FS-3

DECEMBER 1972

1973 FERTILIZER Situation

ECONOMIC RESEARCH SERVICE

U.S. DEPARTMENT OF AGRICULTURE

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

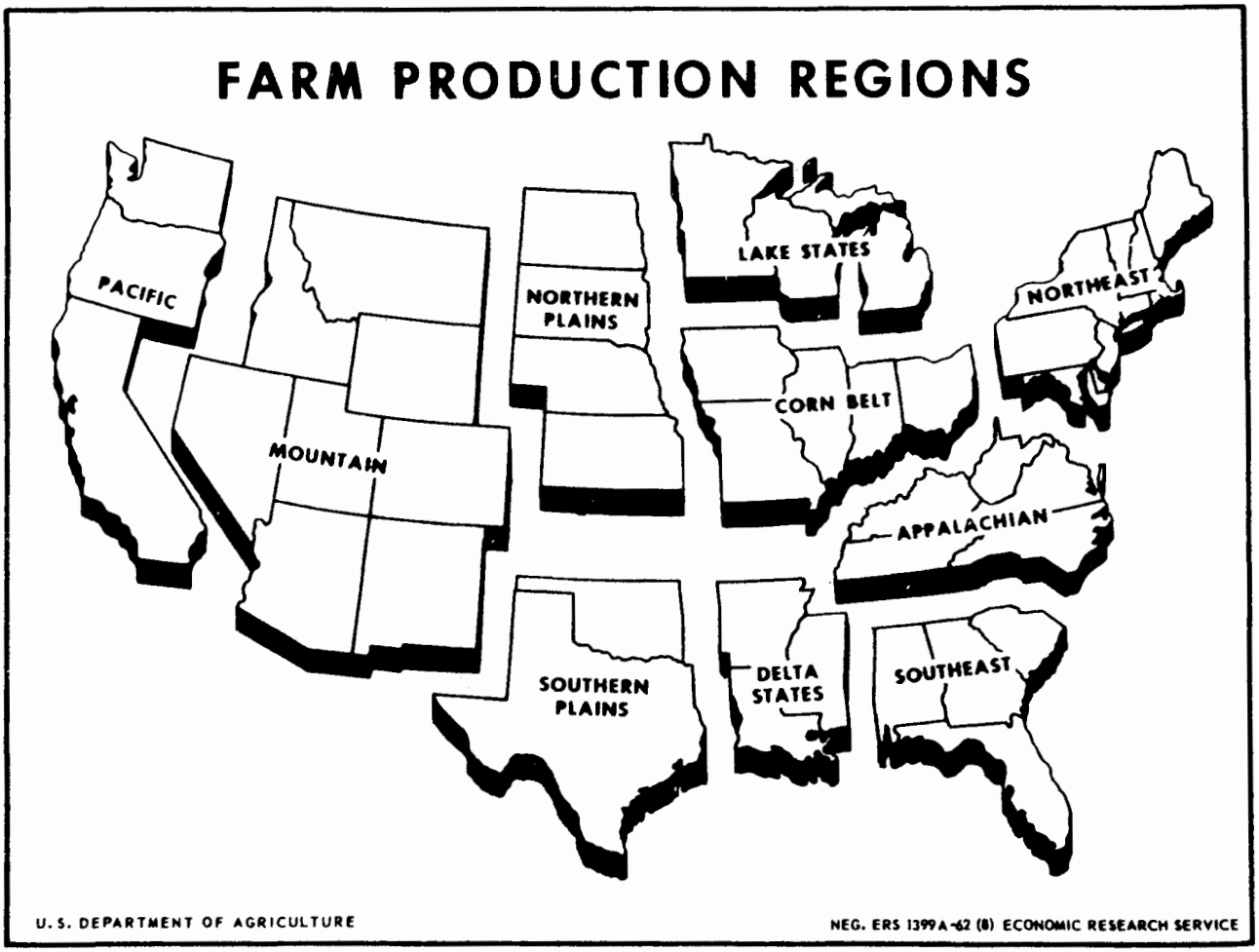

Figure 1

FERTILIZER SITUATION

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SUMMARY

Fertilizer prices at all marketing levels will be bullish in 1973. Some specific items—urea, concentrated superphosphate, some of the ammonium phosphates, for example—most likely will be priced at or near their ceilings. Prices for high-analysis phosphates will continue to be particularly unyielding as the foreign market for phosphates is booming. If a soft spot develops, it could be in the price of potash. The Canadian-established floor price is not likely to be breached, but competitive forces may push down prices for coarse and granular grades.

The U.S. capacity to produce ammonia, the source of virtually all fertilizer nitrogen, will remain considerably above demand in 1973, but the gap is likely to narrow. U.S. producers could make about 17 million tons of ammonia in 1973 operating at design capacity. Currently the rate is 85 percent of capacity. Shortages of natural gas are critical and could force a noticeable cut in ammonia production if the winter is severe, since gas is the source of hydrogen in producing ammonia. Also, demand will be strong for most nitrogen fertilizers as farmers press for high yields in 1973 in response to current favorable commodity prices.

The supply of high-analysis phosphate fertilizers will continue tight through 1973. Additional U.S. capacity to produce phosphoric acid is under construction with more planned to come into production in 1973 and 1974. If all new plants come on stream as planned, 1.9 million tons P_2O_5 in additional phosphoric acid annual capacity will be available by late 1974. Fertilizers took 4.8 million tons P_2O_5 in 1971/72.

One potash plant in the United States and another in Canada were closed for technical reasons but both will be fully operable in 1973. U.S. capacity in 1973 will be 3.4 million tons K_2O. Added to this is more than 8.3 million tons capacity in Canada where producers will be allowed to produce only about half that amount.

Price changes were slight in 1972 as a combination of competitive forces and price controls kept price movements at a minimum at producer levels as well as at retail. The total farm bill for fertilizers is estimated to be up at least 2 percent over 1971's 2.4 billion. With few exceptions, prices for most fertilizers were up fractionally.

Fertilizer use was a record high—41.3 million tons—in

the 12 months ended June 30, 1972. A year earlier, use was 41.1 million tons. However, on a plant nutrient basis, the tonnage of K_2O equivalent was the only one to increase. Consumption of nitrogen and P_2O_5 both dipped slightly. Despite the slight increase in total use, per-acre use of the 3 primary nutrients was up nearly 4 percent as the acreage of harvested crops dropped 10.5 million acres from 1971.

The trend toward greater use of both dry bulk and liquid fertilizer continued. Just over 70 percent of all fertilizer was applied in these 2 forms. Bagged fertilizer was down to 11.5 million tons—30 percent of all fertilizer—in 1970/71.

Fertilizer exports rose 17 percent in dollar value during the year ended June 30, 1972, rising to $339 million. Much of the increase came from increased export tonnages at higher prices for concentrated superphosphate and ammonium phosphates. Export prices for high-analysis phosphates generally are $25 a ton or more higher than domestic prices for the same material. The United States was a net exporter of nitrogen and phosphate in 1971/72.

OUTLOOK FOR 1973

Nitrogen Fertilizers

Prices

Prices for most nitrogen fertilizers and high nitrogen mixed fertilizers are likely to remain firm or edge slightly higher in 1973. Demand will be strong for most nitrogen materials as farmers press for good yields of food and feed grains to capitalize on favorable commodity prices. Strong demand for urea is developing from many sources and urea prices may move close to their ceilings. Because of urea's high (46 percent) nitrogen content, it is sought by foreign fertilizer buyers to keep transportation costs per ton of nutrient low compared with other dry nitrogen materials. One unknown is the strength of the domestic demand for urea for feed for ruminant animals. The cost differential in favor of using urea as a protein substitute for oil meals may get wide enough to attract a substantially larger tonnage into animal feed. As much as 800,000 tons of urea may now be going into animal feeds each year.

Production Capacity

Production capacity for anhydrous ammonia will be close to 17 million tons containing 13.9 million tons of nitrogen during 1973, about the same as 1972. During the year minor increases in capacity will offset decreases brought about by closing of some small inefficient plants. One new plant, with a capacity of 1,000 tons of ammonia per day has been announced for opening in mid-1974. This is the only new plant announced for future completion.

At an estimated 1973 rate of use of 8.5 million tons of N, there is little pressure to expand ammonia capacity. However, within 3 years or so, use may climb into relative balance with capacity. It is likely that steps will be taken either to build new capacity or to devise some plan that will enhance the importation of ammonia.

Natural gas, the source of hydrogen in synthetic ammonia, could get into a tight supply situation if we have a cold winter. If this comes about, some industrial users of gas, including ammonia plants, will be forced to curtail operations in favor of residential use with the result that supplies of some nitrogen fertilizers may become tight. About 32,300 cubic feet of natural gas are required to make a ton of ammonia. By way of comparison, a modest 3-bedroom house in the Washington, D.C. area typically may use nearly that much gas during the month of January.

Use

Somewhat more nitrogen fertilizer is likely to be used in 1973. Grain prices at the end of 1972 were relatively high and coupled with anticipated strong export demand for food and feed grains, will encourage farmers to plant and fertilize for high yields. Primary strength will come from the Corn Belt States, as usual.

Phosphate Fertilizers

Prices

High-analysis phosphate fertilizers will continue bumping against price ceilings in 1973. Strong overseas demand for concentrated superphosphate and ammonium phosphates has pushed world prices $25 a ton and more above domestic price levels, and domestic prices are, for the most part, at their ceilings. Because of the price differential in favor of exports (price ceilings do not apply to exports), world markets will tend to siphon off any additional phosphates that may become available.

Production Capacity

The outlook is for a significant increase in high-analysis phosphate production capacity during 1973. Annual capacity for phosphoric acid is scheduled to rise 1.9 million tons P_2O_5 by late 1974 (See "Where Did All the Phosphate Go?" in this issue.). Some of this increase is now on stream. More will be available early in 1973.

Use

Domestic use of phosphates will rise a few percentage points. Grain fertilization involves considerable

quantities of phosphorus for high yields. With prospects for strong demand for corn, wheat, and soybeans, farmers may tend to boost average use of P_2O_5 per acre.

Phosphate Rock

Demand for phosphate rock comes from two sources—dometic demand for phosphate fertilizers and foreign demand for phosphate rock as a raw material for making fertilizers. In view of the anticipated strong worldwide demand for phosphate fertilizers, production and use of phosphate rock will climb. And a strong rise in output will be accompanied by continued firmness in open market rock prices—unchanged for more than a year at $6 and more a ton, f.o.b. Florida mines. The price varies with the quality of the rock.

Sulfur

The sulfur situation will change little from 1972. Supplies are considerably above demand and prices are soft. There is little information available to spark strong movement in prices above current levels. The Bureau of Mines reported the declared export value for the first 9 months of 1972 at $17.70 per long ton, about the same as a year earlier. Import values averaged $15.09 a long ton January-September 1972. This was 23 percent below a year earlier.

Potash Fertilizers

Prices

A floor price of 33.75 cents (Canadian) per 20-pound unit of K_2O equivalent, f.o.b. should keep wholesale prices of potash at the mine at least at their 1972 levels through 1973. Prices for grades other than standard will be somewhat higher. Also, prices are seasonally higher in the spring "rush".

Prices to farmers for potash and mixtures high in K_2O may be somewhat above 1972 prices if planting is not delayed as it was in the Midwest early in 1972.

Production Capacity

All Canadian and U.S. potash mines are scheduled to be operable at full capacity in 1973. For several years, one or more of the potash mines have been shut down to make changes in minining techniques. With all this completed, U.S. designed annual capacity is estimated at 3.4 million tons of K_2O. Add to this the 8.3 million tons capacity reported for Saskatchewan, and total K_2O capacity in North America is 11.7 million tons.

Some changes were made in Saskatchewan's government prorationing program effective July 1, 1972. The new plan is based almost solely on rated annual productive capacity of 8,324,000 tons K_2O. The total production allowable for the 12 months ending June 30, 1973, is 4,316,153 tons. This is 51.9 percent of capacity and compares with the year-earlier actual production of 4,323,222 tons. Involved in this prorationing program are 9 producing firms operating 10 mines. Allowable production can be revised if marketing conditions warrant.

Use

Use of potash in the United States is not limited to, but is particularly strong in the 12 North Central States. To boost grain yields in these States, farmers are likely to use more potash than they did in 1972. Soybeans offer the greatest opportunity for expanded use of K_2O. Soybean acreage has increased almost every year for the past decade and probably will again in 1973.

Fertilizer Prices—1972

Prices of basic fertilizer materials were virtually unchanged at the wholesale level during 1972. Although open market prices remained stable for materials used by manufacturers, retail prices paid by farmers tended to rise for most fertilizer categories (tables 1, 2, and 3). Price increases, however, were minimal at the farm—some fertilizers were up only fractionally as both competitive forces and the Price Commission worked to keep retail prices down. In 1971, farmers spent an estimated $2.4 billion for fertilizers—in 1972, they may have spent at least 2 percent more.

Nitrogen Fertilizer Prices

Nearly 38 percent of the fertilizer nitrogen is applied as ammonia. Since most of the ammonia is used by farmers about 45 percent of the nitrogen farmers use is in the form of ammonia. As of April 15, 1972, the national average price paid by farmers for ammonia was $80 a ton—4.9 cents a pound for nitrogen. The most costly source of nitrogen is sodium nitrate. In April, the average farm price of the nitrogen contained in sodium nitrate was 21 cents a pound! Among dry materials, nitrogen in urea was lowest cost in 1972, just over 9 cents a pound.

Phosphate Fertilizer Prices

Retail price levels for normal superphosphate continued to advance to new highs—up 4 percent in a year—and the quantity used continued to shrink. Prices of concentrated superphosphate rose less than 2 percent to $78 a ton on April 15. Prices of ammonium phosphates also were up slightly. One widely used grade, 16-20-0, was up only 3 percent over a year earlier.

