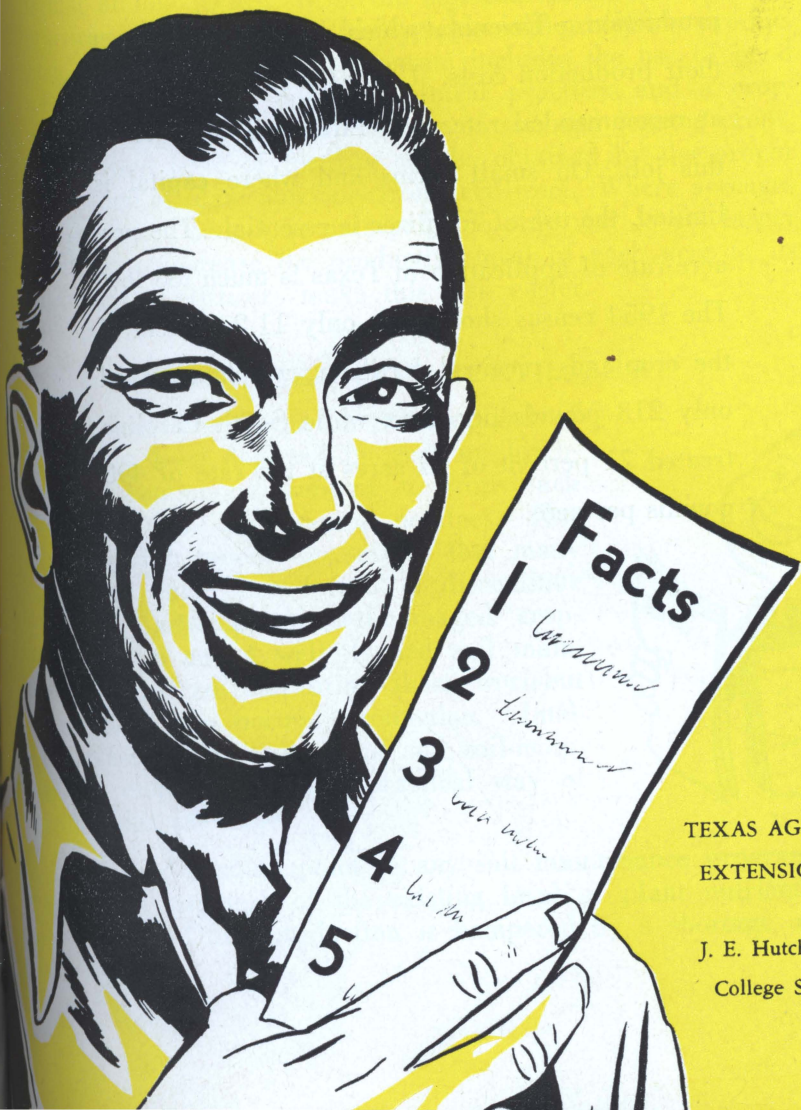


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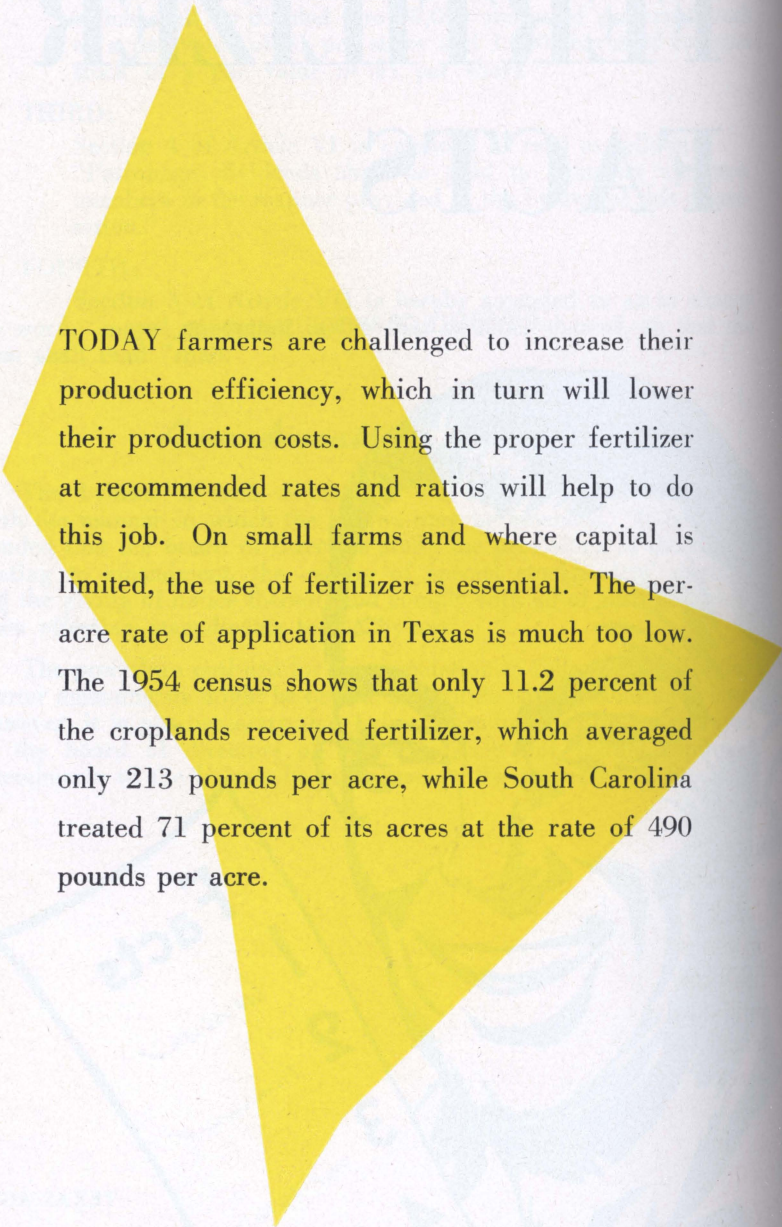
# FERTILIZER FACTS

