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# Where's the Feed (for MPP-Dairy)?

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According to the March 26 USDA Economic Research Service Milk Cost-of-Production Estimates total feed costs now represent nearly 80 percent of the total operating costs of producing milk in the U.S. To address the income risk associated with higher livestock feed prices the 2014 Farm Bill introduced the Margin Protection Program for Dairy Producers (MPP-Dairy). Several *farmdoc Daily* articles have explored program features and farmer participation in MPP-Dairy (*farmdoc daily* February 12, 2014, *farmdoc daily* November 5, 2014, and *farmdoc daily* February 11, 2015).

An often overlooked component of MPP-Dairy is that it creates a new index by which USDA will measure the average feed costs associated with producing 100 pounds of milk. As part of this measurement USDA specifies the quantity of feed ingredients used in a generic ration for feeding milking cows, hospital cows, dry cows, and replacement heifers (National Milk Producers Federation, 2010). The MPP-Dairy feed ration consists of 1.0728 bushel of corn, 0.00735 tons of soybean meal, and 0.0137 ton of alfalfa hay per 100 pounds of milk produced. Actual feed ingredients and ration quantities likely differ from the MPP-Dairy ration. As evidence, USDA's Risk Management Agency identifies a number of alternative dairy feed ingredients based on protein and energy content per ton (USDA Risk Management Agency, 2010).

Not including alternative feed ingredients or ration allocations, an analysis of USDA Crop Production and Milk Production statistics reveals that two-thirds of U.S. states do not produce enough corn, soybeans, or alfalfa hay to fulfill the feed requirements of MPP-Dairy. In order to provide some perspective on the source of MPP-Dairy feed ingredients relative to the concentration of U.S. milk production, today's article uses 2014-15 marketing year crop production to map the deficit (or surplus) of corn, soybeans, and alfalfa hay relative to the MPP-Dairy feed ration.[1] For corn and soybeans the marketing year runs from September through August, while alfalfa cutting can occur several times per year depending on climate conditions, plant maturity, and calendar date.[2]

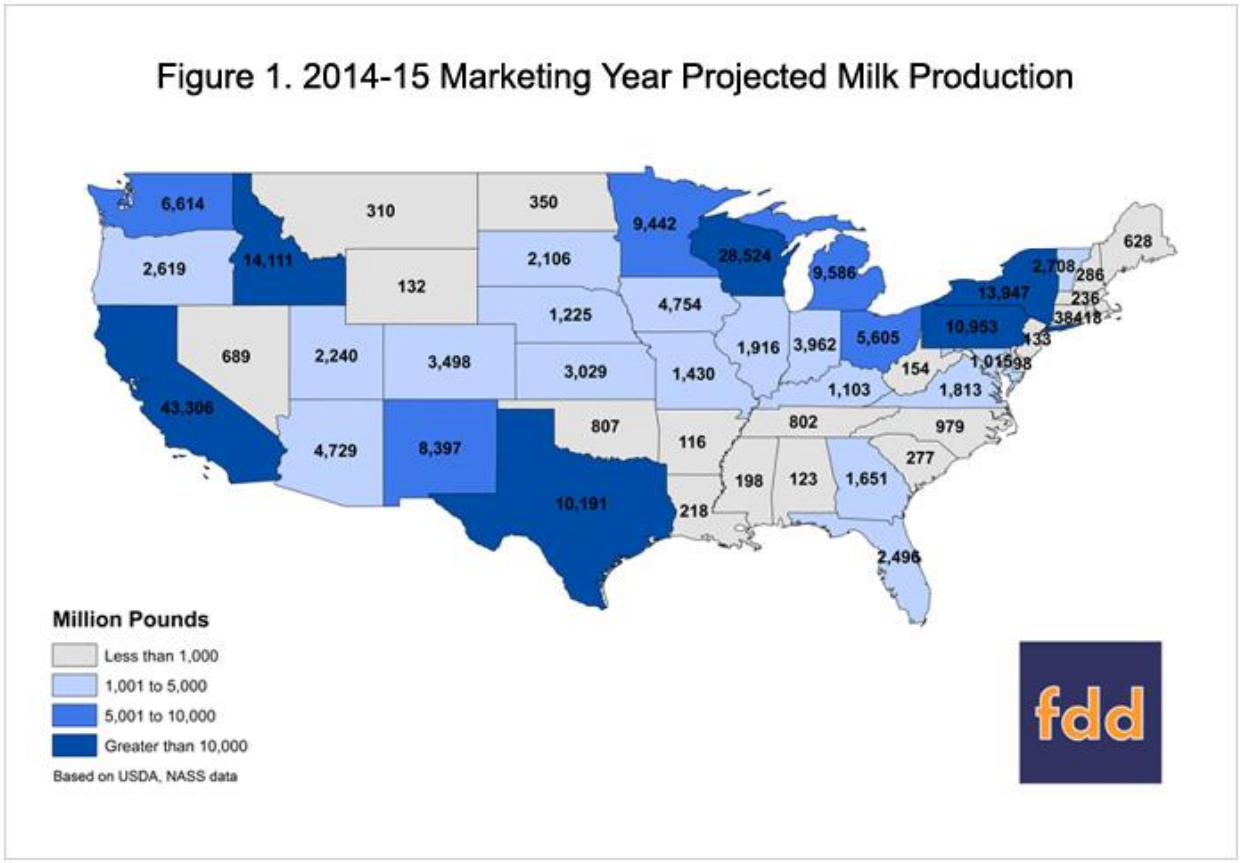
[1] Soybean meal is converted to soybean equivalents using a 47.5 pounds per bushel conversion rate.
[2] For the purpose of this analysis alfalfa availability and usage will follow the corn and soybean marketing year

