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CHANGES IN THE ARIZONA ORDER'S MILK SHED: 2000 – 2015

John Mykrantz ¹

Change is perhaps the only constant. Changes in the character of the milk shed of the Arizona Order over the last 15 years illustrate this point. ² Where milk is produced and the size of dairies has changed significantly. Using three perspectives, this article attempts to illustrate some of those changes by looking at producer milk and producer numbers in October of 2000, 2005, 2010 and 2015.

General Changes

In October 2000, 116 producers delivering a total of 238 million pounds comprised the milk shed of the Arizona Order. Fifteen years later, in October 2015, the number of producers decreased to 97, but the milk delivered to the market increased to 388 million pounds, or about 60 percent. This dramatic change in the Arizona can be illustrated a number of ways. The easiest way is through simple statistics as are shown in Table 1. The number of producers, average production, minimums and maximums, and average per day tell one story. While the number of producers declined by 16 percent since 2000, the average production per producer increased from about 2 million pounds to nearly 4 million pounds, or over 90 percent. Average production per producer per day increased from 66,000 pounds in 2000 to 129,000 pounds in 2015. And while the size of the smallest farm has not changed substantially, the largest farm has grown by almost 120 percent. One last simple statistic is a measure of the variability or diversity of dairy farm size in the region, the coefficient of variation (CV). The CV is calculated as the standard deviation divided by the average (mean). Over the period, the distribution of farm sizes has remained relatively constant, with a CV of a little over 90 percent. The consistency suggests that most producers have effectively grown together. One last aspect of the changes in the milk shed of the Arizona Order that may be evident in the simple statistics, but not particularly obvious, are two regulatory changes that occurred in April and May 2006. In April 2006, the Arizona Order was changed after a hearing and a vote of producers to fully regulate all handlers whose routes exceed 3.0 million pounds and who meet the criteria of a pool distributing plant. In addition, in May 2006, Congress passed the Milk Regulatory Equity Act (MREA) of 2005 which “ensured regulatory equity between and among all dairy farmers and handlers for sales of packaged fluid milk in federally regulated milk marketing areas and into certain non-federally regulated milk marketing areas from federally regulated areas.” ³ Some of the change between 2005 and 2010 can be attributed to these changes in the structure of the Arizona Order.

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² The milk shed includes producers primarily in Arizona, but also California and Texas.

³ MREA of 2005: <https://www.congress.gov/109/plaws/publ215/PLAW-109publ215.pdf>

Table 1: Descriptive Statistics of Producers and Producer Milk: October

Variable	2000	2005	2010	2015	% Δ 2000-2015
Number of Producers	116	86	98	97	-16%
Total Production	238,430,593	233,004,093	339,918,864	387,918,140	63%
Minimum *	107,000	50,000	147,000	30,000	-72%
Maximum †	11,000,000	14,000,000	20,000,000	24,000,000	118%
Average Per Producer	2,055,436	2,709,350	3,468,560	3,999,156	95%
Average Per Producer Per Day	66,304	87,398	111,889	129,005	
Standard Deviation of Production	1,907,513	2,534,298	3,151,462	3,702,401	94%
Coefficient of Variation ‡	93%	94%	91%	93%	0%

* Excludes milk associated with agricultural fairs. Rounded to nearest thousand.

† Rounded to nearest million.

‡ Standard deviation of production divided by average production per producer.

Changes by Region

Another way to illustrate the story of changes in the milk shed of the Arizona Order relates to how milk production has moved between regions. To tell this story, two regions were defined: 1) Arizona; and 2) California. Texas has also become a source of milk in certain months but this data is restricted. The vast majority of producers and producer milk pooled on the Arizona Order have been located in Arizona across the period (See Table 2). However, the share of producers represented by California has increased from three percent of the total in 2000 to five percent in 2015. Were Texas to be included, the percentage of milk from States other than Arizona would be higher. A change not shown in Table 2 relates to farms moving between counties in Arizona. As the suburbs of Phoenix have expanded, many producers have ceased production in Maricopa County, and some have moved to neighboring Pinal County. Some aspects of the change in the Arizona Order's milk shed can be seen in data published in the Compilation of Statistical Material for the Arizona Order, which can be found at: <http://fmmaseattle.com/statisticalreport.html>.

