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AGRONOMY AND SOILS SERIES

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Adjusting to the High Cost of Fertilizers

Fertilizer prices closely follow fuel prices. As natural gas and crude oil prices skyrocket, so will fertilizer prices. The manufacture of N fertilizers directly competes with other uses for fossil fuels. Phosphate (P) and potash (K) components have to be mined, extracted, concentrated, and then shipped cross-country or internationally before they arrive at a fertilizer dealer in Alabama. These costs are passed along to the consumer. Don't expect to see cheap fertilizers just as we will never see cheap gas again.

So, what's a large cotton, grain or livestock farmer to do if they have depended on cheap fertilizers to maintain a slim margin of profit. Realistically, there are not a lot of options. Hopefully, we can draw on soil reserves of P, K and micronutrients. We can take advantage of high soil test levels. Research has shown rather conclusively that cotton and grain crops DO NOT remove much P and K from a soil that tests "High" or "Very High" in these nutrients. Experiments on 7 Alabama Agricultural Experiment Station outlying units looked at P and K drawdown over 15 years and found only a small decline in soil test levels of these nutrients when cotton, corn for grain and soybeans for grain were produced and the residue returned to the soil. As long as the soil test is in the "high" range, yields will not be compromised by not applying additional P and K.

Nitrogen, the most expensive nutrient, is a different story. The only way N can build up in the soil is by building up soil organic matter. Unfortunately, Alabama farmers have depended on cheap N to substitute for organic matter. Now we find ourselves with expensive N fertilizers and very little soil organic matter. A survey of cotton fields a few years back in Autauga and Elmore Counties found topsoils averaging 0.6% organic matter. Another study showed that maximum cotton yields were produced when soil organic matter was AT LEAST 2%. The extra, slow-release, organic N may contribute to a higher yield potential. In addition, organic matter increases soil moisture reserves, improves infiltration of rainfall, and increases beneficial soil microorganisms. Building soil organic matter is a slow process but high-residue, conservation tillage can speed up the process in most of our well drained, cropland fields.

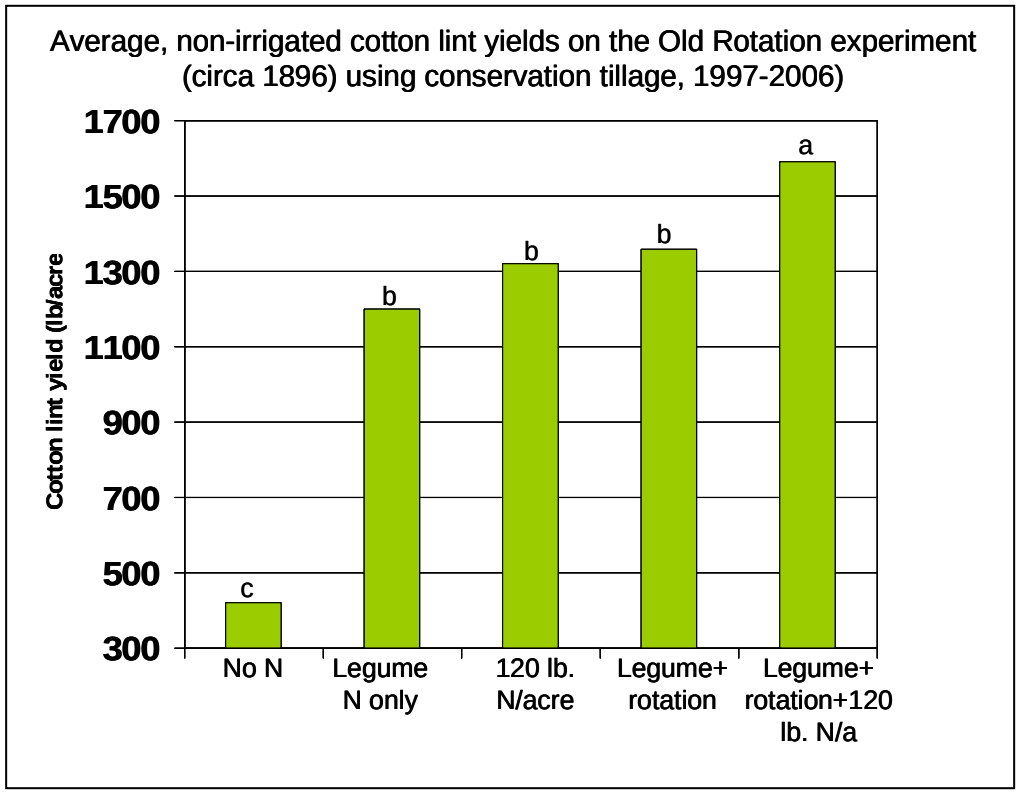
What alternative sources of N are available to Alabama farmers?

