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1975 FERTILIZER Situation

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Conversion Factors

To convert	To	Multiply by
P_2O_5	P	0.43642
P	P_2O_5	2.29137
K_2O	K	.83016
K	K_2O	1.20459
Anhydrous ammonia	N	.82
Urea	N	.46
Ammonium nitrate	N	.335
Ammonium sulfate	N	.205
Sodium nitrate	N	.16
Superphosphate:		
20 percent P_2O_5	P	.08728
46 percent P_2O_5	P	.20075
Potash:		
60 percent K_2O	K	.49810
62 percent K_2O	K	.51470
Potassium chloride	K_2O	.63177
Metric tons (tonnes, 2204.6 av. lbs.)	Short tons	1.10231
Long tons (2240 av. lbs.)	Short tons	1.12

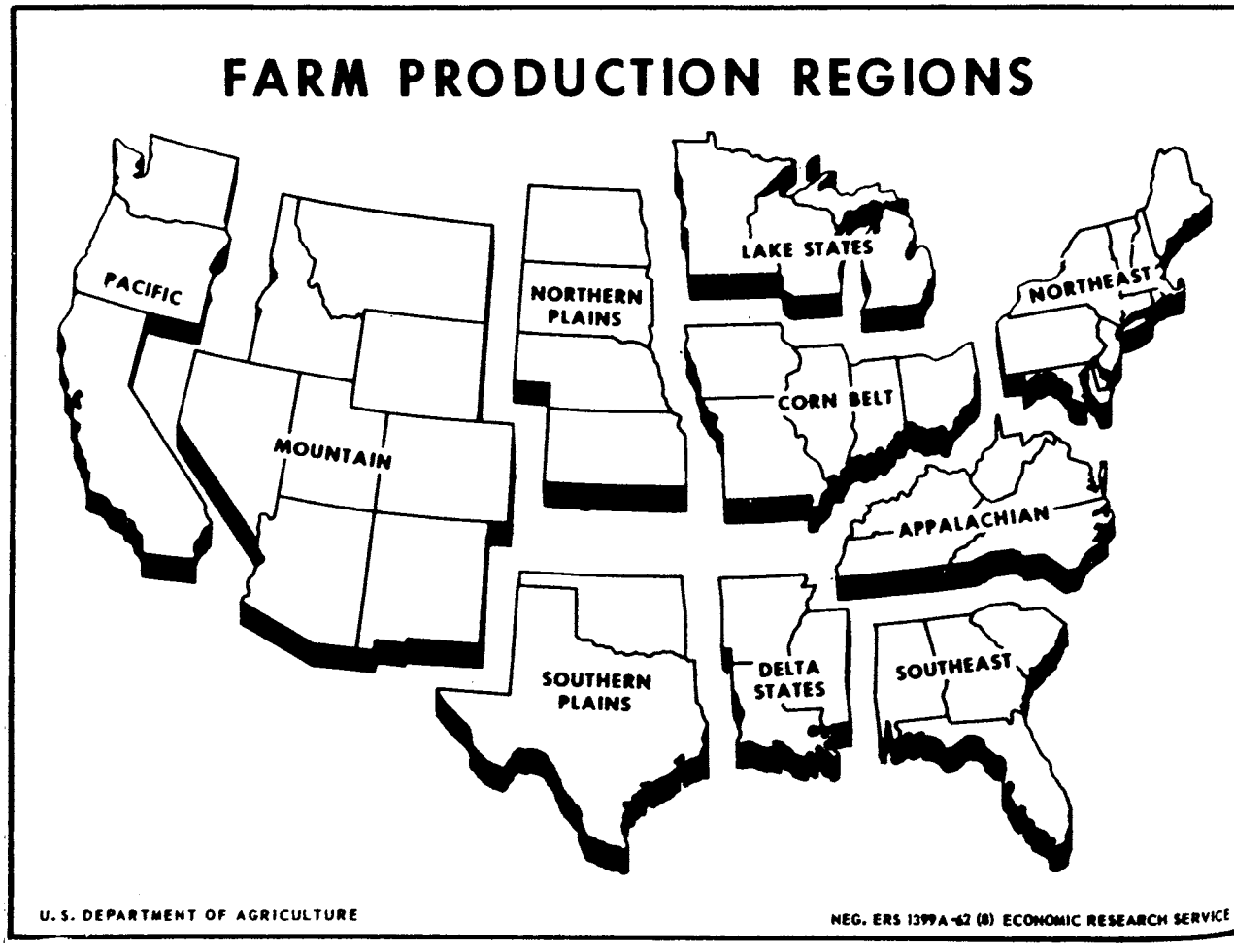

Figure 1

1975 FERTILIZER SITUATION

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Approved by
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and Summary released
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SUMMARY

Farmers may pay 10 to 15 percent more per ton for fertilizer during the 1975 planting season than they did during the last quarter of 1974. Such an increase would be much below the more than doubling in prices since the lifting of price controls in the fall of 1973. It may also signal an end to the violent upward price spiral of recent months. Use of all 3 primary plant nutrients will be up in 1975, but use of nitrogen and potash may rise less than in 1974.

There is some evidence that farmers' fertilizer purchases in the last half of 1974 have slackened noticeably from 1973. At the same time, inventories of basic materials have increased. This can be an indication of buyer resistance to higher fertilizer prices and the uncertainties of the 1975 crop production season.

Ammonia production capacity will be up by 907,200 tons (about 5 percent) annually as 7 additional facilities come onstream during the year. However, output from most of this capacity will not be available until the last half of 1975. With several million more acres to be planted to crops in 1975, demand will be stronger than it was in 1974.

Phosphoric acid rated capacity will undergo a series of additions totaling some 1.9 million tons P_2O_5 by year's end. About a fourth of this will be available for use during 1975 in the United States. Despite this increase, prices are likely to be somewhat higher because of increased demand. New mines will need to be opened soon to avert a serious shortage of phosphate rock. World market phosphate rock prices have increased 350 percent since December 31, 1973. They are scheduled to go up 8 percent more on January 1, 1975.

Potash supplies are likely to tighten in the year ahead and prices may rise. No substantial increase in production capacity for muriate of potash has been announced in North America. One reason is the high fee that must be paid by producers in Canada—typically $12.10 a ton, comparable to a $1.95 per ton royalty in the United States.

U.S. fertilizer demand in 1973/74 exceeded available supplies. As a result, prices generally doubled in a year. At the same time, use of nitrogen and potash rose nearly 10 percent but the use of phosphate was unchanged from a year earlier. Out of 47 million tons of fertilizer used, 24 million tons were mixed goods.

Gains in use of nitrogen and potash were reported in most parts of the country—particularly in the Corn Belt. Phosphate use declined in 5 of the 10 regions.

Although use of N-P_2O_5-K_2O was up 7 percent nationally, the rate of use per acre varied by crop. Just over 102 pounds of nitrogen were applied to corn, down 10 percent from 1973. Also, less phosphate was used per acre of corn, while potash use was up. More cotton acres were fertilized with more nitrogen, but potash applications were substantially lower. The percentage of soybean acres fertilized was down but application rates changed only slightly. More wheat acres were fertilized. Nearly two-thirds of all wheat was fertilized, but rates of use were little changed from a year earlier.

The United States continues to play a principal role in the world fertilizer market. In the 1973/74 fiscal year, the declared value of U.S. fertilizer exports was $680 million—45 percent more than a year earlier.

U.S. Agency for International Development financed 33 percent fewer tons of fertilizer in 1973/74 than during 1972/73. In some instances, AID refused to accept fertilizers at high offering prices.

The United States was a net exporter of nitrogen by a margin of only 7 percent compared to 54 percent a year ago.

Exports of P_2O_5 in 1973/74 were up 10 percent compared with a 29 percent gain in the preceding year.

Potash imports, principally from Canada, were roughly equivalent to three-fourths of U.S. domestic use.

World use of nitrogen during 1974/75 may be about 47 to 48 million tons—a 13 percent increase. Even so, the supply-demand balance will continue tight. Prices may be somewhat higher but the rate of increase may be moderating. About 17 million tons of potential additional nitrogen production capacity have been announced worldwide to come onstream in the late 1970's.

Several new phosphoric acid and phosphate fertilizer plants will start up in 1975. Thus, supplies of phosphate fertilizer production capacity will not be a limiting factor. Morocco plans to boost phosphate rock output to 21.5 million tons. Spanish Sahara hopes to increase its production to 6 million metric tons.

Potash inventories in North America are at dangerously low levels and little expansion in output is in view for 1975. The USSR will probably ship more potash into western markets.

OUTLOOK FOR 1975

OVERVIEW

The outlook for 1975 fertilizer prices continues bullish. With high grain prices, the demand for fertilizer will be strong. Before and at the height of the planting season—70 percent of the fertilizer is used in the first half of the year—supplies of the primary plant nutrients will be moderately above a year ago. If the weather is normal and farmers are able to plant more acres, demand will likely push prices above September 1974 levels, possibly by 10 to 15 percent. If both prices and supplies rise as expected, farmers will spend an estimated $6½ billion for fertilizer in 1975. This is nearly 18 percent more than the $5.5 billion estimated for 1974.

Nitrogen Fertilizers

Production Capacity

Capacity to produce synthetic anhydrous ammonia for all purposes—fertilizer and industrial—in the United States will be about 17.4 million tons at the start of 1975. During 1974, three additions totaling 510,000 tons were made to annual domestic plant capacity. The output from these new and reactivated plants will be a net gain for the entire coming year.

During 1975, 907,200 tons of additional ammonia capacity is scheduled to come onstream from 7 additions to our 1974 plant inventory. However, April is the first month that any of these plants—either new, reactivated, or enlarged existing plants—will be in actual production. If all plants come into operation as scheduled, about 800,000 tons or 9 percent more nitrogen fertilizer will be available for use in 1975 than was used in 1974. Most of the 1975 potential will be realized in the last half of the year and virtually all the new output is destined for agricultural rather than industrial use. This puts 1975 potential use of nitrogen solely for fertilizer in the United States close to 10 million tons.

A forecast of production of ammonia must be hedged by an estimate of the availability of natural gas in the United States. About 95 percent of our domestic ammonia capacity is based on gas as the hydrogen source. Estimates of the American Gas Association indicate that curtailments of gas deliveries as reported by over half the interstate pipelines will amount to about 12 percent of firm requirements during the 5-month winter period, November 1974 through March 1975. Reports of curtailments of deliveries of gas by intrastate pipelines are not available, but it is unlikely that such curtailments are a significant consideration. All told, the loss of nitrogen due to curtailed gas deliveries could approach 400,000 tons or more if the winter is particularly severe. This prospective loss was taken into consideration in the 1975 estimate of ammonia output for fertilizer use.

Prices

Prices of high nitrogen content fertilizers in 1975 may rise 10 to 15 percent above September 1974 levels. The U.S. average price for ammonia would thus be about $250 a ton at the farm. Although other materials such as ammonium nitrate, ammonium sulfate, and nitrogen solutions could show corresponding increases, urea is a special case and its price level difficult to assess.

Two years ago, estimates of the annual use of urea as feed for ruminant animals were as high as 800,000 tons. The cost differential heavily favored using urea as a protein substitute for oil meals. This is no longer true and 1975 use of urea in feed will probably total half that estimated for the past 3 years. As this shift takes place, more urea will become available for fertilizer use and the quantity may be great enough to diminish somewhat the upward price pressure on fertilizers containing appreciable quantities of urea.

Use

Demand for nitrogen fertilizers will continue strong through 1975. Planting restrictions are virtually nonexistent and crop prices are at high levels. Crop acreage planted may expand moderately in 1975. So, if weather at planting time is good, it is almost a certainty that farmers would buy all the nitrogen fertilizers they could get at current prices. However, at the higher price levels in prospect for 1975, some price resistance may affect early sales with the result that some inventory buildup could occur at the manufacturing level.

Phosphate Fertilizers

Production Capacity

Domestic capacity to produce wet-process phosphoric acid will be about 6.8 million tons on January 1, 1975. By the end of April, 4 new plants with a rated annual capacity of 1.75 million tons are scheduled to begin production. A fifth plant is planned to start operation before the end of the year. This will put the increase in production capacity at 1.9 million tons for 1975 and raise total capacity 28 percent to 8.7 million tons of P_2O_5 by the end of the year.