Table 2: Producer Milk and Producers by Region: October

Region	Producer Milk (Million Pounds)				Number of Producers			
	2000	2005	2010	2015	2000	2005	2010	2015
Arizona *	230	233	323	369	113	86	88	86
California	8	R	17	19	3	R	10	11

	Percent of Producer Milk				Percent of Producers			
	2000	2005	2010	2015	2000	2005	2010	2015
Arizona *	97%	100%	95%	95%	97%	100%	90%	89%
California	3%	R	5%	5%	3%	R	10%	11%

* Arizona includes Texas in 2015.

R - Restricted. Included in Arizona.

Changes by Size-Range of Production

One more way to tell the story of changes in the milk shed of the Arizona Order is to look at changes in what share of the market is supplied by small, medium, medium/large, large, and very large dairy farms. Looking at the data through changes in how the market is supplied by different sized dairies reveals some stark changes. For this analysis, farm size is measured in

pounds of pooled milk delivered by each producer (See Table 3).⁴ The portion of the market supplied by small, medium, and medium/large-sized dairies has dropped by 30 percentage points from about 46 percent to 16 percent. The portion supplied by large and very large size farms has increased by about 30 percentage points from about 54 percent to 84 percent. But while the character of market has changed significantly, small, medium and medium/large size farms still represent 44 percent of the total number of producers.

Table 3: Producer Milk and Producers by Size Range of Production: October

Size Category	Size-Range *		Producer Milk (Million Pounds)				Number of Producers			
	≥	<	2000	2005	2010	2015	2000	2005	2010	2015
Small		0.25	0.33	0.49	0.15	0.03	3	4	1	2
Medium	0.25	1.00	25.71	10.14	7.12	6.98	37	15	11	9
Medium/Large	1.00	2.50	83.87	57.21	64.01	56.93	49	34	37	32
Large	2.50	5.00	58.46	73.26	93.43	109.17	17	21	27	28
Very Large	5.00		70.06	91.90	175.21	214.80	10	12	22	26

Size Category	Size-Range *	Size-Range *	Percent of Producer Milk				Percent of Producers			
			2000	2005	2010	2015	2000	2005	2010	2015
Small	0.00	0.25	0.1%	0.2%	†	†	2.6%	4.7%	1.0%	2.1%
Medium	0.25	1.00	10.8%	4.4%	2.1%	1.8%	31.9%	17.4%	11.2%	9.3%
Medium/Large	1.00	2.50	35.2%	24.6%	18.8%	14.7%	42.2%	39.5%	37.8%	33.0%
Large	2.50	5.00	24.5%	31.4%	27.5%	28.1%	14.7%	24.4%	27.6%	28.9%
Very Large	5.00		29.4%	39.4%	51.5%	55.4%	8.6%	14.0%	22.4%	26.8%

* Million pounds.

† Less than 0.05%.

Summary

Over the past 15 years, the character of the milk shed of the Arizona Order has changed dramatically. Producers have grown larger and the milk shed has moved and expanded. And while the larger dairy farms have grown yet larger, over 40 percent of the producers in the milk shed currently produce less than 2.5 million pounds per month, and about 11 percent produce less than one million pounds per month. It will be interesting to see what changes the next five years will bring.

⁴ These ranges are for illustration purposes only and are not intended to reflect a specific industry standard or common understanding of dairy farm size. Using an aggregate milk production per cow figure for Arizona (1,930) calculated from National Agricultural Statistics Service data for October 2015, the production by size-range categories roughly translate as follows: small: 1-130 cows; medium: 130-520 cows; medium/large: 520-1,300 cows; large: 1,300-2,600 cows, and very large: more than 2,600 cows.