1980 Fertilizer Situation

Economics, Statistics, and Cooperatives Service

FS-10

U.S. Department of Agriculture

December 1979

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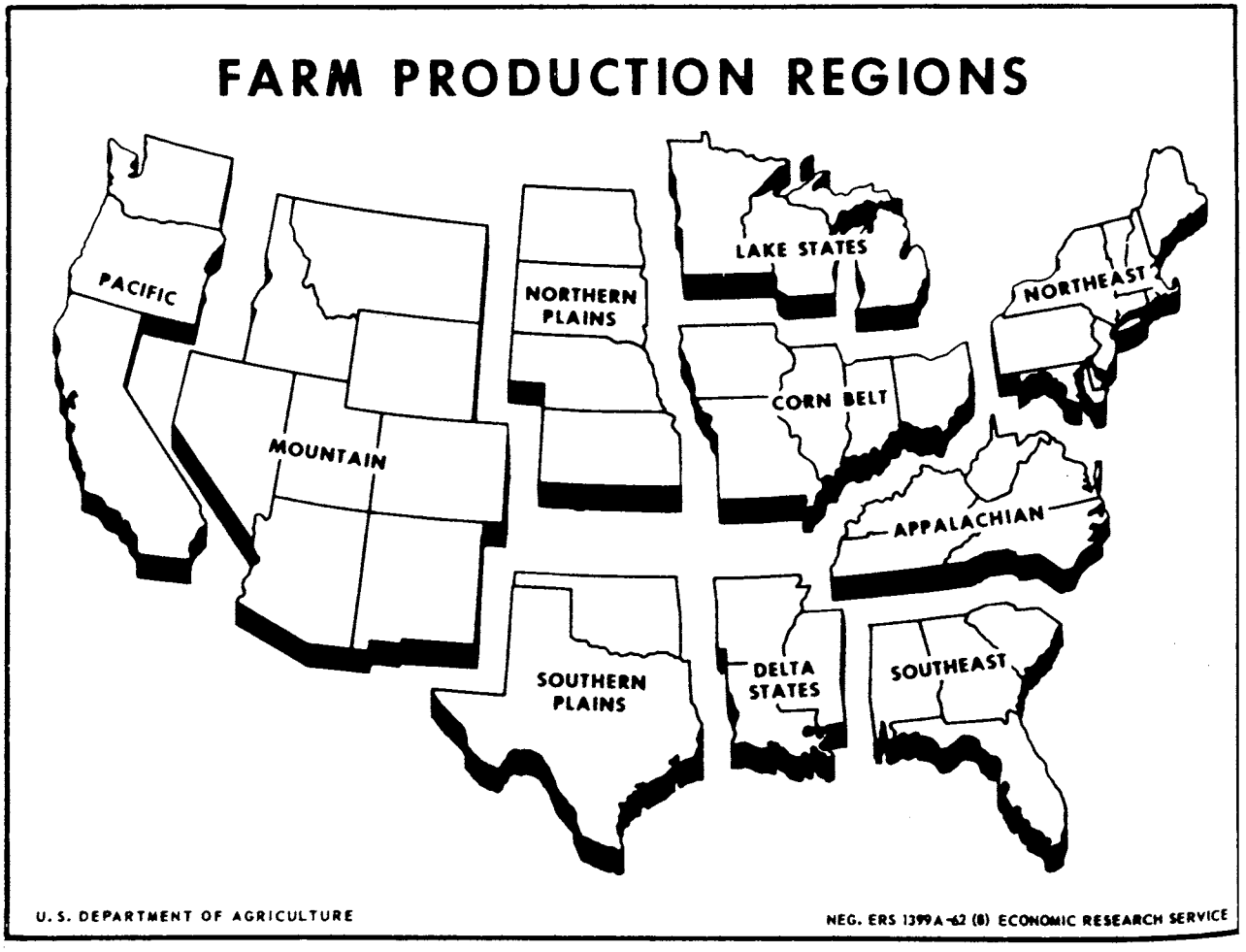
Conversion Factors

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



1980 FERTILIZER SITUATION

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SUMMARY

Farm prices for fertilizer are expected to average 16 to 20 percent higher this spring than a year earlier and 9 to 11 percent above October 1979. These increases stem from strong domestic and export demand and rapidly rising production, transportation and retailing costs. Nitrogen prices this spring may average 10 to 12 percent above the October 1979 level, phosphate prices will be 11 to 13 percent higher, and potash prices will be up 7 to 8 percent.