**2014-15 Marketing Year Estimated Milk Production**

The 2014-15 marketing year is well underway for crops such as corn or soybeans in that harvesting is complete and only the pace of consumption remains unknown. For milk however, slightly less than half of the production has yet to occur (mid-April through August). In order to estimate how much milk may be produced for the remainder of the 2014-15 marketing year, U.S. milk production data from the 2013-14 marketing year was increased by amount equal to the growth in the milk supply experienced thus far during the 2014-15 marketing year (approximately 3.1 percent). This calculation resulted in an estimate of 210 billion pounds of milk produced from September 2014 to August 2015.

Monthly state-level milk production data is only available for the top 23 milk producing states. To approximate state-level milk production volumes for the entire U.S., the 210 billion pounds of milk were allocated to each state based on the state's 2012 to 2014 annual average share of U.S. milk production. Figure 1 details the projected milk production volume by state for September 2014 through August 2015. As demonstrated, projected milk production is concentrated in California, Idaho, Texas, the Upper Midwest, and Northeast portions of the U.S. Among those areas California leads the U.S. with an estimated 43 billion pounds of milk produced during the 2014-15 marketing year.

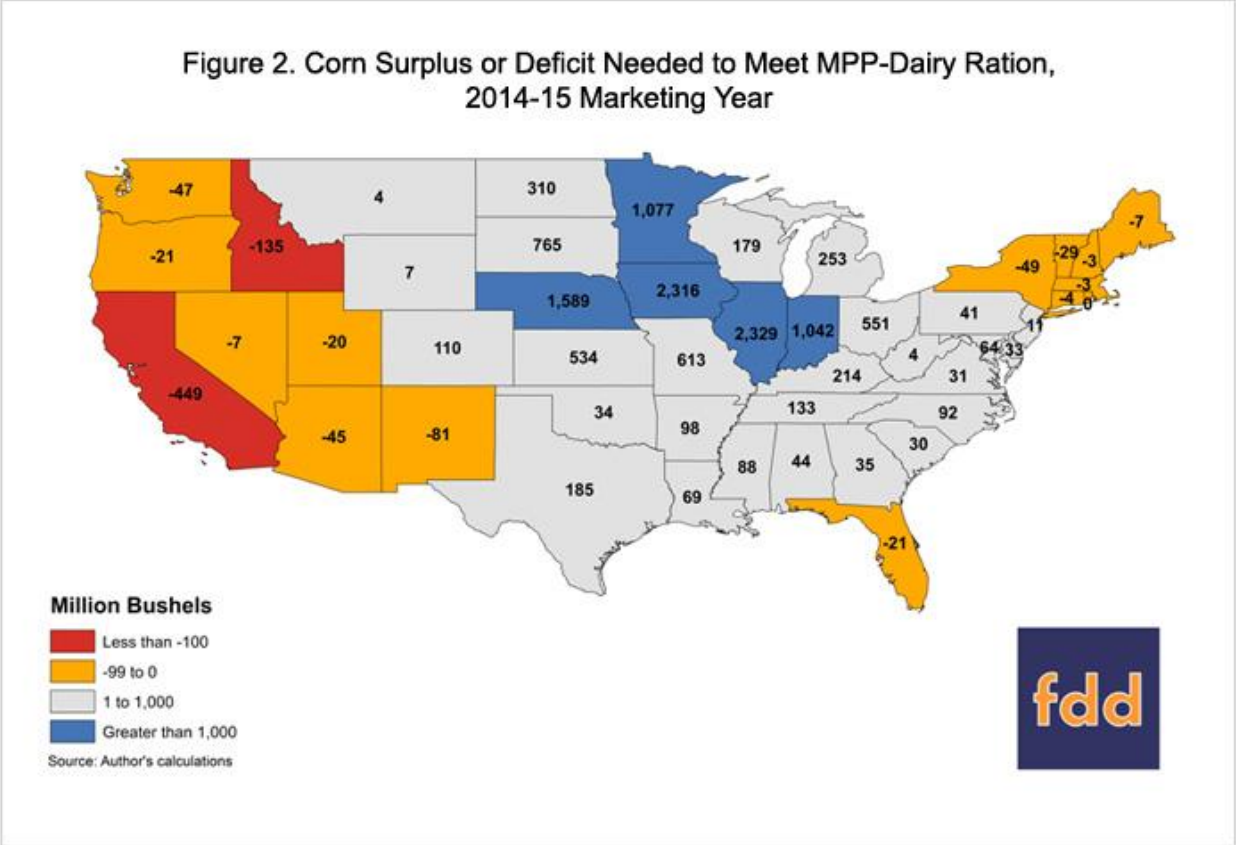
Figure 1. 2014-15 Marketing Year Projected Milk Production