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TEXAS AGRICULTURAL  
EXTENSION SERVICE

J. E. Hutchison, Director,  
College Station, Texas



TODAY farmers are challenged to increase their production efficiency, which in turn will lower their production costs. Using the proper fertilizer at recommended rates and ratios will help to do this job. On small farms and where capital is limited, the use of fertilizer is essential. The per-acre rate of application in Texas is much too low. The 1954 census shows that only 11.2 percent of the croplands received fertilizer, which averaged only 213 pounds per acre, while South Carolina treated 71 percent of its acres at the rate of 490 pounds per acre.



# FERTILIZER FACTS

JOHN BOX  
ASSISTANT EXTENSION AGRONOMIST  
THE TEXAS A. & M. COLLEGE SYSTEM

**M**ANY SMALL OPERATORS in Texas have given up farming, because it was no longer profitable nor practical for them to continue. Rising costs, poor market facilities, weather, reduced allotments and low yields helped to cause this situation. Of these causes, the one which the farmer can control best is that of low yields. A fertile soil and sound management practices are essential for high yields and profitable production. A good management program includes the use of good seed, insect control, adapted cultural practices and a cropping system which permits the use of sod and legume crops. Any desired level of fertility can be obtained by the proper application of plant nutrients from fertilizers. Where acreages are small and cannot be enlarged, the only way to get larger yields is to increase the productive level of each acre to its maximum. Fertilizers make this task easier.

## THE NEED FOR FERTILIZER

A high percentage of the cropland of Texas has been depleted by erosion, leaching and continuous cropping to crops such as cotton, corn, peanuts and potatoes. This depletion has become so serious that many producers have been forced to discontinue full-time farming. A well-managed cropping system and a well-planned soil maintenance program can bring these worn-out acres back into normal production. Intelligent use of fertilizer, lime and soil-maintaining crops is the most practical way of getting this job done.

A good starting point in any soil maintenance program is to take inventory of the existing level of plant nutrients in the soil. Often production is hampered by a shortage of



a single plant nutrient, but generally there is a shortage of two or more. Wide differences in fertility levels can occur between fields or within a field. Soil tests provide the best method for establishing the nutrient level for a field and aid in estimating the fertilizer requirements for a particular crop.

Each crop has a different nutrient requirement and recovery rate for the fertilizer applied during the season. Unused portions of nitrogen, phosphorus and potassium will carry over in the soil and be partially recovered by later crops, except in light-textured soils in areas of high rainfall where nitrogen and potassium may be lost by leaching.

When using chemical fertilizers, the plant foods should be balanced properly. As a rule, nitrogen sets the level of production and phosphorus and potassium operate to that level. The application of the wrong amount of a single plant nutrient will affect the yield. Excessive amounts of a single element will often unduly accentuate the shortage of another element and result in no yield increase, or in extreme cases a reduced yield.

Other factors such as stand density, water supply, crop variety, insects and diseases greatly affect crop response to fertilizers. Water most often is the limiting factor in crop production in Texas, and in extremely dry years it alone can cause a complete failure. Crops that are well supplied with plant food utilize available moisture much better than plants which are less well fed. One reason is that well-fertilized plants develop more extensive root systems and can gather moisture from a larger volume of soil; however, for maximum yields a plentiful supply of moisture must be available. Plants must have sufficient water through the fruiting and early maturing periods of their life cycle.

Fertilizers are chemical salts. When high rates are used, the fertilizer should be placed at a distance, generally 4 to 10 inches depending upon the crop and the rate of application, from the plant or seed to avoid injury. Application of high rates requires more care than that of low rates. Fertilizers high in nitrogen or potassium are most likely to cause burning.



