourmet stores in larger metropolitan areas, such as Nashville, Memphis, Knoxville or Chattanooga. Others may sell through local farmers’ markets or food cooperatives. Farmers’ markets are often clustered around metropolitan areas to take advantage of a large customer base (Figure 16). Other types of specialized stores are often clustered around metropolitan areas also (Figure 17)³. A listing of farmers’ markets is also available from the Tennessee Department of Agriculture Market Development Division at <http://www.agriculture.state.tn.us/Marketing.asp?qstring=MKT>.

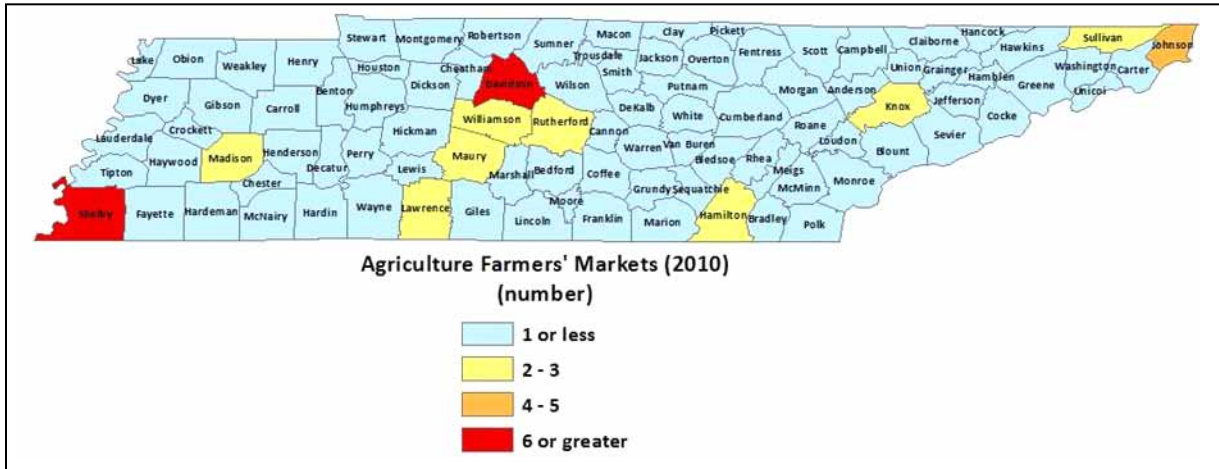


Figure 16. Number of Farmers’ Markets, by County, 2010 (USDA, Economic Research Service, 2011)

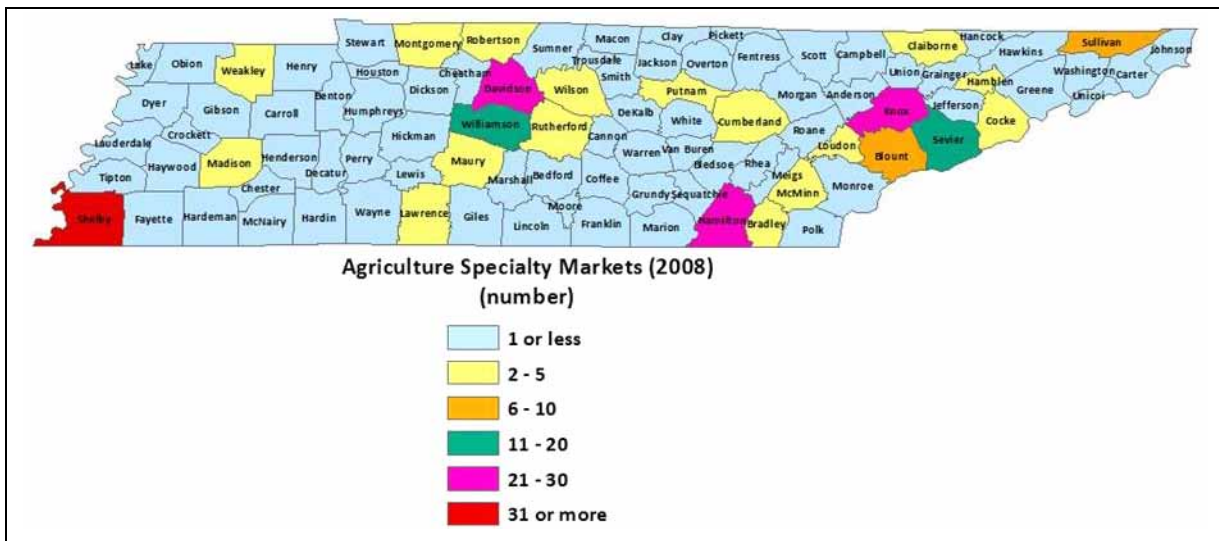


Figure 17. Number of Specialty Stores/Markets, by County, 2010 (USDA, Economic Research Service, 2011)

³Specialized food stores or markets include establishments primarily engaged in retailing specialized lines of food such as retail bakeries, meat and seafood markets, dairy stores and produce markets.

With the region, in particular major metropolitan areas, experiencing population growth, opportunities may exist for dairy farmers to use value-added enterprises to directly market pasteurized fluid milk or further-processed dairy products, such as ice cream or cheese. Farmstead cheeses are those produced on the same farm where the milk is produced. Cheeses that are also considered artisan are those that are handmade using skilled traditional cheese-making methods. These cheeses are generally considered higher-end cheeses and are often aged. Examples of value-added dairy products and considerations when adding value to milk are discussed in the next section.

Take-Home Messages

- The dairy industry has undergone many changes in the past few decades, including gains in milk production per cow, but also a decline in the number of licensed dairies.
- With population shifts toward the Southeast region of the United States, the regional demand for milk and dairy products will likely continue to grow.
- Most metropolitan areas in Tennessee are experiencing population growth.
- Metropolitan counties are home to some of the highest income and most educated consumers.
- The highest concentrations of farmers' and specialty markets are in and around the metropolitan areas.

II. Adding Value through Dairy Products for Tennessee Dairy Farmers

Value-Added in the U.S. Dairy Industry

Adding value is the transformation of a product into a more valuable product. Value may be added through processing, packaging, labeling and marketing the product. In the case where a processor buys the milk from the dairy farmer and converts the raw milk into packaged fluid milk or other dairy products, the processor is said to be adding value through processing and packaging. Processing milk into dairy products may come in a variety of forms. Currently, in the U.S. about 30 percent of all milk goes to fluid milk and cream, while the balance is used to manufacture dairy products, such as cheese, ice cream, yogurt and butter (USDA-NASS 2010c). In 2008, 2,012 farms sold about 2.7 billion pounds of organic milk, resulting in more than \$750 million in receipts (USDA-NASS 2009). In 2009, fewer than 1,000 new U.S. dairy food products were introduced into retail outlets (USDA-ERS 2010b).