**Livestock Feed Requirements and Availability**

To produce the estimated 210 billion pounds of milk, and based on the MPP-Dairy ration, 2.3 billion bushels of corn, 15 million tons of soybean meal (equivalent to 650 million bushels of soybeans), and 29 million tons of alfalfa hay are required. To put this into perspective, for the 2014-15 marketing year, the U.S. produced 14.2 billion bushels of corn, 4.0 billion bushels of soybeans, and 61.4 million tons of alfalfa hay. Accordingly, 16 percent of corn production, 16 percent of the soybean production, and 47 percent of the alfalfa hay production is needed to meet the ration requirements of MPP-Dairy.

As evidenced by the USDA Crop Production report and based on the MPP-Dairy ration, many states do not produce enough livestock feed to satisfy the demands of their state-level milk production. For example, California requires 465 million bushels of corn to produce 43 billion pounds of milk. However, during the 2014-15 marketing year California produced only 16 million bushels of corn grain, approximately 3 percent of the total MPP-Dairy amount required. This leaves California 449 million bushels short of the amount of corn needed to meet the MPP-Dairy ration, Figure 2. For states deficit in corn production, these bushels must be shipped into the state or offset through modifications in the feed ration.




Similar analyses can be done for soybean meal and alfalfa hay. As demonstrated in Figure 3, a similar pattern to the one observed for corn emerges for soybeans in that Western states are deficit soybean producing regions relative to the MPP-Dairy ration.[3] This is partially to be expected as states such as Illinois, Indiana, and Iowa have competitive advantages for crop production, while states such as California, Idaho, and Texas generally enjoy greater economies of scale in milk production.

The leading states for alfalfa hay production are California, South Dakota, and Idaho. These and other states in the Upper Midwest and Western portions of the U.S. account for the majority of the alfalfa production. Accordingly, except for California, many of these states are surplus alfalfa producing regions. Deficit regions for alfalfa hay production include large portions of Southern U.S. and the Northeast. New York is the largest deficit state at 1.2 million tons of alfalfa.

[3] Figure 4 does not reflect soybean crushing locations or volumes.

Figure 3. Soybean Surplus or Deficit Needed to Meet MPP-Dairy Ration, 2014-15 Marketing Year