Favorable crop prices anticipated through the planting season plus the possibility of additional corn and wheat acreage could bring 1979/80 fertilizer use to a record level. On the other hand, further increases in farm production expenses and higher fertilizer prices could dampen fertilizer use. If fertilizer prices increase as forecast, consumption of all primary nutrients could rise 3 to 4 percent in 1979/80, to about 23 million tons. Consumption of nitrogen, phosphate, and potash will be up by about the same proportion as total consumption. Sharp price increases could cause use to remain near or drop below the 1978/79 level. In addition, rapidly increasing expenses for other farm production inputs could stem the expected increase in planted acres, with farmers keeping marginal land out of production.

Worldwide production capacity is sufficient and supplies should be adequate to meet the fertilizer needs of U.S. farmers in 1979/80, even though U.S fertilizer producers' inventories are substantially below year-earlier levels. Inventories of nitrogen, phosphate, and potash (including Canadian) are well below the high levels of a year ago—down 18, 15, and 43 percent, respectively.

Domestic anhydrous ammonia production capacity, presently at about 20.4 million tons, appears adequate. Additional plants are available for production, but are presently idle. Because the cost of natural gas feedstocks is expected to increase and offset rises in nitrogen fertilizer prices, some plants—mainly high cost operations—will remain idle.

Domestic capacity to produce wet-process phosphoric acid was estimated to be about 9.7 million tons on January 1, 1979 and is expected to increase

to 10.2 million tons of P_2O_5 in 1979/80. Annual U.S. capacity to produce potash is 2.8 million tons, and the Canadian capacity is about 8.8 million tons.

Primary nutrient content of fertilizer materials used in the United States in 1978/79 was up 9 percent to 22.4 million tons. Of the primary nutrients, nitrogen use increased 7 percent to 10.6 million tons, phosphate use rose 9 percent to 5.5 million tons, and potash use jumped 12 percent to 6.2 million tons. Overall fertilizer use was higher in all regions except the Northeast, Delta States, and Pacific, where it declined modestly.

Application rates of the three primary nutrients rose on corn, soybean, and wheat acreage in 1979, but they were lower on cotton acreage. The percent of acres fertilized increased for all four crops.

The value and volume of fertilizer trade in the United States reached record levels in in 1978/79. Export value surpassed import value by $900 million. The United States was again a large net exporter of phosphate and a large net importer of potassium. In 1978/79 nitrogen exports slightly exceeded imports, thus reversing the situation of the preceding two years.

In fiscal 1979, the U.S. Agency for International Development (AID) made committments to finance fertilizer purchases by developing nations amounting to over 336,000 metric tons—worth over $80 million. This represents a small decline in tonnage and a small increase in value over 1978. The 1979 AID shipments went primarily to Pakistan, Sri Lanka, Bangladesh, and Zambia.

Preliminary estimates indicate that world fertilizer consumption increased about 8 percent in 1978/79 to a record 107 million metric tons. International fertilizer prices increased dramatically in 1979, establishing a new trend of steadily increasing real prices. Energy cost increases have been an important factor behind these increases, particularly for nitrogen and phosphates. However, the demand pressure from steadily increasing world fertilizer consumption to expand global crop output has allowed the pass through of rising production costs. Temporary transportation and production disruptions contributed to the tight fertilizer supplies in 1979.

Production capacity of the world's fertilizer industries is expected to be adequate to meet anticipated demand for plant nutrients through 1983/84, according to recent forecasts by the FAO/UNIDO/World Bank Fertilizer Working Group. By then, world fertilizer consumption is forecast to reach 138 million tons of nutrients, nearly 40 percent more than in 1977/78.

Growing worldwide surplus production capacity is indicated for nitrogen during the next 5 years. However, this surplus could be eliminated if ammonia plants in Europe and Asia dependent on naphtha and other petroleum derivatives are forced to close due to excessive feedstock costs. For phosphates and potash, production potential is expected to exceed consumption over the next 5 years, but the size of the surplus will likely diminish.

