



CHOOSING A CROP YIELD GOAL

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Choosing a yield goal for each field is one of the most important decisions a grower makes. Since fixed costs per acre are the same with low or high yields, profits in relation to fixed cost increase as yields increase. Variable costs increase as potential yields increase, so it becomes important to choose a realistic yield goal so average returns from variable costs, in this case fertilizer, are greater than your costs.

precipitation are very inaccurate and of little if any practical use.

The use of a five-year average yield as a yield goal is too conservative. In fact, if you fertilize according to soil test for average yield, the crop will have inadequate nutrients in half of the growing seasons, resulting in lower yields and grain protein.

What is a Yield Goal?

A yield goal is the yield per acre you hope to grow. The yield you hope to achieve and what you actually obtain are often two different things. Yields are largely determined by your management, the soil, and weather conditions during each growing season. Management is directly under your control. The soil is a constant factor but can be improved through good management. Weather conditions are not under your control and are unpredictable for the coming growing season. For this reason you do not always reach your goal. However, this should not be an excuse to have a low yield goal.

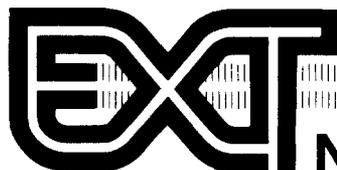
The practical range for a yield goal should be somewhere between **above average** to near **past maximum yield** obtained by you or a nearby neighbor on a similar type of soil. Where your yield goal should be within this range can depend on many factors. Limited availability of capital, a one-year lease, etc., are some factors that could influence the amount of money you would invest for variable costs such as fertilizer. One thing certain is that your yield goal should be greater than your average yield. If your yield goal is consistently reached, your goal should be increased. Also, hard red spring wheat growers who grow wheat with less than 14 percent protein more often than one year in five should increase their yield goal.

What Should Your Yield Goal Be?

A yield goal could vary all the way from past average yield to potential yield. Potential yield is the highest possible yield obtainable with ideal management, soil, and weather. Some scientists feel potential yield can be estimated from the amount of stored soil moisture at planting time. Research indicates that 1 inch of available water is worth anywhere from 1 to 6 bushels of wheat per acre. The wide range in the value of an inch of water is due to variation in management, different soils, the fact that the amount and distribution of rainfall during the growing season varies from year to year and cannot be predicted, etc. For these reasons formulas for estimating potential yield based on stored moisture and expected

When sufficient nutrients are applied for a specific yield and your yield goal is not reached because of poor growing season conditions, the nutrients will carry over and be available to future crops. In this case, the added cost to you is the cost for one year's interest on the money used to purchase nutrients that were not used in the year of application. This could amount to \$0.50 to \$1 per acre when your yield goal for wheat was 10 bushels per acre above actual yield. On the other hand, if your yield goal was 10 bushels per acre low, the unrealized yield would be worth \$30 per acre when wheat is worth \$3 per bushel.

While it is not economical to have a yield goal that is too low, it is not wise to have an



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unrealistically high yield goal. Fertilizing for an unrealistically high yield ties up capital that could be more profitably used in other ways and can increase the chances of losing significant amounts of nutrient during years of above average rainfall. Also, too much nitrogen can cause low test weight and a small yield decline in a drought year. Some plant diseases can be stimulated by over fertilization.

Management for Higher Yields

The management factors that influence yields are tillage, rotations, drainage, soil fertility, crop variety, seed quality, planting dates, row spacing, plant population, weed, insect and disease control, and harvesting time and method. Many of these have little or no influence on costs but can significantly increase returns. Other factors, like soil fertility, result in high variable costs per acre since higher yields require more nutrients than low yields. Although the cost for fertilizer on a per acre basis can be significant, returns can be greatly increased when soil tests indicate need for nutrients. For example, it costs \$3.75 per acre for enough nitrogen (@ 15 cents per pound of N) and \$1.25 per acre of phosphorus (@ 25 cents per pound of P₂O₅) to supply nutrients for an extra 10 bushels of wheat per acre. With wheat at \$3 per bushel, the extra yield returns \$6 for each dollar invested in fertilizers.

Available Water

Another factor that has a large influence on yield is available water supply. Available water is the amount of water that is in the soil at planting time, plus the rainfall during the growing season that soaks into the soil. Scientists have shown a good relationship between the amount of water actually used by a crop during the growing season and wheat yield. Since neither the amount of rain that will fall, the amount that will soak into the soil, nor the amount of stored soil moisture that the crop

will use are predictable, the amount of water a crop will use during the growing season cannot be used to predict yield with any accuracy. However, if the supply of stored soil moisture is good at planting time, be more optimistic in choosing a yield goal than when stored soil moisture is low. For example, if a medium textured soil is wet to a depth of 4 feet, choose a wheat yield goal of 5 to 10 bushels per acre higher than when the soil is wet only to a depth of 1 or 2 feet. If the soil is very dry at seeding time, be less optimistic.

Important Factors to Consider in Choosing a Yield Goal are:

- Your yield goal has to be practical, feasible, and achievable. However, if you achieve your yield goal more than two years out of five, then your goal is probably too low. Low grain protein is also an indication of too low a yield goal.
- A yield goal should be well above the past average yield. In most cases a yield goal should be at least 10 bushel per acre higher than average yield for a field.
- Be more optimistic in choosing a yield goal if stored soil moisture is good at planting time.
- Nutrients not used in years with poor growing conditions will normally be available in following years. Although soil testing sometimes cannot quantitatively account for all of these nutrients, most will still be in the soil system and available to future crops.
- A low yield goal in a good growing season can easily mean a lost income of \$30 to \$40 per acre, while a high yield goal in a poor growing season will mean a loss of \$0.50 to \$1 interest cost on unused nutrients.
- Never fertilize for a poor yield, because then you will be sure to have one.

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