## THE VALUE OF FERTILIZER

The greatest return per dollar invested comes from the first fertilizer applied beyond that needed by the soil organisms. This initial demand by the soil for nutrients may account for the failure of some crops to show a response to *light* applications. Farmers with limited funds may have to apply less fertilizer and take a lower yield than the maximum which could be obtained if the fertilizer rate were increased to its highest point of profitable return. As more and more fertilizer is applied, the increase in yield per unit of fertilizer drops off until a point is reached where additional fertilizer fails even to pay for itself.

The return per dollar invested in fertilizer varies with conditions and crops but, as a rule, the return should be approximately \$6 to \$1 invested in fertilizers at low rates and \$2 to \$1 at higher rates where maximum production per acre is obtained. It is highly profitable for the farmer to continue increasing his rate of application as long as the return is \$2 for \$1. For the small farm, the higher rates of application return the largest dollar profit per acre. Few, if any, other farm operations produce profits of this size.



## GRAIN PRODUCTION

For each bushel of corn produced the soil must furnish from all sources the following amounts of plant nutrients:

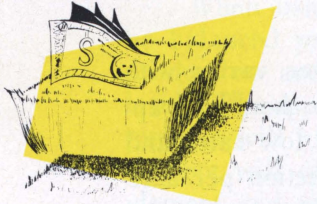
1. Nitrogen 1.75 lb.
2. Phosphorus .75 lb.
3. Potassium 1.30 lb.

To produce a 75-bushel per acre crop of corn, the plants must have access to:

1. Nitrogen 130 lb.
2. Phosphorus 60 lb.
3. Potassium 100 lb.

A soil test can determine the amount of additional plant nutrients needed in all cases, above that which the soil can provide. The corn crop should have a stand of about 12,000 plants per acre (1 plant for each 13 inches of row) and 20 inches of usable moisture during the growing season.

## FORAGE PRODUCTION



Fertilizer is also important in a sound pasture and forage program. Feed accounts for as much as 65 percent of the total cost in milk production and up to 85 percent of beef and sheep production costs. These costs indicate strongly that a profitable cattle enterprise requires a sound feed and forage production program. Good pasture can supply feed nutrients at half the cost of grain. High-quality roughage can supply 75 percent of the total feed requirements of dairy animals, beef animals and sheep. Producers who grow their own hay, silage or pasture are in a strong economic position.

Forage crops respond well to fertilizer applications and can utilize large amounts of plant nutrients effectively. Fall or spring applications of a complete fertilizer to provide 40 to 60 pounds per acre each of nitrogen, phosphorus and potassium and topdressing with 30 to 40 pounds per acre of nitrogen between grazings or harvests are necessary for profitable yields of high-quality feed.

In a livestock program, all animal manures should be utilized. The average cow produces about 15 tons of manure each year, worth at least \$30. Hogs produce manure worth \$48, and sheep, \$18 per 1,000 pounds of live weight each year. The chief benefits obtained from manure are indirect, such as improvement in soil tilth, structure and other physical properties.



## TRUCK CROPS AND HOME PRODUCE

Vegetables require a high level of fertility for best results, and they probably respond better than any other crop to proper fertilizer treatments. Fertilizer requirements of vegetable crops are relatively high and unless the crop is supplied properly with plant nutrients, maximum yields cannot be obtained. Through a market garden, the part-time farm operator can supplement the family income, if a market for the produce is available. The demand for high-quality produce always is good. If the producer is near a large urban area, ready outlets usually can be found for good-quality produce in season. Cull or poor-quality items should not be allowed to spoil the market for high-quality produce. A system of grading or sorting varieties will pay good profits for the operator who is willing to take the time. Once a reputation for quality is established, the problem becomes that of meeting the demand.



### WHAT FERTILIZER WILL DO

Fertilization is one of the most profitable practices contributing to increased crop yields and greater farm profits. One ton of balanced, high-analysis, commercial fertilizer, which meets the requirements of a particular soil, will give the following increases in yields:

TABLE I. AVERAGE YIELD INCREASES PRODUCED BY 1 TON OF BALANCED FERTILIZER\*

Crop	Yield increase
Corn	125 bu.
Cotton	2 bales
Oats	140 bu.
Potatoes	185 bu.
Sweet potatoes	285 bu.
Peanuts	200 bu.
Tomatoes	215 bu.
Beans (green)	130 bu.
Milk	8,000 lb.
Beef	1,000 lb.

\*Collings, G. H., Commercial Fertilizer, McGraw-Hill, 1955, Fifth Edition, pg. 433.

*Have You Met . . . .*



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Most county extension agents have their offices in the county courthouse or agriculture building. Get to know them and take advantage of their services.

This publication is one of many prepared by the Texas Agricultural Extension Service to present up-to-date, authoritative information, based on results of research. Extension publications are available from your local agents or from the Agricultural Information Office, College Station, Texas.

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