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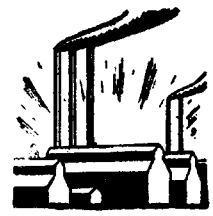
War Program Creates Fertilizer Problem

Important changes are taking place with respect to the wartime supply of commercial fertilizers that have so long been the mainstay of southern agriculture. While the supplies of such basic fertilizer materials as potash, phosphate rock, and sulphur are ample for all foreseeable needs, there is a real transportation problem. The shipping shortage and the danger of submarine sinkings compel movement of the materials by rail for the most part instead of by coastwise ships, hitherto the main carriers. The lack of available ocean shipping facilities and the demand generated by munitions manufacturing have seriously affected the available supply of nitrogen carriers. In fact, the nitrogen supplies, instead of moving freely into the market as formerly, are now under direct allocation by the War Production Board. As an accompanying control, ceiling prices have been established by the Office of Price Administration upon retail sales of certain fertilizer materials.

▶ The Sixth District, as illustrated by Table I, is an extensive user of commercial fertilizers and will therefore be vitally affected by any interruption in supply made necessary by wartime changes. Much of the area has been under long-term cultivation, so that original plant foods in the soil have long since been exhausted, necessitating constant replacement. The District lacks the rich, glaciated soils of the North and Middle West that have made it possible for these regions to defer the extensive use of artificial fertilizers. Southeastern farmers have concentrated upon the production of cash crops at the expense of livestock production, so that animal manures are not plentiful in the District. The acreage of legume crops has likewise been limited because of the reliance upon cash crops such as cotton and tobacco.

In spite of known needs, the extent to which commercial fertilizers are used is largely determined by anticipated profit margins. With prices of most farm products now offering profitable opportunities, it is expected that the demand for fertilizer will expand considerably, even though the supply problem already offers difficulties. This dependence of fertilizer demand upon the relative prosperity of agriculture is illustrated by data shown in Table II. When agriculture, for example, reached the depression lows of 1932, the consumption of commercial fertilizers dropped to a low point of 4,385 thousand tons. On the other hand, during the relatively prosperous year of 1941, fertilizer consumption reached an all-time high with 9,254 thousand tons. Fertilizer sales for the year 1942 are at very near the level attained in the record year of 1941. Sales for the first five months of the year for the United States as a whole, as based upon reports of tax tag sales, amounted to 4,681 thousand tons, as compared with 4,684 thousand tons for the year 1941. For the six states of the District, however, sales for the first five months of the year 1942 were somewhat below sales for the same period a year ago (an indicated sale of 2,115 thousand tons as compared with 2,167 thousand tons). It is highly improbable that marketing of fertilizer at such high levels can be consistently maintained in view of the present supply problem.



▶ The commercial fertilizer supply problem is especially related to the movement and processing of the three basic materials—(1) phosphate, (2) potassium, and (3) nitrogen. So far as phosphate is concerned, continental United States is self-sufficient. As early as the year 1868, South Carolina deposits were placed in production, and some twenty years later numerous phosphorous rock deposits were opened up for commercial production in nearby Florida and Tennessee. Phosphorous rock reserves in Florida alone are estimated to be in excess of three billion tons, while reserves in the United States as a whole are known to be more than ten billion tons. At the present rate of consumption, these reserves, it is estimated, will last more than three thousand years.

While phosphorous rock exists in more than sufficient quantities, the necessary processing presents certain problems. First of all, the railroads of the country are faced with the task of transporting thousands of tons of phosphorous rock that formerly moved by coastwise ships. Whether or not the railroads can handle this tonnage in addition to all of the other wartime tonnage they now must haul remains to be seen. Plant capacity does not appear to be much of a problem, for it is estimated that existing processing plants, especially for the production of superphosphate, are able to produce quantities equal to double any annual consumption of recent years. Sulphuric acid is used in great quantities by the fertilizer industry in extracting phosphates from phosphorous rock. Sulphuric acid is also in great demand for munitions purposes. Any conflict in the demand for the available supply of sulphuric acid seems to be remote, however, because the acid can be recovered from munitions plants as spent acid and be used again in the superphosphate plants.

With respect to the supply of potassium, the second principal component of commercial fertilizers, the situation is at least as favorable as it is in the case of phosphorus. It is only since the close of the first World War that the United States has become self-sufficient in potassium, known in the trade as potash. The two principal producing areas are at Searles Lake, California, and at Carlsbad, New Mexico. Reserves in these areas are estimated at well over 100 million tons, sufficient to last over 200 years at the present rate of consumption. As in the case of phosphorus, therefore, the principal supply difficulties will be found in the lack of transportation facilities for distributing available sup-

plies to the areas where they are most needed and in the possibility of a restricted labor force.

The present potash situation is in sharp contrast to that prevailing during the first World War. At that time, Germany was our chief source of potash and with the prompt application of the English blockade, the supply was abruptly cut off. Domestic sources of potash were then resorted to and limited quantities of potash were obtained from by-products of blast furnaces, cement mills, and distilleries; and from processing seaweed, cottonseed hulls, and certain sand deposits. These makeshift sources of supply, however, did not prevent the price of potassium chloride from rising from $38 a ton to $500 a ton.