Potash Fertilizer Prices

Potash fertilizer prices at the farm leveled at $1.18 per 20-pound unit of K_2O in 1972. This is about the price farmers have paid for 8 of the past 10 years. Prices in 1972 might have been higher if spring weather had been more favorable. At the height of the planting season,

Table 1.--Average prices paid by farmers per ton for selected fertilizers, United States, 1957-59 average, and 1967-72

April 15 of year	Anhydrous ammonia	Superphosphate		Ammonium phosphate 16-20-0	Potash 60 percent K_2O	Mixed fertilizer 6-24-24
		46 percent P_2O_5	20 percent P_2O_5			
	---Dollars---					
Annual average 1957-59	149.00	82.20	37.00	89.60	1/56.80	---
1967	113.00	84.10	42.10	80.70	1/58.50	85.70
1968	91.40	78.40	43.20	78.40	49.10	81.80
1969	75.60	74.00	43.80	77.70	47.80	73.20
1970	75.00	75.10	45.40	76.90	50.90	75.00
1971	79.30	76.60	47.80	76.70	58.20	80.30
1972:						
Apr. 15	80.00	78.00	49.90	79.00	58.80	81.00
Sept. 15	80.80	79.00	51.20	79.40	58.70	81.60

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

Source: "Agricultural Prices", Pr 1 (9-72), Statis. Rptg. Serv., U.S. Dept. Agr., September 29, 1972, and earlier issues.

Table 2.--Average prices paid by farmers per 20-pound unit of nitrogen contained in nitrogenous materials, United States, 1962-72 1/

April 15 of year	Nitrate of soda	Sulfate of ammonia	Ammonium nitrate	Urea	Anhydrous ammonia	Nitrogen solutions percent N		
						28	30	32
	Dollars							
1962	3.73	2.78	2.44	2.40	1.63	---	---	---
1963	3.75	2.55	2.42	2.35	1.56	---	---	---
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:								
Apr. 15	4.07	2.52	1.89	1.80	.97	1.79	1.87	1.90
Sept. 15	4.06	2.50	1.90	1.76	.97	1.81	1.81	1.93
1972:								
Apr. 15	4.13	2.54	1.93	1.79	.98	1.85	1.84	1.96
Sept. 15	4.36	2.59	1.95	1.82	.99	1.86	1.86	1.98

1/ Excludes Alaska and Hawaii.

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, 1962-72 1/

April 15 of year	Superphosphate		Muriate of potash 4/
	Normal 2/	Concentrated 3/	
	Dollars		
1962	4.40	4.20	1.17
1963	4.64	4.04	1.18
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:			
Apr. 15	5.48	3.82	1.17
Sept. 15	5.61	3.82	1.16
1972:			
Apr. 15	5.72	3.89	1.18
Sept. 15	5.87	3.94	1.18

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.

hundreds of carloads of potash were enroute to the Corn Belt from Canada and Carlsbad. At the same time, warehouses were full and movement of fertilizer to the fields slowed markedly. To avoid demurrage charges that could run into thousands of dollars a day for individual producers, much potash was sold at "distress" prices to free the freight cars. This meant that some coarse and granular potash was sold to mixers and bulk blenders at prices close to the Canadian floor price for standard grade material. To move this potash to the fields, cost savings were passed on the the farmers.

Fertilizer Use Estimates—1971/72

Fertilizer used for all purposes rose to a record 41.3 million tons in the year ending June 30, 1972 (table 4). This was only slightly above the 41.1 million tons used the preceding 12 months. However, average use per harvested acre was up nearly 4 percent compared with a year earlier. Farmers used an average of 232 pounds per harvested acre for 301 million acres in 1971.[1] Crops were harvested from an estimated 10.5 million fewer acres in 1972. This would mean that fertilizer application rose to 241 pounds. Nearly three-fourths of the reduction in acreage (7.3 million acres) was in corn—the crop fertilized the most.

[1] Fifty-nine crops harvested, from "Crop Production" CrPr 2-2 (7-72) Statis. Rptg. Serv., U.S. Dept. Agr., July 12, 1972.

Table 4.--All fertilizer: Total use and primary nutrient use, United States, 1960-72 1/

Year ending June 30	Total use	Primary nutrient use				
		N	Available P_2O_5	K_2O	Total	Index
	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	4,304.7	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 2/	41,118	8,133.6	4,803.4	4,231.4	17,168.4	122.9
1972 3/	41,260	8,126.7	4,783.0	4,318.4	17,228.1	123.3

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 1970-72 from "Consumption of Commercial Fertilizers in the United States" SpCr 7(10-72) Statis. Rptg. Serv., U.S. Dept. Agr., October 1972 and earlier issues.

Plant nutrient use in 1971/72 was up only fractionally from a year earlier. Potash, up 2 percent, was the only primary plant nutrient to show an increase. Both nitrogen and phosphate use declined slightly. Primary plant nutrient use in the United States for the past 2 years was:

Nutrient	1970/71	1971/72	Change
	1,000 tons	*1,000 tons*	*Percent*
Nitrogen	8,114	8,106	-.1
P_2O_5	4,796	4,775	-.4
K_2O	4,216	4,302	2.0
Total	17,126	17,183	.3

Mixture-Material Ratio Changes Slowly

Close to half—48 percent—of all fertilizer used is applied as a separate material (table 5). Since most separate materials are used by farmers, it is likely that well over half of the fertilizer used on farms is now by direct application of such materials.

Although year to year changes in the mixture-material mix are relatively unnoticeable, the switch away from mixed fertilizers has been consistent over the long pull as farmers take advantage of the efficiencies that come from using separate materials—liquid as well as dry.

More Use of Liquids and Dry Bulk Fertilizers

The use of liquid fertilizers continued to expand during the most recent year for which data are available—1970/71—when 28 percent of all fertilizer was

Table 5.--All fertilizer: Mixtures and direct-application materials used, averages 1950-64, annual 1966-72, United States

Year ending 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
1966	34,324	19,477	57	14,847	43
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 2/	41,113	21,258	52	19,855	48

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, 1971", SpCr 7(10-72) Statis. Rptg. Serv., U.S. Dept. Agr., Oct. 1972, published annually.

applied as a liquid (table 6). Anhydrous ammonia is considered a liquid for this report.

Dry bulk fertilizer use also is increasing at a rapid rate. If present trends continue, within 5 to 7 years half of the fertilizer used will be dry bulk. Some of the big reasons for the switch away from bagged fertilizers are: (1) the use of soil test results to buy "prescription" mixed fertilizers; (2) to reduce need for farm labor to apply fertilizers; and (3) lower cost per unit of plant nutrient used in some instances.

Nitrogen

Nitrogen use in 1971/72 was up in 6 of the 10 farm production regions (table 7). The greatest rate of increase was reported for the Delta States—up 17 percent—followed by the Pacific States, up 10 percent. Cotton is a principal crop in these regions and probably this accounts for greater nitrogen use since harvested acres of cotton nationally were up 15 percent over 1971. Conversely, the biggest tonnage drop in nitrogen fertilizer use was in the Corn Belt and Lake States where much of the cut in corn acres took place. Both corn and cotton are heavy users of nitrogen. Nationally, greater use of nitrogen on cotton about offset reduced use on corn.

Phosphate (P_2O_5)

Phosphate fertilizer use was down in 5 of the 10 regions in 1971/72 (table 8). Increased use was reported for the remaining 5 regions. These latter areas include most of the cotton growing sections. Like nitrogen, use on the increased cotton acres in 1972 was about offset by the drop in total P_2O_5 use on the reduced acres of corn.

Potash (K_2O)

Potash was the only primary nutrient to show an increase nationally (table 9). Up 2 percent over a year ago, regional increases ranged from 2 to 14 percent in 6 regions. Declines were reported in 4 regions, primarily in the northeastern quarter of the country. Unlike the

Table 6.--All fertilizers: Use by class, mixtures and direct application materials 1/ 2/

Year ending June 30	Dry bagged	Percentage	Dry bulk	Percentage	Liquid	Percentage
	1,000 tons	Pct.	1,000 tons	Pct.	1,000 tons	Pct.
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	8,426.6	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	11,529.5	29	16,958.6	43	11,141.5	28

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, 1971", SpCr 7 (6-72) Statis. Rptg. Serv., U.S. Dept. Agr., June 1972, and earlier issues.

Table 7.--Change in nitrogen fertilizer use by farm production regions

Region	Plant nutrient use, 1957-59 average	Change from 1957-59 to 1968/69	Change from preceding year		
			1969/70	1970/71	1971/72 Prelim.
	1,000 tons		Percent		
Northeast	152	71	4	12	-11
Lake States	128	337	- 6	34	- 7
Corn Belt	440	343	9	14	- 6
Northern Plains	158	485	18	3	3
Appalachian	253	81	4	9	- 8
Southeast	352	91	0	3	5
Delta States	229	51	7	10	17
Southern Plains	145	436	8	0	7
Mountain	107	243	2	3	4
Pacific	342	76	7	5	10
48 States	2,306	200	7	9	0

Table 8.--Change in phosphate (P_2O_5) fertilizer use by farm production regions

Region	Plant nutrient use, 1957-59 average	Change from 1957-59 to 1968/69	Change from preceding year		
			1969/70	1970/71	1971/72 Prelim.
	1,000 tons		Percent		
Northeast	268	9	0	9	- 8
Lake States	266	102	-11	22	- 7
Corn Belt	638	136	0	2	- 1
Northern Plains	108	292	7	- 2	-10
Appalachian	332	22	- 2	7	- 2
Southeast	357	20	- 3	0	5
Delta States	99	93	- 2	3	16
Southern Plains	110	255	-11	3	6
Mountain	78	206	1	4	1
Pacific	117	95	4	10	7
48 States	2,363	96	- 2	5	- 1

Table 9.--Change in potash (K_2O) fertilizer use by farm production regions

Region	Plant nutrient use, 1957-59 average	Change from 1957-59 to 1968/69	Change from preceding year		
			1969/70	1970/71	1971/72 Prelim.
	1,000 tons		Percent		
Northeast	237	8	6	8	- 4
Lake States	242	127	3	17	- 2
Corn Belt	582	153	6	2	2
Northern Plains	8	1,008	16	1	3
Appalachian	346	33	1	1	- 2
Southeast	398	54	- 2	2	8
Delta States	94	102	1	4	12
Southern Plains	30	299	6	9	5
Mountain	5	210	17	10	- 3
Pacific	40	103	15	5	14
48 States	1,982	94	4	5	2

other primary nutrients, use of K_2O was up in the Corn Belt. This may have come from a strong sales push to get potash out of the rail cars and on the fields.

Fertilizer Used on Corn, Cotton, Soybeans and Wheat

Data for tables 10, 11, 12, 13, 14, and 15 were obtained by Statistical Reporting Service in interviews of farm operators for objective yield surveys. Information about fertilizer use on these 4 crops has been collected each year since 1964 for Economic Research Sevice. The survey includes the principal producing States, which, in total, account for approximately 90 percent or more of the acres of these crops harvested in 1972. Estimates are based on a stratified, random sample number of fields in the States shown for each crop. Data are in terms of N, P_2O_5, and K_2O. Together, these crops—corn, cotton, soybeans, and all wheat—account for well over half of all fertilizer used in farming. These are not official estimates of fertilizer use. Official estimates of fertilizer use by States are found in "Consumption of Commercial Fertilizers in the United States", published by Statistical Reporting Service, U.S. Department of Agriculture. Consumption in recent years is shown in appendix tables 1, 2, and 3.

FOREIGN TRADE IN FERTILIZER

World consumption totaled 75.2 million tons of primary plant nutrients (N-P_2O_5-K_2O) in 1971, more than double the level of 1962. By 1975, world consumption of plant nutrients is expected to be about 95 million tons.[2]

About 30 percent of the world consumption of plant nutrients is imported. Leading developed countries imported about 25 percent of the 55.1 million tons of plant nutrients they used in 1970. By 1975, these countries will import a smaller percentage of their requirements than countries in developing regions, but a larger tonnage.[3]

In 1971, developing regions of the world imported about 7.3 million tons of the 14.8 million tons of primary plant nutrients used. By 1975, the are expected to use 20.6 million tons.

With 19.4 million tons of expected production capacity by 1975, these countries would import 9 million tons if they operate their plants at an average of 60 percent of capacity. They have historically operated at low percentages of capacity because of maintenance problems and an undependable supply of inputs, both power and feedstocks.

[2] "Estimated World Fertilizer Production Capacity as Related to Future Demand", E. A. Harre, T. P. Hignett and D. L. McCune, Tennessee Valley Authority, Muscle Shoals, Ala., August 1972.

[3] Developed regions: North America, Europe, Japan, Israel, South Africa, and Oceania. Developing regions: Asia (excluding Japan and Israel), Africa, (excluding South Africa), and Latin America—from "Estimated World Fertilizer Production as Related to Future Demand" Tennessee Valley Authority, Muscle Shoals, Ala., August 1972.

