

How Much Fertilizer Do My Crops Need?

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Profitable crop production including the efficient use of fertilizer and other best management practices and environmental protection should go hand in hand. Soil and plant fertility accounts for about one-third or more of total crop yield. On many high yielding or highly managed fields, increased production from fertilizer could be as high as 60 percent.

Fertilizer management can affect one or more of several components of farmer profits.

Production Costs

The farmer may or may not be able to do much to control rising costs of production. Maximizing the efficiency of all inputs is a goal shared by most business-farmers today. For example, soil nitrate testing is an option to use nitrogen more efficiently.

Crop Yield

This point is the “easiest” to try to maximize. Higher yields and profit per acre are closely related. Farmers generally focus a great deal of attention to this goal.

Should a farmer apply all their nitrogen pre-plant on corn? Should all the spring nitrogen be applied at green-up time for winter wheat? Do soybeans need any fertilizer at all?

Michigan Right to Farm Generally Accepted Agricultural and Management Practices (GAAMPS) for Nutrient Utilization essentially means following best management practices based upon sound science. The January 2015 revision to the Nutrient GAAMPS were developed and reviewed with industry, university and multi-governmental agency input.

Agricultural fertilizer has been perceived as a nonpoint source pollution problem in 71 percent of the 279 watershed in Michigan as far back as a 1988 Non-Point Pollution Assessment Report by the then Michigan Department of Natural Resources. Significant phosphorus (P) loading of Michigan’s lakes and streams has been documented by MDNR in 1985. Nitrate contamination of groundwater has been documented in 1984 and since.

Although the use of other fertilizer nutrients has also increased, changes in soil test levels of nutrients such as potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), and micronutrients have been less dramatic. Currently these nutrients are not causing any known environmental damage, and there are no concerns for their continued use as long as they benefit the farmer agronomically and environmentally.

Managing crops for efficient fertilizer use may mean considering some of the following practices.

1. Do not apply any fertilizer, especially phosphorus, unless soil tests show a deficiency situation exists.
2. Consider side-dressing nitrogen and perhaps base rates upon a nitrate nitrogen soil test, taken just prior to application time.
3. Soil test on a regular basis before nutrients from fertilizer, manure, biosolids or compost are applied. Obtain a nutrient analysis of manure, biosolids or compost. Grid soil sampling is more precise than traditional soil sampling by soil type if the fertilizer dealer can apply a variable rate of the nutrient source. A regular soil test means every four years for a two crop rotation situation or every three years for a three crop farm rotation.

4. Selecting a realistic yield goal for crops is one of the most important steps in obtaining economic and environmentally sound recommendations. Excessively high yield goals can lead to loss of income and over-fertilization that may threaten water quality. A yield goal that is both realistic and achievable should be based on the soil potential and the level of crop management utilized. The nutrient GAAMP considers a realistic yield goal to be one that is achievable at least fifty percent of the time. If a yield goal is seldom achieved, the entire crop management system should be re-evaluated to identify those factors other than soil fertility that are limiting yields.
5. If fertilizer recommendations between MSU and agribusiness vary, then farmers should follow MSU recommendations which have been proven to be sound agronomically, economically and environmentally.
6. Take nutrient credits for cover crops, legumes, organic matter, manure, previous crops or other biological materials.
7. Good recordkeeping demonstrates good management and will be beneficial for the farmer if their management practices are challenged.
8. Use soil erosion control practices, such as filter strips, to minimize nutrient runoff and soil loss.

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