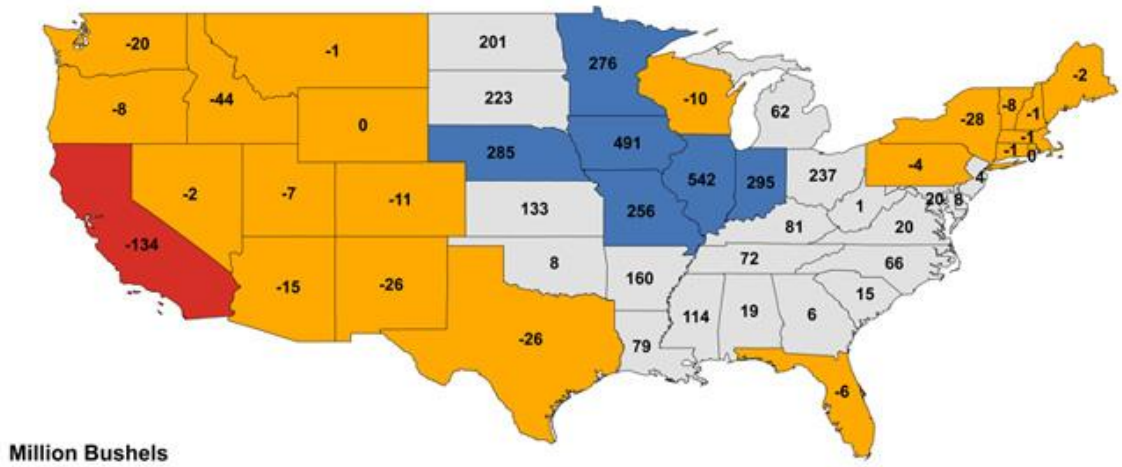
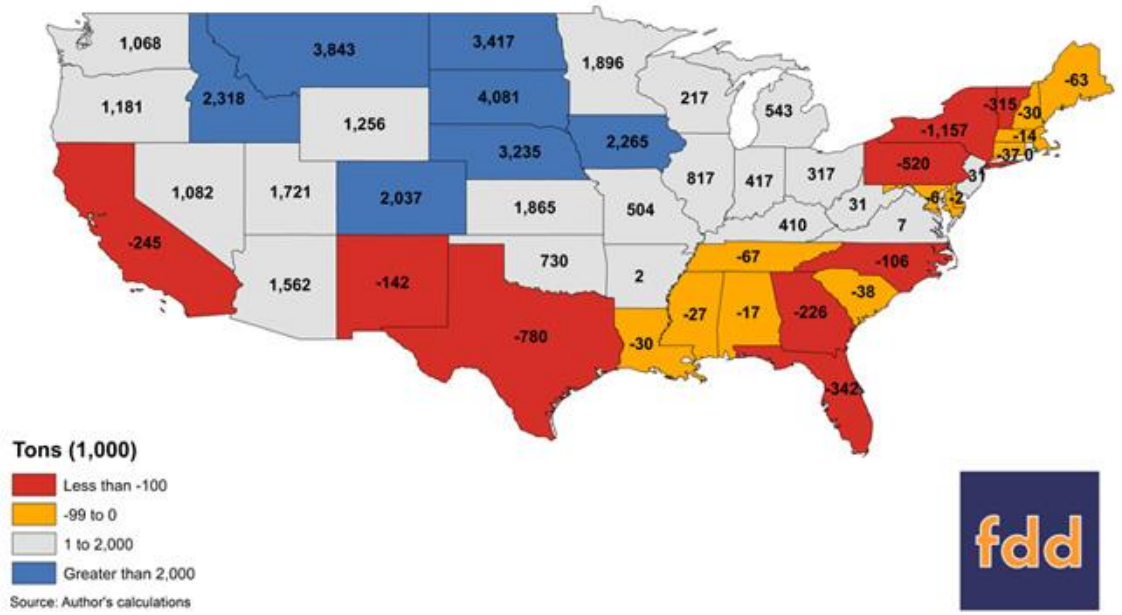