U.S. FERTILIZER OUTLOOK FOR 1979/80[1]

Prices paid by farmers for fertilizer materials are expected to average 16 to 20 percent higher in spring 1980 than a year earlier as a result of strong domestic and export demand and rapidly rising fertilizer production, transportation, and retailing costs.

Although fertilizer prices are expected to increase, total domestic fertilizer consumption may reach record levels in 1979/80 as a result of increased acreage of corn and wheat and a reasonably strong grain price outlook through the spring planting season.

Several factors could dampen the relatively strong demand outlook. Prices for energy and other production inputs are rising rapidly, and farmers contemplating increased plantings could reevaluate their income prospects and not expand acreage as currently anticipated. In addition, if world fertilizer demand strengthens and fertilizer prices increase more rapidly than anticipated, U.S. farmers may reduce phosphate and potash application rates.

With anticipated fertilizer price increases, fertilizer consumption could increase 3 to 4 percent to a record 23 million nutrient tons. Sharper fertilizer price increases could hold consumption near or below 1978/79 levels.

In 1979/80 nitrogen and phosphate production and exports are expected to rise, while potash exports and production will remain close to year-earlier levels. Producer inventories of all three nutrients are expected to decline. Phosphate imports will probably remain close to 1978/79 levels, but nitrogen and potash imports are expected to increase (table 1).

Nitrogen

Nitrogen prices in spring 1980 are likely to average 10 to 12 percent above fall 1979 prices. Prices

[1]Fertilizer year is July 1-June 30.

Table 1—Supply-Utilization Balance by Fertilizer year 1977-78 to 1979-80

Item	Nitrogen			Phosphate			Potash		
	1977-78	1978-79	1979-80[1]	1977-78	1978-79	1979-80[1]	1977-78	1978-79	1979-80[1]
	Million nutrient tons								
Producers' Beginning Inventory	1.21	2.00	1.71	.60	.68	.57	.29	.45	.26
Production	14.43	14.18	15.03	9.68	10.66	11.20	2.29	2.26	2.25
Imports[2]	2.01	2.26	2.3-2.5	.21	.21	.20	5.08	5.22	5.3-5.5
Total Available Supply	17.65	18.44	19.0-19.2	10.49	11.55	11.97	7.66	7.93	7.8-8.0
Agricultural Consumption	9.97	10.64	10.7-11.0	5.10	5.54	5.6-5.8	5.53	6.22	6.2-6.4
Exports[2]	1.67	2.37	2.5-2.7	[3]3.25	[3]3.80	[3]4.2-4.4	1.03	1.04	1.0-1.1
Total Agricultural and Export Demand	11.64	13.01	13.2-13.7	8.35	9.34	9.8-10.2	6.56	7.26	7.2-7.5
Producers' Ending Inventory	2.00	1.71	1.70	.68	.57	.40	.45	.26	.24
Available for Non-Agricultural Use	4.01	3.72	4.1-3.8	1.46	1.64	1.77-1.37	.65	.41	.36-.26

[1] Estimated. [2] Limited to Products in tables 20-23 only. [3] Does not include phosphate rock.

will reflect increased foreign and domestic demand and the pass through of rising production costs in the United States and worldwide. Prices of anhydrous ammonia and urea are expected to be up the most, while more modest price rises are expected for nitrogen solutions and other nitrogenous fertilizer materials.

Domestic consumption will depend upon the level of fertilizer prices and the grain price outlook and how these factors translate into farmers decisions to plant more corn and wheat acres. Domestic consumption may range from close to the 1978/79 level of 10.7 million nutrient tons to about 11 million tons in 1979/80.

A strong export market has contributed substantially to the rise in nitrogen prices in 1978/79 and will continue to support price rises in 1979/80. U.S. exporters had an overall increase of 41 percent to about 2.4 million tons of nitrogen shipped abroad in the last fertilizer year. Urea and diammonium phosphate led in both nitrogen export volume and growth. Significant export gains were also recorded for ammonium sulfate and nitrogen solutions.