Table 10.--Fertilizer use on corn acreage harvested for grain, selected States, 1972

State	Acres for harvest 1/	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized 2/		
			Any fert.	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				Pounds			Percent		
Pennsylvania	965	118	96.6	96.6	96.6	95.8	83.8	66.4	55.8	94.7	0.0	5.3
Delaware	176	74	95.9	95.9	94.6	94.6	100.3	65.5	73.6	52.1	0.0	47.9
Maryland	450	88	100.0	100.0	97.7	100.0	92.4	83.4	95.6	70.5	1.1	28.4
3 States	1,591	280	97.5	97.5	96.7	96.8	88.1	71.3	69.4	83.1	.3	16.6
Michigan	1,630	91	100.0	100.0	100.0	97.8	88.4	72.2	68.7	50.5	1.1	48.4
Wisconsin	1,937	154	98.1	98.1	97.4	96.8	79.1	61.2	78.3	67.6	0.0	32.4
Minnesota	4,850	146	90.4	90.4	87.7	86.3	92.5	66.4	60.2	80.3	5.3	14.4
3 States	8,417	391	94.0	94.0	92.3	90.9	88.4	66.4	66.4	71.1	3.2	25.7
Ohio	3,103	152	97.4	97.4	96.7	96.7	102.4	80.7	80.7	65.5	1.4	33.1
Indiana	4,880	185	100.0	99.5	100.0	98.9	125.7	75.4	108.6	48.1	0.0	51.9
Illinois	9,250	224	97.3	96.4	90.6	90.6	128.4	73.8	79.7	60.5	4.6	34.9
Iowa	10,450	208	94.2	94.2	89.9	86.1	110.0	60.3	56.4	76.6	1.0	22.4
Missouri	2,500	160	98.1	98.1	84.4	84.4	115.8	60.3	63.8	68.1	8.3	23.6
5 States	30,183	929	96.7	96.4	92.0	90.5	118.0	69.2	76.0	65.0	2.6	32.4
South Dakota	2,460	102	45.1	45.1	37.3	19.6	52.6	29.3	19.8	71.8	13.0	15.2
Nebraska	5,100	169	92.8	92.2	69.1	50.2	139.4	39.9	18.1	53.0	13.1	33.9
Kansas	1,215	134	97.0	97.0	80.6	66.4	142.6	44.5	24.3	81.5	3.1	15.4
3 States	8,775	405	80.0	79.7	61.8	43.9	126.2	39.0	19.6	60.8	11.4	27.8
Virginia	440	100	99.0	99.0	97.0	96.0	113.6	73.1	94.4	44.4	7.1	48.5
North Carolina	1,340	144	100.0	100.0	100.0	100.0	151.7	59.6	74.6	7.6	2.1	90.3
Kentucky	1,042	119	97.5	97.5	93.3	90.8	124.8	86.4	81.1	59.5	2.6	37.9
3 States	2,822	363	98.9	98.9	97.1	96.0	136.0	71.3	80.0	32.3	3.0	64.7
Georgia	1,410	95	98.9	98.9	98.9	113.3	114.5	51.6	74.2	13.8	4.3	81.9
Colorado	360	118	97.5	97.5	74.6	13.6	165.8	80.0	51.0	27.8	10.4	61.8
19 States 2/ 3/	53,558	2,581	96.1	95.9	90.0	85.8	115.3	65.8	69.4	62.6	3.8	33.6

1/ "Crop Production", Cr Pr 2-2 (9-72) Crop Reporting Board, SRS, USDA, September 12, 1972.
2/ Percentages apply to acres receiving fertilizer.
3/ In 1972, 57,141,000 acres of corn were for harvest for grain in 40 States. The 19 States shown accounted for 94 percent of the total acres.

Table 11.--Fertilizer use on cotton acreage harvested, selected States, 1972

State	Acres for harvest 1/	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized 2/		
			Any fert.	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				Pounds			Percent		
Missouri	410	68	100.0	100.0	91.2	91.2	63.1	51.3	56.0	45.6	38.2	16.2
North Carolina	175	61	100.0	100.0	100.0	100.0	66.0	57.3	84.4	26.2	0.0	73.8
Tennessee	480	80	95.0	95.0	93.8	95.0	68.5	61.0	63.6	76.3	0.0	23.7
2 States	655	141	96.3	96.3	95.5	96.3	67.8	60.0	69.3	62.4	0.0	37.6
South Carolina	360	92	100.0	98.9	96.7	98.9	94.6	76.5	101.5	7.6	2.2	90.2
Georgia	420	95	100.0	100.0	100.0	97.9	81.5	59.8	91.3	42.1	3.2	54.7
Alabama	590	117	100.0	100.0	98.3	98.3	89.4	72.9	77.3	43.6	1.7	54.7
3 States	1,370	304	100.0	99.7	98.4	98.3	88.3	69.7	88.1	33.7	2.3	64.0
Mississippi	1,622	357	100.0	100.0	48.2	47.3	91.5	63.7	64.7	58.9	12.0	29.1
Arkansas	1,440	276	100.0	99.3	71.7	69.9	62.4	44.2	54.1	75.0	9.8	15.2
Louisiana	670	96	97.9	97.9	69.8	69.8	72.5	53.8	56.1	73.4	18.1	8.5
3 States	3,732	729	99.6	99.4	61.1	60.1	76.9	52.9	58.2	67.7	12.2	20.1
Oklahoma	488	106	46.2	46.2	41.5	34.9	32.2	37.6	26.1	95.9	4.1	0.0
Texas	5,160	650	51.2	50.9	35.5	11.4	52.5	44.2	18.9	81.3	13.3	5.4
2 States	5,648	756	50.8	50.5	36.0	13.4	50.9	43.5	20.5	82.4	12.6	5.0
New Mexico	149	54	68.4	61.1	63.0	9.3	69.2	69.4	30.6	32.4	51.4	16.2
Arizona	326	117	82.1	82.1	48.7	4.3	116.9	56.6	38.7	11.5	55.2	33.3
2 States	475	171	77.8	75.6	53.2	5.9	104.8	61.4	34.7	17.3	54.2	28.6
California	874	227	92.3	92.3	42.5	12.2	121.3	70.3	48.7	37.8	27.5	34.7
14 States 2/ 3/	13,164	2,396	77.2	76.9	54.9	41.1	74.8	55.2	60.8	62.2	13.8	24.0

1/ "Crop Production", Cr Pr 2-2 (9-72) Crop Reporting Board, SRS, USDA, September 12, 1972.
2/ Percentages apply to acres receiving fertilizer.
3/ In 1972, 13,186,000 acres of cotton were for harvest in 19 States. The 14 States shown accounted for all but 2/10 of 1 percent of the total acres.

Table 12.--Fertilizer use on soybean acreage harvested for beans, selected States, 1972

State	Acres for harvest 1/	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized 2/		
			Any fert.	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				Pounds			Percent		
Minnesota	3,191	111	14.4	12.6	10.8	11.7	20.2	44.2	61.9	100.0	0.0	0.0
Ohio	2,893	127	53.5	46.5	52.8	53.5	11.9	37.8	47.0	95.6	2.9	1.5
Indiana	3,715	122	48.4	41.8	46.7	47.5	10.9	40.6	51.2	98.3	0.0	1.7
Illinois	7,508	147	21.8	10.9	17.7	21.8	11.9	47.4	63.1	96.9	3.1	0.0
Iowa	6,147	142	14.1	8.5	13.4	14.1	11.3	35.7	34.7	95.0	5.0	0.0
Missouri	4,000	133	27.1	22.6	27.1	27.1	16.5	36.7	42.6	97.2	2.8	0.0
5 States	24,263	671	28.6	21.2	26.8	28.4	12.3	40.1	49.6	96.8	2.4	.8
Nebraska	742	55	21.8	16.4	21.8	16.4	13.8	34.4	22.0	100.0	0.0	0.0
Kansas	930	44	13.6	13.6	11.4	9.1	44.3	46.3	30.5	83.3	0.0	16.7
2 States	1,672	99	17.2	14.8	16.0	12.3	29.3	39.2	25.5	92.7	0.0	7.3
North Carolina	1,095	78	66.7	65.4	66.7	66.7	13.1	34.4	55.4	96.2	3.8	0.0
Tennessee	1,428	82	53.7	41.5	53.7	53.7	15.0	44.0	46.0	97.7	2.3	0.0
2 States	2,523	160	59.3	51.8	59.3	59.3	14.0	39.4	50.6	97.0	3.0	0.0
South Carolina	1,125	82	85.4	64.6	84.1	84.1	17.9	45.8	77.1	95.7	2.9	1.4
Mississippi	2,265	140	33.6	15.0	32.9	30.7	27.0	54.3	53.4	97.9	2.1	0.0
Arkansas	4,040	161	38.5	13.7	34.8	37.9	13.9	41.7	48.4	93.6	6.4	0.0
Louisiana	1,667	104	27.9	13.5	27.9	27.9	14.8	53.8	52.5	100.0	0.0	0.0
3 States	7,972	405	34.9	14.0	32.8	33.8	18.1	47.4	50.4	95.9	4.1	0.0
14 States 2/ 3/	40,746	1,528	31.2	21.7	29.4	30.5	14.4	41.9	51.4	96.5	2.8	.7

1/ "Crop Production", Cr Pr 2-2 (9-72) Crop Reporting Board, SRS, USDA, September 12, 1972.
2/ Percentages apply to acres receiving fertilizer.
3/ In 1972, 45,846 acres of soybeans were harvested for beans in 30 States. The 14 States shown accounted for 89 percent of the total acres.

Table 13.--Fertilizer use on all wheat acreage harvested, selected States, 1972

State	Acres for harvest 1/	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized 2/		
			Any fert.	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				Pounds			Percent		
Michigan	600	65	92.3	90.8	92.3	90.8	35.9	59.6	49.7	71.7	0.0	28.3
Minnesota	1,380	44	95.5	95.5	95.5	59.1	57.5	38.3	21.2	92.9	0.0	7.1
2 States	1,980	109	94.5	94.1	94.5	68.7	51.2	44.5	32.6	86.6	0.0	13.4
Ohio	1,050	81	97.5	97.5	97.5	97.5	43.3	58.7	53.8	54.4	1.3	44.3
Indiana	845	68	97.1	97.1	95.6	97.1	53.0	57.1	52.0	37.9	9.1	53.0
Illinois	1,200	73	94.5	93.2	86.3	76.7	55.9	71.7	55.5	46.4	14.5	39.1
Missouri	1,010	92	91.3	91.3	65.2	64.1	78.2	37.8	41.4	42.8	29.8	27.4
4 States	4,105	314	95.0	94.6	85.9	83.1	57.3	58.2	51.6	45.9	13.5	40.6
North Dakota	7,396	237	71.7	68.0	70.5	7.7	18.2	26.4	11.7	99.3	.7	0.0
South Dakota	1,922	124	31.4	31.1	27.9	5.2	27.1	20.2	10.6	93.1	6.9	0.0
Nebraska	2,558	117	46.2	45.3	18.8	.9	40.1	43.5	6.0	72.2	27.8	0.0
Kansas	9,230	261	59.8	59.8	39.5	6.1	51.1	35.5	14.5	64.7	5.8	29.5
4 States	21,106	739	59.7	58.3	46.8	5.9	35.4	30.2	12.8	81.3	5.8	12.9
Oklahoma	3,950	153	63.4	63.4	39.9	9.2	48.5	36.2	11.2	56.7	9.3	34.0
Texas	2,000	116	45.7	45.7	23.6	4.3	82.3	37.3	16.0	77.6	2.0	20.4
2 States	5,950	269	57.4	57.4	34.4	7.6	57.5	36.4	12.2	62.3	7.3	30.4
Montana	3,650	192	47.4	42 8	44.8	1.7	13.5	21.8	6.1	95.2	1.2	3.6
Idaho	994	123	72.2	71.3	12.9	.9	59.7	46.1	12.0	60.4	21.2	18.4
Colorado	2,400	113	9.7	9.7	0.0	0.0	61.4	0.0	0.0	100.0	0.0	0.0
3 States	7,044	428	38.1	35.5	25.0	1.0	31.0	23.6	6.9	85.0	7.1	7.9
Washington	2,520	133	91.7	91.7	6.0	0.0	63.1	32.1	0.0	78.7	4.1	17.2
Oregon	811	70	88.6	88.6	8.6	0.0	46.0	35.1	0.0	62.9	24.2	12.9
2 States	3,331	203	90.9	90.9	6.6	0.0	59.0	33.0	0.0	74.9	8.9	16.2
17 States 2/ 3/	43,516	2,062	62.7	61.7	44.0	15.3	45.7	37.8	37.8	73.2	7.2	19.6

1/ Crop Production, Cr Pr 2-2 (9-72) Crop Reporting Board, SRS, USDA, September 12, 1972.
2/ Percentages apply to acres receiving fertilizer.
3/ In 1972, 47,839,000 acres of all wheat were harvested in 42 States. The 17 States shown accounted for 91 percent of the total acres.

Table 14.— Percentage of fields of corn, cotton, soybeans, and all wheat receiving fertilizer in selected States, 1964-72[1]

Crop and year	Fields in survey	Acres receiving			
		Any fertilizer	N	P_2O_5	K_2O
	Number	*Percent*	*Percent*	*Percent*	*Percent*
Corn					
1964	2,875	85	85	78	72
1965	3,322	88	88	82	77
1966	3,338	91	91	86	80
1967	3,412	92	92	87	82
1968	3,107	93	92	89	84
1969	3,060	93	93	87	82
1970	3,107	95	94	90	85
1971	2,606	94	94	88	82
1972	2,581	96	96	90	86
Cotton					
1964	2,262	78	77	58	43
1965	2,503	79	79	59	44
1966	2,433	77	76	59	45
1967	2,448	73	72	56	40
1968	2,440	74	73	56	43
1969	2,460	76	75	54	39
1970	2,447	72	72	48	36
1971	2,320	75	74	50	39
1972	2,396	77	77	55	41
Soybeans					
1964	1,073	13	7	12	12
1965	1,106	18	11	16	17
1966	1,307	27	18	26	24
1967	1,460	28	21	27	27
1968	1,495	29	21	27	27
1969	1,503	27	19	26	27
1970	1,552	29	21	27	28
1971	1,532	28	19	27	27
1972	1,528	31	22	29	31
All Wheat					
1964	1,792	50	47	36	16
1965	1,960	52	48	38	15
1966	2,241	54	49	38	15
1967	2,146	58	53	43	17
1968	2,119	60	56	43	17
1969	2,047	59	56	44	17
1970	2,068	63	61	44	20
1971	2,230	58	57	41	14
1972	2,062	63	62	44	15

[1] States included for each crop are shown in Tables 10, 11, 12, and 13.