Some methods for identifying and developing value-added opportunities are to:

- Contact potential buyers about need for the product.
- Visit specialty shops that might stock your product.
- Look at mail order catalogs and websites selling products you are considering marketing.
- Read trade magazines and newsletters.
- Visit with other milk producers who have added processing facilities. Speak with the *UT Center for Profitable Agriculture* and UT Extension county agents about your idea.
- Carefully evaluate the market potential and financial feasibility before investing in processing facilities and equipment.

The farm price as a percent of the retail price of whole milk in 2008 was 53 percent, while for butter it was 43 percent, 38 percent for cheddar cheese and 19 percent for ice cream. For the overall market basket of dairy food products purchased, farm prices were about 32 percent of retail prices (USDA-ERS 2009). While these percentages may give the perception that there is ample room to reap profits through processing, it should be recognized that these price differentials reflect a variety of factors beyond profits per unit to the processor and retailer; they also reflect costs of assembly, handling, processing, packaging, distribution, advertising and promotion, and retailing.

Methods for Adding Value

Dairy farmers can add value to their herd's milk by processing and marketing products of their own. Examples of such products are:

- farm-bottled milk
- cheeses
- yogurt
- butter
- ice cream
- conversion to organic
- organic production of value-added products

Differentiated is taking a homogenous product such as milk and making changes to it so it will be different.

In some cases, these products may receive a premium price because the milk is locally produced, locally processed or because the product is organic. If the farmer adds processing and packaging of the product on-farm, the farmer is vertically integrating forward into production/processing. This process can give the farmer the opportunity to capture more of the end-use value of farm products. Forward vertical integration can also enable the producer to gain access to distribution channels that otherwise would be inaccessible. By moving from a commodity, raw fluid milk, into a differentiated product, producers have more influence over the product's price through product branding. Marketing of value-added dairy products is critical for building a market, since the farm's milk has now been converted to a differentiated consumer-oriented product.

Examples of Specialty Value-Added Dairy Products

- **Artisan cheese** is manufactured in small quantities by hand, using traditional cheese-making methods. Artisan cheeses are often aged and ripened to develop flavor and textural characteristics. One type of artisan cheese is farmstead cheese, which is made with milk from the producer's own herds of cows, sheep and goats.
- **Greek-style yogurt** is a yogurt that is strained to filter the whey from the yogurt. The texture of Greek style yogurt is thicker than most yogurts sold in the U.S. market and has a texture more like sour cream.
- **Packaged milk from grass-fed cows** may have higher levels of some beneficial fatty acids and also have a different flavor than milk from cows using conventional feeding systems. The milk can take on a unique flavor that is individual to the particular location on which the cows are grazed (Paine 2009).
- **Super premium ice cream** is typically made with all-natural ingredients, milk fat of generally not less than 14 percent and very little added air.

Example Value-Added Dairy Enterprises



Farm A is a family farm located near a major city in Tennessee. A few years ago, after developing a business plan, it added milk processing to its dairy operation. Farm A brands and sells its milk in an on-farm store. It participates in a weekly farmers market. Its milk is also sold in specialty shops in the nearby city. Farm A markets its product on the basis of freshness, being traceable and being locally grown. It participates in the Tennessee Farm Fresh program.



Farm B is located near an interstate, about halfway between two major cities in Tennessee. About 10 years ago, Farm B followed the steps required for organic certification and began producing organic milk. During this time, the owners of this family farm also became interested in artisanal cheese-making. After attending an artisanal cheese-making workshop and doing much research, Farm B began making artisanal cheeses. Farm B also followed the steps in processing for its cheeses to be certified as organic. Farm B markets its products as artisanal cheeses of high quality that are locally and organically produced. This farm participates in the Pick Tennessee Products program. It sells its products in gourmet stores in the two nearby cities. It also has begun selling its cheeses by mail order through an Internet site.

Market Outlets

- **Grocery Stores** – Many grocery stores require a “slotting fee” to place a product on their shelves. The slotting fee can be very expensive and prohibitive to small businesses. In addition, products must compete with branded products from large national food companies.
- **Institutional Food Service** – The institutional food service market includes restaurants, schools, factories and hospitals, and is often served by large food distribution companies. Advantages of this market are that brand identification is less of an issue than with retail grocery stores and, in some cases, restaurants are locally owned, providing direct contact with the potential buyer.
- **Specialty Shops** – Specialty or gourmet food stores tend to provide more opportunities for small food processors to supply locally produced products than the market outlets mentioned above. In this market, however, the product needs to be unique and of high quality.
- **Direct Marketing** – In some cases, marketing of the product may occur directly on the farm with a farm store. In other cases, the producer may bring the products to a farmers market. Still another opportunity for direct marketing of some products is through the Internet.

Value-Added Considerations

Forward vertical integration into processing is not without potential drawbacks. For example, additional regulations will be encountered, then significant capital outlays will be needed, and developing the new business can draw away management effort and expertise from the original dairy business. Hence, adding on-farm processing should build upon strengths of the dairy operation, not serve as an attempt to overcome weaknesses within the farming operation.

If adding value through processing is to be successful, it must be recognized that marketing of value-added products is very different from selling the raw commodity milk and that additional costs are incurred from processing and marketing. For example, the overall dairy products industry average advertising-to-sales ratio has been estimated at 7.1 percent. So, for every dollar of sales, about 7 cents goes to advertising and promotion (USDA-ERS 1999). Marketing messages should emphasize the locally

produced, superior quality and/or environmental responsibility characteristics of the product.

A product that is differentiated from other products either through its product characteristics or accompanying services provides greater potential for profitable pricing strategies. However, adding value will also add costs to the overall operation, both at start-up and in year-to-year operations. Therefore, these costs must be considered along with product price, to evaluate the profitability potential of the value-added venture. In addition, producers must consider the potential outlets through which they may market their products. Likely choices for the smaller farm are specialty shops, farmers' markets or on-farm marketing.

If a farmer does decide to sell products through grocery facilities, working with a knowledgeable broker is very important. A broker arranges transactions between the farmer and grocery, and receives a commission when the transaction is complete. Alternatively, the farmer may decide to sell products directly from the farm. In this case, personal marketing and building the reputation of the farm are critical. In either case, the marketing messages should emphasize the unique attributes of the product, such as it being locally produced, of superior quality and/or environmentally responsible characteristics of the product.

Branding is helpful to marketing your product, because it

- Differentiates your product from other products,
- Conveys a message of quality of your product,
- Helps build loyalty to your product, and
- Builds recognition for your product.