The outlook for nitrogen trade in 1979/80 points to larger import and export tonnages than in 1978/79 and another small nitrogen export balance. Exports are expected to increase to 2.5 to 2.7 million tons (N) with imports at about 2.3 to 2.5 million tons.

Nitrogen exports in 1979/80 should exceed 1978/79 levels primarily because of the strength of diammonium phosphate export demand and the expanded market for anhydrous ammonia. Rapidly increasing transportation costs make use of these high analysis fertilizers an attractive option to reduce costs. The United States will continue to be the world's principal supplier of DAP and should expand ammonia exports to Europe where U.S. producers are attracted by higher prices. European ammonia prices are higher than U.S. levels primarily due to Europe's greater dependence upon naphtha and other petroleum products as feedstocks. Prices for these products have increased much more rapidly than natural gas, the virtually exclusive feedstock in the United States.

To some extent world surplus fertilizer supply capabilities and large inventories have kept fertilizer prices unusually low for the past two to three years, and the current rounds of price increases probably reflect the industry's attempts to catch up.

Higher ammonia prices, however, will probably not bring much of the presently idled anhydrous ammonia capacity back into production. Ammonia

producers with expensive natural gas feedstocks closed plants because of their unprofitability. Although anhydrous ammonia prices have increased, natural gas contract renewals are also at higher prices. Unless increases in nitrogen fertilizer prices more than offset increasing costs of natural gas feedstocks, a large percentage of the anhydrous ammonia capacity now idle will remain out of production.

Despite this idle capacity, the current operating capacity of about 20.4 million tons is probably adequate to produce the ammonia required for all uses. In addition, domestic production will be supplemented with imports. Anhydrous ammonia production in 1978/79 was down 2 percent from 1977/78, urea production for all uses was up 20 percent, while nitrogen solution production was down 12 percent. In the July-September quarter, anhydrous ammonia and urea production were up 10 and 29 percent, respectively, from a year earlier. Nitrogen solution production was down 1 percent.

Inventories of most nitrogen fertilizers declined during 1978/79 as producers adjusted production and supplied increased consumption from excessive stocks. September 1979 inventories are well below year-earlier levels and are expected to remain close to the September level throughout 1979/80.

Phosphate

Phosphate prices in spring 1980 are likely to average 11 to 13 percent above October 1979 prices. Prices of diammonium phosphate and phosphoric acid are expected to be up the most, but prices of concentrated superphosphate will also show strong increases.

Although domestic consumption of phosphate fertilizers is expected to rise modestly, a strong export demand will probably be the most significant factor contributing to higher phosphate prices. The United States was again a major exporter of phosphate, and in 1978/79 exports, excluding phosphate rock, totaled about 3.8 million nutrient tons. Increasing diammonium phosphate exports are responsible for the greatest share of growth in phosphate exports as shipments increased 28 percent to 2.1 million tons of P_2O_5. Concentrated superphosphate exports were up 11 percent.

Continued growth in phosphate exports through June 1980 is likely because of strong world demand and probable supply problems elsewhere caused by the continuing tight sulfur situation. Phosphate exports, excluding phosphate rock, are expected to total 4.2 to 4.4 million tons of P_2O_5 in 1979/80. Higher phosphoric acid exports are virtually assured through the remainder of the current fertilizer year due to the completion of superphosphoric acid production and handling facilities built to facilitate trade with Russia.

Phosphate imports at about .2 million tons of P_2O_5 in 1978/79 are not expected to change much in volume or composition in 1979/80.

With anticipated increases in fertilizer prices for the 1980 spring season, U.S. farmers could use 5.6 to 5.8 million tons of P_2O_5. Further substantial increases in price could cause farmers to reduce application rates.

Inventories of most phosphate fertilizer materials on October 1, 1979 were below year earlier levels. Producer inventories at .47 million tons of P_2O_5 were the lowest since early 1977. Inventories of diammonium phosphate and wet-process phosphoric acid were down 20 and 6 percent, respectively. A tight supply-demand balance in 1979/80 could cause further declines in inventories.

Production of phosphate fertilizer materials are up from a year earlier. In July-September 1979, production of diammonium phosphate and wet-process phosphoric acid was up over 8 and 2 percent, respectively. Domestic annual capacity to produce wet-process phosphoric acid was estimated at about 9.7 million tons of P_2O_5 in 1978/79. Capacity for 1980 is expected to increase to about 10.2 million tons.