Table 15.—Quantity of fertilizer used and time of application on corn, cotton, soybeans, and all wheat in selected States, 1964-1972[1]

Crop and year	Rate per acre receiving—			Time and fertilization			Harvested acreage United States[2]
	N	P_2O_5	K_2O	At or before seeding	After seeding only	At or before and after seeding	
	Pounds	*Pounds*	*Pounds*	*Percent*	*Percent*	*Percent*	*1,000 acres*
Corn							
1964	58	41	35	54	6	40	55,369
1965	75	50	48	50	5	44	55,332
1966	86	57	57	53	3	44	56,933
1967	93	60	60	58	3	40	60,557
1968	104	64	65	66	2	32	55,880
1969	110	64	67	62	2	36	54,598
1970	112	71	72	64	2	34	57,224
1971	107	62	64	68	3	29	63,819
1972	115	66	69	63	4	33	[3]57,141
Cotton							
1964	69	50	37	49	15	36	14,055
1965	81	55	57	47	12	41	13,615
1966	84	55	58	50	12	39	9,552
1967	79	55	55	60	11	29	7,997
1968	80	57	58	54	13	33	10,160
1969	91	60	57	56	15	29	11,058
1970	75	55	57	68	11	22	11,160
1971	75	53	58	65	13	22	11,471
1972	75	55	61	62	14	24	[3]13,161
Soybeans							
1964	14	30	37	99	1	([4])	30,793
1965	10	32	39	97	3	([4])	34,449
1966	12	34	41	96	3	([4])	36,546
1967	13	37	42	97	3	([4])	39,767
1968	15	37	45	96	2	1	41,104
1969	12	41	48	98	1	([4])	40,982
1970	14	37	51	99	1	([4])	42,056
1971	15	39	48	99	1	([4])	42,409
1972	14	42	51	97	2	1	[3]45,843
All Wheat							
1964	27	27	19	68	16	16	49,762
1965	31	30	35	67	16	17	49,560
1966	32	32	37	65	17	18	49,867
1967	35	32	39	75	7	18	58,771
1968	36	32	36	68	14	18	55,262
1969	38	34	39	77	8	15	47,577
1970	39	30	36	76	8	16	44,141
1971	40	34	36	77	7	16	48,453
1972	46	37	38	73	7	20	[3]47,839

[1] States included for each crop are shown in Tables 10, 11, 12, and 13. [2] Does not include Alaska or Hawaii. [3] Preliminary. [4] Less than 0.5 percent.

The United States exported $339 million worth of primary plant nutrients in 1971/72 (table 16). This was $50 million over the previous year due both to increased tonnages exported and higher unit values. Declared values of potash fertilizers and high-analysis phosphate fertilizers increased.

Exports financed by the United States Agency for International Development (AID) increased $16 million in 1971/72 (table 17). Tonnages were larger and prices were higher for most fertilizers financed, especially high-analysis phosphate materials (fig. 2). The prices of concentrated superphosphate nearly doubled and the price of diammonium phosphate increased 75 percent.

To take advantage of economies of transportation costs, most countries import more of the higher analysis materials each year. The average nutrient content of AID-financed fertilizers rose from 46 percent in 1969/70 to 55 percent in 1971/72. If the same amount of nutrients imported in 1971/72 were purchased as 46 percent average nutrient content material, the developing countries alone would have paid $4.9 million more in ocean freight cost on an additional 139,000 tons of material they would have needed in 1971/72. Of the 781,000 tons of plant nutrients financed in 1971/72, 46 percent was nitrogen, 45 percent P_2O_5 and 9 percent K_2O. Only P_2O_5 increased in tonnage over 1970/71.

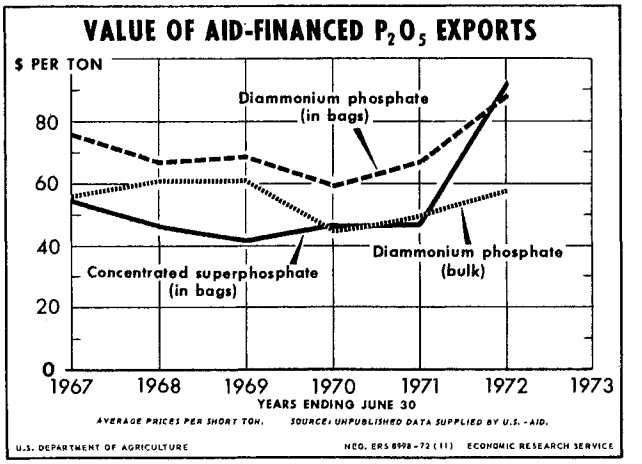

Figure 2

Table 16.— Fertilizer exports: Declared values of specified fertilizers exported from the United States, selected years ending June 30, 1969-72

Fertilizer	1969	1971	1972[1]
	Million dollars	*Million dollars*	*Million dollars*
Urea	35.6	21.6	21.4
Ammonium nitrate	5.0	3.0	1.9
Ammonium sulfate	40.2	9.2	9.8
Sodium nitrate	.1	---	.1
Anhydrous ammonia fertilizer	30.6	19.7	13.2
Phosphate rock (hard)	90.1	86.7	90.9
Phosphate rock (fertilizer)	8.9	9.5	11.9
Normal superphosphate	1.3	.6	.3
Concentrated superphosphate	46.1	23.0	33.1
Ammonium phosphates	57.6	59.4	91.6
Potassium chloride	26.0	22.4	28.1
Potassic chemical fertilizer NEC	9.2	9.5	9.2
Mixed fertilizer NEC	18.1	19.0	17.8
Nitrogenous chemical fertilizer	1.7	5.0	9.6
Total	370.5	288.6	338.9

[1] Preliminary.

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

Table 17.— Fertilizer exports: Sales financed by the U.S. Agency for International Development, years ending June 30, 1971-72

Fertilizer	1971		1972	
	Quantity	Amount	Quantity	Amount
	1,000 tons	*1,000 dollars*	*1,000 tons*	*1,000 dollars*
Ammonium sulfate	71	469	9	395
Ammonium phosphate	1	37	(1)	20
Diammonium phosphate	166	5,956	269	16,944
Urea	295	15,508	239	14,829
Concentrated superphosphate	37	1,770	34	3,117
Potassium chloride	10	264	5	241
Potassium sulfate	10	589	9	546
Mixed fertilizer	152	8,097	201	12,344
Anhydrous ammonia	15	364	13	431
Sulfate of potash-magnesia	(1)	36	---	---
Total	707	33,090	781	48,867

[1] Less than 1,000 tons.

Source: Agency for International Development.

The liberalization of credit permitting AID to finance offshore exports of fertilizer wasn't widely used in 1971/72. Only 50,000 tons of urea were financed under this program.

Nitrogen

Although U.S. imports (table 18) and exports (table 19) of nitrogen both declined in 1971/72, the United States remained a net exporter of contained nitrogen by 188,000 tons. Decreases of 177,000 tons in anhydrous ammonia, of 43,000 tons in ammonium sulfate, and of 74,000 tons in other fertilizer materials containing nitrogen accounted for most of the drop in nitrogen exports. Exports of urea and the ammonium phosphates increased 24 and 36 percent respectively.

With dwindling stocks of low-cost natural gas, the United States will find it more difficult to remain competitive with countries with large natural gas resources in the production in ammonia. A large potential exists for the low-cost production of nitrogen fertilizers in the Middle East, parts of Africa, and the Soviet Union. In addition to the potentially low costs of production, these countries are near developing countries and Eastern Europe, the largest potential markets for nitrogen fertilizers during the next decade.

In 1971/72, approximately 64 percent of U.S. nitrogen fertilizer exports went to developing countries. Because of high shipping costs per unit of nitrogen, AID financed only 9,000 tons of ammonium sulfate even though 94 percent of U.S. sulfate exports —or 526,000 tons—went to developing countries (table 20).

AID financed 198,000 tons of nitrogen in fertilizer exports in 1971/72—about equal to that of the previous year. About 85 percent of the nitrogen was in urea, anhydrous ammonia, and diammonium phosphate (DAP).

Average prices of AID-financed exports of urea (figure 3) and DAP increased sharply in 1971/72. However, urea prices were still below 1968-70 prices. The average price

Table 18.—U.S. imports of specified fertilizer materials, selected years ending June 30, 1964-72

Fertilizer	1964	1970	1971	1972[1]
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
Anhydrous ammonia	91	477	501	393
Ammonium nitrate	218	306	367	390
Ammonium sulfate	228	179	228	235
Sodium nitrate	397	164	188	160
Urea	280	424	330	365
Nitrogen solutions	82	98	194	120
Phosphate, crude	188	154	123	67
Ammonium phosphates	106	395	472	489
Potassium chloride	1,043	4,378	4,115	5,082
Potassium sulfate	95	70	63	48
Phosphate fertilizer	---	---	---	54
Fertilizer (NSPF)	---	---	---	47

[1] Preliminary.

Source: U.S. Imports—Commodity and Country—Report No. FT 135, U.S. Bureau of Census, published monthly.

Table 19.—U.S. exports of specified fertilizer materials, selected years ending June 30, 1964-72

Fertilizer	1964	1970	1971	1972[1]
	1,000 *tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
Anhydrous ammonia	82	764	598	421
Ammonium nitrate	39	81	59	34
Ammonium sulfate	413	528	601	558
Urea	44	670	374	464
Phosphate rock	6,664	10,965	12,757	13,575
Normal superphosphate	154	37	18	14
Concentrated superphosphate	597	711	627	724
Ammonium phosphates	274	986	1,135	1,542
Potassium chloride	805	902	772	859
Potassium chemical fertilizer	51	186	238	211
Fertilizer materials	165	404	317	243

[1] Preliminary.

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

Table 20.—Nitrogen fertilizers: U.S. exports by country of destination, year ending June 30, 1972[1]

Country of destination	Ammonium sulfate	Anhydrous ammonia	Urea
	1,000 tons	*1,000 tons*	*1,000 tons*
Brazil[2]	264	8	37
Mexico	95	108	20
Salvador[2]	37	---	17
Dominican Republic[2]	47	---	11
Colombia[2]	6	11	---
Italy	10	---	17
Belgium	14	---	18
United Kingdom	---	44	---
South Vietnam[2]	9	---	131
Denmark	---	73	---
Finland	---	32	---
Singapore[2]	---	---	71
Indonesia[2]	---	---	43
Algeria[2]	---	32	---
Turkey[2]	---	40	---
Costa Rica[2]	---	14	21
Trinidad[2]	---	19	---
France	8	---	16
N. Antilles[2]	---	18	---
Jamaica[2]	13	---	---
Other countries	55	22	62
Total	558	421	464

[1] Preliminary. [2] Countries with active AID programs, but fertilizer purchases not necessarily financed by AID.

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

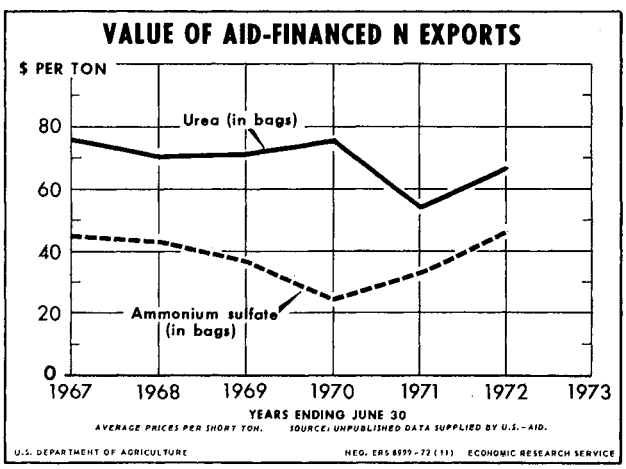

Figure 3

for bagged DAP increased 33 percent while bulk increased only 16 percent. Substantial savings can be realized when both urea and DAP are shipped bulk. For this reason, AID encourages developing countries to buy fertilizer materials in bulk where possible.

Phosphates

The world supply-consumption ratio for P_2O_5 in phosphate fertilizers declined slightly to 1.04 in 1972. This tightening was the result of increasing consumption without a corresponding increase in supply. North America's—United States and Canada—domestic supply-consumption ratio was 1.22 in 1972, down from 1.38 in 1968. Planned increased in output of phosphoric acid can bring the ratio up to 1.42 by 1975.

The United States shipped about 28 percent of the world exports of P_2O_5 in 1970/71 (excluding phosphate rock). U.S. export tonnages of P_2O_5 increased about 29 percent in 1971/72. The largest increase was in the ammonium phosphates. This is part of a general shift from low-analysis to high-analysis fertilizer products.

Our 1971/72 exports of P_2O_5 were up 27 percent in value and set a record. The declared per-ton value of the higher analysis materials was the highest since 1968. For the third straight year, export prices for concentrated superphosphate and DAP have been above domestic prices. Some were concerned that higher export prices would cause suppliers to divert P_2O_5 to the world market leaving inadequate supplies for domestic users. However, the uncertainty of acquiring a long-term, continuous export market caused most suppliers to take care of their domestic customers first. But the difference of $25 to $35 a ton between domestic and export prices in late 1972 will attract supplies from producers with new or expanded facilities who do not have domestic commitments or domestic channels of distribution.

In 1971/72, Brazil, India, and Italy imported 65 percent of U.S. exports of 1.5 million tons of ammonium phosphates (table 21). This was a sizeable increase over the previous year. Exports of bulk DAP tonnages financed by AID were up 132 percent; prices were up 15 percent. Since prices were up 33 percent for bagged DAP, importers shifted to bulk shipments where they could.

U.S. export tonnage and total declared value of phosphate rock increased 6 percent and 7 percent respectively. Rock exports of 13.6 million tons in 1971/72 were a record high and accounted for a third of marketable U.S. production. Canada and Japan, the largest purchasers, again increased their imports of U.S. rock—by 49 percent and 8 percent respectively. Exports to West Germany and Italy declined slightly but were still above a million tons to each country. Rock deposits in Florida, located near excellent deep water ports with loading capacity of 28 million tons a year, are in a good position to supply the world market.

Volume of exports of concentrated superphosphate was up 15 percent despite a 24 percent increase in export price. AID-financed superphosphate prices averaged 93 percent higher per ton than in the previous year.

Potash

Record consumption coupled with a decline in domestic production boosted U.S. potash imports 23 percent to a new high in 1971/72. Imports were larger than domestic production for the first time since 1937.

Table 21.—Phosphate fertilizers: U.S. exports, by country of destination, year ending June 30, 1972[1]

Country of destination	Phosphate rock	Ammonium phosphates	Concentrated superphosphate
	1,000 tons	*1,000 tons*	*1,000 tons*
Brazil[2]	717	469	248
Algeria[2]	---	---	65
Chile[2]	55	3	59
Italy	1,141	218	51
Canada	2,979	44	47
Iran[2]	316	---	45
Indonesia[2]	---	---	33
France	515	80	31
Japan	2,188	40	25
Argentina[2]	---	40	19
Netherlands	561	42	17
Colombia[2]	74	8	15
Costa Rica[2]	6	21	12
Salvador[2]	15	32	5
Belgium	796	41	2
Lebanon	---	21	2
Mexico	844	---	---
Korea Republic[2]	522	---	---
United Kingdom	101	1	---
Uruguay[2]	43	10	---
Spain	251	27	---
Philippine Republic[2]	126	---	---
West Germany	1,276	2	---
Switzerland	26	2	---
India[2]	438	338	---
China Taiwan	70	---	---
Romania	221	---	---
Sweden	94	---	---
Austria	103	---	---
Norway	68	---	---
Ethiopia	---	16	---
Other Countries	29	87	48
Total	13,575	1,542	724

[1] Preliminary. [2] Countries with active AID program, but fertilizer purchases not necessarily financed by AID.

