

MAINTAINING SOIL FERTILITY IN SOUTHERN ARIZONA

By FRANK NICHOLS, '28

Value of Fertilizer Demonstrated—Proper Care of Manure Necessary—
Importance of Green Manures.

OF THE many problems that confront the American farmer of today one of the most important is that of maintaining soil fertility. To solve this problem will no doubt cause the expenditure of time and money, but the returns by increased crop production will more than pay for the increased cost. The loss of fertility from the soil is caused in many ways, such as poor soil management, leaching due to weather conditions, single cropping year after year, and washing due to heavy rains. There are also many ways in which this fertility may be maintained. Some of these are the use of commercial fertilizers, barnyard manure, green-manure crops, and crop rotation.

Perhaps the most striking example of the depletion of soil fertility can be found in the southern states. Since the time of slavery cotton has been the main crop of the South. The land was planted to cotton year after year, and the yield per acre became less and less. Then came that fortunate disaster; namely, the invasion of the boll weevil. Due to this invasion, the farmers of the South were compelled to plant other crops. Among these crops some legumes such as soy beans, cow peas, and peanuts were planted. Very soon after the boll weevil made its appearance, methods of controlling the pest were introduced. The men of the South at once put their land back to cotton, but much to their surprise the yield per acre was greatly increased. So elated were these farmers over their discovery, that a monument was built to the boll weevil, which had opened their eyes to the necessity of crop rotation.

Farm land in Arizona is comparatively new, but the general practice seems to be a crop rotation that will maintain soil fertility and still produce the maximum yield per acre. Not only in Arizona but all over the United States this practice is becoming prevalent. In planning a system of crop rotation, it is essential to include some legume such as alfalfa, clover, or cow peas. This is important because the legumes are known as soil builders and are the only plants capable of taking free nitrogen from the air and fixing it in the soil.



Green manure is an excellent source of fertilizer for Arizona.

Another loss of fertility, due largely to poor management, occurs through the improper handling of barnyard manures. It has been proved that 50 per cent of the total constituents in farm manures is lost due to leaching and improper fermentation and that a large number of farmers unknowingly encourage the maximum loss. It has also been estimated that a very large part of this waste is avoidable at slight expense, but if only 10 per cent of the loss from this cause annually was saved, the value of the total constituents maintained for further use would more than equal the total amount paid for commercial fertilizers in the United States. Perhaps the best method of caring for manure is to build concrete pits in which it can be placed until time to put it on the land. By keeping these pits covered the loss from the manure is reduced to a minimum. If it is not possible to build pits a method which is cheaper is to rake the manure in piles as often as possible, always keeping them well packed to prevent circulation of air. If possible it is well to make these piles under a shed or where they can be covered from the weather. As the urine contains a high percentage of nitrogen, it is considered good practice to make arrangements where possible to collect this in tanks and put it on the land also. In applying manure to the land, it

is essential that it be spread evenly and turned under as soon as possible. If it is left to lie on top of the ground, losses will occur due to exposure to the weather. The returns in increased crop production will be noticed for four or five years after the application is made. One of the unfortunate conditions that exist in communities where land is rented or leased on a yearly basis, is that no provision is made to care for the barnyard manure. Each tenant feels that he cannot afford to bother with the manure because he will probably not have a chance to reap the reward of its application.

Two more methods of maintaining soil fertility are by the use of commercial fertilizers and green manure crops. Commercial fertilizers are now being used very extensively in the southern and eastern states, but so far they have not proved valuable enough to pay for themselves in Arizona on account of high freight rates. Then there are three ways left for conserving soil fertility: (1) by crop rotations, (2) by caring properly for barnyard manure, (3) by the use of green-manure crops. By green-manure crops is meant crops grown to be turned under, thus fertilizing the soil. Green-manures aid the soil in three ways: (1) by an addition of organic matter to the soil, (2) by saving

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the plant food, especially the nitrogen, from loss by leaching, (3) in case the green-manure is a legume, through an addition of nitrogen to the soil. However advantageous green-manures are, care must be taken in their use. If the crop is a heavy one, upon turning it under there may be formed an impervious layer of organic matter which decomposes very slowly and will cause serious injury to the physical condition of the soil. However, if care is taken to keep the soil moist, this condition will not occur. A green-manure crop should be plowed under at least two weeks and preferably longer before the succeeding crop is to be planted. This allows the decaying processes to be well under way, and any substance formed in this process that is toxic to the young plant will be out of the soil in this length of time,

The following table is an example of results in citrus in California by the use of different fertilizers:

Treatment	Average yield in pounds per tree	
	Navel oranges	Valencia oranges
Cover crop and manure	46 lbs.	113 lbs.
Manure	26 lbs.	85 lbs.
Dried blood	20 lbs.	56 lbs.
Nitrate of soda	9 lbs.	1 lb.
Two elements with nitrogen	28 lbs.	19 lbs.
Complete fertilizer	42 lbs.	20 lbs.
Steamed bone	1 lb.	21 lbs.
Potash	0	3 lbs.
Super-phosphate	0	10 lbs.
Unfertilized	0	3 lbs.

The question "Will it pay to fertilize?" must be answered by each individual farmer. Profits on the use of fertilizers depend on many things such as the character of the soil, previous treatment of the soil, weather and moisture conditions, prices for crops, cost of labor and many other things. Whether these facts are important or not, the time will come when it will pay to fertilize. Whether now, must be left to the man who now must be left to the man who owns and cultivates the soil. The soil may be likened to a bank account; it is impossible to keep drawing out and never put anything back. It is essential that every farmer give this question of maintaining soil fertility the most careful consideration.

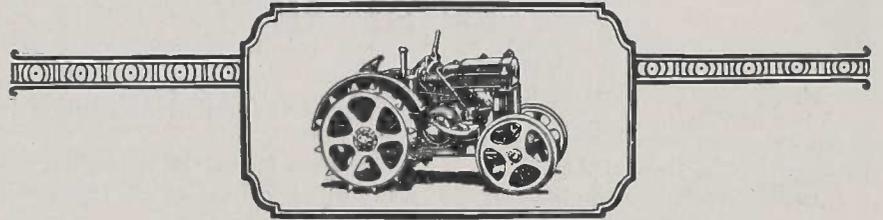
GRAIN CREEP GOOD FOR YOUNG LAMBS

When a farmer is raising purebred lambs or wishes to push his lambs through for an early market, a creep in a corner where the lambs may eat grain by themselves is very desirable.

Arrange the creep early so that the lambs may become acquainted with it before they are old enough to munch

on the grain, suggests J. K. Ford, extension specialist in livestock at the State College of Washington.

The grain may consist of equal parts of coarsely ground wheat and whole oats or oats and bran or millrun, two and one parts each by weight. Whole oats, millrun and linseed oil meal, 60-30-10 parts each by weight make another splendid ration.



There Must Be A Profit

NO INDUSTRY or individual business can long continue without a suitable profit. Therefore there must be profit in farming, because it goes on year after year.

Profit is all contained in the margin between selling prices and production costs. On this margin a few farmers "go broke," others make a good living and many grow wealthy.

Since the selling price at any given time is the same to all farmers it is evident that prosperous farmers are producing at lower costs than those who do not prosper.

How do they do it? Mostly by cutting down power and labor costs through the use of more efficient machinery. It is significant that many of the most prosperous farms are equipped with Case machines—built and sold since 1842 to make more money for their owners.



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