Feasibility Study

As part of a thorough business-planning investigation, the producer should fully evaluate the potential for success of the venture. To evaluate the potential success of a value-added product, an evaluation of the overall feasibility should be conducted.

A feasibility analysis involves the assessment of four types of feasibility: market, technical, financial and organizational (**Figure 18**; Iowa State University Extension 2009).

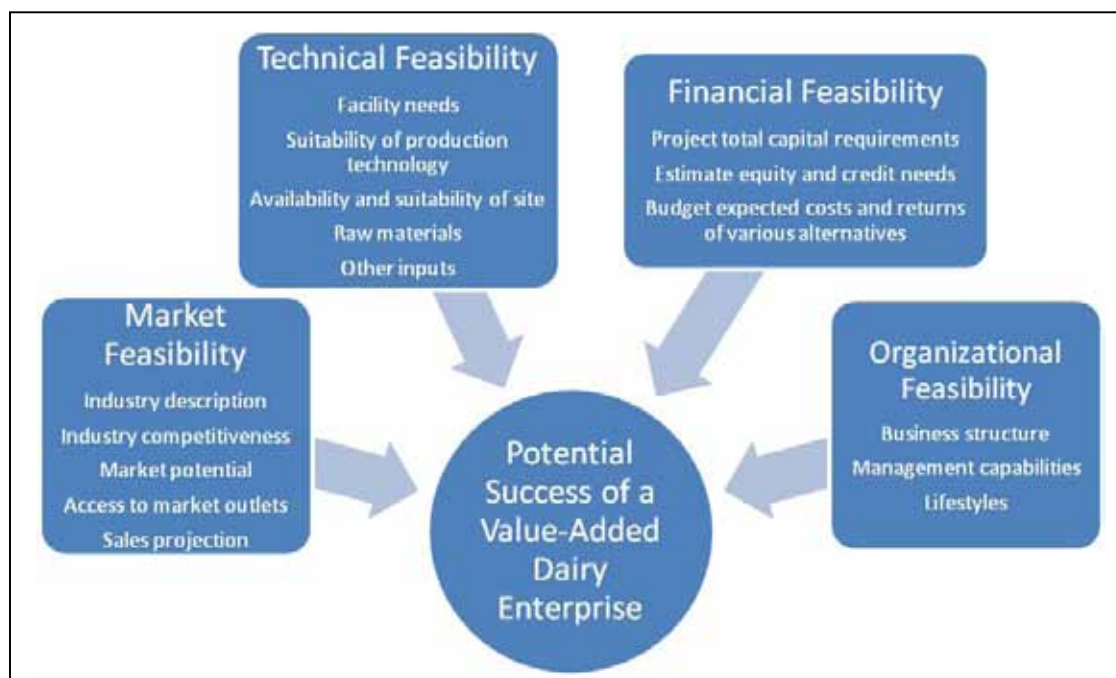


Figure 18. Elements of a Feasibility Study

Take-Home Messages

- Marketing of value-added products is very important, due to the consumer orientation of these products.
- If you plan to sell products through grocery facilities, working with a qualified and knowledgeable broker can be critical.
- If you plan to sell products directly from the farm, personal marketing and building the reputation of the farm are crucial.
- Marketing messages should emphasize unique attributes of your product, such as locally produced, superior quality and/or environmentally responsible characteristics of the product.
- Seek assistance and advice from other successful on-farm processors, UT Extension staff and local and regional economic development personnel.
- Carefully evaluate the market potential and financial feasibility before investing in processing facilities and equipment.

On-farm processing, branding, special labeling or direct marketing can be means for farmers to capture more of the final retail value of a product. If a value-added strategy is successful, the farmer can potentially gain premium prices for product freshness and quality, being locally produced, or being produced on-farm. However, because adding value at the farm level also entails additional costs and some business risk, it requires careful business planning and evaluation of market potential.

III. Milk Labeling in Tennessee

Milk may be marketed with a variety of labeling claims (**Figure 19**). Labeling claims may convey information about how the milk is produced, where the milk is produced or specific product characteristics. The labeling serves two purposes: one is informational and the other is to market the product's attributes. The marketing function may also help the seller capture additional buyers and potentially even a premium price for the product by differentiating it from other sellers' products. Labeling claims may help the producer meet the preferences for product attributes demanded by consumers in certain market segments; for example, customers who are health conscious or customers who like to buy locally produced products.

In order to label a product under one or more of the above claims, certain specifications must be met or are highly recommended. The information in this section provides information to milk producers and on-farm processors to assist in complying with the requirements or recommendations set forward for accurately using labeling claims on milk. While the above list is not comprehensive, it does contain some

Examples of location-oriented labeling claims on milk include:

- *Pick Tennessee Products*
- *Tennessee Farm Fresh*
- *locally grown*

Examples of process-oriented labeling claims on milk include:

- *natural*
- *raw*
- *grass-fed*
- *non-rBST*
- *organic*

Figure 19. Examples of Potential Labels on Milk

of the more commonly used labels on milk. A description of each the requirements or recommendations for these labeling claims is provided below.

Location-Oriented Labeling

Pick Tennessee Products

Many customers may have a preference for locally produced products. For fresh products like milk or on-farm processed cheese, butter or ice cream, local production can be a key marketing point. A prior study of consumers found that those who were willing to pay more for products produced in-state were female, older, had higher incomes and visited local farmers' markets (Carpio and Isengildina-Massa 2008). As was previously noted, some of the higher household incomes and greatest numbers of farmers' markets can be found in the metropolitan areas (**Figure 15, Table 4**). A good example is the Nashville area with the county with the highest median household income and the county with the greatest number of farmers' markets.



Figure 20. Pick Tennessee Products Logo

Tennessee has a labeling and promotion program for items produced in-state called *Pick Tennessee Products* (PTP). The PTP program is administered by the Tennessee Department of Agriculture Market Development Division. *Pick Tennessee Products* is designed to promote both fresh and processed products originating in Tennessee. A logo is provided for use on labels and in marketing and promotion materials (**Figure 20**). Furthermore, online directories of PTP participants are provided through the PTP website. Guidelines for participation in the PTP are as follows:

Farmers/producers of fresh agricultural products are eligible to use the PTP logo on products and/or be listed on the PTP website (www.PickTNProducts.org). Producers must be able to provide a high-quality agricultural product produced on a Tennessee farm.