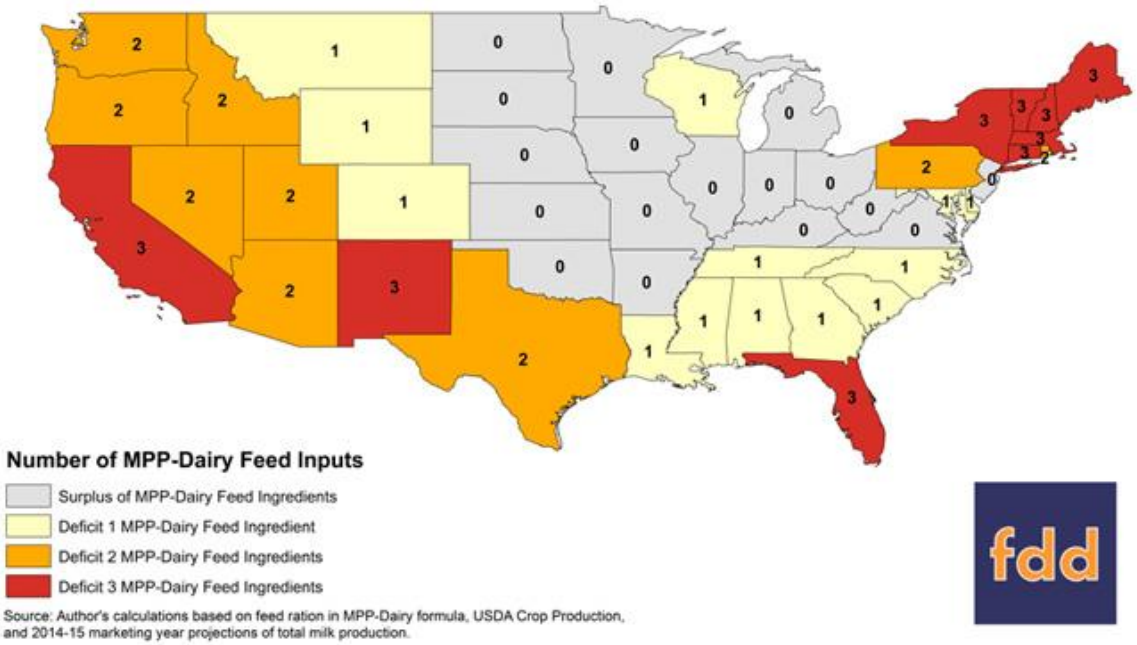

Figure 4. Alfalfa Hay Surplus or Deficit Needed to Meet MPP-Dairy Ration, 2014-15 Marketing Year



**Implications**

As part of the 2014 Farm Bill's MPP-Dairy program USDA now reports each month an estimate of the average feed costs needed to produce 100 pounds of milk based on three feed ingredients: corn, soybean meal, and alfalfa hay. Based on the quantity of feed ingredients in the MPP-Dairy ration formula, USDA Crop Production data reveals that several principle milk producing states are deficit in the production of corn, soybeans, and alfalfa hay. Across the U.S. 33 states are deficit one or more MPP-Dairy ingredients, and more than 20 percent of U.S. states are deficit in all three ration components, Figure 5. For states deficit in the production of livestock feed, feed ingredients must be imported into the state or offset through modifications in the feed ration.

Figure 5. Number of Deficit MPP-Dairy Feed Inputs Among Corn, Soybean Meal, and Alfalfa Hay, 2014-15 Marketing Year




Source: Author's calculations based on feed ration in MPP-Dairy formula, USDA Crop Production, and 2014-15 marketing year projections of total milk production.

This shortage of MPP-Dairy ration ingredients is not a recent development. To compliment this analysis, supplemental data online shows state-level ration requirements for MPP-Dairy using 2006-07 to 2013-14 marketing year data: Tableau Public. States such as California, Idaho, New York, Texas, and even Wisconsin are consistently short in the production of MPP-Dairy livestock feed ingredients.

Financially, the need to import livestock feed can represent a significant portion of total feed costs. USDA's Milk Cost-of-Production Estimates indicated that on average purchased feed costs represented more than 50 percent of U.S. dairy farmer total feed costs. Obviously, for states appreciably deficit in feed production this percentage is even greater. Using California as an example, given the low levels of corn and soybean production, on average for the current marketing year 74 percent of the MPP-Dairy feed ration must be purchased and imported into the state. With marketing year average prices for corn at $3.70 per bushel and soybean meal at $370 per ton reported in USDA's April 9 World Agricultural Supply and Demand Estimates, for California these MPP-Dairy purchased feed costs represent nearly $3 billion dollars (not including local basis).

The observation that principle milk producing regions are (and have historically been) feed deficit was not unanticipated. In fact, the impressive milk production growth rates in states like California, Idaho, and

Texas was largely facilitated by land availability for large-scale dairy operations and the low costs of sourcing feed ingredients. Transporting livestock feed is a cost-effective way of outsourcing the production of water-intensive row crops. Given that one acre of corn can require as much as 670 thousand gallons of water this pattern is unlikely to reverse. Instead, it is more likely that weather related shocks to the feed supply will continue to negatively impact the profitability of these dairy operations. Even farmers more dependent on home-grown feed are exposed to supply shocks in livestock feed (e.g. 2012). Consequently, as demonstrated in this article, the deficit of MPP-Dairy feed ingredients in several milk producing regions underscores the importance of farmers utilizing income-based risk management tools.

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