Since two of these plants are scheduled to start up in January, part of this new output will be on the market early enough to be of real benefit in 1975. All told, about 1.3 million tons additional P_2O_5 may be available for all uses in the coming year. Much of this may go into export and, as in the case of nitrogen, some resistance to high prices may cause phosphate producers to rebuild depleted inventories. Also, as P_2O_5 becomes more readily available in high analysis goods, the output of normal superphosphate is likely to again trend lower.

Prices

With increased output of phosphates, the domestic supply of P_2O_5 may increase as much as 10 percent above 1974. Nevertheless, demand may be even stronger with the result that domestic phosphate prices could climb another 10 percent or so during the peak months of use in the first half of 1975. Phosphate prices will continue higher is grain prices remain high and foreign demand continues strong.

Use

The United States plays a major role in the world phosphate market. Much of the new capacity is intended to produce products for export. How much actually is exported depends upon existing contracts with foreign buyers, spot price levels for phosphates in the world markets, and domestic prices. At present price relationships, domestic use of P_2O_5 may increase as much as 10 percent during the coming year to a total of some 5.5 million tons.

Phosphate Rock

Phosphoric acid production capacity is being greatly increased and more attention must be focused on solving fast developing problems with the availability of phosphate rock in the United States.

U.S. phosphate rock producers have three markets for their product. Roughly 10 percent of the rock is used for industrial products other than fertilizer, 30 percent is exported as rock, and the remaining 60 percent is used to make fertilizer in this country.

In recent years, production of phosphate rock has not kept pace with these uses. This is evidenced by the reduction in stocks of phosphate rock maintained by producers. These are the inventories of phosphate rock for recent years.

Year ended June 30	Total stocks in tons
1971	13,747,000
1972	12,886,000
1973	9,660,000
1974	7,505,000

About 20 companies in the United States mine phosphate rock. On the average, each firm has slightly less than 400,000 tons of rock on hand. In terms of marketable rock, there is a 2-month average supply above ground in all producing areas of the United States—Florida, North Carolina, Tennessee, Missouri, and the Western States. This probably is close to the absolute minimum and is a precarious position for American agriculture at this time of pressing need.

Inventories will probably be cut further in 1975 as producers supply phosphate rock to their new plants. Exports of rock will probably be maintained at 1974's level of about 14 million tons. However, deliveries by The Phosphate Rock Export Association in the export market may be reduced as individual rock producers reportedly are bartering rock for nitrogen fertilizer.

What does it mean as far as phosphate rock output is concerned when a new phosphoric acid plant comes into production? The most widely marketed grade of rock in the United States is 66-70 percent BPL—bone phosphate of lime. BPL can be converted to P_2O_5 by multiplying the BPL content by .45767. Thus, a short ton of 70

percent BPL rock contains the equivalent of 640 pounds of P_2O_5.

Using 70 percent BPL rock as the basis, some 3,080 pounds of rock are required to produce a ton of concentrated superphosphate or a ton of diammonium phosphate. To produce a ton of wet-process phosphoric acid (54 percent P_2O_5) requires 3,620 pounds of rock. Thus, a plant capable of producing annually 761,000 tons concentrated superphosphate (350,000 tons P_2O_5) would need a minimum of 1.2 million tons of phosphate rock a year.

However, because machinery efficiencies partly govern the size of the mining operation, a typical phosphate rock mine may produce about 3 million tons of rock a year. To produce this, some 30 million to 42 million tons of gross weight—overburden and ore—must be moved each year. (This latter weight is equivalent to the tonnage of fertilizer used in the United States in 1973).

What does it take to mine 3 million tons of rock in addition to highly skilled labor and capital investment? Electric power—240,000 KWH per day; bunker "C" oil—6 million gallons per year; fresh water—6,000 gallons a minute.

Finally, what about the time required from the date of decision to open a new mine until the first ton of rock comes out of the dryer?—3 to 5 years.

Phosphate Rock Prices

On January 1, 1974, Morocco assumed world leadership in pricing phosphate rock. They priced 75 percent BPL phosphate rock at $42 a metric ton f.a.s. This compares with $14 at the end of 1973. American exporters also raised their prices at that time but stayed below the Moroccan price. These relatively high prices for exported rock tended to boost the price of rock for domestic use.

The price of 75 percent BPL rock is now $63 a metric ton, f.a.s. Morocco. On Janauary 1, 1975, the price is slated to go to about $68. This new price is to be effective until July 1, 1975.

Sulfur

About half of the sulfuric acid in the United States is used to make fertilizers. Supplies of sulfur and sulfuric acid are adequate for the prospective 1975 demand. In addition, one mine now closed will be reopened. The output from this mine will ease the load on sulfur supplies that will be caused by opening new phosphate fertilizer plants.

Sulfur prices, like most other prices, have increased without letup and are likely to remain at current levels or rise higher in 1975. This will tend to put added pressure on phosphate fertilizer prices.

Potash Fertilizers

Production Capacity

Potash will be tight in 1975. For several years, the combined supply of potassium-based fertilizers from U.S. and Canadian deposits was more than ample to meet demand in the United States. However, world demand for muriate of potash has absorbed much of the available output from all deposits being worked around the world.

Mines and refineries in North America are operating at or near practical capacity. With stocks in Canada and in this country at low levels, it is unlikely that 1975 use of K_2O in the United States will increase much more than 3 percent or 150,000 tons.

Despite price levels substantially above a year ago, no new production facilities have been announced for 1975. However, potash transport problems may ease somewhat in 1975. Both independent potash producers and Saskatchewan government agencies have leased additional cars for the movement of potash out of Saskatchewan to seaports for export and to the United States.

A principal drawback to expansion of output from the Canadian deposits is a rather complex and costly system of rents, rovalties, taxes, and other fees that must be paid. These fees are considerably above those paid by producers in the United States.

In Canada, all mineral ownership is in private hands or the Provinces. There is no Federal ownership of the potash deposits. Ownership in fee was early granted to the railroads and Hudson's Bay Company. As a result of the divided ownership, most potash mines in Canada are operated under a unitization agreement so that a proportionate share of royalty is paid to all owners on each ton produced.

Each lease area consists of 12,000 acres of provincial land plus privately owned acreage included within the boundary lines. Lease rental on the area is $1 an acre per year on the first 12,500 acres plus 10 cents per acre on any additional reserved area held. This is comparable to lease rental agreements in the United States.

Royalty is computed on a sliding scale depending upon the K_2O grade of the ore. The probable average royalty is 5 percent on ore averaging 25 to 27 percent K_2O. This rate is applied to the recovered K_2O equivalent in the finished product based on 49 percent of the current price for standard grade muriate but not less than 17.65 cents per unit (20 pounds). The formula for computing the royalty is: tons of ore mined times ore grade, times mill recovery rate, times the sales value of the K_2O units, times 49 percent, times the royalty rate.

Mineral tax of 1.6 cents per dollar of net sales from a minimum of 30 percent K_2O ore grade from the fee land

portion of the ore body is levied by the Province. To arrive at this tax, the sales value is multiplied by the ore grade divided by 30 percent multiplied by the fee land percentage of the total lease multiplied by the $.016 tax rate.

A *Potash proration fee* of $1.20 per ton of product is assessed and paid monthly to the Province.

A *Saskatchewan potash reserve tax* is to be imposed retroactive to July 1, 1974. This tax is a quarterly ad valorem tax paid for the right to mine potash and applies when the average selling price is $35.50 Canadian or more per K_2O ton. The effect of the tax is that at today's prices, 56 percent of the price above 35.5 cents per unit will be taken by the Saskatchewan government. The percentage of the selling price paid as tax varies with the price.

These royalties and mineral taxes were allowed as an expense for Canadian federal income taxes, but after November 1974 they were not. Instead, a reduction of 15 percentage points of the tax rate on mineral profits will be allowed as part abatement of these royalty and mineral tax expenses. The estimated net effect on producers will vary. One producer estimated that their income taxes might increase more than 30 percent.

All told, for a ton of product with a typical price at the mine of 65 cents unit or $39 a ton, the Canadian fee would be $12.10—royalty, 90 cents; proration fee, $1.20; and a reserve tax of $10.00. This compares with the U.S. royalty of about $1.95.

These data are fairly complex to compute and are typical costs. They refer to no individual firm. They do, however, help explain why new potash mines in Canada may be slow to develop.

FERTILIZER PRICES—1974

Fertilizer supplies—nitrogen and phosphate—were short in 1974. This was particularly true during the early part of the year when planting conditions were generally good. Because of the strength of the demand, fertilizer prices at all marketing levels moved to new record highs with only intermittent, short periods of stability. Toward the end of 1974, a semblance of order appeared in fertilizer pricing as occasional price resistance was reported in some parts of the country.

Nitrogen Fertilizer Prices

Ammonia farm prices rose sharply from $87.60 a ton as recently as April 15, 1973, when prices were still controlled, to $183 on April 15, 1974 (table 1). This 110 percent rise in 12 months are followed by a 25 percent rise to $229 a ton, U.S. average, as of September 15. Some 4.2 million tons of ammonia were used as such in the United States during the 12 months ended June 30, 1974. This means that farmers spent nearly three quarters of a billion dollars for ammonia containing 3.4 million tons of nitrogen. In addition, all other nitrogen fertilizer prices were affected similarly. Urea, 46 percent nitrogen content, was $5.10 per 20-pound unit of nitrogen by September 1974 (table 2). This is equivalent to 25.5 cents per pound of nitrogen and is 27 percent above the April 15, 1974, U.S. average price paid by farmers. Ammonium nitrate prices per unit of nitrogen were close to those for urea. At the high end of the scale, the September price of sodium nitrate was the equivalent of 53 cents per pound of contained nitrogen, 28 percent above the April price.

Table 1—Average prices paid by farmers per ton for selected fertilizers, United States, 1967 and 1969-74

April 15 of year	Anhydrous ammonia	Superphosphate		18-46-0	Potash 60 percent K_2O	Mixed fertilizer 6-24-24
		46 percent P_2O_5	20 percent P_2O_5			
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1967	113.00	84.10	42.10	113.00	[1]58.50	85.70
1969	75.60	74.00	43.80	94.10	47.80	73.20
1970	75.00	75.10	45.40	94.40	50.90	75.00
1971	79.30	76.60	47.80	95.70	58.20	80.30
1972	80.00	78.00	49.90	97.40	58.80	81.60
1973	87.60	87.50	53.70	109.00	61.50	88.00
1974:						
Apr. 15	183.00	150.00	91.40	181.00	81.30	139.00
Sept. 15	229.00	188.00	104.00	228.00	91.00	164.00

[1] Based on equivalent price for 55 percent K_2O reported by SRS.

Source: "Agricultural Prices", Pr 1 (9-74), Statis, Rptg, Serv., U.S. Dept. Agr., September 30, 1974, and earlier issues.

Table 2—Average prices paid by farmers per 20-pound unit of nitrogen contained in nitrogenous materials, United States, 1964-74[1]

April 15 of year	Nitrate of soda	Sulfate of ammonia	Ammonium nitrate	Urea	Anhydrous ammonia	Nitrogen solutions percent N		
						28	30	32
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1964	3.76	2.57	2.38	2.33	1.54	--	--	--
1965	3.76	2.60	2.35	2.29	1.49	--	--	--
1966	3.73	2.58	2.28	2.22	1.45	--	--	--
1967	3.76	2.64	2.21	2.18	1.38	--	--	--
1968	3.74	2.63	2.03	2.02	1.11	1.95	2.09	2.06
1969	3.74	2.56	1.84	1.84	.92	1.49	1.79	1.80
1970	3.89	2.56	1.79	1.82	.91	1.64	1.81	1.83
1971	4.07	2.52	1.89	1.80	.97	1.79	1.87	1.90
1972	4.13	2.54	1.93	1.79	.98	1.85	1.84	1.96
1973:								
Apr. 15	4.84	2.69	2.13	1.98	1.07	2.05	1.94	2.09
Sept. 15	5.11	2.90	2.31	2.11	1.13	2.18	2.03	2.25
1974:								
Apr. 15	8.19	5.37	4.15	4.02	2.23	4.11	3.70	3.97
Sept. 15	10.50	6.68	5.07	5.10	2.79	4.89	4.53	4.78

[1] Excludes Alaska and Hawaii.

Source: Computed from "Agricultural Prices", Pr 1 (9-74), Statls, Rptg. Serv., U.S. Dept. Agr., September 30, 1974, and earlier issues.