- Manufactured/processed food products eligible for inclusion in the *Pick Tennessee Products* program and authorized to bear the logo must be manufactured in Tennessee and include ingredient(s) from a Tennessee farm when available.
- To qualify as a non-food product, items must be produced from a Tennessee agricultural product on a working Tennessee farm.
- All products listed on the PTP website and bearing the logo must meet or exceed U.S. government and/or state of Tennessee standards and regulations where applicable. Manufacturers/processors must provide an updated facility permit from Tennessee Department of Agriculture's Regulatory Service.

Certain specifications are placed on the logo use:

- Changes in logo composition or colors must be approved by the Division of Market Development, Tennessee Department of Agriculture (TDA). The design or graphics of the logo cannot be altered, and the logo must be printed in its entirety. The logo can be printed in varying sizes.

- The logo may be used in marketing, incorporated into a product’s packaging or label, displayed in point-of-purchase materials or signage, on pressure-sensitive labels, promotional materials or brochures, letterhead and envelopes, etc.
- The logo has been designed to be simple and “generic” so that slogans or “tag lines” can be incorporated. All slogans or tag lines used in conjunction with the logo must be approved by the Tennessee Department of Agriculture.
- An application, available at http://picktnproducts.org/producer/PTP_Application.pdf, must be completed and submitted to the address listed on the application form.

A listing of dairy products processors participating in the Pick Tennessee Products program is provided at http://www.picktnproducts.org/food/dairy_products.html.

Tennessee Farm Fresh

Perceived freshness is a key attribute for milk and dairy products that are directly marketed. The Tennessee Department of Agriculture, in cooperation with the Tennessee Farm Bureau, provides the *Tennessee Farm Fresh* program. The focus of the label and the marketing program is to emphasize that not only is the product produced in Tennessee, but it is also produced and marketed fresh directly from the farm (**Figure 21**). The goal of the program is to assist local producers with marketing their farm-fresh products directly to local buyers. To become eligible for the program, milk or dairy products producers must read the *Tennessee Farm Fresh Guidelines*, which can be found at <http://www.tnfarmfresh.com/documents/AandG2010.pdf>.



Figure 21. The Tennessee Farm Fresh Logo

The producer must also pay a \$100 annual fee, fill out and sign the application located at the website listed above. The application and fee are sent to the program coordinator. Producers are notified of program approval by the Tennessee Farm Fresh coordinator and review committee.

Guidelines for participation in the ***Tennessee Farm Fresh Program*** are:

- Produce agriculture products in Tennessee.
- Must produce a majority of products offered and provide origin of products to consumers when asked. (Market operator is strongly encouraged to provide origin information of all products offered to consumers.)
- Offer consumers a quality product at a fair price.
- Maintain a clean market appearance, and provide a safe environment for employees and customers.
- Present the *Tennessee Farm Fresh* program in a positive manner at all times, including proper usage of promotional materials, and projection of a service-oriented attitude to consumers. Any misuse or inappropriate activity of the Tennessee Farm Fresh program should be reported to the *Tennessee Farm Fresh* coordinator.

- Market operation should be professional with operating hours firmly established.
- Local regulations and best management practices should be followed in production, processing and marketing.
- Refrain from disparaging comments toward alternative production practices.

Participants are strongly encouraged to actively:

- Participate in training sessions and workshops offered through the *Tennessee Farm Fresh* program.
- Verify that they are properly protected with liability coverage for their activity.
- Offer input to the program coordinator on program activities and opportunities to serve participants.
- Validate membership by submitting an annual fee and updating application.
- Provide quality service to customers.

For participating in the *Tennessee Farm Fresh* Program, producers/processors are offered promotion/marketing assistance and workshop opportunities. Promotion and marketing assistance includes a website listing and link; advertisement and branding; and signage, bags and other labeling tools. The right to use the logo is made to the applicant and cannot be reassigned.

Locally Grown

No regulations exist specifying what locally grown means. However, past market research has suggested that consumers associate a locally grown label with products that were produced within 50 miles of the point of sale (Onozaka et al. 2010). This market research also showed that most consumers considered local products as superior in several product dimensions: freshness, eating quality, food safety and nutritional values.

Given the size of Tennessee counties, this would suggest that the point of origin likely would be within the county where the product is sold or within two counties away.⁴ A map that uses these criteria in identifying the locally grown regions for the major metropolitan areas of Memphis, Nashville, Knoxville, Chattanooga and the Tri-Cities is shown below (Figure 22).

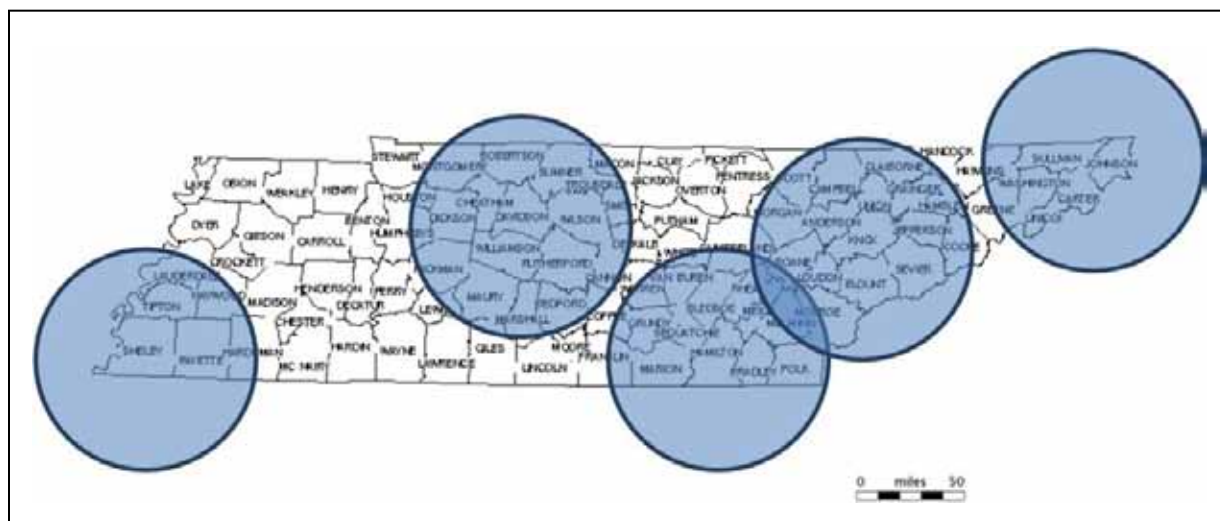


Figure 22. “Locally” Grown Regions for the Major Metropolitan Areas in Tennessee

Process-Oriented Labeling

Natural

The demand for organic and natural foods has seen rapid growth in the past couple of decades. When considering using the natural label versus an organic label, it is important to understand the differences between the two. While all organic foods would be considered natural, not all natural foods are considered organic. The term natural does not require special production systems and methods, as does the term organic. Furthermore, the Food and Drug Administration has not established a