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

Potassium chloride from Canada accounted for nearly all the imports of potash materials (table 22).

Saskatchewan continued to regulate both production and prices of its huge potash industry for the third consecutive year. The average declared value per ton of K_2O equivalent imports for use as fertilizer was $39.83 in 1971/72, down from $41.49 in 1970/71 but up from $29 in 1969 and 1970 (figure 4).

WORLD TRADE OUTLOOK

Nitrogen

In the next 3 years, worldwide nitrogen use is expected to grow at an annual rate of about 7 percent. Production is expected to increase more than consumption in 1973, increasing the supply-demand ratio slightly. However, the ratio is expected to decline by 1975.

Table 22.—Imports of specified potash materials, K_2O equivalent, into the United States, years ending June 30, 1971-72, by country of orgin

Country	1971		1972	
	Muriate of potash	Sulfates	Mirate of potash	Sulfates
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*
Canada	2,402.2	---	2,947.3	(1)
Belgium & Luxembourg	---	2.2	(1)	.8
Congo	1.0	---	1.2	---
France	---	4.8	8.2	1.9
Germany, West	---	21.5	(1)	21.3
Israel	55.0	---	90.5	---
Chile	---	---	1.8	---
Italy	---	2.8	---	---
Spain	7.4	---	---	---
Mexico	3.6	---	(1)	(1)
Other Countries	---	---	.4	---
Total	2,469.2	31.3	3,049.4	24.0

[1] Less than 100 tons.

Source: Mineral Industry Surveys, Bureau of Mines, September 29, 1972.

Developing countries are expected to increase nitrogen consumption at an annual rate of 10 percent in the next 3 years. Capacity is expected to increase at an even faster rate and the supply-demand ratio is expected to be about .63 by 1975 for these countries, 23 percent above the ratio in 1972, if ammonia plants are operated at 60 percent of capacity. The rate of growth in consumption is likely to be greatest in Latin America and Asia.

Asia will continue to be the largest importer with Mainland China, India, Pakistan, Turkey, South Vietnam, and Indonesia taking more than 90 percent of the imports.[4]

The supply-demand ratio for nitrogen in developed countries will be 1.15 by 1975, down from 1.21 in 1971. Increasing demand and the closing of small inefficient ammonia plants in North America will require nitrogen plants to operate at a 90 percent capacity level in 1975 to maintain the present net trade balance. Western Europe and Japan, with a ratio of 1.31, will continue to have capacity above their domestic needs in 1975.

Phosphate

In the next 3 years, the annual rate of growth in world consumption of P_2O_5 (excluding ground phosphate rock) is expected to be about 5 percent. This will require an equal expansion in production because the 1972 supply-consumption ratio is about in balance.

[4] "Annual Fertilizer Review—1971", Food and Agriculture Organization of the United Nations.

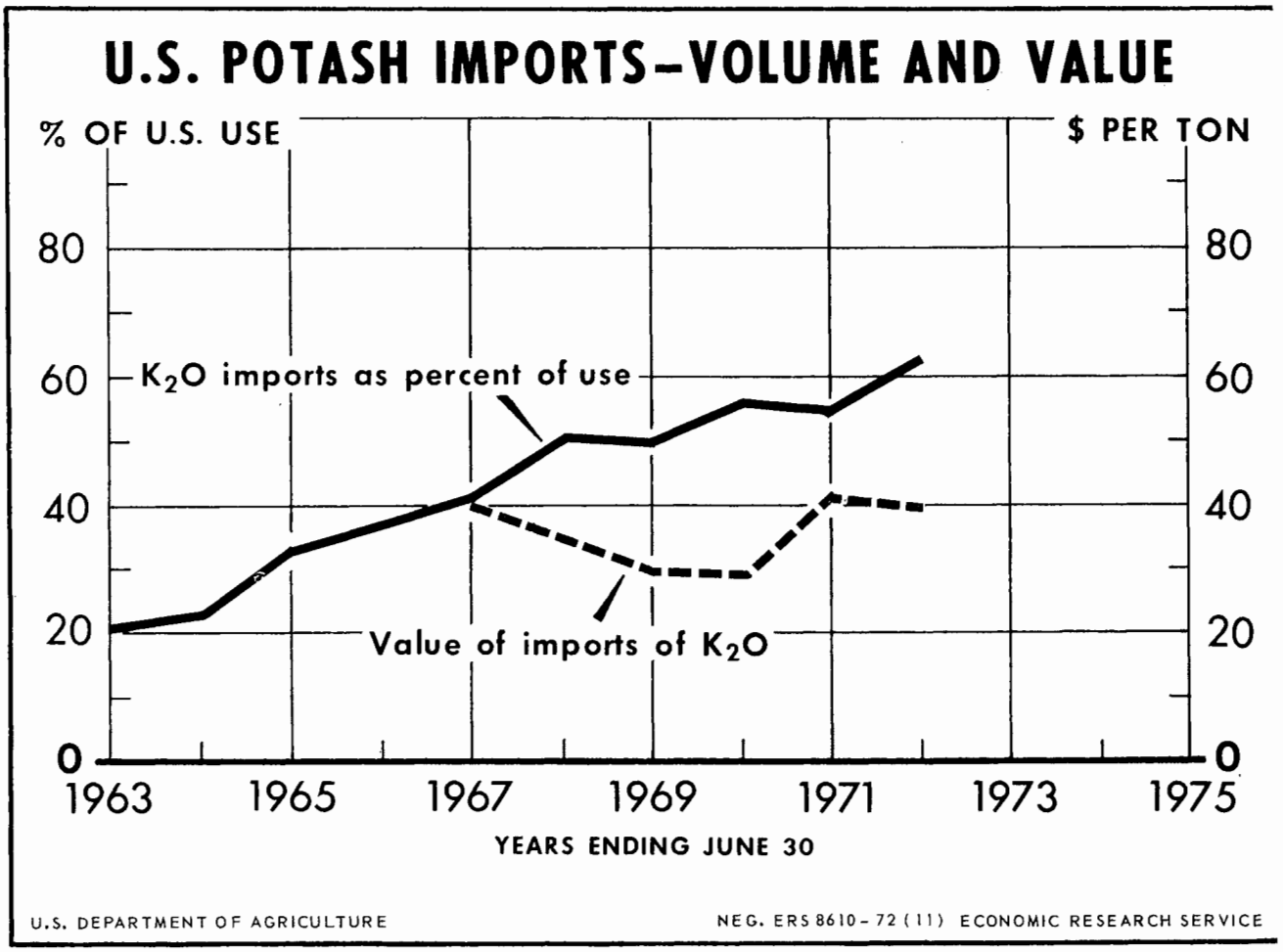

Figure 4

At the United Nation's Conference for Trade and Development (1971) in phosphates, it was recommended that developing countries with large phosphate rock deposits expand their exports by means of processing phosphate into such products as phosphoric acid and concentrated superphosphate. These countries would be quite competitive if they could obtain the capital and technology.

To maintain the current export trade balance in phosphate fertilizers, U.S. plants will have to keep production at near capacity for the next year and a half. Export demand for U.S. phosphate fertilizers is expected to be heavy in the 1972/73 season. However, in 1974 and 1975 some of the plants now being built in Brazil, France, Spain, North Africa, and Eastern Europe will be on stream. Their output will be competing with U.S. exports.

Potash

Canada's production restraints and base price for potash material, effective January 1, 1970, will continue to relieve some of the oversupply problems and to maintain a measure of price stability in the world potash market. However, it won't cure the overcapacity problem for Canada. While North American producers are unlikely to expand capacity, West European producers will increase their capacity from 6.2 to over 7 million tons of K_2O and Eastern Europe is planning expansion that will bring their capacity to 10.4 million tons by 1975, three quarters of a million tons above 1972. North America will continue to have the largest share of world production capacity, now at 27.5 million tons, but will lose some of its edge—about 2 percent—to Europe. If the developing regions can sustain a 10 percent annual increase in demand for potash, they will increase imports to 2.0 million tons K_2O by 1975, up 0.4 million tons from 1971. However, the developed countries will continue to be the larger importers.

Canada's production restraints and base price for potash will continue to stabilize import prices of K_2O to the United States. The United States will become even more dependent upon potash imports from Canada in the future.

WHERE DID ALL THE PHOSPHATE GO?

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ABSTRACT: Supplies of high-analysis phosphate fertilizers for domestic use are tight. The main factor is a boom in foreign demand for phosphates at price levels considerably above U.S. price ceilings. Although phosphates will continue to be tight for the next 18 months, relief is in sight. American producers have announced construction plans for new wet process phosphoric acid plants (and have reopened some previously closed plants) that will add 1.9 million tons annual capacity of P_2O_5 by late 1974. Until then, phosphate prices are likely to stay at or near their ceilings.

Key Words: *Phosphate fertilizer prices, phosphate fertilizer supply and demand.*

Phosphate fertilizers have been in short supply twice since the end of World War II. In both instances a shortage of sulfur, now plentiful, brought about by first the Korean War and again in 1966-68 during the Vietnamese conflict, put a crimp in the output of all kinds of phosphate fertilizers except phosphate rock. Once again phosphates are in tight supply. But the cause is entirely different—strong foreign demand at comparatively high prices has put domestic demand in tenuous balance with current offerings for domestic consumption at present price levels.

Phosphoric acid is an essential ingredient in the manufacture of the principal high-analysis phosphatic fertilizers—concentrated superphosphate and the ammonium phosphates. As recently as 1969, 7 wet-process phosphoric acid plants with annual capacity estimated at 652,000 tons P_2O_5 (10 percent of total U.S. capacity) were in standby condition.[1] Some were dismantled within months.

Domestic use of all phosphate fertilizers—dry and liquid products plus phosphate rock—rose at a rate averaging around 7 percent a year from 1960 to 1965 and went even higher over the next 2 years. Then the rate of advance slowed abruptly. Use of P_2O_5 was only 12 percent higher in the 4-year period from 1967 through 1971 (table 1). Use in 1970 declined 2 percent from 1969. The sudden slowdown in demand brought with it lower retail prices. At the same time, transportation costs rose rapidly and problems of pollution control became increasingly expensive. The combination of these factors was principally responsible for the closing of some phosphate-producing facilities.

Then, as quickly as it began, the slowdown in demand halted. Export and domestic demand increased sharply until by late spring of 1971 the supply of phosphates available for domestic, open market transactions evaporated. Fortunately, there had been forward contracting for supplies of phosphates so domestic needs were met during the 1971/72 fertilizer year.

What brought about the reversal in demand for phosphates? Four major events were responsible—devaluation of the dollar, establishment of domestic price ceilings, favorable corn prices, and strong foreign demand not necessarily associated with changes in the dollar.

When the dollar was freed from gold, it floated lower compared with most hard foreign currencies; U.S. items in foreign trade became relatively less expensive in many importing countries. The drop in price in terms of foreign currencies was reported to be as much as 15 percent. This, of course, tended to strengthen foreign demand for phosphate fertilizer.

Even as the dollar was devalued, foreign demand for phosphates strengthened. At least 2 fertilizer complexes were under construction near phosphate rock deposits in North Africa. To build an immediate market for the future output from these new plants, the operators bought U.S. phosphates to use as "seed" in their markets. As soon as these plants are in full production, it is likely that not only will their purchases from U.S. producers probably cease, but also they will become competitors in the world market.

Additional demand came from countries with strong programs for increasing agricultural production. Brazil is an outstanding example. During the 5 years from 1966/67 to 1971/72, U.S. exports to Brazil of phosphate rock were quadrupled, concentrated

[1] "Fertilizer Trends—1969," Edwin A. Harre, National Fertilizer Development, Tennessee Valley Authority, Muscle Shoals, Ala.

Table 1.--Consumption of phosphate fertilizer by kind, 1965-72, United States and Puerto Rico

Years ending June 30	Available P_2O_5 in--		
	Mixtures	Direct-application materials	Total
	1,000 tons		
1965	2,816	696	3,512
1966	3,111	786	3,897
1967	3,503	802	4,305
1968	3,579	874	4,453
1969	3,724	941	4,665
1970	3,709	865	4,574
1971	3,943	860	4,803
1972	3,914	869	4,783

Source: "Commercial Fertilizers, Consumption in the United States, Fiscal Year Ended June 30, 1972", SpCr 7 (10-72) Oct. 27, 1972, Statis. Rptg. Serv., U.S. Dept. Agr.

superphosphate exports were up similarly, and ammonium phosphates increased 11 times (table 2).

Price ceilings were established August 15, 1971, an unfavorable time for fertilizer producers. The slowdown in the increase in use of phosphates, starting in 1967, was accompanied by price declines brought about by competitive forces in the marketplace. Prices paid by farmers for concentrated superphosphate averaged $84 a ton on April 15, 1967. On the same date in 1971, the price was below $77 (table 3). Retail prices to farmers for one popular grade of ammonium phosphate—16-20-0—dropped from $81 to $77 a ton over the same period. From the viewpoint of manufacturers and at most levels in the marketing chain, the picture was considerably darker. Transportation and labor costs rose sharply over this period and the increases had to be absorbed by phosphate producers as prices of their products declined. Even so, prices were frozen at these relatively low levels 4 months later on August 15. During Phase II, of the price control program, firms that could show just cause were allowed to and did raise prices.

From the farmer's viewpoint, his situation has rarely been better as far as fertilizer prices were concerned. Of all the things used in farm production, average prices for fertilizer, phosphates included, were near their lowest levels in almost 25 years.