Poulty litter. Alabama produces around 1.6 million tons of poultry litter each year. On the average, dry poultry litter as it comes from the broiler house is about a 3-3-2 grade fertilizer. That is, a ton will contain a total of 60-60-40 pounds N-P_2O_5-K_2O. Conservatively, about 2/3 of the total N will be available the year it is applied whether surface applied or incorporated. Therefore, a ton will have about 40-60-40 pounds of available nutrients. Research in the Tennessee Valley, at E.V. Smith Research Center near Shorter, and in Headland in South Alabama has shown that 2 to 3 tons of poultry litter applied at planting will provide all the N, P, and K needed for 2+ bales per acre of cotton or 150 bushels per acre of non-irrigated corn.

In spite of the fact that we have an abundance of poultry litter in Alabama, row crop farmers may have difficulty getting it when they want it, where they want it, and spreading it uniformly. Stockpiling litter and keeping it covered near the field is the best way to avoid the spring rush for litter. But keep in mind that the high cost of fuel will add to the transportation costs of the litter. The days of $10-per-ton litter is over. Expect to pay at least $30 per ton but considering the cost of the same nutrients in commercial fertilizers, even that is a bargin. Find a dependable Certified Animal Waste Vendor (CAWV) who can deliver the litter to your farm for proper storage and perhaps, come back to spread it as close to planting as possible. A list of Alabama CAWVs can be found at the following web site:

http://www.aces.edu/dept/aawm/County.php

Winter legumes. Crimson clover and vetch have been used as a source of N for cotton and corn for over 100 years. They still work. Legumes and other cover crops also build soil organic matter. However, since abundant and relatively less expensive fertilizer N came available after World War II, most farmers found it easier to spread fertilizer N than planting a winter cover crop. Modern selections of crimson clover and vetch, if properly managed, can provide between 100 and 150 pounds of available N to the following crop whether the legume is plowed under or left on the soil surface. On Alabama's "Old Rotation" experiment at Auburn (circa 1896), "AU Robin" crimson clover has produced 10-year average yields as high as those where 120 pounds N per acre is applied as fertilizer (see figure). Add a rotation with corn plus a winter legume plus the fertilizer N, and yields have averaged over 3 bales per acre! The legume not only will substitute for the N fertilizer, but it also greatly increases the yield potential of the soil. The drawback of using a legume is that it requires more management.



Urea nitrogen. Next to anhydrous ammonia, dry urea is the lowest cost N fertilizer per pound of N. Dry urea is by far the least cost dry fertilizer. It is used in a lot of fertilizer blends today instead of ammonium nitrate. The only problem with urea is that it is subject to some volatilization loss as ammonia gas if surface applied to hot, dry soils with a lot of organic residue on the surface. If rain or irrigation washes the urea into the soil within a day or two of application, there is little or no risk of loss. Additives, e.g. Agrotain® , a urease inhibitor, are available to reduce the risk of volatilization losses, but these additives can sometimes cost as much as simply applying more urea N.

Cost of some common N fertilizer materials (as of 11/20/07)*		
Fertilizer Material	Cost per ton	Cost per pound N
Ammonium nitrate (34-0-0)	$410	$0.63
UAN solution (28-0-0)	$325	$0.58
UAN solution (30-0-0)	$345	$0.58
Dry urea (46-0-0)	$465	$0.51
Anhydrous ammonia (82-0-0)	$485	$0.30
DAP (18-46-0)	$505	$0.55/ lb. P_2O_5
Liquid 10-34-0	$435	$0.64/ lb. P_2O_5
*Prices from selected retail fertilizer companies in Alabama and the Midwestern U.S. for bulk products. Additional cost for spreading ranged from $3.75 per acre to $20 per ton.		

Liquid nitrogen. Most liquid nitrogen materials are a mixture of ammonium nitrate and urea, thus the name urea-ammonium nitrate solutions or UAN solutions. A 30-0-0 or a 32-0-0 liquid is about a 50:50 mixture. The half that is urea is subject to the same volatilization losses as dry urea. The advantage is that liquid can be injected, placed behind a coulter, or squirted onto the soil surface. If it comes into contact with soil rather than crop residue, losses will be minimized. It is also easy to direct as a sidedress N application. The above table indicates that the prices for UAN solutions are between the price of N as ammonium nitrate and the price of N as urea.

There are not a lot of easy alternatives to cheap fertilizer N but there are alternatives. Most will require a different approach to management and some will require a much higher level of management of each field. Getting the best deal on N for 2000 plus acres of a single crop will no longer be as easy as calling the local fertilizer dealer. It will require different approaches for each field and several different sources for the entire farm.

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