

THE MANAGER

TOP MANAGERS

By Dave Russell

Break fields into management zones, adopt variable rate fertilization practices, use in-tractor GPS to increase field operation efficiency, and use in-cab display to improve record-keeping.



Use of Precision Agronomic Technologies on Top Farms

Successful dairy producers learned the value of technology to track the production and health of their animals years ago, which ensures maximum production from the smallest input. Many of these progressive producers have now learned to track the production and health of their land resources for similar reasons. As land resources become harder to acquire, inputs become more expensive, and crops become more valuable, it is apparent that cropping programs require the same attention to detail as the milk production program to ensure overall business efficiency.

While no two operations are the same, the following technologies are becoming common on farms I work with to implement precision agronomy practices:

1. Break fields into management zones

Just as most dairies break cow herds into groups based on milk production, fields should be subdivided into separate zones based on yield potential. Several tools and methods assist with this process. It can be as simple as dividing the field by soil type, which is easily found on the internet. Another tool,

used to more accurately determine soil productivity, is soil electro-conductivity testing, which involves passing an electric current through the soil to give an indication of its texture, water holding capacity, cation exchange capacity and organic matter content. However, the ultimate technology for judging yield potential is yield mapping. This has been available to grain farmers that use combines for over a decade, but only recently became possible with forage harvesters.

Variable rate lime application map based on intensive pH sampling.

As more manufacturers offer this ability, multiple year harvest data can be collected and analyzed to build and verify yield based management zones.

2. Adopt variable rate fertilization practices

Once a field is divided into zones based on yield potential, it is then possible to “feed” that zone based on potential, just as you would feed your cow groups based on their milk production. Using GPS, a field can be mapped to determine where the different zones are, and then a variable rate prescription can be produced to control the application of any nutrient. Nitrogen application is the primary nutrient applied this way on most dairies. In addition to nutrients, seed rates can be varied by management zone. A zone with high yield potential will have higher optimal plant population for a given variety than zones with average or low potential yield. Yield in zones with low nutrient and water holding capacity can even increase slightly with seed rates less than the majority of the field due to decreased competition for limited resources. Another important nutrient on many northeast dairies is lime. New tools allow rapid, high intensity, geo-referenced pH samples to be taken independent of the normal soil sample. This allows a one or two day turn around between testing and variable rate lime application (see image).

3. Use in-tractor GPS to increase field operation efficiency

The most commonly adopted technology related to field operations is GPS guidance and mapping systems in tractors. A popular option to get more use from such systems than the commonly thought of tillage applications is to put them into the farm’s hay cutting equipment. Just as with tillage equipment, this equipment has increased in size and speed, lead-



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ing to an increase in overlaps and skips. Automatic and assisted steering systems increase efficiency by reducing these problems and allowing accurate spacing at higher speeds. These systems vary from visual guidance to full automatic steering control. More advanced systems can reduce seed, fertilizer, and chemical costs by automatically shutting off applications as the equipment encounters an area previously covered. The most advanced systems allow repeatable passes along a guidance path and makes it possible to till a narrow strip, plant into that strip, side dress between the strips, and then harvest the crop over that strip. This should ensure efficient use of labor and equipment, while minimizing negative impacts of compaction and excessive tillage.

4. Use in-cab displays to improve record keeping

Another benefit dairy farmers can get from GPS-based mapping, available in most systems used to auto-steer tractors, is automatic manure application recording. The addition of flow meters to application equipment allows geo-referenced records to be kept of where and how much manure is spread without the trouble of a paper trail. It also becomes possible to more accurately identify areas to avoid spreading. Hydrologically critical areas (see image), which can become overwhelming to track when applying manure, can be mapped and entered into the in-cab display. That information can be used by the operator to manually avoid those areas, or allow additional systems to automatically shut off or vary the application rate.

Few, if any, producers have incorporated all of these practices, but a step-by-step approach works well when learning how to best use new technologies. It is important to find people with experience to help reduce the learning curve. While there are software



Example of real field maps with multiple hydrologically critical areas that need to be avoided when applying manure.

and hardware solutions available that allow anyone to plan and implement these practices in-house, that is not likely the best use of time and labor resources for most producers. The best approach is to form a team of crop consultants, fertilizer applicators and data analysts. When approached in this way, new technology can allow producers to unlock new levels of production and efficiency. □

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to their advantage in both crop production and manure management, is paramount to success.

The fear of change can be an issue in any business, and the dairy business is not immune. Most progressive farms seem to have the ability to manage through change and some actually embrace it as it comes. Oddly enough, it seems that the team approach helps to manage through change. Producers who make informed decisions, not knee-jerk reactions that propel them forward with technological advancements, become more efficient and productive.

6). Keeping it legal:

Like in other areas, top producers take a different approach to

environmental regulation. That's not to say that they advocate for more restrictive government oversight, it simply means that they accept it as a cost of doing business. They acknowledge that the industry has to adapt to meet the changing needs and wants of the consumer. They understand and take very seriously the need to become more efficient and productive, while at the same time be the best stewards of the land. They make sure that their entire staff is cognizant of their surroundings and are sensitive to neighbor relation issues. They take a proactive approach to nutrient management and try to address issues before they happen, instead of dealing with them as problems after the fact.

Top managers don't have exclusive access to a silver bullet or a magic bag of tricks. They pay attention to the basic details of crop production and nutrient management. By building on these mastered basics, producers can capitalize on and make the best use of new technology. □