

Whole Farm Nutrient Analysis: The Casey Farm

Posted on [November 2, 2011](#) (Small Farms Quarterly, Fall 2011).

Bill and Joanne Casey of Apulia Station, NY own a 60 cow organic, grass based dairy farm. Management intensive grazing is essential to feeding the herd. Pastures, which are both grazed and mechanically harvested as baleage, only receive manure deposited by the cows. The Caseys also compost manure and spread it in the fall on hay ground. In 2009, the Caseys joined the three year Whole Farm Nutrient Analysis project (WFA), a Cornell Nutrient Management Spear Program (NMSP) initiative. A WFA goal for the 11 participating farms was to identify opportunities for improved nutrient inputs or allocations to benefit the environment and farm profitability. Casey explained why he participated. “I thought it would be a good learning opportunity to gain a better handle on my management’s impact on the soil resources. I spread compost in the fall to avoid manure residue in baleage, but haven’t applied any other nutrients for 15 years. I hoped to learn about the effect over time.”

Patty Ristow, NMSP Extension Associate, outlined the WFA process. “Each farmer assembled a team of people. Initially, farmer concerns were identified and goals were set. After data analysis got underway, we held meetings to discuss the results and their application to the farmer’s concerns. We then developed an action plan to address those issues.” Casey identified a herd health concern. “I had a few fresh cows three years ago that didn’t respond to normal milk fever treatments. Pumping the cows with phosphorus got them up and going but I wasn’t fully aware of the cause. I questioned the risk of repeated problems and hoped the farm data would reveal answers to the team. Compounding the problem is that we’re unable to separate dry cows from the milking herd so a dry cow ration isn’t an option”. The Casey’s team included Ristow, John Conway, Cornell PRO-Dairy Extension Associate and Janice Degni, Cornell South Central NY Dairy Team Field Crop Specialist.



Group discussions facilitated data interpretation at Casey Dairy. Photo by Quirine Ketterings

Ristow explained, “The first team step was gathering relevant data to analyze the farm’s nutrient use efficiency. The next step was running the data through diagnostic tools generally used in

stand-alone fashion. The tools applied on the Casey farm were five years of Nutrient Mass Balance (NMB) data, past and current soil tests, and manure and forage analyses. The integrated results provided a comprehensive view (of the nutrient status) of the farm.”

The NMB approach calculates the annual net nutrients (N, P and K) that remain on a farm by subtracting nutrients exported from those imported, providing a picture of nutrient trends across the entire operation. Soil test reports in conjunction with manure and forage analyses provide a more field specific view of these trends. Degni compiled the Casey’s NMB and noted, “This went smoothly as the Caseys’ had excellent records. The NMB showed that compared to other NYS farms, potassium remaining on the farm was relatively high, phosphorus was moderately low and nitrogen was well-balanced.”

Degni explained how the data fit together. “The NMB trend of high K balances along with moderate to high K forage analyses, high K manure nutrient ratios and somewhat high K soils were very useful in identifying potential dry cow issues.” Conway remarked, “Having everyone at the table facilitated data interpretation. Bill faces the same challenge as non-organic dairies in trying to provide some low K forage. The data are a point of awareness. If dry cow issues persist, Bill knows to consider their K intake from the forages.” Casey noted, “The team discussions about potassium levels have proven useful, as I’m finding the cows rejecting high quality, very high K forages. I’m more keenly aware of how forage quality affects animal performance and the cows’ view of the feed”.

The diagnostic tools led the discussions from problem identification to solutions. Ristow explained, “The soil results were displayed graphically and, together with farm maps, clearly showed where nutrients were ultimately ending up. The soil tests also indicated mostly optimum-range phosphorus, with many fields at the low end of optimum. Along with the NMB trend, this illustrated that phosphorus could drop too low in certain fields. This identified the opportunity to adjust P and K levels on individual fields by changing manure distribution.”

Casey added evidence to the nutrient imbalance discussion, “Back when the cow health problems occurred, I had to purchase some forage that was organic-by-neglect. I believe *low* nutrient levels, especially P rather than high K, caused the problems. The severe milk fevers were resolved by returning to homegrown forages. In addition, I decreased milk fever occurrence by reducing the cows’ dry period to 45 days.

The P and K data changed Casey’s manure application management as well. He commented, “Before this program, I hadn’t sat down and analyzed my farm’s soil test data. I was spreading to obtain maximum yields with manure N. When I learned how high the potassium levels were in some fields, I changed where the manure compost gets spread. As an organic farm, I’ve maximized on-farm resources to avoid purchased inputs. By continuing to track soil tests I can determine if the changes I’m making in manure allocations address phosphorus needs or whether I might have to purchase phosphorus. Where the WFA program really provided insight was getting specific about nutrient allocation. Now I have the knowledge to plan manure applications and improve the forage allocation to the cows.”

The Casey's team summarized their WFA experience. Degni stated, "It was very worthwhile as we're all learning. I view it as part of a process in developing effective tools to help farms be more efficient and profitable." Conway agreed, "It was really interesting to see how the diagnostic tools can fit together to provide useful information." Casey noted the project's impacts. "Farming in an environmentally sound manner is very important to me. Participation in the WFA project helped with my nutrient efficiency goals. It also had a positive impact on profitability by helping me increase forage quality, palatability and yields."

Lisa Fields is an independant consultant in Agronomy and Farm Management and resides in Worcester, NY. She may be reached at lafields@hughes.net