Even though a price lid was clamped on domestic transactions, prices for exported commodities were unaffected. The result was that high-analysis phosphates for export were priced about $10 a ton above domestic ceilings. This promoted a drain on uncommitted domestic phosphates which were virtually nonexistent at the time. Primary producers up to mid-1972 had worked around the clock to push production to record highs in an attempt to meet the strong foreign demand. Even so, in the 9 months following August 1971 the export price had climbed reportedly to as much as $70 per ton of material quoted at around $45 per ton on the open market in the United States.

The consequence of this combination of strong demand coupled with high export prices was predictable. Closed plants were reactivated, existing plants are undergoing expansion, new plants were announced, and

Table 2.--U.S. exports of specified phosphate fertilizers to Brazil 1967-72

Years ending June 30	Phosphate rock	Concentrated superphosphate	Ammonium phosphates
	1,000 tons		
1967	171	66	41
1968	222	92	104
1969	294	132	156
1970	372	178	239
1971	522	262	309
1972	717	248	469

Source: "U.S. Exports, Schedule B--Commodity and Country," Report FT410, U.S. Bureau of the Census, published monthly.

Table 3.--Prices paid by farmers for selected fertilizers, United States, 1965-72

April 15	Concentrated superphosphate	16-20-0	18-46-0
	Dollars per ton		
1965	82.70	80.70	111.00
1966	80.90	81.10	108.00
1967	84.10	80.70	113.00
1968	78.40	78.40	101.00
1969	74.00	77.70	94.10
1970	75.10	76.90	94.40
1971	76.60	76.70	95.70
1972	78.00	79.00	97.40

Source: "Agricultural Prices", Pr 1 (9-72), Statis. Rptg. Serv., U.S. Dept. Agr., Sept. 29, 1972, and earlier issues.

operating plants are being "de-bugged" to increase the output of product with little additional increase in capital investment.

Public announcements through mid-November 1972 indicate that new and expanded wet process phosphoric acid annual capacity will increase by 1.9 million tons P_2O_5 by the end of 1974 if announced plans are carried to completion. Some 335,000 tons of this now are on stream, 2 plants capable of producing 320,000 tons P_2O_5 annually will commence operating the spring of 1973, and 650,000 tons of capacity are indicated to begin production in mid-1974. The remaining plant capacity of 600,000 tons P_2O_5 is planned for the late summer of 1974.

Domestic use of fertilizer P_2O_5 in the fertilizer year just ended was 4.8 million tons. Expansion over the next 2 years will be equivalent to 40 percent of this quantity. However, domestic use is not currently responsible for the squeeze in phosphates; foreign demand is. And about two-thirds of the expansion is intended first for export, then for domestic markets. How much actually enters foreign trade channels will depend upon demand and price levels in the next few years.

At the start of the 1972/73 fertilizer year, virtually all phosphates were contracted for with considerable tonnage earmarked for foreign delivery, reportedly for at least 18 months. However, the situation will ease by mid-1974 if supply capacity is expanded as planned and demand tends to level-off.

Further complicating the picture for U.S. phosphate producers is the growth of foreign competition in the world market. Deposits of phosphate rock abound along the south shore of the Mediterranean Sea and the northwest coast of Africa. Europe is the logical outlet for phosphate fertilizers (and rock) produced in North Africa. Any increase in shipments to Europe by African producers is likely to reduce demand for U.S. phosphates. All these countries—Spanish Sahara, Morocco, Algeria, Tunisia—have phosphate rock deposits and either already are in production or plan to produce high-analysis phosphates for export.

In general, then, phosphates will be in tight supply in the United States as long as export prices are high enough to siphon off any uncommitted product until mid-1974 when supply catches up with demand. During this period, U.S. prices are likely to remain quite firm and to feel upward pressure at all marketing levels.

FARMER COOPERATIVES IN THE FERTILIZER BUSINESS

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ABSTRACT: Farmer cooperatives account for about a third of the distribution of fertilizer to farmers. Data show the numbers of firms at all levels of manufacture from the points of primary production through local retail outlets. Also shown are production capacities, shares of total U.S. production, and capital investments. This study concludes with an analysis of the factors influencing the cooperatives' progress in the fertilizer business—the "cons" as well as the "pros".

Key Words: Cooperatives, fertilizer manufacturing, fertilizer distribution.

Farmer cooperatives have been distributing fertilizer to their members for about 100 years. Their sales of fertilizer have increased from about 15 percent of total sales to U.S. farmers in 1950/51 to 32 percent in 1969/70, the earliest and latest years such data are available. Nearly 4,300 cooperatives handled fertilizer in 1969/70— in almost all instances along with other production supplies such as feed, seed, and pesticides.

Cooperatives handling fertilizer are of two basic types (figure 1): (1) Federated systems consiting of local, retail, farmer-owned cooperatives that, in turn, own regional wholesaling-manufacturing cooperatives. (2) Centralized systems consisting of regional cooperatives owned directly by farmer members which are served by local branches, and in some cases by private agents, of the regional cooperative. These regional cooperatives may also manufacture some of their requirements.

Several regional cooperatives combine both systems—they have both farmers and cooperatives as members and thus provide retailing, wholesaling, and manufacturing services. A third level of cooperation occurs when regional cooperatives find that working together will be to their advantage. They may set up national or area purchasing-manufacturing cooperatives.

Cooperatives in 1969/70 distributed or marketed about 12.5 million tons of fertilizer at retail. About three-fourths of this was acquired through their wholesale cooperatives (figure 2). About two-thirds of the total cooperative volume was produced in cooperative plants—some of it sold direct to farmers and some distributed through wholesale divisions of regional cooperatives to their locals.

Over the years, cooperatives have developed an extensive system of local distribution facilities, including equipment for providing custom services. In 1970, cooperatives operated an estimated 2,185 bulk blending plants, 2,730 warehouses for bagged goods, 1,655 ammonia stations, and 1,740 nitrogen solution stations, plus several thousand pieces of application equipment for serving farmers.

Cooperatives gradually extended their operations from their local distribution or marketing systems into mixing and manufacturing. They first began mixing operations about 50 years ago, followed by the production of normal superphosphate in the 1940's. They then began manufacturing nitrogen and phosphate fertilizers in the 1950's and the production of potash at the end of the 1960's. By 1970, cooperatives were producing the following percentages of the plant nutrients that they sold: nitrogen (N), 87 percent; phosphates ($P_2 0_5$), 73 percent; and potash ($K_2 O$), 16 percent.

Cooperatives decided to produce basic fertilizer materials and their derivatives for the following reasons:

1. They found it difficult to obtain needed materials on a highly seasonal basis to meet their members' needs. This was especially true in meeting the shortage of nitrogen fertilizers after World War II. Suppliers naturally first took care of their own demands for products.

2. They found their own basic production and primary distribution helped logistically and economically to support their marketing operations.

3. They soon discovered that margins as buyers and sellers were limited and that substantially greater savings could be returned to member local cooperatives and farmer-members by producing basic materials.

4. They found that new products could be developed, quality could be controlled, and new methods of application and other services could best be effected by

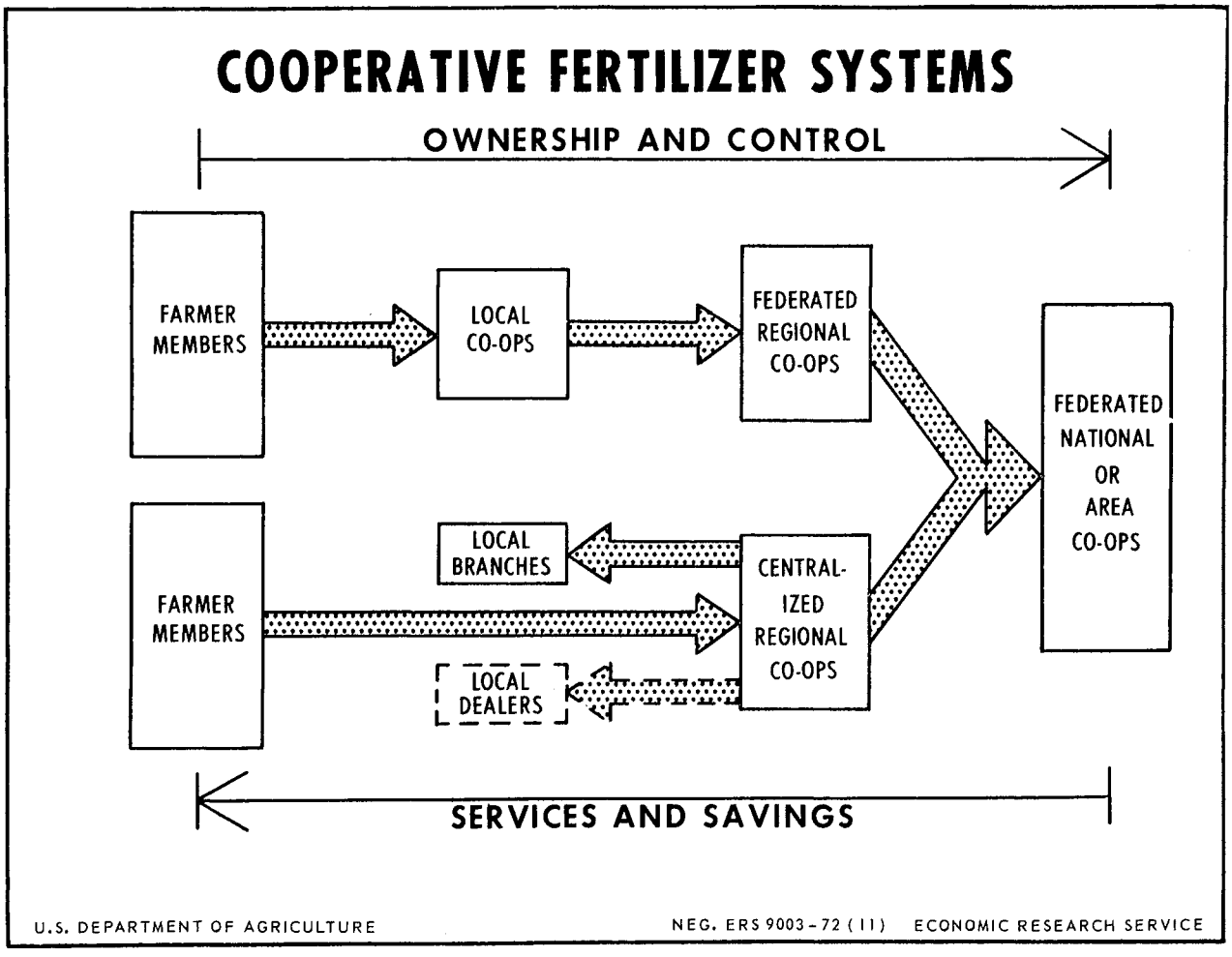


Figure 1

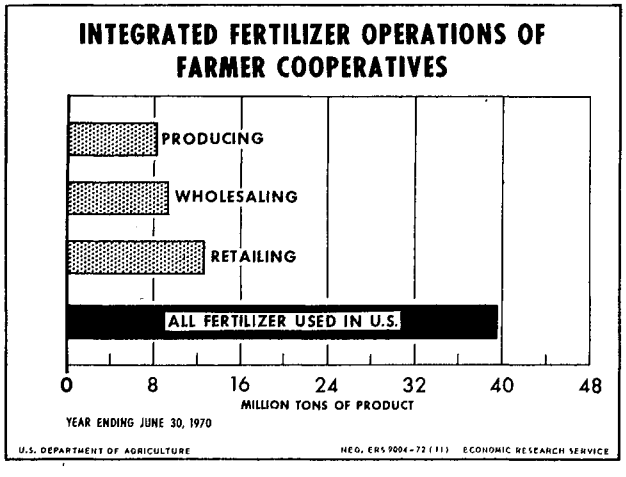


Figure 2

having control over a substantial amount of basic production.

Cooperative Production of Basic Materials

In 1970, cooperatives manufactured about a fifth of both the Nation's ammonia and normal superphosphate and a fourth of its wet-process phosphoric acid. They produced only 3 percent of the North American output of output of potash (figure 3).

Anhydrous Ammonia.—At the beginning of 1972, 5 regional cooperatives and their subsidiaries had 14 anhydrous ammonia plants with a design annual capacity of 3,256,000 tons of NH_3—about 19 percent of U.S. capacity. In June 1972, plans were made for constructing another plant with a capacity of 380,000 tons per year. Cooperative production in 1969/70 was 2,669,000 tons—slightly over 20 percent of the output of all firms.

Normal Superphosphate.—On January 1, 1972, cooperatives operated 13 normal superphosphate plants with a combined annual capacity of 166,000 tons of P_2O_5, or 18 percent of the U.S. total. Their output in 1969/70, the latest year data were available, was 139,000 tons, or about 19 percent of the total. Both industry and cooperative output have declined around 50 percent in the last 10 years as use of other phosphate products has increased.

West Process Phosphoric Acid.—On January 1, 1972, cooperatives had 6 wet phosphoric acid plants with a combined capacity of 1,330,000 tons of P_2O_5 per year. This was 21 percent of U.S. capacity. Construction of another 250,000 ton a year plant is proposed to be in operation in 1974. Industry capacity has increased more than four-fold in the last 10 years.

Cooperative production in 1969/70 was 1,210,800 tons, or 27.5 percent of the output of all firms. Cooperatives do not mine phosphate rock, but 2 own some acreage containing phosphate beds.

Muriate of Potash.—Cooperatives began mining and processing potash in a joint venture with a major company in Canada in 1969. The plant capacity in 1972 was 900,000 tons of K_2O annually, or 9 percent of the total U.S. and Canadian operable capacity.