Domestic prices paid by farmers for nitrogen fertilizers reflect increases in ammonia prices at the manufacturer's level. The April 15, 1974, price of $130 per delivered ton rose to $170 by September 15 (fig. 1). This 31 percent rise includes increased transportation and labor costs that can be more significant at the manufacturer's level than at the retail level.

Phosphate Fertilizer Prices

Phosphate fertilizer prices rose at a fast clip although at a somewhat slower pace than nitrogen fertilizer prices. Phosphates doubled in price over the 18 months from April 1973 to September 1974. Concentrated superphosphate and 18-46-0 both increased 25 percent in price from April 1974 to September 1974. These increases were more moderate than those posted for nitrogen products despite what seemed to be a relatively tighter supply of phosphates. Largely overlooked because of its declining share of the market for phosphates, normal superphosphate was considerably more costly than concentrated superphosphate per pound of P_2O_5. In April 1974, a 20-pound unit of P_2O_5 in normal superphosphate cost farmers an average of $10.48 (table 3). The same quantity of plant nutrient in concentrated superphosphate was $7.47, 29 percent less. However, normal superphosphate is an excellent source of sulfur while ammonium phosphates and concentrated

Table 3—Average prices paid by farmers per 20-pound unit of phosphorus contained in phosphate materials and potassium in muriate of potash, United States, 1964-74[1]

April 15 of year	Superphosphate		Muriate of potash[4]
	Normal[2]	Concentrated[3]	
	Dollars	*Dollars*	*Dollars*
1964	4.62	3.99	1.18
1965	4.66	4.03	1.17
1966	4.74	4.12	1.20
1967	4.82	4.19	1.17
1968	4.95	3.90	.98
1969	5.02	3.69	.96
1970	5.20	3.74	1.02
1971	5.48	3.82	1.17
1972			
1973:			
Apr. 15	6.15	4.36	1.23
Sept. 15	6.41	4.69	1.28
1974:			
Apr. 15	10.48	7.47	1.63
Sept. 15	11.92	9.35	1.83

[1] Excludes Hawaii and Alaska. [2] 20 percent P_2O_5. [3] 46 percent P_2O_5; 45 percent P_2O_5 prior to 1967. [4] 60 percent K_2O; 55 percent K_2O prior to 1968.

Source: Computed from "Agricultural Prices", Pr 1 (9-74), Statls, Rptg, Serv., U.S. Dept. Agr., September 30, 1974, and earlier issues.

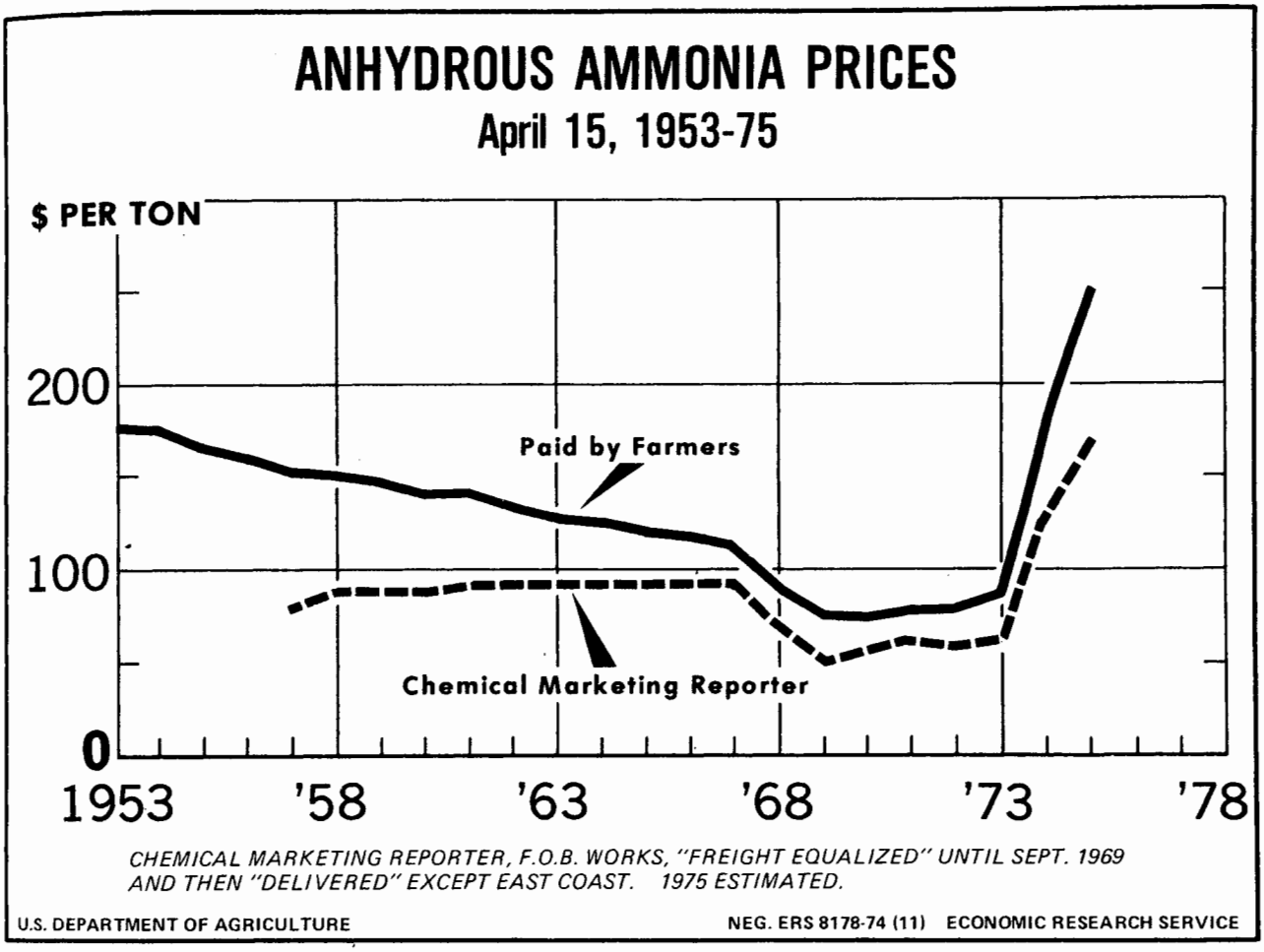

Figure 1

are not. Agronomic studies indicate that supplemental sulfur applications are fast becoming essential to efficient crop production in some areas.

Potash Fertilizer Prices

Of the primary plant nutrients, potash prices advanced the least in 1974 compared with 1973. Partly responsible for the comparatively moderate increase from $61.50 a ton average on April 15, 1973, to $81.50 on April 15, 1974, is the fact that demand was below supplies and pressures for price increases were somewhat subdued. This may change in the next 24 months.

FERTILIZER USE ESTIMATES, 1973/74

Forty-seven million gross tons of fertilizer were used in the United States and Puerto Rico during the fertilizer year July 1, 1973, to June 30, 1974 (table 4). This is a record high and is 9 percent—4 million tons—more than the year before. After an allowance for noncropland use, the use of fertilizer per acre of cropland used for crops averaged:

Year	Area	Fertilizer	Primary plant nutrients
	Million acres	*Pounds per acre*	*Pounds per acre*
1972	334	210	88
1973	354	208	87
1974	360	222	91

These data include the acres that later were abandoned or not fertilized because of poor weather during the crop season. The principal component of the number of acres shown is planted acres rather than harvested acres. Based on cropland used for crops, not only did the number of acres increase from 1973 to 1974, but also the pounds of plant nutrients rose. This clearly shows that farmers were able to obtain more

Table 4—All fertilizer: Total use and primary nutrient use, United States, 1960-74[1]

Year ended June 30	Total use	Primary nutrient use				
		N	Available P_2O_5	K_2O	Total	Index
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1967=100*
1960	24,887	2,738.0	2,572.4	2,153.3	7,463.7	53.4
1961	25,567	3,030.8	2,645.1	2,168.5	7,844.4	56.1
1962	26,615	3,370.0	2,807.0	2,270.5	8,447.5	60.5
1963	28,844	3,929.1	3,072.9	2,503.4	9,505.4	68.0
1964	30,681	4,352.8	3,377.8	2,729.7	10,460.3	74.9
1965	31,836	4,638.5	3,512.2	2,834.5	10,985.3	78.6
1966	34,532	5,326.3	3,897.1	3,221.2	12,444.7	89.1
1967	37,082	6,027.1	4,304.1	3,641.8	13,973.6	100.0
1968	38,743	6,787.6	4,453.3	3,792.6	15,033.5	107.6
1969	38,949	6,957.6	4,665.6	3,891.6	15,514.8	111.0
1970	39.591	7,459.2	4,573.9	4,035.7	16,068.8	115.0
1971	41,118	8,133.6	4,803.4	4,231.4	17,168.4	122.9
1972	41,206	8,016.0	4,863.7	4,326.8	17,212.8	123.2
1973[2]	43,288	8,295.2	5,085.2	4,648.7	18,029.1	129.1
1974[3]	46,997	9,123.8	5,070.6	5,085.7	19,280.1	138.0

[1] Includes Puerto Rico. [2] Revised. [3] Preliminary.

Source: Years 1960-69 from "Consumption of Commercial Fertilizers and Primary Plant Nutrients", Stat. Bull. 472, Statis. Rptg. Serv., June 1971. Years 1970-74 from "Consumption of Commercial Fertilizers in the United States" SpCr 7 (11-74) Statis. Rptg. Serv., U.S. Dept. Agr., November 1974 and earlier issues.

fertilizer in 1974 than they used in 1973. However, for the most part these rates of use reflect available supplies rather than quantities demanded.

By reducing plant inventories to their minimums, by the addition of new production facilities, and by operating existing facilities without adequate maintenance, total supplies of the primary plant nutrients—N, P_2O_5, K_2O—were 7 percent above a year ago. However, changes in total use were not uniform. Nitrogen and K_2O use rose about 10 percent each. Use of phosphate declined slightly, according to early estimates. These are the reported uses of N, P_2O_5, and K_2O in the United States for the past 2 years:

Nutrient	1972/73	1973/74	Change
	1,000 tons	*1,000 tons*	*Percent*
Nitrogen	8,276	9,099	9.9
P_2O_5	5,078	5,062	0
K_2O	4,634	5,069	9.4
Total	17,987	19,230	6.9

Use of Separate Materials Increases

After remaining constant during the past 3 years, the use of separate materials rose in 1973/74 (table 5). A principal component of the separate materials category is ammonia. In 1973/74, the use of ammonia rose to 4.2 million tons. This 800,000 ton increase plus a 500,000 increase in use of separate potash materials largely balanced a 1.5 million ton increase in use of mixed fertilizers. Out of 47 million tons of fertilizer, 24 million tons, a little over half, were mixed materials. Within 2 years or so, the majority is likely to be the separate materials.

Use of Dry Bulk Materials Rises

Dry fertilizer materials—bagged plus bulk—have accounted for nearly three-fourths of the fertilizer used each year since 1968 (table 6). However, within this category, the use of bagged goods has moved lower as use of dry bulk goods has moved consistently higher. Dry bulk materials are usually the most efficient materials to use. Also, they are highly flexible in that farmers can obtain any combination of plant nutrients they require.

Liquids, too, are flexible in use but often they are more costly than dry materials per unit of plant nutrient. Nitrogen products—anhydrous ammonia, aqua ammonia, and nitrogen solutions make up nearly ¾ of the liquid used.

Plant Nutrient Use Up in Most Regions

Nitrogen

At the regional level, gains in nitrogen use were reported for all but the Northeast where use fell 12,000 tons or 4 percent (table 7). In the 9 other regions, the use of nitrogen increased over a broad spectrum from 2 to 21 percent. The largest increase in use was 427,000 tons—21 percent—in the Corn Belt States of Ohio, Indiana, Iowa, and Missouri. Nitrogen use in these 5

Table 5—All fertilizer: Mixtures and direct-application materials used, averages 1950-64, annual 1967-74, United States

Year ended June 30	All fertilizer	Mixtures		Materials[1]	
		Quantity	Percentage of total	Quantity	Percentage of total
	1,000 tons	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*
Average:					
1950-54	21,313	14,293	67	7,020	33
1955-59	22,831	14,843	65	7,988	35
1960-64	27,062	16,347	60	10,715	40
1967	36,888	20,958	57	15,930	43
1968	38,557	21,126	55	17,431	45
1969	38,782	21,077	54	17,705	46
1970	39,434	20,819	53	18,615	47
1971	40,982	21,388	52	19,594	48
1972	41,059	21,398	52	19,661	48
1973	43,149	22,420	52	20,729	48
1974[2]	46,836	23,939	51	22,897	49

[1] Primary nutrients plus secondary and micronutrient materials not included in commercial mixtures. [2] Preliminary.

