



# SPOTLIGHT ON THE 4RS: GRID AND ZONE SOIL SAMPLING

JENNIFER NELSON AND KEILLER KYLE, DELAWARE MARYLAND 4R ALLIANCE

With low recent commodity prices, many farmers are looking at strategies to control costs and improve profit margins. An investment in grid or zone sampling may seem counterintuitive due to higher upfront costs, but many farmers who have adopted the practice have seen a positive return on investment by focusing application of fertilizers and lime to areas of the field that show deficiencies. Grid and zone soil sampling are 4R strategies that aim to apply the right nutrient source, at the right rate, at the right time, in the right place.

Both grid and zone soil sampling require analysis of soil samples at a subfield scale, allowing farmers to hone in on those areas in the field with different needs for fertility inputs. Subfield sampling can reveal inconsistencies throughout the larger field such as soil pH, which affects the availability of several nutrients for crop growth.

In-field variability can result from different factors, including soil series and textures, topography, cropping history, historical nutrient applications, and other management factors. Grid sampling and zone sampling are similar, in that they both require collecting soil samples from multiple areas in the field in order to help identify and address variability. In grid sampling, soil samples are collected throughout the field in a grid pattern using GPS, with each sample representing between 1/4 acre to 5 acres. Zone sampling combines information from a variety of sources to delineate sampling areas.

In grid sampling, choosing the size of the sampling grid is a balancing act between cost and gaining information that has enough resolution to be meaningful. Bill Rohrer at AgroLab in Harrington, Delaware, observes that most grid samples are taken at 2.5 acres. "Whatever grid size one is managing, it is important to pull a representative sample within the entire grid and not just the center of the grid." If the field to be sampled has significant variability in yield, topography or soil types, a smaller grid size will provide greater resolution and may be worth the additional investment. Ask your consultant about the cost of sampling at different grid sizes and discuss options that offer the best fit for your farm.

Zone sampling may save some cost on sampling and analysis, but also requires more time and information prior to sampling to evaluate the field and delineate zones for management. Different layers that can inform those decisions include yield maps (especially helpful if multiple years of data are available), soil maps, imagery, and topographic maps. Personal knowledge of the field and management history should also factor into delineation of sampling and management zones as well.

Once the soil test results are in, nutrient recommendations and variable-rate applications will determine how much the investment in grid or zone sampling pays off. Nutrient recommendations can follow one of two approaches- either a build & maintain approach, which seeks to keep soil test values at higher levels to minimize potential for yield loss; or a sufficiency approach, which seeks to maximize the economic return of fertilizer applied. Rohrer says "Most farmers using variable rate applications don't use more total fertilizer, but rather apply the appropriated rate to help balance the variability found in the soil tests."

The Delaware-Maryland 4R Alliance sat down with a few farmers who had participated in an NRCS Regional Conservation Partnership Program initiative for Advanced Nutrient Management to discuss their experience with

the program and get their feedback on grid soil sampling. The farmers worked with a consultant to collect soil samples on 2.5-acre grids, and the results were used to determine variable-rate P, K and lime recommendations. Each contract lasted three years, with sampling in Year 1, variable-rate nutrient and lime application in Year 2, and evaluation in Year 3. Some farmers were initially skeptical about grid soil sampling, but soon found that the practice had enough value for them to continue using it even after the contracts were complete. While one farmer plans to continue grid sampling every year, most of the farmers that we talked to plan to conduct grid sampling every four to five years.

Consider trying grid or zone sampling on a few fields, starting with fields that show significant variability in yield and/or soil type. The Delaware Maryland 4R Alliance is developing a 4R Service Provider Directory that can help you locate someone in your area to provide these services. You can find the directory, along with a list of references on grid and zone sampling at [4RMidAtlantic.com](http://4RMidAtlantic.com).