UNIVERSITY OF MARYLAND EXTENSION

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Fuel into Fertilizer: Cost Analysis

Higher fertilizer costs are based on higher fuel costs. Why? To answer that question we need to understand the role of fossil fuels in the production of fertilizers. There is a distinct relationship between energy and fertilizer, especially for nitrogen production. An estimated 0.8% of the total United States annual energy consumption is presently being used for fertilizer production. The production of anhydrous ammonia, which requires approximately 6300 Kcal/lb of nitrogen, represents nearly two-thirds of the total energy used for all fertilizers. Energy consumption values for phosphorus and potassium fertilizers are estimated at 1250Kcal/lb of phosphate (P_2O_5) and 1000 Kcal/lb of potash (K_2O). It is ironic that 80% of the air we breathe is nitrogen (N_2) gas, which is completely unavailable for plant growth (except for legumes utilizing the nitrogen fixation process). It takes energy; lots of it to generate hydrogen (H) from natural gas or methane (CH_3), capable of combining under intense heat and pressure with N_2 gas to create ammonia (NH_3). The process looks like this:

1 ton NH_3 = 38,180 ft^3 CH_3 + 9 gal Fuel Oil + 54kwh Electric

The amount of natural gas required to produce 5 tons of NN_3 would heat the average home in Maryland for the entire winter. This same amount of natural gas, converted into nitrogen fertilizer, results in enough corn production to satisfy the minimum caloric requirements of 275 people for a year. Save more money then ever before – just by following your nutrient management plan.

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