Source: "Consumption of Commercial Fertilizers in the United States, Year Ended June 30, 1974", SpCr 7 (11-74) Statis. Rptg. Serv., U.S. Dept. Agr., November 1, 1974, published annually.

Table 6—All fertilizers: Use by class, mixtures and direct application materials, selected years 1954-73 [1] [2]

Year ended June 30	Dry bagged	Percentage	Dry bulk	Percentage	Liquid	Percentage
	1,000 tons	*Percent*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*
1954	--		--		565.4	3
1961	--		--		2,763.4	12
1963	--		--		4,089.2	15
1964	--		--		4,742.2	16
1965	--		--		5,352.3	18
1967	15,489.2	44	12,159.4	34	7,676.1	22
1968	13,900.1	38	14,313.4	39	8,556.6	23
1969	13,143.8	35	15,198.5	41	8,936.7	24
1970	12,146.3	32	15,822.4	42	9,977.2	26
1971	11,500.0	29	16,931.7	43	11,131.8	28
1972	11,242.0	29	17,463.7	44	10,839.7	27
1973	10,324.2	25	19,977.1	48	10,967.5	27

[1] Alaska and Hawaii not included. [2] Includes all commercial fertilizer sold or shipped for farm and nonfarm use as fertilizer. Secondary and micronutrient materials applied directly to the soil are not included. Anhydrous ammonia is included in "liquid".

Source: "Commercial Fertilizers, Consumption in the United States by Class (Dry Bagged, Dry Bulk, Liquid) Year ended June 30, 1973", SpCr 7 (74) Statis, Rptg. Serv., U.S. Dept. Agr., June 7, 1974, and earlier issues.

–Not available.

Table 7—Use of nitrogen as fertilizer, by regions, years ended June 30, 1973 and 1974

Region	1973	1974 Prelim.	Change
	1,000 tons of N	*1,000 tons of N*	*Percent*
Northeast	332	310	-4
Lake States	684	705	3
Corn Belt	2,056	2,483	21
Northern Plains	1,303	1,387	6
Appalachian	515	543	5
Southeast	764	778	2
Delta States	446	530	19
Southern Plains	914	1,011	11
Mountain	457	480	5
Pacific	813	873	7
50 States	8,276	9,099	10

Detail may not add to totals.

Table 9—Use of potassium as fertilizer, by regions, years ended June 30, 1973 and 1974

Region	1973	1974 Prelim.	Change
	1,000 tons K_2O	*1,000 tons K_2O*	*Percent*
Northeast	303	319	5
Lake States	682	772	13
Corn Belt	1,734	2,000	15
Northern Plains	171	152	-11
Appalachian	513	534	4
Southeast	696	710	2
Delta States	227	243	7
Southern Plains	155	174	12
Mountain	22	28	27
Pacific	130	137	5
50 States	4,634	5,069	9

Detail may not add to totals.

States accounted for 27 percent of all the fertilizer nitrogen used in the country. Two cotton growing regions reported increases of 19 and 11 percent, following the Corn Belt in rates of increase.

Phosphates

The tight supply of phosphates in 1973/74 was evidenced by a drop in use in 5 of the 10 regions (table 8). Although increases in the remaning 5 regions ranged from 1 to 6 percent, the only sizable absolute rise was reported in the Corn Belt where use of P_2O_5 was up 83,000 tons. This increase was in the face of a slight net decline nationally.

Table 8—Use of phosphorus as fertilizer, by regions, years ended June 30, 1973 and 1974

Region	1973	1974 Prelim.	Change
	1,000 tons of P_2O_5	*1,000 tons of P_2O_5*	*Percent*
Northeast	318	309	-3
Lake States	552	555	1
Corn Belt	1,545	1,628	5
Northern Plains	527	484	-8
Appalachian	444	429	-3
Southeast	464	445	-4
Delta States	227	240	6
Southern Plains	398	401	1
Mountain	291	256	-12
Pacific	311	315	1
50 States	5,078	5,062	—

Detail may not add to totals.

Potash

Potash use dipped in only one region—the Northern Plains (table 9). Increases were reported in all other parts of the country, ranging as high as 27 percent. The potash industry in North America was able to meet demand in large part because production capacity was greater than the quantity demanded. The 9 percent increase for the United States brought use of K_2O up to a virtual level with P_2O_5 use. This is the first time this has happened since fertilizer use estimates were started beginning with 1850.

FERTILIZER USE ON CROPS

Each year since 1964, USDA's Statistical Reporting Service has collected information about fertilizer used on corn for grain, cotton, soybeans for beans, and wheat in the major producing States. Approximately 8,700 fields randomly selected in the States covered were surveyed, with farmers reporting N, P_2O_5, K_2O used on the fields and the timing of application.

Corn for Grain

The 19 States surveyed for fertilizer use on corn accounted for 93 percent of the total acreage of corn harvested for grain in the United States. Of the fields surveyed, 94 percent received fertilizer (table 10), up slightly from 1973 (table 11).

Corn acres receiving nitrogen was also up to 94 percent; 87 percent received phosphate, up over 1 percentage point, and 83 percent received potash, up 3 percentage points from 1973.

The application rate for nitrogen was 102.5 pounds per acre, down 10 percent from the 1973 level. This may reflect difficulty in securing nitrogen, although the 10 percent increase in the net domestic supply of nitrogen would seem to refute this hypothesis. Many farmers did not get the fertilzier they desired, some even at the higher prices. But the data may also reflect a decline in the quantity of nitrogen demanded for use on corn. Fertilizer was applied "at or before seeding only" to 72.3 percent of the corn acreage receiving fertilizer in 1974 compared with 60 percent in 1973. Most of the remaining acreage, 25.4 percent, received applications of

Table 10—Estimates of fertilizers used on harvested acres of corn, cotton soybeans, and all wheat, United States, 1970-74

Crops and year	Acres receiving				Rate per acre receiving			Harvested acreage 48 States
	Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
	Percent	*Percent*	*Percent*	*Percent*	*Pounds*	*Pounds*	*Pounds*	*1,000 acres*
Corn								
1970	95	94	90	85	112	71	72	57,224
1971	94	94	88	82	107	62	64	64,047
1972	96	96	90	86	115	66	69	57,421
1973	94	93	86	80	114	64	71	61,760
1974	94	94	87	83	103	62	73	63,746
Cotton								
1970	72	72	48	36	75	55	57	11,160
1971	75	74	50	39	75	53	58	11,471
1972	77	77	55	41	75	55	61	12,984
1973	75	74	55	39	73	53	62	11,995
1974	79	79	58	46	78	53	55	13,072
Soybeans								
1970	29	21	27	28	14	37	51	42,056
1971	28	19	27	27	15	39	48	42,701
1972	31	22	29	31	14	42	51	45,698
1973	33	24	32	32	14	42	55	56,416
1974	30	22	28	28	15	41	55	52,510
All wheat								
1970	63	61	44	20	39	30	36	44,141
1971	58	57	41	14	40	34	36	47,674
1972	63	62	44	15	46	37	38	47,284
1973	64	63	45	17	48	38	36	53,875
1974	66	66	46	20	46	38	37	64,102

fertilizer "at or before *and* after seeding". Only 2.3 percent of the acreage received fertilizer "after seeding only" one-half the 1973 level. Thus, with the relative decline in acreage receiving fertilizer after seeding in 1974, it seems plausible that farmers were less willing to risk sidedress application because of high fertilizer prices and adverse weather. Studies have shown a substantial decline in the yield response to fertilizer the longer planting is postponed.

All major corn producing States showed declines in nitrogen application rates. Application rates increased in only 3 States. In Delaware and Virginia application rates increased, although the percent of acreage receiving nitrogen declined. In Georgia increased application rates accompanied an increase in the percent of acres receiving nitrogen and an increase in total corn acreage.

The application rate of 62 pounds P_2O_5 per acre, on those acres receiving phosphate, was down from nearly 64 pounds per acre in 1973. This was expected because of the increase in crop acreage with no increase in the net domestic supply of phosphate. However, farmers increased their application rates on those acres receiving fertilizer in 5 States. In Iowa and Missouri, they appeared to do it at the expense of the percent of acres receiving phosphate. But in Illinois, North Carolina, and Kentucky, they increased application rates simultaneous to increasing the percent of acres receiving phophate. The percent of acres receiving phosphate increased in 10 States. This exhibits sound management because it is usually more productive to spread a limited supply of fertilizer over all acres than to apply it at high rates on a portion of the acreage, leaving the rest untreated. Of course, variations in the ambient phosphate content of soils may warrant variations in application rates to obtain maximum crop production. Thus the importance of soil testing.

Application on those corn acres receiving potash averaged 73 pounds per acre, up from 71 pounds per acre in 1973, while the percent of acres receiving potash rose from 80 to 83 percent. Application rates increased in 8 States. The percent of acres receiving increased in 9 States, 5 of which had also increased application rates.

Cotton

The 14 cotton producing States surveyed accounted for virtually all of the cotton acreage in the United States. Of the fields surveyed, 79 percent received fertilizer (table 12), up from the 75 percent in 1973. The percent of acres receiving nitrogen rose over 4 percentage from the 1973 level to 79 percent, the percent of acres receiving phosphate rose 3 percentage points to 58 percent, while the percent of acres receiving

Table 11—Fertilizer use on corn acreage harvested for grain, selected States, 1974

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Pounds*	*Pounds*	*Pounds*	*Percent*	*Percent*	*Percent*
Pennsylvania	1,070	116	97.4	97.4	95.7	96.6	71.1	61.0	52.2	90.2	1.8	8.0
Delaware	186	79	96.2	96.2	92.4	92.4	112.4	70.7	95.1	38.2	2.6	59.2
Maryland	500	72	100.0	100.0	100.0	95.8	92.5	74.7	87.0	61.1	1.4	37.5
3 States	1,756	267	98.0	98.0	96.6	95.9	81.6	66.0	66.5	76.4	1.8	21.8
Michigan	1,730	101	98.0	98.0	97.0	95.0	72.4	56.5	72.9	70.7	1.0	28.3
Wisconsin	2,090	163	98.8	98.2	97.5	98.2	61.7	55.1	88.3	77.0	0.0	23.0
Minnesota	5,810	173	93.6	93.6	87.9	86.1	83.0	61.4	68.8	80.9	3.1	16.0
3 States	9,630	437	95.5	95.4	91.6	90.3	76.2	59.0	74.2	78.2	2.0	19.8
Ohio	3,700	172	98.8	98.8	96.5	98.3	90.4	68.1	82.5	70.0	0.6	29.4
Indiana	5,500	163	99.4	99.4	99.4	96.3	101.9	73.5	96.8	75.9	0.0	24.1
Illinois	10,150	223	97.3	95.5	93.7	91.9	113.2	74.5	85.4	72.4	0.9	26.7
Iowa	11,750	195	91.3	89.7	81.0	79.0	101.8	61.9	63.8	79.8	3.4	16.8
Missouri	2,750	152	94.1	93.4	82.9	83.6	116.7	59.3	64.4	86.7	4.9	8.4
5 States	33,850	905	95.5	94.3	89.7	88.2	105.2	68.5	78.7	76.3	1.9	21.8
South Dakota	2,300	91	59.3	59.3	50.5	24.2	47.4	22.5	10.9	85.1	5.6	9.3
Nebraska	5,000	171	94.1	93.7	67.9	48.9	130.9	37.7	18.8	65.8	3.4	30.8
Kansas	1,400	149	94.6	92.6	66.4	48.3	139.7	52.4	31.4	83.7	5.7	10.6
3 States	8,700	411	84.4	83.8	62.8	41.8	115.7	36.6	19.7	72.6	4.2	23.2
Virginia	540	121	98.3	98.3	94.2	94.2	133.3	79.0	110.1	50.4	2.5	47.1
North Carolina	1,570	144	100.0	100.0	97.2	97.2	132.9	57.5	75.2	22.9	2.8	74.3
Kentucky	1,120	123	100.0	100.0	96.7	95.9	96.5	57.5	60.8	69.8	3.2	26.8
3 States	3,230	388	99.7	99.7	96.6	96.3	120.3	61.0	75.9	43.8	2.9	53.3
Georgia	1,800	110	99.1	99.1	97.3	98.2	124.2	48.4	74.8	18.4	1.8	79.8
Colorado	410	129	92.2	92.2	62.8	26.4	157.8	56.0	32.0	38.7	18.5	42.8
19 States	59,376	2,647	94.3	93.6	86.9	82.7	102.5	62.3	73.0	72.3	2.3	25.4

[1] "Crop Production" CRPR 2-2 (11-74) Crop Reporting Board. SRS, USDA, November 8, 1974. [2] Percentages apply to acres receiving fertilizer.