⁴Tennessee’s land area spread across the 95 counties is 42,169 miles, or about 444 square miles on average per county. This implies a county radius of about 10.5 miles. Hence, to use 50 miles as a rule-of-thumb suggests the producer will be located within two counties of the county containing the selling point.

regulatory definition for **natural** milk as it has with the term **organic milk**⁵. However, the agency has not objected to the use of the term if the food does not contain added color, artificial flavors or synthetic substances as defined in the Code of Federal Regulations Title 21, Chapter I, Subchapter B, Part 101-Food Labeling. Under Sec. 101.22 Foods; labeling of spices, flavorings, colorings and chemical preservatives, the following definitions are provided (FDA 2010):

(1) The term *artificial flavor* or *artificial flavoring* means any substance, the function of which is to impart flavor, which is not derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, fish, poultry, eggs, dairy products or fermentation products thereof

(2) The term *artificial color* or *artificial coloring* means any “color additive” as defined in 70.3(f) of this chapter.

(3) The term *chemical preservative* means any chemical that, when added to food, tends to prevent or retard deterioration thereof, but does not include common salt, sugars, vinegars, spices or oils extracted from spices, substances added to food by direct exposure thereof to wood smoke, or chemicals applied for their insecticidal or herbicidal properties.

Using the above definitions, the term natural may be used on fluid milk products as long as they don’t contain any artificial ingredients, added colors or added flavors. Most producers label their milk as natural if they do not add antibiotics or hormones. For cheese, regular production methods should be used in order for products to be labeled natural. Processed cheese, cheese food or cheese spread should not be labeled as natural.

For more information, visit the Code of Federal Regulations Title 21 at <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=101.22>

Raw

The raw milk market is based on claims of the raw milk having a higher nutritional value and a better taste than pasteurized milk. Raw milk is unpasteurized, unprocessed milk. Water-soluble vitamins and proteins are lost during processing while the milk goes through periods of high temperatures and heat exposure, decreasing the nutritional value of the milk (Harris and Karmas 1975). Heat treatment also changes the flavor of the milk. When milk is compared, the consumer may notice a taste difference between raw milk and pasteurized milk. While laws concerning the sale of raw milk vary from state to state, Tennessee does not allow the sale of raw milk due to safety concerns and health risks. The Tennessee Department of Agriculture rule states that “Only Grade A pasteurized milk and milk products shall be sold to the final consumer, or to restaurants, soda fountains, grocery stores or similar establishments” (TDA 1999).

⁵The USDA Food Safety and Inspection Service (FSIS) has adopted certain requirements for use of the term “natural” in meat and poultry products. However, these requirements do not directly apply to milk and dairy products. A description of the FSIS requirements can be found in the Food Standards and Labeling Policy Book at http://www.fsis.usda.gov/OPPDE/larc/Policies/Labeling_Policy_Book_082005.pdf

Grass Fed

Grass-fed dairy products are often associated with organic and raw products; however, grass-fed implies that the animal is solely fed a grass and forage diet. The market for grass-fed dairy is based on claims of higher nutritional value and better taste. Research has found that consumers who would pay a premium for grass-fed milk tend to be younger, female and have higher household incomes (Wong et al. 2008). Populations that are younger, higher percent female and with higher incomes can be found in the five metropolitan areas examined for Tennessee (**Figure 15, Table 4**). The Agricultural Marketing Service (AMS) has not established a voluntary standard for a grass (forage) fed dairy; it has established one for the marketing claim in livestock. According to the USDA Agricultural Marketing Service, the term grass-fed may be used when following certain specifications:

- Grass and forage are the feed source consumed for the lifetime of the ruminant animal, with the exception of milk consumed prior to weaning (USDA-AMS 2008a).
- The diet is to be derived solely from forage consisting of grass (annual and perennial), forbs (e.g., legumes, *Brassica*), browse or cereal grain crops in the vegetative (pre-grain) state.
- Animals cannot be fed grain or grain byproducts and must have continuous access to pasture during the growing season.
- Hay, haylage, baleage, silage, crop residue without grain and other roughage sources may also be included as acceptable feed sources.
- Routine mineral and vitamin supplementation may also be included in the feeding regimen. If supplementation occurs due to inadvertent exposure to non-forage feedstuffs or to ensure the animal's wellbeing during adverse environmental or physical conditions, the producer needs to fully document (e.g., receipts, ingredients and tear tags) the supplementation that occurs. This documentation includes the amount, the frequency and the supplements provided.

While this voluntary standard was intended for livestock and meat products and does not directly specify dairy cattle, the same set of standards would be recommended for dairy. The United States Standards for Livestock and Meat Marketing Claims, Grass (Forage) Fed Claim for Ruminant Livestock and the Meat Products Derived from Such Livestock, as put forward in the Federal Register, can be accessed at:

<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5063842>.

Although the Livestock and Seed (LS) Program of AMS provides certification via direct product examination for a number of production claims related specifically to livestock and carcass characteristics, other fee-based, private third-party certifiers are available specifically for the purpose of certifying that ruminants, including dairy cattle, are raised as grass-fed (USDA-AMS 2007).

non-rBST

Laboratory-created bovine somatotropin, rBST, also known as the Bovine Growth Hormone, is allowed to be used as the Food and Drug Administration approved it for commercial use in 1993 (FDA 1994). rBST is a protein that, when injected into a dairy cow, will increase milk production. The FDA determined that milk from rBST-treated cows is safe for human consumption, and that production and use of the product do not have a significant impact on the environment. In addition, the FDA found that there was no significant difference between milk from treated and untreated cows and, therefore concluded that under the Federal Food, Drug and Cosmetic Act, the agency did not have the authority in this situation to require special labeling for milk from rBST-treated cows. The FDA stated, however, that food companies that do not use milk from cows supplemented with rBST could voluntarily inform consumers of this fact in their product labels or labeling, given that any statements made are truthful and not misleading.