It is in the supply of nitrogen carriers that the war has created serious difficulties. Supply problems are particularly noteworthy in the case of sulphate of ammonia and nitrate of soda, the two most widely used nitrogen fertilizer materials. Although supplies of sulphate of ammonia, which is a by-product of the coke ovens of steel plants, are increasing as the result of increased steel production, the increased quantities will not be sufficient to make up for the deficiencies now becoming apparent in other sources of production. Further, there has been a considerable diversion of ammonia solutions to the munitions industry. Unlimited quantities of nitrate of soda are available from Chilean sources, but scarcity of ocean shipping and the submarine menace offer a most difficult problem in transportation. Moreover, part of the imported Chilean nitrates must be diverted to the manufacture of explosives.

Vegetable organics to some extent will be available as a source of nitrogen materials. Increased acreages of oil production crops such as peanuts and soy beans may lead to an increased production of oil meals with a possibility that some of the increase will be left over for commercial fertilizers. Farmers have also been advised by the Department of Agriculture to plant legumes and thus to obtain nitrogen by atmospheric fixation of plant nutrients in roots.

TABLE I

Number of Farms Using Commercial Fertilizer and the Tonnage and Dollar Value of Fertilizer Used for the Year 1939

	Number of Farms	Number of Farms Using Fertilizer	Per Cent of Farms Using Fertilizer	Tonnage of Fertilizer Used Total	Tonnage of Fertilizer Used Per Farm	Dollar Value Fertilizer Used Total	Dollar Value Fertilizer Used Per Farm
Alabama...	231,746	196,515	84.8	525,977	2.7	13,405,411	68.21
Florida....	62,248	42,086	67.6	419,356	9.9	13,072,255	31.06
Georgia...	216,033	193,643	89.6	700,044	3.6	18,647,880	96.30
Louisiana..	150,007	78,808	52.5	129,212	1.6	3,956,530	50.20
Mississippi	291,092	178,206	61.2	305,926	1.7	8,883,948	49.85
Tennessee.	247,617	111,909	45.2	136,971	1.2	3,405,875	30.43
District....	1,198,743	801,167	66.8	2,217,486	2.8	61,371,899	76.60
U. S.....	6,096,799	2,337,031	38.3	7,003,826	3.0	195,927,959	83.84

Source: U. S. Bureau of the Census, Census of Agriculture 1940.

TABLE II

United States Fertilizer Consumption

Year	Fertilizer Consumption (In Thousands of Tons)	Year	Fertilizer Consumption (In Thousands of Tons)
1925.....	7,334	1934.....	5,583
1926.....	7,329	1935.....	6,276
1927.....	6,844	1936.....	6,931
1928.....	7,986	1937.....	8,247
1929.....	8,012	1938.....	7,571
1930.....	8,222	1939.....	7,789
1931.....	6,354	1940.....	8,317
1932.....	4,385	1941.....	9,254
1933.....	4,908		

Source: National Fertilizer Association.

Any deficiency in nitrates will have a depressing effect upon crop production in the Sixth District. It is estimated that approximately one-third of the total cotton production and more than 10 per cent of the corn production in the Atlantic coastal area arises from the application of nitrogen fertilizers.

▶ In spite of all measures that can be taken, there seems little prospect that fertilizer materials will be available in unrestricted quantities. Recognizing the problem, various governmental and private agencies have taken steps to augment the supply of nitrogenous fertilizer materials and to utilize the available material as efficiently as possible.

The imposition of price control was an early step. The Office of Price Administration established temporary maximum prices on mixed fertilizer for retail sale on February 27, 1942. On March 19, 1942, maximum margins were fixed for charges made by mixers and retailers to farmers for nitrate of soda, sulphate of ammonia, and cyanamide. Mixed fertilizers, sulphates and potash were also brought under price control as of April 30, 1942. Meat scrap and tankage, representing organic fertilizer materials, were placed under a zone pricing system as of June 5, 1942.

The establishment of direct control over existing supplies was another step. The War Production Board placed the more important nitrogen supplies completely under allocation orders. Synthetic nitrogen was withdrawn from sale for ordinary industrial and agricultural uses. Sodium nitrate was brought under allocation by a general preference order taking effect January 15, 1942. By-product ammonia, sulphate of ammonia, and synthetic ammonia were similarly placed under allocation control as of July 1, 1942.

Nitrogen supplies that are allocated to agriculture by the War Production Board are, in turn, to be allocated to particular crops in accordance with the recommendation of the United States Department of Agriculture. So far, the problem of rationing fertilizer materials has been avoided, but the Department of Agriculture is working out, in cooperation with the states, the grades of fertilizers for each crop that will make the most efficient use of the available supplies of nitrogen. Under consideration also is the establishment of priorities for crops on the basis of their need for and consumption of fertilizers. Already it has been ruled that fertilizers containing nitrogen may not be sold in the Middle West for grain crops to be sown during the coming autumn.

▶ By and large, the fertilizer supply problem promises to be one of ever-increasing stringency, and while the problem is not one of immediate urgency, the long-term outlook offers no grounds for optimism, particularly if the war is to be of long duration.

Material for this article has been drawn from publications of the National Fertilizer Association, United States Department of Agriculture, and from the *Commercial Fertilizer*, and the *Journal of Commerce and Commercial*. In addition helpful suggestions and assistance have been given by the following individuals:

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