Table 12—Fertilizer use on cotton acreage harvested, selected States 1974

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Pounds*	*Pounds*	*Pounds*	*Percent*	*Percent*	*Percent*
Missouri	325	71	97.2	97.2	84.5	88.7	60.2	50.9	72.9	60.9	11.6	27.5
North Carolina	155	60	100.0	100.0	100.0	100.0	69.8	55.7	89.5	20.0	3.3	76.7
Tennessee	540	83	100.0	100.0	96.4	97.6	65.8	59.9	60.9	83.2	3.6	13.2
2 States	695	143	100.0	100.0	97.2	98.1	66.7	58.9	67.4	69.0	3.6	27.4
South Carolina	300	106	100.0	100.0	94.3	99.1	101.3	69.8	108.1	3.8	0.9	95.3
Georgia	400	92	100.0	100.0	97.8	100.1	118.8	64.6	103.1	7.6	0.0	92.4
Alabama	605	107	100.0	100.0	99.1	99.1	99.5	75.5	74.5	43.9	0.0	56.1
3 States	1,305	305	100.0	100.0	97.6	99.3	105.9	70.8	91.0	23.6	0.2	76.2
Mississippi	1,715	339	100.0	100.0	44.5	45.7	103.2	63.9	64.4	55.1	14.2	30.7
Arkansas	1,325	272	97.8	97.8	72.4	75.0	68.0	40.3	45.9	62.0	9.4	28.6
Louisiana	615	96	100.0	97.9	59.4	59.4	68.6	54.3	51.1	58.3	29.2	12.5
3 States	3,655	707	99.2	98.8	57.1	58.6	84.8	51.4	53.5	58.2	15.0	26.8
Oklahoma	500	108	47.2	47.2	42.6	40.7	21.2	29.8	14.8	94.1	5.9	0.0
Texas	4,800	632	54.6	54.6	47.3	23.7	48.3	43.4	17.4	87.7	5.5	6.8
2 States	5,300	740	53.9	53.9	46.9	25.3	46.1	42.3	17.0	88.3	5.5	6.2
New Mexico	140	50	56.0	52.0	48.0	16.0	48.9	56.7	26.3	57.2	32.1	10.7
Arizona	386	105	97.1	97.1	51.4	1.9	122.9	57.9	26.8	23.5	29.4	47.1
2 States	526	155	85.9	84.8	50.5	5.8	110.5	57.6	26.4	29.5	29.9	40.6
California	1,165	222	83.1	83.5	37.5	10.4	103.6	58.5	22.1	47.4	34.4	18.2
14 States	12,971	2,343	78.8	78.7	57.8	45.5	77.6	53.0	55.2	60.7	12.1	27.2

[1] "Crop Production" CR-PR 2-2 (11-74) Crop Reporting Board. SRS, USDA, November 8, 1974. [2] Percentages apply to acres receiving fertilizer.

potash rose to 46 percent, up 7 percentage points from 1973. These increases largely can be attributed to favorable cotton prices.

Essentially all fields received fertilizer in the Southern States where heavy cropping long ago depleted soils of their native plant nutrients. On the other hand, only about half of the fields are fertilized in Oklahoma and Texas where the possibility of moisture shortages adds substantial risk to production. In New Mexico, Arizona, and California, irrigation reduces this risk and most fields receive fertilizer. The percent of acres receiving nitrogen fell in only Oklahoma, New Mexico, and California. In 5 States the percent of acres receiving phosphate increased, while 8 States realized increases in the percent of acres receiving potash.

The average application on those acres receiving nitrogen was 78 pounds per acre, up from 73 pounds per acre in 1973. The phosphate application rate remained unchanged at 53 pounds, while the potash application rate fell from 62 pounds to 55 pounds. There were substantial increases in Missouri, Georgia, Alabama, and Mississippi and small increases in South Carolina, Texas, and Arizona. Application rates fell substantially in North Carolina, Oklahoma, and New Mexico. Phosphate application rates did not increase in any State, while the application rate of potash was most variable, increasing in 6 States but falling in the other 8 States. The potash application rate increased 47 percent in New Mexico and fell 55 percent in California, the two extremes of the range.

Soybeans for Beans

The 14 States surveyed for fertilizer use on soybeans accounted for 85 percent of the soybean acreage in the United States. The percent of acres receiving fertilizer fell from 33 percent in 1973 (table 13) to about 30 percent in 1974. This general shift also held for the acreages receiving each of the three nutrients. The nitrogen application rate increased about 1 pound per acre, a mild surprise in light of the tight nitrogen situation. The phosphate application rate decreased just over 1 pound per acre from the 1973 level while the potash application rate remained unchanged.

Wheat, All

The 17 wheat producing States surveyed accounted for 91 percent of the wheat acreage harvested in the United States. Acres receiving fertilizer increased 3 percentage points from 1973 to nearly 67 percent (table 14). Acres receiving nitrogen and phosphate each increased about 3 percentage points and the percentage of acres receiving phosphate increased 1 point. The nitrogen application rate on those acres receiving was down about 1 percentage point, phosphate was up slightly and the potash application rate up just over 1 percentage point. A larger portion of the wheat acreage received fertilizer after seeding compared to a year earlier, probably because of inability to secure nitrogen early last fall. The shift to post-plant applications was most apparent in Washington, Oregon, Indiana, Missouri, and Oklahoma.

Implications For 1975

The fertilizer use by crops data and the consumption data, discussed earlier, are consistent with respect to phosphate. Given the available supply of phosphate reported in the consumption data, application rates on corn, cotton, soybeans and wheat appear logical. In 1972 these crops accounted for 56 percent of harvested crop acreage and 53 percent of the phosphate sold (table 15). In 1973 they accounted for 57 percent of the acreage and 54 percent of the phosphate, and in 1974 they accounted for 59 percent of the acreage harvested and 55 percent of the phosphate sold.

However, this tidy relationship does not hold for either nitrogen or potash. The portions of nitrogen and potash accounted for by these four crops seemingly should have increased, given the 10 percent increase in supply, but they dropped off substantially. Instead of accounting for about 56 percent of the nitrogen and 58 percent of the potash as might be expected given the portion of crop acreage they account for and past application rates, they accounted for only 50 percent of the nitrogen and 54 percent of the potash.

Some of this apparent decline in relative application rates can be accounted for by the fertilizer that went on crop acreage that was planted but not harvested because of unfavorable weather. However, if the planted acreage of the four crops received the same amount as reported on those acres harvested for grain, the same divergence exists, although perhaps to a lesser degree (table 16).

Assuming accuracy of the data, high fertilizer prices and the risk of limited response to nitrogen and potash because of late corn planting apparently reduced the quantity demanded. Consequently, a wet-late spring or a high probability of a dry summer coupled with high fertilizer prices could suppress the demand for fertilizer for 1975 crops. High fertilizer prices alone are not likely to suppress demand significantly. With prospects of high commodity prices in 1975, most farmers can economically justify higher application rates. Even the risk of falling commodity prices can be minimized or eliminated by contracting on the futures market. But the risk of reduced yields may depress demand, particularly with high fertilizer prices. In 1971 application rates on corn dropped substantially, apparently because of the risk of a repeat of the 1970 corn leaf blight. Several instances can be identified where fertilizer application rates on wheat declined when the prospects of reduced yields loomed large. Each of these occurred with lower fertilizer prices. Thus, with high fertilizer prices, a threat of poor yields because of weather or other conditions could be expected to depress the demand for fertilizer.

The two sets of data may also suggest that a significant amount of the nitrogen and potash available

Table 13—Fertilizer use on soybeans acreage harvested for beans, selected States 1974

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Pounds*	*Pounds*	*Pounds*	*Percent*	*Percent*	*Percent*
Minnesota	2,550	102	22.5	17.6	20.6	20.6	14.5	25.8	38.5	95.5	43.5	0.0
Ohio	3,200	124	54.8	46.8	53.2	54.0	12.9	42.0	49.5	97.1	1.4	1.5
Indiana	3,910	125	58.4	48.8	53.6	57.6	9.8	38.0	59.9	97.3	2.7	0.0
Illinois	8,500	151	19.2	11.9	15.2	17.2	10.5	43.9	73.4	100.0	0.0	0.0
Iowa	7,070	153	10.5	6.5	10.5	10.5	8.7	33.0	43.8	93.8	6.2	0.0
Missouri	4,350	134	14.2	11.9	13.4	14.2	16.7	42.8	55.2	84.2	15.8	0.0
5 States	27,030	687	26.0	20.0	23.7	25.2	11.4	40.1	58.0	96.3	3.3	0.4
Nebraska	1,100	54	7.4	7.4	5.6	5.6	27.3	29.3	13.7	100.0	0.0	0.0
Kansas	1,050	49	14.3	12.2	10.2	4.1	55.2	29.0	16.0	71.4	0.0	28.6
2 States	2,150	103	10.9	10.0	7.9	4.8	45.0	29.1	14.7	80.9	0.0	19.1
North Carolina	1,450	65	63.1	56.9	60.0	61.5	16.5	38.2	60.3	100.0	0.0	0.0
Tennessee	1,540	79	58.2	38.0	58.2	57.0	14.5	41.8	44.0	100.0	0.0	0.0
2 States	2,990	144	60.6	47.2	59.1	59.2	15.7	40.0	52.2	100.0	0.0	0.0
South Carolina	1,250	74	79.7	59.5	78.4	79.7	21.1	38.2	67.6	88.1	8.5	3.4
Mississippi	2,550	121	34.7	16.5	33.9	32.2	23.0	55.8	54.9	97.6	2.4	0.0
Arkansas	4,300	145	31.7	20.0	31.0	31.7	16.1	43.8	52.2	95.6	4.4	0.0
Louisiana	1,760	101	20.8	16.8	19.8	19.8	18.6	53.8	52.8	100.0	0.0	0.0
3 States	8,610	367	30.4	18.3	29.6	29.4	18.4	49.2	53.1	96.9	3.1	0.0
14 States	44,580	1,477	29.6	21.9	27.6	28.3	14.7	40.7	55.4	96.0	3.2	0.8

[1] "Crop Production" CRPR 2-2 (11-74) Crop Reporting Board. SRS, USDA, November 8, 1974. [2] Percentages apply to acres receiving fertilizer.

Table 14—Fertilizer use on all wheat acreage harvested, selected States 1974

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Pounds*	*Pounds*	*Pounds*	*Percent*	*Percent*	*Percent*
Michigan	940	62	96.8	96.8	95.2	95.2	37.7	57.0	49.2	65.0	1.7	33.3
Minnesota	2,624	61	91.8	91.8	86.9	68.9	52.3	38.8	27.8	89.3	8.9	1.8
2 States	3,564	123	93.2	93.2	89.2	76.1	48.1	44.2	35.1	82.3	6.9	10.8
Ohio	1,540	64	96.9	96.9	96.9	96.9	40.1	59.1	57.4	53.3	6.4	40.3
Indiana	1,380	69	100.0	98.6	98.6	98.6	53.4	56.2	61.6	30.4	2.9	66.7
Illinois	1,760	72	95.8	95.8	93.1	69.4	57.0	66.4	57.2	50.7	2.9	46.4
Missouri	1,310	82	98.8	98.8	70.7	73.2	53.4	53.1	46.4	38.3	39.5	22.2
4 States	5,990	287	97.7	97.4	90.4	84.0	51.0	59.6	56.4	43.8	11.9	44.3
North Dakota	9,556	260	64.6	63.1	63.1	11.2	20.8	25.3	10.3	97.6	0.0	2.4
South Dakota	2,880	132	42.4	42.4	40.9	6.8	23.0	22.2	10.2	96.4	1.8	1.8
Nebraska	2,900	144	72.9	72.2	22.9	4.2	45.2	34.0	12.0	93.3	3.8	2.9
Kansas	11,200	274	69.0	68.2	38.7	10.2	48.9	34.4	18.5	80.5	2.6	16.9
4 States	26,536	810	65.0	64.0	46.0	9.5	36.6	28.7	14.1	89.3	1.8	8.9
Oklahoma	6,200	182	65.4	65.4	38.5	14.8	53.5	38.4	15.3	57.1	11.8	31.1
Texas	3,300	135	64.7	64.7	32.2	12.5	81.8	36.8	15.0	74.5	13.1	12.6
2 States	9,500	317	65.2	65.2	36.4	14.1	63.0	37.9	15.2	62.9	12.2	24.9
Montana	4,832	212	37.3	36.8	37.3	1.9	13.0	25.1	7.4	91.1	0.0	8.9
Idaho	1,357	140	72.1	72.1	19.3	1.4	69.1	40.4	32.5	74.3	10.9	14.8
Colorado	2,540	111	8.1	8.1	0.0	0.0	35.4	0.0	0.0	88.9	11.1	0.0
3 States	8,729	463	34.3	34.1	23.7	1.3	33.1	27.0	11.8	85,5	4.3	10.2
Washington	3,110	126	86.5	86.5	13.5	0.0	69.4	59.4	0.0	72.5	3.7	23.8
Oregon	1,210	71	81.7	81.7	19.7	5.6	69.2	40.4	19.5	56.9	22.4	20.7
2 States	4,320	197	85.1	85.1	15.3	1.6	69.4	52.3	19.5	68.1	8.9	23.0
17 States	58,639	2,197	66.8	66.3	46.2	20.1	46.5	38.3	37.1	75.5	6.2	18.3

[1] "Crop Production" CR-PR (7-74) Crop Reporting Board. SRS, USDA, July 11, 1974. [2] Percentages apply to acres receiving fertilizer.

