

Fertilizer prices are going crazy; what should we do?

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Why do we apply fertilizers? To supplement inherent soil fertility, to overcome nutrient deficiencies, to maintain or build soil fertility to a level that ensures economic optimum crop yields and quality. Fertilizer prices have more than doubled in the recent past. This calls for efficient and rational use of fertilizer nutrients to get the most out of the dollars spent on fertilizers. A holistic approach to fertilizer application is desirable.

Test your soils and manure or any other organic nutrient sources! Soils should be sampled and tested, once in every 3 years, for phosphorus (P), potassium (K), sulphur (S) and micro nutrients, such as zinc, manganese, boron, etc., to know the nutrient status. Manure and pre seeding nitrogen tests should be done every year. Likewise, if you plan to apply any other organic nutrient source or wood ash, try to know what nutrients it could supply. Follow standard soil sampling procedures (Re: Soil Fertility Handbook or Agronomy Guide for Field Crops). Keep records for all such tests. Include leguminous crops that could leave some residual nitrogen for the following crop(s). Consult a Certified Crop Advisor (CCA) or a local researcher or a specialist to formulate a suitable fertilizer program by taking into account all such aforesaid factors. Results from location specific research should be given due consideration in the planning process. For example, our research reveals that it pays not to adjust N contribution by manure in the fertilizer rates for cereals. The manure, applied at 50 tonne/ha (~5000 gallons/acre), could however meet P and K requirements of cereals in soils of medium to high fertility. Since only a part of the total nutrients in manure is available in the first crop year, and most of the rest in the second crop year, it is advisable to make a fertilizer plan for a couple of years. The plan could be reviewed before the next crops season, if need be.

Abandon luxury practices such as applying 11 kg N/ha at seeding through mono ammonium phosphate (MAP: 11-52-0) that could supply more P than what is required. Seed placement of MAP should be P based. Seed placement of P is desirable for proper root development that could enhance (other) nutrients uptake right from the seedling stage. N, for seed placement, if need be, could come from the safer rates of urea.

Choose fertilizers carefully by calculating cost per unit nutrients. If MAP and TSP (triple super phosphate: 0-46-0) are sold at the same price, prefer to buy MAP that will give you more nutrients per dollar than TSP. N supply from MAP could be adjusted in the N fertilizers. Choice of fertilizer will also depend upon the crop you grow. For example, urea, especially at rates higher than 100 kg N/ha, isn't a good source of N for canola, but it works well for corn. Other than such considerations, go for high analysis nutrient sources (for example, MAP and urea).

A fertilizer program should adequately address the nutrient deficiencies. For example, we have noticed deficiency of sulphur, zinc and boron in our soils or crops. Sulphur and boron are important for alfalfa and zinc is important for corn. Zinc content in soils is likely to come down due to corn cultivation. Not all fields in Thunder Bay district have high amounts of zinc. Deficiency of even a single nutrient can inhibit crop growth and yield to a level, where other applied nutrients are economically wasted. For example, zinc deficient corn will not grow well and may find it difficult to unfold its leaves even if

abundant amounts of other nutrients are applied. Crop response to N is generally limited if sulphur (S) in soil is deficient. Amongst field crops, alfalfa is known to remove maximum amount of sulphur (often equal to that supplied by ~170 kg ammonium sulphate/ha). Ammonium sulphate (20.5 % N; 24 % S) is a very good source of sulphur, but it is a costly fertilizer (though its per unit nutrient cost is about the same as urea). Try to incorporate elemental sulphur in the fertilizer program, to lower the cost from sulphur application where ever possible. It may be desirable to apply a part of N through ammonium sulphate (at least 10-11 kg N/ha in cereals and 20-21 kg N/ha in corn) to cover the risk of sulphur deficiency and to improve the produce quality.

Crop rotations, involving different crops, are known to improve soil quality. Legumes, contrary to the general belief, may not always leave the soil richer. Alfalfa is a heavy feeder of nutrients. My observation is that corn doesn't grow as well after alfalfa as after other crops, especially if manure is not applied to corn. On the other hand, corn well supplied with nutrients from organic and fertilizer sources may leave the soil richer as compared to cereals or even soybean. Even though soybean, as a legume, is capable of fixing N into the soil, it removes a lot of N in its grains. No wonder, durum wheat in a farmer's field has better growth after corn than that after soybean. At TBARS, we observed a lack of significant response to N in cereals after corn (residual nitrate N: 26 ppm as compared to ~10 ppm after cereals). Fallow fields (unseeded spring fields due to bad weather or otherwise) could build up N to the extent that one could get a bumper winter wheat crop without fertilizer N. We shall probe these things more through our on going experiments at TBARS. Mean while, my advice to our enterprising growers is to go for pre seeding N tests; nitrate and ammoniacal (in spring for spring crops and late summer for winter wheat). A & L Lab Canada Inc. London (<http://www.alcanada.com/>) tests for N are very well correlated with crop yields at TBARS. As you know, soil for N tests should be sampled from 0-30 cm depth and kept in a freezer before shipping to the lab. Sampling depth for sulphur is the same as that for N. It may therefore be desirable to test the same samples for sulphur as well.

While planning a fertilizer program, don't limit your self to crop yield. Look for nutrient management practices that enhance crop quality as well. Some times, a nutrient may not improve crop yield, but may improve the produce quality to a level where the produce fetches a premium price in the market, making the nutrient application economical. Fertilizers application decisions based on crop yield alone could therefore be faulty.

Right time and method of fertilizer/manure application will make a significant contribution to fertilizer use efficiency. High cost of N fertilizers may make an investment in manure injecting equipment worth to minimize volatilization losses of N (as ammonia) from the liquid manure.

To conclude, I would say that get all the tests done, take all your reports/records to a CCA, tell him the crops you would like to grow and targeted crop yields, and together (with CCA), formulate a fertilizer program that is economical, crop yield and quality promoting, and environment (soil, air and water) friendly. Thunder Bay growers should become members of the Thunder Bay Agricultural Research Association to take advantage of location specific research and an experienced CCA at a meager cost of \$50. Contact Bruce Forrest at 473-9609 or me at 475-1373 or tarloksahota@tbaytel.net.

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