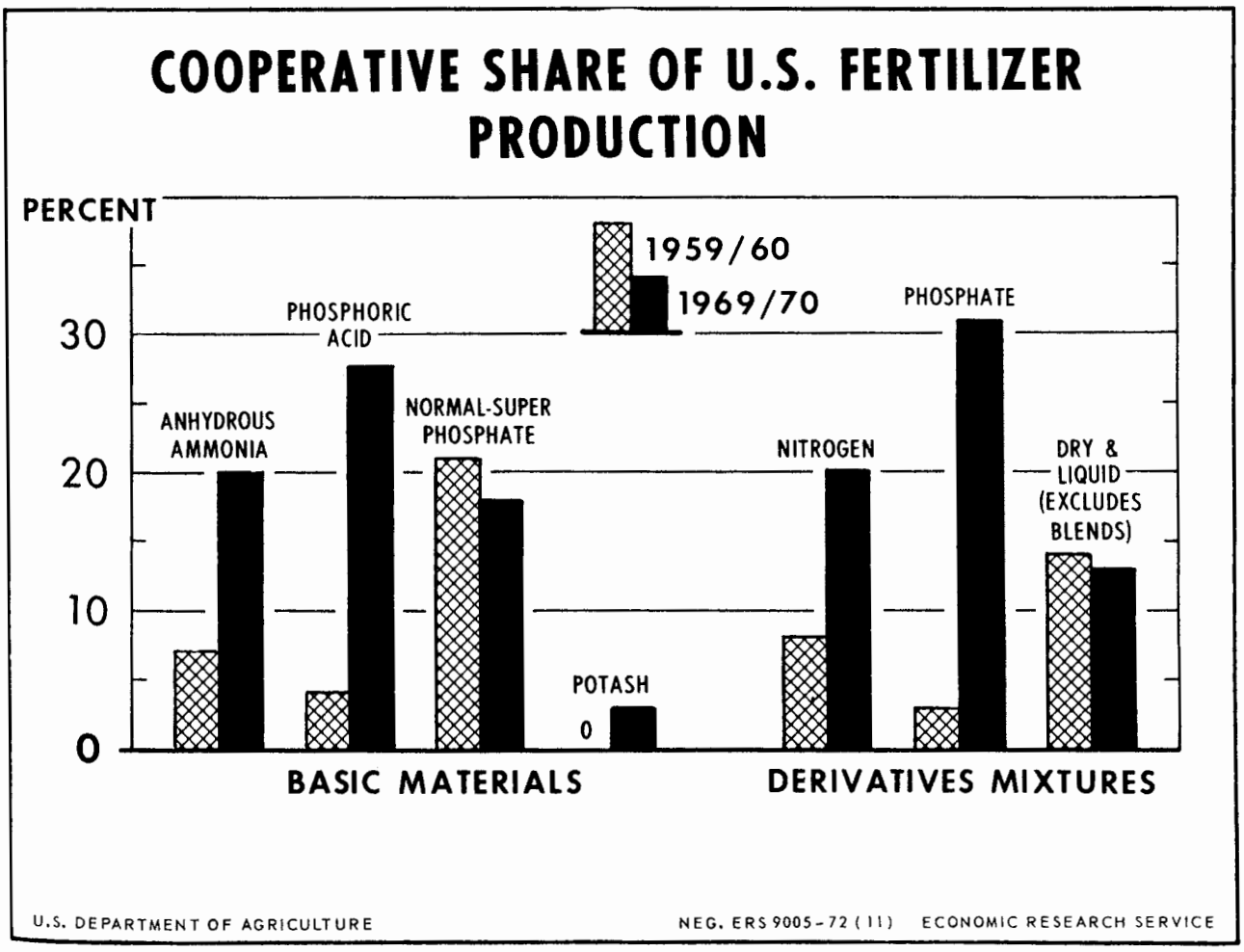


Figure 3

Cooperative production in 1969/70 was 180,000 tons, or 3 percent of the total North American output.

Production of Derivatives

Cooperatives also own and operate facilities to produce a variety of secondary and tertiary fertilizer products. These facilities convert basic or primary fertilizer materials—anhydrous ammonia, phosphoric acid, phosphate rock, and muriate of potash—into upgraded forms of fertilizer containing one, two, or all three of the primary nutrients.

Nitrogen Materials.—The following tabulation indicates cooperative domestic plant capacity and production of straight nitrogen materials:

Product	Plants	Annual capacity—January 1, 1972		Production—1969/70	
	Number	*1,000 tons*	*Percent of U.S.*	*1,000 tons*	*Percent of U.S.*
Ammonium nitrate (solid)	7	1,300	36	1,034	32
Nitrogen solutions 32% & under	10	861	(1)	521	17
Nitrogen solutions over 32%	4	285	(1)	173	8
Ammonium sulfate	1	274	8	167	21
Urea—solid[2]	5	457	16	198	15
Subtotal	27	3,177	(1)	2,093	20
Urea—solution	5	355	22	(1)	---
Total	32	3,532	(1)	(1)	---

[1] Not available. [2] Construction of another 350,000-tons a year plant is planned.

Straight Phosphate Materials.—Domestic plant capacity in 1972 and production in 1969/70 of phosphate materials were as follows:

Product	Plants	Annual capacity—January 1, 1972		Production—1969/70	
	Number	*1,000 tons*	*Percent of U.S.*	*1,000 tons*	*Percent of U.S.*
Triple or concentrated superphosphate (P_2O_5)	2	340	19	700	24
Ammonium phosphates	5	1,444	52	1,555	35
Total	7	1,784	39	2,255	31

Production of Acids and Other Products

Cooperatives, like others in the industry, have sought to further integrate operations by producing nitric acid used in the manufacture of solid nitrogen fertilizers and sulfuric acid used in manufacturing phosphate fertilizers.

Nitric Acid.—At the beginning of 1972, 8 cooperative plants were capable of producing 1,500,400 tons of nitric acid, or about 14 percent of U.S. capacity. In 1969/70, 8 plants with a capacity of 1,267,000 tons produced 1,148,000 tons of acid, or about 18 percent of the total output in the country.

Sulfuric Acid.—Six cooperative plants had capacity to produce 4,036,000 tons of sulfuric acid on January 1, 1972, compared with 3,503,000 tons in 1969/70.

Production in 1969/70 was 3,466,500 tons, or 13 percent of total domestic output.

Primary Distribution and Storage

Because of the highly seasonal nature of fertilizer use and since basic production largely is located at a distance from principal farming areas, a costly and complex storage and distribution system is required to deliver fertilizer from plants to farms when needed. Cooperatives have given much attention to establishing such a system to insure suppliers and service to farmer-members.

In 1970, cooperatives had 347,900 tons of storage for liquid products at primary distribution points other than

at plants. About two-thirds were for anhydrous ammonia and one-third for nitrogen solutions.

In the same year, cooperatives had 882,700 tons of storage capacity for dry goods at primary distribution points. About half was for mixtures with the remainder for phosphate and nitrogen materials.

Output of Chemical Mixtures

On January 1, 1970, a total of 22 cooperatives operated 60 dry mixing plants with a combined annual capacity of 3,482,000 tons. Mixing capacity, however, has been decreasing in recent years as bulk blending has increased. Production of these plants totaled 2,366,300 tons of dry mixtures in 1969/70, or about 14 percent of the total by all firms.

There were 9 cooperative liquid mixing plants that produced 90,100 tons in 1969/70. This was about 4 percent of the U.S. total, exclusive of plants producing only mixtures of nitrogen products.

Capital Used in Fertilizer Operations

Regional cooperatives had invested over $465 million in fertilizer plants and primary storage facilities by the end of 1970. Their depreciated value was $307 million. Nitrogen facilities accounted for about two-thirds and phosphate facilities for about one-fourth of the total. Investments in mixing and blending facilities were about $65 million at cost, and $32 million at depreciated values. Working capital may have averaged about half of net fixed assets, or $170 million.

Also, capital used in marketing or local distribution was probably about equal to that used in manufacturing and primary distribution. These resulted in a total of approximately $920 million in capital used in cooperative fertilizer operations in 1970.

People Employed

The fertilizer operations of cooperatives in 1970 provided employment for about 22,700 people—mostly located in small cities and towns in rural areas.

Regional cooperatives employed over 4,200 in manufacturing and primary distribution. They estimated their affiliated local cooperatives and branches had about 7,600 people engaged in mixing and local marketing operations, and another 10,800 employees working part of the time with fertilizer and part with feed, seed, and other supplies.

Factors Influencing Progress

Cooperatives have made progress over the years in supplying fertilizer to farmers for several reasons. Basically, as user-owned enterprises, they have been highly service-oriented. Drawing on the research of land-grant university experiment stations and Tennessee Valley Authority, they have endeavored to handle the kind of plant foods that would produce maximum returns for farmers.

Cooperatives have encouraged the use of high-analysis fertilizers and custom bulk spreading to save time and labor for farmers, and bulk blending of materials based on soil tests for individual fields. They have also provided agronomic advice and record keeping and supplied fertilizer through farm service centers so as to share handling costs with other production supplies and farm production marketed.

In addition to service and quality, net savings for members—especially from manufacturing and primary distribution—have been responsible for much of the progress of cooperatives. These savings have been largely distributed as patronage refunds to farmer-patrons who have agreed to invest large amounts of them in the capital structure of the cooperatives.

Other important factors contributing to progress have been the services of specialized cooperative credit agencies and the emergence of more competent management to develop larger, stronger cooperatives at local, regional, and national levels.

There are also some factors or constraints that have tended to slow progress in cooperative operations. The objectives of cooperatives—to serve and benefit farmer-members as users rather than as investors—limit their flexibility.

Also, cooperatives serving members located over wide areas and engaging in a wide range of farming enterprises may experience difficulty in meeting various needs or requests for comparable services as soon as farmers would like to have them.

When cooperatives become important suppliers of a farm input, their influence on quality or prices often becomes taken for granted and farmers see less need for cooperatives to continue to grow. Frequently, after cooperatives attain a substantial share—possibly a third or more—of the market, increases thereafter come at a slower rate.

Under most State laws, cooperatives must restrict some of their business operations to qualify as co-ops and thus forego some competitive practices which other business have available to them. Also, cooperatives that comply with Section 521 of the 1954 Internal Revenue Code (the so-called income tax-exempt basis) are especially limited in their methods of operation.

Some cooperatives have the problem of raising adequate equity capital for growth. Most farmer-members have many needs for capital to meet increasing costs and enlarge their scale of farming operations. Cooperatives usually have found it necessary to rely on members for equity capital; few have sold capital stock or other securities in public money markets. Also, some cooperatives find it difficult to accumulate adequate member equity reserves because of members' desire for cash patronage refunds or the revolving of the existing equities.

Cooperatives compete with large conglomerates which have entered the fertilizer business in recent years.

In 1970, the 4 largest conglomerates had 2½ times more fertilizer and other agricultural chemical sales, 8 times larger total sales, and 19 times more net worth than the 4 largest cooperatives handling fertilizer.

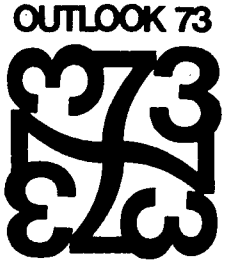
Finally, most cooperatives handle a wide range of production supplies. Fertilizer has to compete with other supply departments for resources within the cooperative. From time to time, the need for improved services, more integrated operations, or the opportunity for net margins may be greater in other items.

OUTLOOK CONFERENCE SCHEDULED FOR FEB. 20-22, 1973

The 1973 National Agricultural Outlook Conference has been set for Feb. 20 through 22, at the U.S. Department of Agriculture in Washington, D.C.

Central theme of the Conference will be "The Future Structure of Agricultural Production and Marketing." Such topics as the long-range expansion of demand for agricultural products, input requirements of the food industry, significant trends in organization and control of the food and fiber sector of the economy, impact of environmental developments on agricultural production and marketing, and future developments in the export market will be explored in depth.

The 1973 outlook for U.S. agriculture and the general economy will receive particular attention at the Conference. Sessions on the 1973 outlook for major commodities and rural family living will make up an important part of the Conference as usual. The Conference, sponsored by USDA's Economic Research Service and Extension Service, will feature presentations and panel discussions by leading authorities in agriculture and business.