Table 15—Portion of harvested acreage and fertilizer used accounted for by corn, cotton, soybeans, and wheat[1]

Item	1972	1973	1974
	Percent	*Percent*	*Percent*
Harvested acres	56	57	59
Nitrogen	54	54	50
Phosphate	53	54	55
Potash	55	56	54

[1] Assumes that fertilizer application rates on all acres of the four crops harvested was equivalent to that reported in the fertilizer use by crops data.

Table 16—Portion of planted acreage and fertilizer used accounted for by corn, cotton, soybeans, and wheat[1]

Item	1972	1973	1974
	Percent	*Percent*	*Percent*
Planted acres	60	61	64
Nitrogen	62	62	58
Phosphate	60	60	64
Potash	62	65	63

[1] Assumes that fertilizer application rates on all acres of the four crops planted was equivalent to that reported in the fertilizer use by crops data which reports on harvested acres only.

was not used on the 1974 crop. While it is possible that much of the fertilizer used on the four primary crops was instead used on other crops, there seems to be no logical explanation for such a sudden and large shift.

Thus, this unaccounted-for fertilizer must be in storage at either the retail or farm levels. If these four crops accounted for 56 percent of the nitrogen and 58 percent of the potash actually utilized, as might have been expected, then about a million tons of nitrogen (equal to 10 percent of last year's use) and 300,000 tons of potash would be in storage at the local level July 1, 1974. Unfortunately, little data exist on the amount of fertilizer in storage at the local level. Inventory data reported by the U.S. Department of Commerce cover only inventory owned by the basic fertilizer manufacturers. It does not include farm inventory, and would include inventories of retailers, brokers or other distributors only where owned by the basic manufacturer. While it is doubtful that a full million tons of nitrogen were carried over, much may have been. Any carryover will help relieve the pressure on supplies in 1975.

U.S. FOREIGN TRADE

Responsive to high world prices and firm demand, U.S. fertilizer exports of phosphates and potash have increased (tables 17 and 18). However, in spite of high sales prices and significant differentials between domestic and export prices, U.S. producers have restricted nitrogen fertilizer exports (table 19) to supply domestic demand. Due both to higher prices and increased tonnage of specified fertilizer exports, the declared value of $680 million for 1973/74 was 45 percent above the previous year (table 20). Total export tonnage of primary plant nutrients increased about 6 percent above 1972/73.

Tight fertilizer supplies have resulted in a continued increase in selling prices and a widening gap between domestic and export prices. For example, urea f.o.b. price ranges for bagged material in 1972 were $56-$88 a ton. By June 1973 they had moved up to $100 and in late 1974, the little uncommitted material available was being offered between $317 and $365 a ton. Of course, these spot market prices represent the highest prices being paid in a time of acute shortage while most of the international trade moved at lower price levels. Some

Table 17—U.S. exports of specified fertilizer materials, years ended June 30, 1970-74

Fertilizer	1970	1972	1973	1974[1]
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
Nitrogeneous chemical NEC	--	--	30	29
Anhydrous ammonia	764	421	685	532
Ammonium nitrate	81	59	21	37
Ammonium sulfate	528	558	486	557
Urea	670	464	523	323
Phosphate rock	10,965	13,580	13,577	14,918
Normal superphosphate	37	14	60	52
Concentrated superphosphate	711	724	865	965
Ammonium phosphates	986	1,542	2,069	2,154
Potassium chloride	902	859	1,247	1,264
Potassium chemical fertilizer	136	211	240	272
Fertilizer materials	404	243	373	437
Phosphorus acid, fertilizer grade	--	--	--	44
Phosphorus chemical fertilizer NEC	--	--	49	81

[1] Preliminary.

Source: U.S. Exports, Schedule B—Commodity and Country, Report FT 410, U.S. Bureau of Census, published monthly.

Table 18—Phosphate fertilizer: U.S. exports, by country of destination, year ended June 30, 1974

Country of destination	Phosphate rock	Ammonium phosphates	Concentrated superphosphate	Phosphoric acid
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
China, Peoples Republic of	58	48	--	--
China T	70	--	--	--
Canada	3,579	45	18	7
Mexico	1,067	4	6	--
Brazil	663	523	364	33
W. Germany	1,017	--	--	--
Japan	2,276	111	11	4
Poland	226	--	--	--
Romania	95	--	--	--
Salvador	21	39	--	--
Columbia	124	22	33	27
Sweden	77	--	--	--
United Kingdom	121	--	--	--
Netherlands	725	--	16	--
Belgium	1,173	18	--	--
Spain	74	--	--	--
Italy	573	53	19	--
Iran	378	--	--	--
Philippine Republic	147	15	--	6
Chile	83	52	81	--
Korean Republic	558	3	134	--
India	257	380	--	13
Norway	73	--	--	--
France	386	142	91	17
Costa Rica	--	33	6	--
Dominican Republic	--	32	11	--
Argentina	--	22	7	--
Thailand	--	85	--	--
Singapore	--	50	45	--
Lebanon	--	67	--	--
S. Vietnam	--	27	--	--
New Zealand	--	49	--	1
Pakistan	--	107	--	--
Yugoslavia	--	49	--	--
Algeria	--	35	22	--
Indonesia	--	14	44	--
Other Countries	197	132	57	9
Total	14,018	2,154	965	117

Source: U.S. Exports, Schedule B—Commodity and Country, Report FT 410, U.S. Bureau of the Census, published monthly.

--None reported.

Table 19—Nitrogen fertilizers: U.S. exports by country of destination, year ended June 30, 1974

Country of destination	Ammonium sulfate	Anhydrous ammonia[1]	Urea
	1,000 tons	*1,000 tons*	*1,000 tons*
Canada	47	21	1
Mexico	106	162	--
Salvador	28	--	9
Jamaica	7	--	--
Dominican Republic	67	--	27
Brazil	205	22	21
Trinidad	–	44	--
Finland	–	34	--
Denmark	–	43	--
United Kingdom	–	36	--
Costa Rica	6	17	1
Spain	–	41	--
N. Antilles	19	--	--
Turkey	–	14	--
Colombia	3	32	11
France	–	60	--
Portugal	–	--	--
Venezuela	24	--	--
S. Vietnam	11	--	83
Indonesia	–	--	41
Honduras	–	--	3
Belgium-Lux	–	--	21
Afghanistan	–	--	13
Pakistan	–	--	39
Thailand	–	--	2
Philippines	–	--	10
China	–	--	7
Japan	–	--	11
Taiwan	31	--	--
Other countries	3	6	23
Total	557	532	323

[1] Ammonia, Anhydrous or in Aqueous solution.

Source: U.S. Exports, Schedule B—Commodity and Country, Report FT 410, U.S. Bureau of Census, published monthly.

estimates place contract prices at around two-thirds the prevailing spot rate.

Offers made under U.S. Agency for International Development (AID) tenders in the third quarter of 1974 were between $316 and $355 a ton, f.o.b. for bagged urea, with delivery in the last quarter of 1974. Awards were made on offers below $353.

The general range for bagged urea f.o.b. prices on the spot market was about $343 a ton for East European material, $315 from West Europe and $272 for Japanese shipments. The latter figure reflects special conditions under which Japan ships urea and ammonium sulfate to Southeast Asia.

AID Financed Exports

In 1973/74, AID restricted the tonnage and the time of shipment of fertilizer it financed. There was a 33 percent reduction in tonnage and 14 percent decline in

Table 20—Fertilizer exports: Declared values of specified fertilizers exported from the United States, years ended June 30, 1972-74

Fertilizer	1972	1973	1974[1]
	Million dollars	*Million dollars*	*Million dollars*
Urea	21.4	32.0	32.7
Ammonium nitrate	1.9	1.3	4.0
Ammonium sulfate	9.8	13.4	20.5
Sodium nitrate	.1	.1	.1
Anhydrous ammonia fertilizer	13.2	24.4	37.1
Phosphate rock (hard)	90.9	93.9	142.9
Phosphate rock (fertilizer)	11.9	10.0	16.4
Normal superphosphate	.3	1.7	.9
Concentrated superphosphate	33.1	52.4	92.2
Ammonium phosphates	91.6	157.4	228.4
Potassium chloride	28.1	40.7	47.3
Potassic chemical fertilizer NEC	9.2	11.2	12.5
Mixed fertilizer NEC	17.8	28.1	42.1
Nitrogenous chemical fertilizer	9.6	1.6	2.5
Total	338.9	468.2	679.6

[1] Preliminary.

Source: U.S. Exports, Schedule B—Commodity and Country, Report FT 410, Bureau of Census, published monthly.

total declared value of AID financed exports (table 21).

The smaller decline in the declared value than that of tonnage reflected higher export prices. Diammonium phosphate prices ranged from $93 to $159 in 1973/74, up considerably from the 1972/73 range of $87 to $95 per ton. In the first quarter of the current fiscal year, prices rose at an even higher rate, reaching $354 per ton. These prices are somewhat similar to spot prices and considerably above those in most long term contracts.

In 1973/74, AID financed exports of fertilizer amounted to less than 2 percent of the 19.3 million tons of total primary plant nutrients used in the United States. About 9 percent of the U.S. nutrient exports were financed by AID in 1973/74, down from 11 percent in 1972/73. This decline was due to AID's restrictions on financing of exports and the reluctance of manufacturers to short their domestic market.

AID financed nitrogen exports were about 12 percent of total nitrogen exports. About 2 percent of the nitrogen came from offshore suppliers. AID's 1974/75 commitments to finance urea and diammomium phosphate exports total 158 and 57 thousand tons, respectively, 43 percent of which was from offshore suppliers. Of 43 thousand tons of AID financed concentrated superphosphate, 23.1 thousand was supplied by offshore producers.

Nitrogen Fertilizer

In 1973/74, the United States maintained a net export position in nitrogen by a margin of only 7 percent as compared to 54 percent the previous year. The decline in the net export position was due to an expansion of imports. Although imports of 4 of 10 nitrogenous fertilizers decreased in 1973/74, the remaining 6 nitrogen fertilizer imports increased a

Table 21.—Fertilizer exports: Sales financed by the U.S. Agency for International Development, years ended June 30, 1973 and 1974

Fertilizer	1973		1974[1 2]	
	Quantity	Amount	Quantity	Amount
	1,000 tons	*1,000 dollars*	*1,000 tons*	*1,000 dollars*
Ammonium sulfate	9	437	11	488
Ammonium phosphate	--	--	6	748
Diammonium phosphate	306	30,714	277	29,485
Urea	448	37,905	168	23,875
Concentrated superphosphate	63	6,185	8	2,153
Potassium chloride	11	427		
Potassium sulfate	6	339	45	2,205
Mixed fertilizer	190	17,171	181	21,548
Total	1,033	93,178	696	80,502

[1]U.S. Aid Commitments to finance fertilizer exports. [2]Off-U.S. Shore origin $4,156,736.
--None reported.

