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CLEAN WATER

You Can Make A Difference

Setting Realistic Crop Yield Goals

George Rehm and Michael Shmitt

Common logic tells us that we can't expect the same yield from the same crop across the entire state of Minnesota. Climate, genetics, crop management, and the physical and chemical properties of soils strongly influence crop yields. Since soils can vary considerably from farm to farm and field to field on any farm, it's important to spend some time establishing a realistic yield goal for each field each year.

Importance

Yield goals have a direct impact on both economics and environment. Considering the economics of crop production, yield goals affect fertilizer use and plant population decisions. Therefore, yield goals have a direct impact on projected cost of production. Calculating the anticipated cost of production has a major impact on marketing decisions.

Fertilizer recommendations are based on the results of a soil sample analysis in combination with a realistic yield goal. If goals are too high, money is spent needlessly on fertilizer. Fertilizer nitrogen not used by the crop during the growing season can potentially reach the ground water. If yield goals are too low, recommended fertilizer rates aren't sufficient for the most profitable yield and farm profitability is being reduced.

Some Things To Consider

Selection of a realistic yield goal is not an easy management decision. There are several factors to consider and some of them change from year to year. The following can have a major impact on yield goals:

Soil Texture and Associated Available Water -- The amount of available water that soils can hold varies with texture. Sandy soils hold relatively low amounts of water that can be used by crops and should be expected to produce less than soils with a silt loam texture if irrigation is not used and rainfall is limiting.

Drainage -- Excessive water in soils can have a negative effect on production. Well-drained soils generally produce more than those that are poorly drained.

Rainfall Probabilities -- Average annual rainfall increases from northwest to southeast in the state. It's reasonable to expect higher yields in southeast and southern Minnesota.

Length of Growing Season -- The length of the growing season decreases from south to north. For some crops, this has a major impact on hybrid or variety selection. Short-season hybrids or varieties usually have a lower yield potential than those requiring a longer growing season.

Soil Moisture Recharge -- In much of Minnesota, the amount of subsoil moisture present in the root zone at the start of a growing season strongly influences crop yields. If the amount of subsoil moisture is low at planting, crop yields become highly dependent on rainfall during the growing season. Yield goals may have to be adjusted downward for these situations. Yet, if the rooting zone is fully recharged at the start of the growing season, yield goals can be raised because the probability of moisture stress is reduced. Therefore, it's important to be aware of the soil moisture situation before a yield goal is set for any year.

Differences in Inherent or Native Soil Productivity -- Even when moisture is not a limiting factor, soils still differ in crop production ability. There are several reasons, but they are beyond the scope and purpose of this publication. Recognition of these differences is expressed as crop equivalent ratings. These ratings consider soil characteristics and also account for the costs necessary to overcome some of the factors limiting production. For example, a soil with a crop equivalent rating of 70 should not have a yield goal as high as a soil with a crop equivalent rating of 80. If the soils in a field are identified, crop equivalent ratings can be obtained by requesting BU-2199,

Productivity Factors and Crop Equivalent Ratings for Soils of Minnesota, from your county extension office.

Some Suggestions

Setting yield goals is difficult: they should be attainable and challenging. There are several methods to use. A method that might be suitable for one producer might not work for a neighbor. There is no one right way to set yield goals. Some suggestions to consider are described in the following.

Using Maximum Yield Produced In The Past -- This historic method revolves around remembering the top yield produced on your land or your neighbor's land in the recent past. It places only a small amount of emphasis on economics and profitability.

Sometimes, however, history is not a clue to the true potential of a field. Past maximums may have been limited by diseases, weeds, inadequate fertility, or some other limiting factor. Past maximums are also closely related to favorable weather. If soil moisture is currently short, this may not be the best method for setting a yield goal for the upcoming crop.

Using Farm and/or County Averages -- This is a relatively easy method to use. Farm or field averages can be derived from farm records. Many statistical summaries of crop production list county averages. This method might be suitable forthose satisfied with the status quo or with no desire to improve. Both high and low yields are incorporated into "average" yields. This method is not suggested for progressive growers who are concernedwith high farm profitability. Aiming for the average is not a method to maximize profit. Average yields do not make the most efficient use of production inputs such as herbicides and fertilizers.

Adjusting The Past Average -- A common and realistic approach to setting yield goals, however, does consider past averages. With this approach the recent average (3-5 years) is increased by 10% to 20% with the higher yield becoming the yield goal. With this method, the average yield of fields should increase each year if not limited by stress conditions.

The selection of the percentage increase can vary with both farmer attitude and climate. If, for example, soil moisture is limiting atthe start of the growing season, it may be wise to strive for a low percentage increase or no increase at all. With favorable soil moisture and a good long range forecast, it would be smart to aim for a 10% to 20% increase over the recent average. This method allows for maximum flexibility in the establishment of yield goals. Crop yields will also increase slowly over time if this approach is used for setting yield goals and yield goals are met.

Be Positive

There is every reason to be positive in setting yield goals. If common logic is used, realistic yield goals can be established. If you plan for a poor yield, you will get a poor yield.

George Rehm and Michael Schmitt are extension soil scientists, soil fertility.

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