APPENDIX TABLE 1.-- USE OF NITROGEN AS FERTILIZER, BY STATES, YEARS ENDING JUNE 30, 1967-72

STATE AND REGION	1967	1968	1969	1970	1971	1972 PRELIM.
	1,000 TONS OF N					
MAINE	19.0	17.7	17.7	16.4	16.0	14.6
NEW HAMPSHIRE	2.7	1.9	2.0	2.1	2.3	2.1
VERMONT	3.9	3.7	4.6	6.1	6.7	6.7
MASSACHUSETTS	7.8	7.8	8.5	8.2	7.7	8.5
RHODE ISLAND	1.7	1.3	1.6	1.6	1.8	1.7
CONNECTICUT	9.1	8.1	8.0	6.5	7.4	7.9
NEW YORK	66.3	74.5	72.3	70.0	75.1	74.5
NEW JERSEY	22.7	23.0	21.0	22.7	27.4	20.5
PENNSYLVANIA	70.2	72.4	75.3	82.9	86.4	77.5
DELAWARE	11.4	12.4	12.4	13.3	14.8	14.4
MARYLAND	39.8	41.0	35.6	40.2	57.1	41.9
DIST. OF COLUMBIA	.5	.6	.7	.7	.7	.6
NORTHEAST	255.1	264.4	259.7	270.7	303.4	270.8
MICHIGAN	106.8	115.9	111.5	139.3	175.0	153.9
WISCONSIN	79.3	90.5	104.0	115.1	122.5	128.9
MINNESOTA	188.1	251.2	343.6	283.9	411.3	372.9
LAKE STATES	374.2	457.6	559.1	528.3	708.3	655.7
OHIO	189.8	194.5	199.5	225.7	276.5	238.8
INDIANA	332.1	339.3	329.7	343.4	404.2	375.3
ILLINOIS	600.0	579.4	610.2	595.5	713.9	672.1
IOWA	543.5	632.9	556.9	659.7	701.8	654.2
MISSOURI	222.6	280.1	250.7	300.7	326.0	328.4
CORN BELT	1,888.0	2,026.2	1.947.0	2,125.0	2,422.4	2,268.8
NORTH DAKOTA	44.2	62.5	66.1	71.9	70.7	82.9
SOUTH DAKOTA	47.5	58.0	65.7	68.5	85.1	77.6
NEBRASKA	328.2	500.2	417.3	499.0	534.3	533.9
KANSAS	281.2	355.0	374.6	443.9	438.0	468.0
NORTHERN PLAINS	701.1	975.7	923.7	1,093.3	1,128.1	1,162.4
VIRGINIA	67.2	67.9	69.8	77.6	86.1	83.3
WEST VIRGINIA	6.3	6.2	6.3	6.7	6.9	7.5
NORTH CAROLINA	166.4	164.7	169.6	195.5	207.6	188.8
KENTUCKY	87.6	88.3	108.0	101.5	113.8	104.0
TENNESSEE	113.0	93.0	104.5	96.7	105.5	94.1
APPALACHIAN	440.5	420.1	458.2	478.0	519.9	477.7
SOUTH CAROLINA	83.1	85.7	91.3	90.6	93.0	92.6
GEORGIA	231.9	250.5	261.7	251.2	263.0	268.4
FLORIDA	139.1	153.8	180.3	191.2	183.2	205.0
ALABAMA	124.8	125.0	137.6	140.7	152.8	162.6
SOUTHEAST	578.9	615.0	670.9	673.7	692.0	728.6
MISSISSIPPI	127.1	135.4	136.6	148.1	160.7	204.5
ARKANSAS	91.2	95.8	104.7	107.3	110.2	127.1
LOUISIANA	91.4	106.5	105.0	114.0	136.0	143.4
DELTA STATES	309.7	337.7	346.3	369.4	406.9	475.0
OKLAHOMA	104.2	127.4	137.2	163.7	173.7	177.7
TEXAS	438.3	550.7	639.4	675.5	661.0	712.1
SOUTHERN PLAINS	542.5	678.1	776.6	838.6	834.7	889.8
MONTANA	25.0	30.4	33.6	36.8	41.2	40.9
IDAHO	64.6	76.9	102.0	93.9	102.0	101.7
WYOMING	12.1	13.0	19.8	18.0	16.2	21.1
COLORADO	58.5	70.5	70.7	80.1	85.9	90.8
NEW MEXICO	18.8	29.3	30.6	30.3	29.6	29.3
ARIZONA	81.5	87.9	94.1	96.7	92.4	96.9
UTAH	11.9	13.2	13.1	15.6	16.1	17.3
NEVADA	2.9	2.6	2.9	3.3	3.4	3.6
MOUNTAIN	275.3	323.8	366.8	374.7	386.8	400.7
WASHINGTON	135.1	145.4	134.9	145.2	164.3	170.4
OREGON	92.1	84.7	79.7	86.0	94.1	96.1
CALIFORNIA	382.1	407.2	387.2	414.8	419.8	478.0
PACIFIC	609.3	637.3	601.8	646.0	678.2	744.5
48 STATES + D.C.	5,974.6	6,735.9	6,910.0	7,407.7	8,080.9	8,074.0
ALASKA	.6	.8	.7	1.0	1.0	.9
HAWAII	24.8	24.0	26.3	28.8	32.1	29.6
UNITED STATES	6,000.0	6,760.7	6,936.7	7,437.3	8;113.9	8,105.6

SOURCE: "CONSUMPTION OF COMMERCIAL FERTILIZERS IN THE UNITED STATES", SPCR7 (10-72) AND EARLIER ISSUES, CROP REPORTING BOARD, SRS, USDA, OCT. 27, 1972.

DETAILS MAY NOT ADD TO TOTALS BECAUSE OF ROUNDING.

APPENDIX TABLE 2.--USE OF PHOSPHORUS AS FERTILIZER, BY STATES, YEARS ENDING JUNE 30, 1967-72

STATE AND REGION	1967	1968	1969	1970	1971	1972 PRELIM
	1,000 TONS AVAILABLE P_2O_5					
MAINE	23.3	21.7	20.5	19.1	18.3	16.9
NEW HAMPSHIRE	2.4	1.8	2.0	2.0	2.2	2.2
VERMONT	6.9	5.6	6.0	7.2	7.6	7.9
MASSACHUSETTS	7.6	6.7	6.6	6.3	6.8	7.5
RHODE ISLAND	1.7	1.3	1.7	1.6	1.6	1.6
CONNECTICUT	8.0	6.6	6.9	5.5	5.4	6.2
NEW YORK	83.3	84.5	93.7	83.8	88.2	88.0
NEW JERSEY	21.6	24.2	20.7	19.6	21.7	17.4
PENNSYLVANIA	85.7	83.6	84.9	92.0	96.7	90.1
DELAWARE	12.2	12.1	11.3	12.3	13.1	12.2
MARYLAND	41.1	39.6	36.9	40.3	53.5	40.9
DIST. OF COLUMBIA	.4	.4	.6	.7	.7	.7
NORTHEAST	294.2	288.1	291.8	290.4	315.8	291.6
MICHIGAN	131.9	128.2	122.7	132.6	156.3	147.8
WISCONSIN	111.2	115.8	120.9	120.1	133.3	135.3
MINNESOTA	211.7	214.1	292.4	223.1	295.3	261.4
LAKE STATES	454.8	458.1	536.0	475.8	584.9	544.5
OHIO	214.7	208.4	211.6	214.5	233.5	229.7
INDIANA	289.7	284.4	253.5	247.5	259.8	245.7
ILLINOIS	451.1	457.5	496.7	459.1	443.5	451.4
IOWA	348.2	361.1	381.8	411.3	422.6	392.7
MISSOURI	153.6	165.4	160.2	168.4	169.9	191.4
CORN BELT	1,457.3	1,476.8	1,503.8	1,500.8	1,529.3	1,510.9
NORTH DAKOTA	99.7	111.6	100.8	101.5	87.5	77.6
SOUTH DAKOTA	33.0	43.3	46.5	50.3	53.9	51.2
NEBRASKA	106.0	124.4	114.8	131.3	150.3	123.4
KANSAS	149.1	159.2	161.0	170.4	152.8	167.1
NORTHERN PLAINS	387.8	438.5	423.1	453.5	444.5	419.3
VIRGINIA	82.3	78.8	81.1	78.9	84.7	79.4
WEST VIRGINIA	9.5	9.1	9.4	10.4	9.9	11.1
NORTH CAROLINA	140.8	131.9	127.0	134.4	137.8	134.2
KENTUCKY	87.2	86.8	97.9	90.4	104.4	105.4
TENNESSEE	86.1	87.9	90.5	83.8	89.4	87.4
APPALACHIAN	405.9	394.5	405.9	397.9	426.2	417.5
SOUTH CAROLINA	73.9	75.4	72.2	66.7	69.0	71.3
GEORGIA	141.6	150.7	145.4	136.5	142.1	147.5
FLORIDA	94.6	97.2	105.5	107.1	100.1	107.1
ALABAMA	104.0	109.9	105.4	105.6	104.7	111.0
SOUTHEAST	414.1	433.2	428.5	415.9	415.9	436.9
MISSISSIPPI	65.1	66.8	71.5	68.3	68.7	83.7
ARKANSAS	52.2	60.7	65.5	63.6	68.1	78.0
LOUISIANA	45.5	56.7	54.3	55.8	57.0	63.3
DELTA STATES	162.8	184.2	191.3	187.7	193.8	225.0
OKLAHOMA	80.1	78.1	87.1	90.5	97.7	96.7
TEXAS	208.0	225.4	302.9	255.5	259.6	280.3
SOUTHERN PLAINS	288.1	303.5	390.0	346.0	357.3	377.0
MONTANA	37.1	44.2	44.6	49.8	56.8	60.2
IDAHO	43.8	48.8	67.4	67.7	62.6	54.7
WYOMING	8.9	9.4	10.8	9.9	12.9	14.1
COLORADO	37.0	41.8	41.9	41.8	43.1	45.8
NEW MEXICO	12.0	14.1	16.1	15.0	16.9	15.0
ARIZONA	25.3	29.7	31.1	31.2	34.0	35.7
UTAH	19.9	22.7	24.7	24.0	23.5	25.4
NEVADA	2.0	1.6	1.8	2.2	1.9	2.2
MOUNTAIN	186.0	212.3	238.4	241.6	251.7	253.1
WASHINGTON	38.4	48.1	46.0	44.7	46.4	51.1
OREGON	47.8	40.3	40.0	44.9	42.7	41.9
CALIFORNIA	142.2	149.1	141.8	146.4	170.0	183.2
PACIFIC	228.4	237.5	227.8	236.0	259.1	276.2
48 STATES + D.C.	4,279.7	4,426.7	4,636.6	4,545.6	4,778.6	4,752.0
ALASKA	.5	.6	.7	.8	.6	.6
HAWAII	14.2	15.3	15.6	19.1	16.8	22.4
UNITED STATES	4,294.4	4,442.6	4,652.8	4,565.3	4,796.0	4,774.7

SOURCE: "CONSUMPTION OF COMMERCIAL FERTILIZERS IN THE UNITED STATES", SPCR7 (10-72) AND EARLIER ISSUES, CROP REPORTING BOARD, SRS, USDA, OCT. 27, 1972.

DETAILS MAY NOT ADD TO TOTALS BECAUSE OF ROUNDING.

APPENDIX TABLE 3.--USE OF POTASSIUM AS FERTILIZER, BY STATES, YEARS ENDING JUNE 30, 1967-72

STATE AND REGION	1967	1968	1969	1970	1971	1972 PRELIM.
	1,000 TONS OF K_2O					
MAINE	22.1	21.3	20.6	20.1	18.9	17.7
NEW HAMPSHIRE	2.4	1.9	2.1	2.3	2.6	2.6
VERMONT	6.9	5.3	5.8	7.6	7.9	8.3
MASSACHUSETTS	7.1	6.2	6.2	6.1	5.5	6.0
RHODE ISLAND	1.5	1.2	1.3	1.3	1.4	1.4
CONNECTICUT	7.1	6.2	6.8	5.6	5.6	5.7
NEW YORK	65.2	64.4	64.1	68.4	72.5	75.9
NEW JERSEY	22.1	22.8	22.1	20.1	22.3	18.4
PENNSYLVANIA	74.1	69.7	69.1	75.1	79.6	77.9
DELAWARE	14.7	15.1	14.6	15.9	17.3	18.1
MARYLAND	46.1	45.4	42.7	47.1	56.5	45.3
DIST. OF COLUMBIA	.3	.3	.5	.5	.5	.4
NORTHEAST	269.6	259.8	255.9	270.1	290.6	277.7
MICHIGAN	131.2	136.1	137.4	153.0	179.0	164.7
WISCONSIN	179.8	205.3	199.6	197.7	211.5	227.2
MINNESOTA	174.6	196.2	211.8	214.2	270.4	258.1
LAKE STATES	485.6	537.6	548.8	564.9	660.9	650.0
OHIO	219.5	220.3	227.2	234.7	254.2	252.7
INDIANA	326.2	303.1	387.9	302.5	329.4	310.8
ILLINOIS	440.0	437.3	482.4	481.9	465.1	476.5
IOWA	268.2	299.0	310.2	347.3	352.9	367.6
MISSOURI	149.8	168.5	165.6	189.7	190.3	213.8
CORN BELT	1,403.7	1,428.2	1,473.3	1,556.1	1,591.9	1,621.4
NORTH DAKOTA	6.3	9.2	9.2	9.5	10.8	10.0
SOUTH DAKOTA	6.0	6.9	7.8	10.2	10.2	10.6
NEBRASKA	22.8	32.6	35.7	36.8	44.2	39.9
KANSAS	25.4	32.9	35.9	46.7	39.3	47.0
NORTHERN PLAINS	60.5	81.6	88.6	103.2	104.5	107.5
VIRGINIA	88.5	87.4	90.1	89.7	84.6	87.7
WEST VIRGINIA	7.5	6.8	7.0	8.0	7.9	8.6
NORTH CAROLINA	178.3	167.6	158.3	168.8	172.0	165.6
KENTUCKY	95.7	97.5	108.8	110.4	116.1	102.7
TENNESSEE	94.0	93.1	97.5	90.7	94.0	98.5
APPALACHIAN	464.0	452.4	461.7	467.6	474.6	463.1
SOUTH CAROLINA	96.0	101.1	94.8	88.5	91.6	96.4
GEORGIA	199.8	213.2	203.7	188.8	207.2	219.2
FLORIDA	169.8	181.9	209.1	215.7	205.0	224.5
ALABAMA	101.1	105.9	106.5	109.7	108.4	119.8
SOUTHEAST	566.7	602.1	614.1	602.7	612.2	659.9
MISSISSIPPI	62.5	64.3	66.0	64.2	64.5	74.7
ARKANSAS	58.5	68.5	76.3	73.4	77.9	86.2
LOUISIANA	40.6	48.3	47.5	53.2	55.8	62.0
DELTA STATES	161.6	181.1	189.8	190.8	198.2	222.9
OKLAHOMA	26.1	27.1	28.9	36.1	32.3	33.2
TEXAS	65.5	73.4	90.9	90.6	105.8	112.0
SOUTHERN PLAINS	91.6	100.5	119.8	126.7	138.1	145.2
MONTANA	1.1	1.7	1.1	1.6	1.3	1.5
IDAHO	4.0	4.4	4.1	4.2	4.0	3.7
WYOMING	.4	.6	1.2	1.1	1.3	1.2
COLORADO	5.5	7.2	6.5	7.2	8.2	8.6
NEW MEXICO	.9	1.1	.9	1.2	1.8	1.6
ARIZONA	1.1	1.4	1.3	2.3	2.9	2.2
UTAH	.2	.4	.3	.3	.3	.3
NEVADA	.1	.2	.1	.2	.1	.2
MOUNTAIN	13.3	17.0	15.5	18.1	19.9	19.3
WASHINGTON	18.0	23.7	17.9	19.6	19.4	21.1
OREGON	11.6	9.1	9.0	12.3	14.5	14.1
CALIFORNIA	50.8	53.8	54.3	61.7	64.3	76.3
PACIFIC	80.4	86.6	81.2	93.6	98.2	111.5
48 STATES + D.C.	3,597.0	3,746.9	3,848.7	3,993.8	4,189.4	4,278.5
ALASKA	.3	.4	.5	.5	.4	.4
HAWAII	22.8	23.8	24.0	24.0	26.3	23.5
UNITED STATES	3,620.1	3,771.1	3,873.2	4,018.1	4,216.1	4,302.3

SOURCE: "CONSUMPTION OF COMMERCIAL FERTILIZERS IN THE UNITED STATES", SPCR7 (10-72) AND EARLIER ISSUES, CROP REPORTING BOARD, SRS, USDA, OCT. 27, 1972.

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