Source: Agency for International Development.

whopping 78 percent (table 22). Total elemental nitrogen exports declined nearly 1½ percent from the previous year. At the same time, imports increased 16 percent with Canada accounting for 36 percent; Trinidad, 13 percent; and Netherlands, 22 percent.

Table 22—U.S. imports of specified fertilizer materials, selected years ended June 30, 1970-74

Fertilizer	1970	1972	1973	1974[1]
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
Anhydrous ammonia	477	393	343	419
Ammonium nitrate	306	390	329	301
Ammonium sulfate	179	264	276	273
Calcium nitrate	--	--	98	185
Sodium nitrate	164	160	75	95
Urea	424	365	672	668
Nitrogen solutions	98	120	145	166
Phosphate, crude	154	67	43	164
Ammonium phosphates	395	489	434	397
Potassium chloride	4,378	5,082	5,250	6,766
Potassium sulfate	70	48	54	74
Phosphate fertilizer	--	54	168	181
Fertilizer (NSPF)	--	198	233	311
Other nitrogen fertilizer	--	--	21	213
Potassic (NSPF)	--	--	9	6
Potassium sodium nitrate	--	--	37	47
A-N-L	--	--	--	209

[1] Preliminary.

--None Reported.

Source: U.S. Imports—Commodity and Country, Report FT 135, U.S. Bureau of Census, published monthly.

Phosphate Fertilizer

Total world trade in P_2O_5 increased 10 percent in 1973/74, the same rate of increase in U.S. exports. This is in addition to the 29 percent increase in our exports during 1972/73. In 1973/74, P_2O_5 imports, mostly as ammonium phosphates, were down 9 percent. However, the imports of other P_2O_5 carrying materials ("fertilizer, NSPF" and "phosphate fertilizer") increased significantly.

Potash Fertilizer

During the fertilizer year ended June 30, 1974, the United States experienced a sharp increase in imports and a slight increase in exports of potassium. Again, Canada supplied the major share of the U.S. potash imports. Imports of 4.0 million tons of K_2O from Canada (table 23) supplied the equivalent of about ¾ of U.S. consumption, compared with 66 percent in 1972/73. The United States took about 71 percent of Canada's 1973/74 production.

Table 23.—Imports of specified potash materials, K_2O equivalent, into the United States, years ended June 30, 1973-74, by country of origin

Country	1973		1974	
	Muriate of potash	Sulfates	Muriate of potash	Sulfates
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
Brazil	7	--	--	--
Brazzaville	12	--	--	--
Canada	3,036	--	3,985	([1])
Chile	2	--	--	--
France	2	11	6	10
Germany (West)	--	16	--	23
Israel	72	--	44	--
Netherlands	4	--	--	--
Spain	11	--	--	--
Zaire	3	--	--	--
Belgium	--	--	--	4
Other countries	--	--	--	--
U.S.S.R.			25	--
Total	3,150	27	4,060	37

[1] Less than 100 tons. -- None reported

Source: Mineral Industry Surveys, Bureau of Mines. (Potash, Crop Year Annual), August 27, 1974.

WORLD TRADE OUTLOOK

Global fertilizer prices have increased rapidly in the past 18 months. A further but considerably slower rise is possible in 1975 because world production capacity is increasing, selling prices are considerably higher than costs, and there are indications of some price resistance, as evidenced in the rejection by AID of bids over $350 for urea exports in August and September 1974. Note than these were spot market prices, representing peak prices being paid in a time of acute shortage while the bulk of international trade is at a lower level. For example, in September 1974 Japan negotiated longer term contracts for urea, with Peoples Republic of China and India for $180 to $283 per ton.

Nitrogen Fertilizer

The supply-demand balance of nitrogen fertilizer will continue tight through 1974/75 and will be felt most in developing countries where demand is strong. The shortage will inevitably result in some price hikes. Should this trend of the past year continue, foreign importers could conceivably be dealing with urea at somewhere between $408 and $455 per ton.

Increasing world nitrogen demand may push global nitrogen usage to 47.4 million tons in 1974/75, a 13 percent increase. Heavy domestic demand, coupled with a shortage of feedstocks in the exporting countries, (United States, Japan, Europe) has resulted in a tighter nitrogen fertilizer supply on the global market. Restriction of nitrogen exports is expected to continue through 1974/75.

In the future, prospective low-cost ammonia producers in countries such as Canada, Venezuela, Indonesia, North Africa, and the Middle East may be of major importance as exporters. In addition, a "trouble-shooting" team to improve capacity utilization of ammonia plants in developing countries such as India, Venezuela, and others that experience long delays in sorting out production difficulties might be established.

However, consumer resistance will reduce the rate of price increase and may even cause it to level off some. Supplies will be larger than last year. However, due to high grain and cotton prices the demand will be up from last year in all countries. The LDC's will continue to have problems locating supplies.

Many of the fertilizer plants in LDC's are operating at less than full capacity. Improvement in their operating rates could provide the critical margin between shortages and adequate supplies and thus provide substantial benefits to both developed and developing countries in terms of fertilizer prices.

A nitrogen surplus could occur in the late 1970's if all the announced intentions to erect plants materialize. Roughly 17 million tons of additional nitrogen production capacity has been announced for completion by 1980. This would be a 40-percent increase over 1973/74 world consumption.

Phosphate

With new phosphoric acid plants onstream in 1974 and others scheduled for startup in 1975, capacity in 1975 will not be a limiting factor. Availability of phosphate rock then will become the main factor limiting the output of P_2O_5 for sale through this and next year.

The buildup in production capacity for phosphoric acid began early in 1974, with the United States, France, Spain, and Tunisia adding about 1.36 million tons of P_2O_5 capacity for 1974/75.

In spite of a 100 percent increase in phosphoric acid export prices, to offset a 200 percent increase in African rock prices in January 1974, the selling price of P_2O_5 in acid was only half that of spot sales of concentrated superphosphate. Producers were reluctant to boost prices to a level that would encourage customers to install their own acid producing plants. At the same time, phosphoric acid exporters did not want to sell their output on a cost plus basis, only to see it turned into solid fertilizer and resold at a large profit.

Phosphate Rock

The production picture is uncertain for phosphate rock in much of the world. Some rock exporting countries—Morocco and Spanish Sahara—expect to increase production 20 percent through overcoming beneficiation problems and by more intensive utilization of capacity already installed.

Despite some improvement in world phosphate rock supply situations, expected in 1974/75, the market will remain firm and wholly under the control of suppliers. There is little evidence that high export prices have entirely balanced supply with market demand. These prices are stimulating interest in countries with undeveloped rock deposits such as India, Australia, Brazil, and Peru.

Higher prices and firm consumer demand for phosphate rock have stimulated the world's major producers to make at least 12 million tons of additional material available for processing, primarily into fertilizers. Based on present trends, demand for phosphate rock is expected to grow by 8.8 million tons in 1974/75 but a further 3.3. million tons supply will be needed to avoid producers' stock reductions, as in 1973/74. Based on this supply-demand situation, assuming the above intentions materialize in 1974/75, there may be a small surplus for retention in producers' stockpiles and or for the establishment of stockpiles at the processor level. The replenishment of depleted stockpiles will make shipments to customers move more smoothly in the future.

In 1974/75, Morocco, the largest exporter, hopes to expand production of phosphate rock by 20 percent to 21.5 million tons through the more intensive utilization of capacity already installed. Most of this will be available for export because Morocco's domestic

consumption is about 1 percent of production. Spanish Sahara expects to boost rock production to 6 million metric tons. This increase is expected partly through overcoming the beneficiation problems which restricted output in the early months of operation. The 3.3 million tons increase in output of the Florida phosphate industry, drawn partly from new capacity and partly from better employment of existing capacity is committed for consumption within North America either by the rock producers themselves or by other fertilizer manufacturers whose production capability has been expanded significantly.

Table 24—Potash: Pertinent statistics on muriate of potash, Saskatchewan Province, Canada, year ended June 30, 1973 and 1974

	1973	1974
	1,000 tons	*1,000 tons*
Opening inventory	769	579
Production	4,214	5,592
Closing inventory	564	204
Disappearance	4,418	5,967
Sales	4,404	5,975

Source: Monthly reports, Department of Mineral Resources, Province of Saskatchewan, Regina, Saskatchewan, Canada.

Potash

In spite of increased production in 1973/74, Canada's closing inventory last summer was off considerably (table 24). Saskatchewan producers increased production about 33 percent in 1973/74. By operating at capacity all of 1974/75, they may be able to replenish inventories and supply an increase in demand.

If potash use continues to grow at the recent rate, the world supply will come from expanded production in North America and by the large-scale incursion into the western markets of potash from the Soviet Union.

The Soviet Union shipped 25,000 tons of K_2O to the United States in 1973/74 compared with none in 1972/73. This, along with the signing of the Occidental Petroleum Corp.—USSR government agreement for the exchange of fertilizer materials has put the USSR one step nearer to being a large-scale supplier of potash to the West. Supplies of potash, ammonia, and urea will be delivered to Occidental Petroleum as repayment for its superphosphoric acid shipments, expected to begin in 1978. In 1973, USSR shipped 705,000 tons of K_2O to the West out of a total production of 2.19 million tons and is expected to achieve a substantially higher percentage in 1974 as a result of new business secured in Europe, Brazil, and the United States.

Appendix table 1—Use of nitrogen as fertilizer, by States, years ended June 30, 1969-74

State and region	1969	1970	1971	1972	1973	1974 Prelim.
	1,000 tons of N	*1,000 tons of N*	*1,000 tons of N*	*1,000 tons of N*	*1,000 tons of N*	*1,000 tons of N*
Maine	17.7	16.4	16.0	14.7	16.1	16.7
New Hampshire	2.0	2.1	2.3	2.3	2.5	2.6
Vermont	4.6	6.1	6.7	6.6	7.0	7.1
Massachusetts	8.5	8.2	7.7	8.9	10.1	9.0
Rhode Island	1.6	1.6	1.8	1.8	1.8	2.6
Connecticut	8.0	6.5	7.4	7.8	9.0	8.2
New York	72.3	70.0	75.1	77.2	88.0	86.8
New Jersey	21.0	22.7	27.4	21.4	26.4	24.3
Pennsylvania	75.3	82.9	86.4	76.1	91.0	88.0
Delaware	12.4	13.3	14.8	13.2	15.1	16.5
Maryland	35.6	40.2	57.1	42.3	55.0	46.9
Dist. of Columbia	.7	.7	.7	.6	.1	.9
Northeast	259.7	270.7	303.4	272.9	322.5	309.5
Michigan	111.5	139.3	175.0	153.7	143.8	155.0
Wisconsin	104.0	115.1	122.5	129.1	116.7	139.6
Minnesota	343.6	283.9	411.3	374.4	424.0	410.3
Lake States	559.1	528.3	708.3	657.2	684.5	704.9
Ohio	199.5	225.7	276.5	242.3	237.8	288.4
Indiana	329.7	343.4	404.2	340.3	327.6	354.1
Illinois	610.2	595.5	713.9	549.7	570.9	738.3
Iowa	556.9	659.7	701.8	662.6	643.7	750.5
Missouri	250.7	300.7	326.0	329.1	276.2	351.2
Corn Belt	1,947.0	2,125.0	2,422.4	2,124.0	2,056.2	2,482.5
North Dakota	66.1	71.9	70.7	83.1	133.5	132.6
South Dakota	65.7	68.5	85.1	78.7	98.8	104.4
Nebraska	417.3	499.0	534.3	550.3	566.9	585.9
Kansas	374.6	443.9	438.0	467.2	503.4	563.7
Northern Plains	923.7	1,093.3	1,128.1	1,179.3	1,302.7	1,386.6
Virginia	69.8	77.6	86.1	83.2	86.4	80.0
West Virginia	6.3	6.7	6.9	7.8	8.2	8.7
North Carolina	169.6	195.5	207.6	192.4	203.2	217.3
Kentucky	108.0	101.5	113.8	108.9	113.3	121.2
Tennessee	104.5	96.7	105.5	99.1	104.2	115.8
Appalachian	458.2	478.0	519.9	491.4	515.3	543.0
South Carolina	91.3	90.6	93.0	91.3	97.3	104.3
Georgia	261.7	251.2	263.0	268.4	285.4	283.2
Florida	180.3	191.2	183.2	199.6	210.0	216.7
Alabama	137.6	140.7	152.8	163.5	171.1	174.1
Southeast	670.9	673.7	692.0	722.8	763.8	778.3
Mississippi	136.6	148.1	160.7	205.8	205.1	228.0
Arkansas	104.7	107.3	110.2	127.7	122.7	151.0
Louisiana	105.0	114.0	136.0	143.3	118.1	151.4
Delta States	346.3	369.4	406.9	476.8	445.9	530.4
Oklahoma	137.2	163.7	173.7	177.9	202.6	210.5
Texas	639.4	675.5	661.0	718.2	711.6	800.4
Southern Plains	776.6	838.6	834.7	896.1	914.2	1,010.9
Montana	33.6	36.8	41.2	37.7	52.8	45.9
Idaho	102.0	93.9	102.0	102.0	124.9	125.4
Wyoming	19.8	18.0	16.2	20.2	22.6	17.6
Colorado	70.7	80.1	85.9	91.0	97.2	118.6
New Mexico	30.6	30.3	29.6	29.4	30.9	34.4
Arizona	94.1	96.7	92.4	102.1	102.5	108.0
Utah	13.1	15.6	16.1	19.6	22.3	25.6
Nevada	2.9	3.3	3.4	3.9	4.2	4.8
Mountain	366.8	374.7	386.8	405.9	457.4	480.2
Washington	134.9	145.2	164.3	168.5	190.4	205.2
Oregon	79.7	86.0	94.1	96.6	113.9	98.7
California	387.2	414.8	419.8	473.2	479.6	542.8
Pacific	601.8	646.0	678.2	738.3	784.0	846.7
48 States + D.C.	6,910.0	7,407.7	8,080.9	7,964.5	8,245.9	9,073.2
Alaska	.7	1.0	1.0	.9	1.2	1.0
Hawaii	26.3	28.8	32.1	29.5	28.0	25.4
United States	6,936.7	7,437.3	8,113.9	7,994.9	8,275.6	9,099.5

