Crop production in the midwest, like that in other regions, is beset with nitrogen problems. These problems arise from both soil conditions and the influences of soil use practices. Some soils naturally contain rather small amounts of this important nutrient element. Others contain relatively large supplies, but they need replenishing from time to time for best results. Many commonly used systems of cropping reduce soil supplies of nitrogen and encourage losses by drainage and erosion; soil resources tend to become less and less and crop yields decline. The effects of an inadequate supply of nitrogen on production economy may vary considerably among agricultural regions and, likewise, the means for effective correction may also differ. In fact, there may be differences in these respects among the several states in a given region and even within a state itself.

The purpose of this paper is to review briefly the methods that are being used to increase the nitrogen-supplying power of midwest soils and to consider the adjustments which may have to be made under wartime conditions.

Supplying Nitrogen Needs

Crop producers deal with the problem of nitrogen supply in several ways. There are many, of course, who give this problem but little, if any, serious consideration. Some operate their farm lands in such a way as to hold the nitrogen outgo to a minimum and thus prolong the usefulness of the supplies in their soils. They do this chiefly with cropping practices and livestock feeding operations. There are some who supplement the soil supplies with chemical nitrogen by making applications to certain crops in definite amounts at the proper time. Then there are a good many farmers who give the legumes and sod-forming crops a prominent place in the cropping system in order to transfer adequate amounts of atmospheric nitrogen to their soils. Finally, there are some who coordinate all or parts of these methods into effective replenishment systems. These plans involve the use of both chemical and organic or farm-supplied nitrogen.

Using Chemical Nitrogen

In 1941 midwest farmers used about 26,000 tons of chemical nitrogen. This was a little more than 6% of that used in the continental United States during the same year. Although this is a small amount, its use is well established in the production of a number of midwestern crops. According to best estimates that can be made, wheat received the largest amounts. The fruit and vegetable crops came next. The other crops receiving nitrogen in descending order of the amounts were potatoes, tobacco, spring grains, sugar, and forage crops. The amounts applied to the last two, however, were very small.

The use made of chemical nitrogen in the individual states varies a good deal from the regional pattern because of variations in the kinds of crops grown, soil, and climatic conditions. In Illinois, for instance, the fruit and vegetable crops received larger amounts than other kinds of crops. This is true in Ohio and Michigan where rather large tonnages were applied to the potato crop. In Kentucky tobacco received the largest amount. In Ohio a fair tonnage was used on sugar beets. Farmers in the northern and eastern states applied more chemical nitrogen to corn than farmers in other parts of the region. In general, chemical nitrogen is used in the midwest states to supply a growing crop with its total nitrogen requirement or even a part of it, but rather as a supplement to soil nitrogen for the purpose of providing production advantages that cannot be obtained readily from soil supplies alone. It is used primarily to overcome seasonal disadvantages and to improve crop quality.

Using Farm Sources of Nitrogen

Growing crops need large amounts of nitrogen. The 1941 Illinois corn crop, for instance, required the use of about 321,000 tons. This is about 80% of the total quantity of chemical nitrogen used in the United States during the same year. It is evident that the major supplies of nitrogen for production, under present conditions, cannot come from commercial sources. They can come from...