As some producers, processors and resellers have moved away from rBST use, some have elected to label their products as from cows not treated with rBST. If the label states that the dairy herd was not treated with rBST, care must be taken in how the labeling is worded. Some dairies labeled their milk BST-free, and the FDA intervened because it violated the “truth in labeling law” (FDA 1994). The FDA intervened when the milk was labeled hormone-free milk, because all milk contains hormones, including BST or growth hormone. Most labels will state that their milk has been produced without using rBST hormone; however, the FDA also recommends, but does not require, that an additional label be used stating that there is no significant difference in milk from cows treated with artificial growth hormones. Participating dairy herds should consist of animals that have not been supplemented with rBST. Recordkeeping programs should be completed to enable tracking each cow in the herd over time, including feeding and any supplements. Milk from non-rBST herds should be kept separate from other milk verifiable by a valid paper trail throughout the transportation and processing steps to the final packaged milk or dairy product. The physical handling and recordkeeping provisions are to ensure that the labeling of the milk is not false or misleading. Guidance by the FDA on labeling milk and milk products as non-rBST can be found at: <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/ucm059036.htm>

USDA has implemented a process for obtaining the USDA Organic seal (**Figure 23**). Prior research has indeed suggested that having the USDA organic seal on organic milk increased the likelihood that consumers would purchase it (Kiesel and Villas-Boas 2007). However, the certification process for organic labeling and the guidelines are perhaps the most established, detailed and lengthy of the labeling claims. Retail sale of organic milk requires that organic standards be met at the milk producer, handler and processor levels. The information below outlines how farm practices must be changed to transition to organic milk production and provides information about how the milk must be processed and labeled.



Figure 23. The USDA Organic Seal

Farm Practices

A. Recordkeeping and Certification

Several steps are required to become a certified organic producer, including detailed recordkeeping: (Iowa State University Extension 2007)

1. An accredited certification agency (accredited certifying agent) is chosen by the producer and an organic system plan application packet is provided. This plan entails three-year histories of all fields and pastures, along with future management strategies. Similar information is required for the dairy herd. As part of the plan, the producer must describe and list all substances used and planned for use by the operation; describe the monitoring practices, the recordkeeping system and steps taken to prevent contamination or commingling; and provide other information that may be requested by the certification agency.
2. The certifying agency reviews the documents and makes a determination if the applicant can comply with the NOP (National Organic Program) requirements.
3. An organic inspector is assigned by the certification agency who verifies information and compliance with the NOP standards.
4. The applicant's file is reviewed by the certifying agency's official organic committee to determine whether the applicant is in compliance with NOP.
5. Certification continues until it is withdrawn by the producer or revoked by the certifying agency. Records maintained by the producer must be kept for at least five years and are auditable.

A list of current third-party organic certifiers is maintained by USDA, Agricultural Marketing Service (USDA-AMS 2010b).

B. Land and Herd Transition

A transition period to organic production is required. Land used for feed and for cows is required to be managed by organic standards for 36 months. If feed is grown on the farmer's land, then the farmer must be in the third year of transition of lands to organic production. Cows must graze for a minimum of 120 days during each grazing season. This clarifies the prior regulation stating that cows needed "access to pasture," which did not require a specific length of time. In addition, the cows must have daily access to the outdoors, shade, shelter, exercise areas, fresh air and direct sunlight. All replacement animals must be raised on the farm or purchased from another certified organic farm. After the year-long transition and the dairy herd is certified organic, all organic dairy replacement animals must be managed organically from the last third of gestation (three months prior to birth). Treated lumber is not allowed where it may be in contact with the animals or their feed once a farm is certified organic.

C. Feeding

The total feed ration, including supplements, must be certified organic. Antibiotics, GMO-derived products, animal by-products, artificial colors/flavors, synthetic flavoring agents and synthetic preservatives are not permitted in any feed products. If a

supplement contains soy oil, wheat middlings or molasses, for instance, these are agricultural products and must be certified organic. Cows must be managed by organic standards for at least 12 months (McCroly 2010). If bedding materials are to be consumed by animals, they must comply with the feed requirements and be certified organic.

D. Health Care Products

No antibiotics or hormones may be used; however, most vaccines can be used. All health care products with synthetic ingredients are prohibited for use, unless they are included in the national list of synthetic materials allowed for use in organic livestock production (Riddle 2010). However, producers are prohibited from withholding treatment to maintain the organic status of an animal. If an animal is treated with a prohibited product, the milk and meat from that animal can no longer qualify as organic; therefore, the animal must be sold as nonorganic or managed as nonorganic. If the animal is sold, a receipt must be kept as proof of sale.

Producers must follow NOP standards, which include recordkeeping, and submission to an audit if requested. Producers with annual sales of \$5,000 or less are exempt from certification. They must still follow NOP standards; however, they cannot use the claim *certified organic* on their product. For more information about on-farm requirements for organic labeling claims, visit the USDA AMS website at <http://www.ams.usda.gov/AMSV1.0/>.

E. Processing

If a producer wishes to expand into processing of organic milk products, several key steps must be followed. All organic processors must have an organic system plan, which is provided and reviewed by an accredited certification agency. The plans must be updated annually and operations must be inspected at least annually to ensure compliance with the organic system plan. Hence, operations producing and/or selling organic products must keep ongoing records to verify compliance. These records must fully disclose all activities and transactions of the certified operation in a manner that can be audited. These records must be maintained for at least five years and be sufficient to demonstrate compliance by the processor.

No GMOs (genetically modified organism) or irradiation may be used in processing. The processor must use organic minor agricultural ingredients in products labeled “organic,” unless such ingredients appear on section 205.606 of the national list and are not commercially available as organic (GPO Access 2007). Organic minor ingredients are ingredients such as flavors, colors or oils.

There must be no commingling or contamination of organic products when products are processed or stored. The processor must protect organic products and packaging from contamination. If pesticides are used in the processing facility, records of all applications must be kept. In addition, no packaging materials that contain fungicides, preservatives or fumigants may be used.

Processed products labeled as “100 percent organic” must contain (excluding water and salt) only organically produced ingredients and processing aids (USDA-AMS 2008b). Products that are simply labeled as “organic” must be comprised of at least 95 percent

organically produced ingredients (excluding water and salt). Remaining product ingredients must consist of nonagricultural substances approved on the National List of Allowed and Prohibited Substances. Processed products containing at least 70 percent organic ingredients can use the phrase “made with organic ingredients” and list up to three of the organic ingredients or food groups on the principal display panel. Processed products labeled “made with organic ingredients” cannot be produced using excluded methods, sewage sludge or ionizing radiation. The percentage of organic content and the certifying agent seal or mark may be used on the principal display panel, but the USDA seal cannot be used in this case. Producers and handlers who sell under \$5,000/ are exempt from certification, but they still have to follow the NOP. Non-certified organic producers can sell their products directly to customers or to retail stores, but their products cannot be used as organic ingredients or feed by other operations. Products from these processors may not use the “USDA Organic” seal.