Source: "Consumption of Commercial Fertilizers in the United States", SPCR7 (11-74) and earlier issures, Crop Reporting Board, SRS, USDA, Nov. 1, 1974.

Details may not add to totals because of rounding.

Appendix table 2—Use of phosphorus as fertilizer, by States, years ended June 30, 1969-74

State and region	1969	1970	1971	1972	1973	1974 Prelim.
	1,000 tons available P_2O_5	*1,000 tons available* P_2O_5	*1,000 tons available* P_2O_5	*1,000 tons available* P_2O_5	*1,000 tons available* P_2O_5	*1,000 tons available* P_2O_5
Maine	20.5	19.1	18.3	17.8	18.7	18.5
New Hampshire	2.0	2.0	2.2	2.0	1.9	2.1
Vermont	6.0	7.2	7.6	7.8	6.8	7.2
Massachusetts	6.6	6.3	6.8	6.3	7.7	7.0
Rhode Island	1.7	1.6	1.6	1.6	1.6	2.5
Connecticut	6.9	5.5	5.4	5.8	6.7	5.2
New York	93.7	83.8	88.2	90.5	83.7	90.2
New Jersey	20.7	19.6	21.7	18.7	22.4	20.4
Pennsylvania	84.9	92.0	96.7	87.6	96.4	93.4
Delaware	11.3	12.3	13.1	11.7	15.9	16.3
Maryland	36.9	40.3	53.5	42.3	55.6	45.5
Dist. of Columbia	.6	.7	.7	.6	.6	.5
Northeast	291.8	290.4	315.8	292.7	318.0	308.8
Michigan	122.7	132.6	156.3	148.2	139.7	147.8
Wisconsin	120.9	120.1	133.3	135.8	132.2	139.5
Minnesota	292.4	223.1	295.3	261.5	280.3	267.5
Lake States	536.0	475.8	584.9	545.5	552.2	554.8
Ohio	211.6	214.5	233.5	237.9	244.6	270.6
Indiana	253.5	247.5	259.8	247.4	264.0	292.3
Illinois	496.7	459.1	443.5	458.2	479.1	478.4
Iowa	381.8	411.3	422.6	402.1	380.3	398.1
Missouri	160.2	168.4	169.9	192.2	177.2	188.9
Corn Belt	1,503.8	1,500.8	1,529.3	1,537.8	1,545.2	1,628.3
North Dakota	100.8	101.5	87.5	77.7	108.0	110.1
South Dakota	46.5	50.3	53.9	53.5	62.2	61.8
Nebraska	114.8	131.3	150.3	149.3	157.6	136.3
Kansas	161.0	170.4	152.8	174.3	199.5	175.8
Northern Plains	423.1	453.5	444.5	454.8	527.3	484.1
Virginia	81.1	78.9	84.7	79.3	76.8	69.0
West Virginia	9.4	10.4	9.9	11.8	10.9	9.5
North Carolina	127.0	134.4	137.8	135.0	144.7	152.3
Kentucky	97.9	90.4	104.4	104.7	112.2	107.9
Tennessee	90.5	83.8	89.4	93.9	99.6	90.6
Appalachian	405.9	397.9	426.2	424.7	444.2	429.3
South Carolina	72.2	66.7	69.0	71.1	74.9	75.1
Georgia	145.4	136.5	142.1	147.8	161.3	152.8
Florida	105.5	107.1	100.1	108.2	111.0	104.5
Alabama	105.4	105.6	104.7	114.1	116.3	112.6
Southeast	428.5	415.9	415.9	441.2	463.5	445.0
Mississippi	71.5	68.3	68.7	83.2	87.8	88.0
Arkansas	65.5	63.6	68.1	81.1	77.3	80.3
Louisiana	54.3	55.8	57.0	62.6	61.7	71.2
Delta States	191.3	187.7	193.8	226.9	226.8	239.6
Oklahoma	87.1	90.5	97.7	96.5	109.1	105.2
Texas	302.9	255.5	259.6	289.9	288.9	295.9
Southern Plains	390.0	346.0	357.3	386.4	398.0	401.1
Montana	44.6	49.8	56.8	59.5	62.3	60.7
Idaho	67.4	67.7	62.6	59.6	74.8	69.0
Wyoming	10.8	9.9	12.9	13.8	14.5	7.7
Colorado	41.9	41.8	43.1	45.5	48.0	44.5
New Mexico	16.1	15.0	16.9	15.0	21.8	16.1
Arizona	31.1	31.2	34.0	38.6	39.0	36.2
Utah	24.7	24.0	23.5	26.9	27.6	19.1
Nevada	1.8	2.2	1.9	2.4	3.1	2.3
Mountain	238.4	241.6	251.7	261.3	291.1	255.5
Washington	46.0	44.7	46.4	50.7	63.2	71.0
Oregon	40.0	44.9	42.7	41.9	49.1	44.9
California	141.8	146.4	170.0	177.7	178.8	182.8
Pacific	227.8	236.0	259.1	270.3	291.1	298.8
48 States + D.C.	4,636.6	4,545.6	4,778.6	4,842.0	5,057.6	5,045.1
Alaska	.7	.8	.6	.6	.7	.4
Hawaii	15.6	19.1	16.8	22.1	19.4	16.0
United States	4,652.8	4,565.3	4,796.0	4,864.8	5,077.6	5,061.6

Source: "Consumption of Commercial Fertilizers in the United States", SPCR7 (11-74) and earlier issues, Crop Reporting Board, SRS, USDA, Nov. 1, 1974.

Details may not add to totals because of rounding.

Appendix table 3—Use of potassium as fertilizer, by States, years ended June 30, 1969-74

States and region	1969	1970	1971	1972	1973	1974 Prelim.
	1,000 tons of K_2O	*1,000 tons of K_2O*	*1,000 tons of K_2O*	*1,000 tons of K_2O*	*1,000 tons of K_2O*	*1,000 tons of K_2O*
Maine	20.6	20.1	18.9	17.1	18.4	19.3
New Hampshire	2.1	2.3	2.6	2.5	2.3	2.6
Vermont	5.8	7.6	7.9	7.8	7.7	9.2
Massachusetts	6.2	6.1	5.5	6.1	6.9	7.2
Rhode Island	1.3	1.3	1.4	1.6	1.5	2.5
Connecticut	6.8	5.6	5.6	5.8	6.8	6.9
New York	64.1	68.4	72.5	78.1	78.7	86.6
New Jersey	22.1	20.1	22.3	18.6	21.1	21.5
Pennsylvania	69.1	75.1	79.6	78.2	77.1	83.1
Delaware	14.6	15.9	17.3	16.2	20.4	23.3
Maryland	42.7	47.1	56.5	44.4	61.4	55.9
Dist. of Columbia	.5	.5	.5	.4	.4	.4
Northeast	255.9	270.1	290.6	276.8	302.9	318.5
Michigan	137.4	153.0	179.0	165.6	164.9	179.5
Wisconsin	199.6	197.7	211.5	227.6	228.5	270.6
Minnesota	211.8	214.2	270.4	258.9	288.7	322.3
Lake States	548.8	564.9	660.9	652.1	682.1	772.4
Ohio	227.2	234.7	254.2	260.0	271.6	309.3
Indiana	387.9	302.5	329.4	305.1	338.2	408.7
Illinois	482.4	481.9	465.1	466.9	535.5	604.8
Iowa	310.2	347.3	352.9	367.1	391.0	460.8
Missouri	165.6	189.7	190.3	214.3	200.5	216.3
Corn Belt	1,473.3	1,556.1	1,591.9	1,613.4	1,734.8	2,000.0
North Dakota	9.2	9.5	10.8	9.4	13.5	17.6
South Dakota	7.8	10.2	10.2	9.9	13.8	16.0
Nebraska	35.7	36.8	44.2	43.1	53.2	55.5
Kansas	35.9	46.7	39.3	46.6	90.9	62.7
Northern Plains	88.6	103.2	104.5	109.0	171.4	151.8
Virginia	90.1	89.7	84.6	87.8	89.0	80.9
West Virginia	7.0	8.0	7.9	8.7	6.5	8.7
North Carolina	158.3	168.8	172.0	168.7	187.8	203.6
Kentucky	108.8	110.4	116.1	115.4	122.8	127.5
Tennessee	97.5	90.7	94.0	102.6	107.1	113.7
Appalachian	461.7	467.6	474.6	483.2	513.3	534.4
South Carolina	94.8	88.5	91.6	96.9	103.9	112.9
Georgia	203.7	188.8	207.2	220.3	238.6	241.7
Florida	209.1	215.7	205.0	226.3	231.8	231.7
Alabama	106.5	109.7	108.4	119.7	121.4	123.9
Southeast	614.1	602.7	612.2	663.2	695.8	710.3
Mississippi	66.0	64.2	64.5	77.3	83.5	80.4
Arkansas	76.3	73.4	77.9	88.5	82.3	95.3
Louisiana	47.5	53.2	55.8	61.3	61.2	67.4
Delta States	189.8	190.8	198.2	227.1	227.0	243.0
Oklahoma	28.9	36.1	32.3	34.1	39.0	40.9
Texas	90.9	90.6	105.8	108.9	115.5	132.7
Southern Plains	119.8	126.7	138.1	143.0	154.5	173.6
Montana	1.1	1.6	1.3	1.8	3.0	4.2
Idaho	4.1	4.2	4.0	3.5	5.3	7.1
Wyoming	1.2	1.1	1.3	1.3	1.9	.6
Colorado	6.5	7.2	8.2	8.8	7.8	10.2
New Mexico	.9	1.2	1.8	1.6	1.8	2.7
Arizona	1.3	2.3	2.9	1.5	1.5	1.1
Utah	.3	.3	.3	.5	.8	1.8
Nevada	.1	.2	.1	.1	.2	.3
Mountain	15.5	18.1	19.9	19.1	22.3	28.1
Washington	17.9	19.6	19.4	21.1	23.9	26.8
Oregon	9.0	12.3	14.5	13.9	20.1	15.3
California	54.3	61.7	64.3	64.1	61.5	69.4
Pacific	81.2	93.6	98.2	99.1	105.5	111.5
48 States + D.C.	3,848.7	3,993.8	4,189.4	4,285.9	4,609.6	5,043.4
Alaska	.5	.5	.4	.4	.5	.2
Hawaii	24.0	24.0	26.3	23.6	24.0	24.9
United States	3,873.2	4,018.1	4,216.1	4,309.9	4,634.1	5,068.8

Source: "Consumption of Commercial Fertilizers in the United States", SPCR7 (11-74) and earlier issue, Crop Reporting Board, SRS, USDA, Nov. 1, 1974.

Details may not add to totals because of rounding.

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