For more information about the National Organic Program visit the Agricultural Marketing Service website at <http://www.ams.usda.gov/AMSV1.0/> and the Code of Federal Regulations at http://ecfr.gpoaccess.gov/cgi/t/text/text-dx?c=ecfr&sid=3f34f4c22f9aa8e6d9864cc2683cea02&tpl=/ecfrbrowse/Title07/7cfr205_main_02.tpl

Take-Home Messages

- Labels can serve as key pieces of information to let consumers know about the characteristics of milk and the production and processing methods used in bringing it to market.
- The labels can also market the milk based upon it being locally produced and fresh.
- Many types of labels require recordkeeping, third-party verification, and in some cases changing milk production and processing methods.
- Understanding the differences between the labels and the requirements associated with using each type of label is critical to successful product marketing.

IV. Summary

With production costs rising and the demand for milk and dairy products expected to increase, producers may be looking to capture more of the food dollar through on-farm value-added processes. A market for specialty value-added products already exists in Tennessee and that market is likely to expand as the population grows. However, if a producer is looking to enter into a value-added venture, it is important that the producer identifies a market and is familiar with the rules and regulations for the product. Also, there are additional costs and business risk that a producer must consider when evaluating the profitability of a value-added product. This publication does not include an in-depth discussion of assessing financial feasibility of a value-added undertaking, and this would be critical information toward developing an overall business plan. This publication provided an overview of the dairy industry in the state, value-added dairy products opportunities, and labeling of dairy products. A producer can use this publication as a starting point to research a business and marketing plan for his or her milking operation.

References Used

- Agricultural Marketing Resource Center. 2011. Dairy Sheep. Available at: http://www.agmrc.org/commoditiesproducts/livestock/lamb/dairy_sheep.cfm (accessed September 2011).
- American Dairy Goat Association. 2010. Available at <http://adga.org> (accessed September 2010).
- Boehm, W. T. 1975. The Household Demand for Major Dairy Products in the Southern Region. *Southern Journal of Agricultural Economics* 7(2): 187-96.
- Boehm, W. T. and E. M. Babb. 1975. Household Consumption of Beverage Milk Products. Purdue University, Department of Agricultural Economics.
- Carpio, C. and O. Isengildina-Massa. 2008. Consumer Willingness to Pay for Locally Grown Products: The Case of South Carolina. *Paper presented at the Southern Agricultural Economics Association Annual Meeting*. February 2-6, 2008.
- Dairy Council of California. 2010. Types of Milk. Available at http://www.dairycouncilofca.org/Milk-Dairy/Milk_Types.aspx (accessed September 2010).
- Davis, C. G., D. Blayney, D. Dong, S. T. Yen and R. J. Johnson. 2011. Will Changing Demographics Affect U.S. Cheese Demand? *Journal of Agricultural and Applied Economics* 43(2):259–273.
- Food and Drug Administration (FDA). 2010. Code of Federal Regulations. Title 21—Food and Drugs, Chapter I—Food and Drug Administration, Department of Health and Human Services, Subchapter B—Food for Human Consumption, Part 101—Food Labeling. Available at <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcr/CFRSearch.cfm?fr=101.22> (accessed September 2010).
- Food and Drug Administration (FDA). 1994. Voluntary Labeling of Milk and Milk Products From Cows That Have Not Been Treated With Recombinant Bovine Somatotropin, Interim Guidance. 59 FR 6279 [Federal Register: February 10, 1994].
- Global Dairy Innovation (GDI). 2010. Milk Nutrition Labels & Dairy Labels. Available at <http://www.globaldairyinnovation.com/dairy-innovation-benefits/organic-milk-vs-regular-milk.aspx> (accessed September 2010).
- GPO Access. 2007. Code of Federal Regulations, Title 7: Agriculture, Part 205-National Organic Program, Subpart G-Administrative-The National List of Allowed and Prohibited Substances, 72 FR 35140. Available at <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=f3ccef4eaa05dac8de45d974e645875&rgn=div8&view=txt&node=7:3.1.1.9.32.7.342.7&idno=7> (accessed September 2010).
- Harris, Robert and Endel Karmas. 1975. *Nutritional Evaluation of Food Processing*. Westport, Connecticut: The AVI Publishing Company, Inc.
- Huang, C. L. and R. Raunikar. 1983. Household Fluid Milk Expenditure Patterns in the South and United States. *Southern Journal of Agricultural Economics* 15(2) 27-33.
- IMPLAN. 2010. Economic Model. Available at <http://implan.com/V4/Index.php> (accessed September 2010).
- Iowa State University Extension. 2009. Feasibility Study Outline. Available at <http://www.extension.iastate.edu/agdm/wholefarm/html/c5-66.html> (accessed September 2010).
- Iowa State University Extension. 2007. Organic Production Planning Concepts File B1-24. Available at <http://www.extension.iastate.edu/agdm/livestock/pdf/b1-24.pdf> (accessed September 2010).

- Kiesel, K. and S. Villas-Boas. 2007. "Got Organic Milk? Consumer Valuations of Milk Labels after the Implementation of the USDA Organic Seal." CUDARE Working Papers, Paper 1024, University of California, Berkeley.
- Liebrand, Carolyn. 2007. Financial Profile of Dairy Cooperatives. USDA Rural Development Research Report 219. Available at <http://www.rurdev.usda.gov/rbs/pub/RR219.pdf> (accessed September 2010).
- Ling, Charles. 2007. Marketing Operations of Dairy Cooperatives: 2007. USDA Rural Development Research Report 218. Available at http://future.aae.wisc.edu/publications/marketing_operations_dairy_coops_2007.pdf (accessed September 2010).
- McCrary, L. 2010. Transition to Certified Organic Milk Production. eOrganic. Available at <http://www.extension.org/article/18552> (accessed September 2010).
- Middleton, B. and M. Murray (2009). Population Projections for the State of Tennessee, 2010-2030. The University of Tennessee Center for Business and Economic Research. Available at http://tennessee.gov/tacir/PDF_FILES/Other_Issues/Population2010.pdf (accessed September 2011).
- Olynk, N. J., G. T. Tonsor and C. A. Wolf. 2010. Consumer Willingness to Pay for Livestock Credence Attribute Claim Verification. *Journal of Agricultural and Resource Economics* 35(2) 261-280.
- Onozaka, Y., G. Nurse and D. McFadden. 2010. Local Food Consumers: How Motivations and Perceptions Translate to Buying Behavior. *Choices Magazine*. Available at <http://www.choicesmagazine.org/magazine/article.php?article=109> (accessed September 2010).
- Paine, L. 2009. Grass-Based Dairy Products: Challenges and Opportunities. Wisconsin Department of Agriculture, Trade and Consumer Protection. Available at <http://www.cias.wisc.edu/wp-content/uploads/2009/09/gbdairyreportfinalowres.pdf> (accessed September 2010).
- Pick Tennessee Products. 2010. Milk. Available at <http://www.agriculture.state.tn.us/Marketing.asp?QSTRING=DMI> (accessed September 2010).
- Riddle, J. 2010. Synthetic Substances Allowed for use in Organic Livestock Production in the United States. eOrganic. Available at <http://www.extension.org/article/18553> (accessed September 2010).
- Salathe, L. E. 1979. *Household Expenditure Patterns in the United States*. U. S. Department of Agriculture, Technical Bulletin No. 1603.
- Sanford, John. 2010. Tennessee Department of Agriculture. Personal Communication (Summer 2010).
- Tennessee Department of Agriculture (TDA). 2011. Grade A Dairy List of Tennessee by County. Purchased May 2011.
- Tennessee Department of Agriculture (TDA). 2010. Tennessee Agriculture: 2010 Annual Report. Available at http://www.tennessee.gov/agriculture/publications/annualreport/annual_report.pdf (accessed September 2010).
- Tennessee Department of Agriculture (TDA). 1999. Rules of Tennessee Department of Agriculture Dairy Division, Chapter 0080-3-2 Regulation Governing Fluid Milk and Fluid Milk Products, 0080-3-2-.11 Milk And Milk Products Which May Be Sold. Available at <http://www.tennessee.gov/sos/rules/0080/0080-03/0080-03-02.pdf> (accessed September 2010).
- Thomas, David. 1996. Dairy Sheep Basics for Beginners. Department of Meat and Animal Science, University of Wisconsin-Madison. Available at http://www.ansci.wisc.edu/Extension-New%20copy/sheep/Publications_and_Proceedings/Pdf/Dairy/Management/Dairy%20sheep%20basics%20for%20beginners.pdf (accessed September 2011).
- TN Farm Fresh. 2010. What is Tennessee Farm Fresh?. Available at <http://www.tnfarmfresh.com/aboutus.asp> (accessed September 2010).

- U.S. Census Bureau. 2011. American Fact Finder. Available at <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml> (accessed September 2011).
- _____. 2008a. 2008 Annual Survey of Manufactures. Available at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=AM0831AS101&-geo_id=0400US47&-search_results=01000US&-lang=en (accessed September 2010).
- _____. 2008b. 2008 County Business Patterns for Tennessee. Available at <http://censtats.census.gov/> (accessed September 2010).
- _____. 2005. Interim State Population Projections. Available at <http://www.census.gov/population/www/projections/projectionsagesex.html> (accessed September 2010).
- _____. 2010a. National and State Population Estimates. Available at <http://www.census.gov/popest/states/NST-ann-est.html> (accessed September 2010).
- _____. 2010b. Small Area Income and Poverty Estimates, State and County Interactive Tables. Available at <http://www.census.gov/did/www/saipe/county.html> (accessed September 2011).
- U.S. Department of Agriculture, Agricultural Marketing Service (USDA-AMS). 2010b. Complete Domestic ACA List. Available at <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5074486> (accessed September 2010).
- _____. 2009. Federal Milk Marketing Order Marketing and Utilization Summary, Annual. Available at <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5082659> (accessed September 2010).
- _____. 2010a. Federal Milk Marketing Orders Map. Available at <http://www.ams.usda.gov/> (accessed September 2010).
- _____. 2008a. Grass Fed Marketing Claim Standards. Available at <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateDatado?template=TemplateN&navID=GrassFedMarketingClaimStandards&rightNav1=GrassFedMarketingClaimStandards&topNav=&leftNav=GradingCertificationandVerification&page=GrassFedMarketingClaims&resultType=&acct=lsstd> (accessed September 2010).
- _____. 2007. Grass (Forage) Fed Marketing Claim Standard (October 16, 2007, Federal Register Notice (72 FR 58631)) – PDF. Available at <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5063842> (accessed September 2010).
- _____. 2008b. Organic Labeling and Marketing Information. Available at <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELDEV3004446&acct=nopgeninfo> (accessed September 2010).
- U.S. Department of Agriculture, Economic Research Service (USDA-ERS). 1999. Agriculture Information Bulletin No. (AIB750). Available at <http://www.ers.usda.gov/publications/aib750/aib750i.pdf> (accessed September 2010).
- _____. 2010a. Commodity Costs and Returns: Data-US Milk and Tennessee Monthly Milk Costs of Production. Available at <http://www.ers.usda.gov/Data/CostsAndReturns/TestPick.htm> (accessed September 2010).
- _____. 2011. Food Environment Atlas. Available at <http://ers.usda.gov/FoodAtlas/> (accessed September 2011).
- _____. 2010b. Food Marketing System Briefing Room. Available at http://www.ers.usda.gov/Briefing?FoodMarketingSystem/new_product.htm (accessed September 2010).
- _____. 2010c. Livestock, Dairy, and Poultry Outlook: Tables. Available at <http://www.ers.usda.gov/publications/ldp/LDPTables.htm> (accessed September 2010).

- _____. 2009. Price Spreads from Farm to Consumer: At-Home Foods by Commodity Group. Available at <http://www.ers.usda.gov/Data/FarmToConsumer/pricespreads.htm> (accessed September 2010).
- U.S. Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). 2007. 2007 Census of Agriculture. Available at http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Tennessee/cp99047.pdf (accessed September 2010).
- _____. 2002. 2002 Census Ranking of Market Value of Ag Products Sold. Available at http://www.agcensus.usda.gov/Publications/2002/Rankings_of_Market_Value/Tennessee/index.asp (accessed September 2010).
- _____. 2010c. 2009 Dairy Products Annual Summary. Available at <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1054> (accessed September 2010).
- _____. 2008. Goat Milk Processor Survey. Available at http://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/Dairy/goatmilkproc.pdf (accessed September 2010).
- _____. 2010a. Milk Production, Disposition, and Income 2009 Summary. Available at <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1105> (accessed September 2010).
- _____. 2009. 2008 Organic Survey. Available at http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Organics/ (accessed September 2010).
- _____. 2010b. Tennessee Farm Facts. Available at http://www.nass.usda.gov/Statistics_by_State/Tennessee/Publications/Farm_Facts/ff021810.pdf (accessed September 2010).
- Wolfe, K., C. Escalante, and J. McKissick. 2006. Market Analysis of Traditional, Grass Fed & Organic Milk in Selected Markets. Center for Agribusiness and Economic Development, University of Georgia, CR-06-09.
- Wong, J., U. Raghunathan, C. Escalante, and K. Wolfe. 2008. Grass-Fed Versus Organic Dairy Production: Southeastern US Willingness to Pay. *Paper presented at the American Agricultural Economics Association Annual Meeting*. July 27-29, 2008.