Potash

Potash prices in spring 1980 are likely to register a 7- to 8-percent increase from October 1979 prices. These price increases are projected because of an expected increase in domestic consumption and a strong world demand for potash. Since most U.S. potash is supplied by Canada, the high prices in the international market directly affect U.S. prices. In addition, current potash prices are influenced by the very strong demand in 1978/79 when U.S. consumption of potash increased by 12 percent.

Increased worldwide potash consumption is leading to a very tight supply/demand situation. Sharply reduced Canadian inventories and Soviet export shortfalls are causing world traders to scramble for a limited amount of exportable potash.

Compared with 1978/79, domestic consumption in 1979/80 will have a smaller affect on advancing potash prices. Since U.S. farmers already increased potash nutrient consumption by 12 percent in 1978/79, it is improbable that they would use significantly greater quantities during the current fertilizer year. U.S. farm use in 1979/80 is expected to total about 6.2 to 6.4 million tons of K_2O, compared with 6.2 million tons in 1978/79. In addition, heavy fall movement of potash by producers may indicate that wholesale and retail distributors in

the United States replenished their stocks earlier this year in anticipation of higher prices and possible transportation delays. Thus, the rate of producer movement to the U.S. market is expected to slow some from the current brisk pace.

Potash supplies are expected to be adequate in 1979/80. U.S. and Canadian production is ahead of year-earlier levels, and imports from Canada are also up. Inventories are down, but from higher than normal levels.

U.S. production of muriate of potash in 1978/79 was down less than 2 percent from a year earlier to about 2.3 million nutrient tons, while Canadian production increased 3 percent to over 7 million tons. In July-September 1979, combined U.S. and Canadian production is ahead of the same year-earlier period by almost 11 percent. Annual U.S. capacity to produce potash is about 2.8 million tons of K_2O. Canadian production capacity totals about 8.8 million tons.

Potassium chloride imports in 1978/79 were about 5.1 million tons K_2O—up over 2 percent from a year earlier. Potassium imports were 12 percent higher during July-October 1979 versus the same months in 1978.

Potash producer inventories (U.S. and Canadian) were much above prior year levels early in 1978/79, but stocks declined to more normal levels as production was adjusted downward. On October 30, 1979, combined stocks of U.S. and Canadian producers were 43 percent below October 1978 levels, reflecting brisk shipments to dealers and wholesalers.

U.S. FERTILIZER INVENTORIES, PRODUCTION LEVELS, PRICES AND USE - 1978/79

Manufacturer Inventories

Increased domestic and export demand for fertilizer materials caused fertilizer manufacturers' inventories to decrease substantially in 1978/79. Total nitrogen, phosphate, and potash inventories at the end of 1978/79 were down from year-earlier levels, with potash declining the most (figure 1). Manufacturers' stocks of most fertilizer materials dropped during the year and leveled off in July-September 1979 at volumes substantially below those of the previous year (tables 2 and 3).

Inventories of most nitrogen fertilizers declined during 1978/79 as producers adjusted production and supplied increased demand from excessive stocks. March 1979 anhydrous ammonia and ammonium nitrate stocks were down 10 and 6 percent, respectively, from March 1978 (table 3). Producer inventories of nitrogen solutions remained above year-earlier levels because of the excessive stocks going into the 1978/79 season. On October 1, 1979 inventories of anhydrous ammonia, nitrogen solution, ammonium nitrate, and ammonium sulfate were below October 1, 1978 and March 1979 levels. Urea inventories, after a seasonal decline, increased and on October 1, 1979, were above October 1, 1978 and March 1979 levels (table 2).

An unusually strong export market helped deplete phosphate fertilizer stocks during 1978/79. March 1979 inventories of normal superphosphate and ammonium phosphates dropped more than 20 percent from a year earlier. Concentrated superphosphate stocks were down 32 percent, while inventories of wet process phosphoric acid were down 4 percent. Total phosphate inventories increased prior to the 1979 spring application season because of the build up in phosphoric acid

Table 2—Manufacturers' inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, October 1, 1978 and 1979

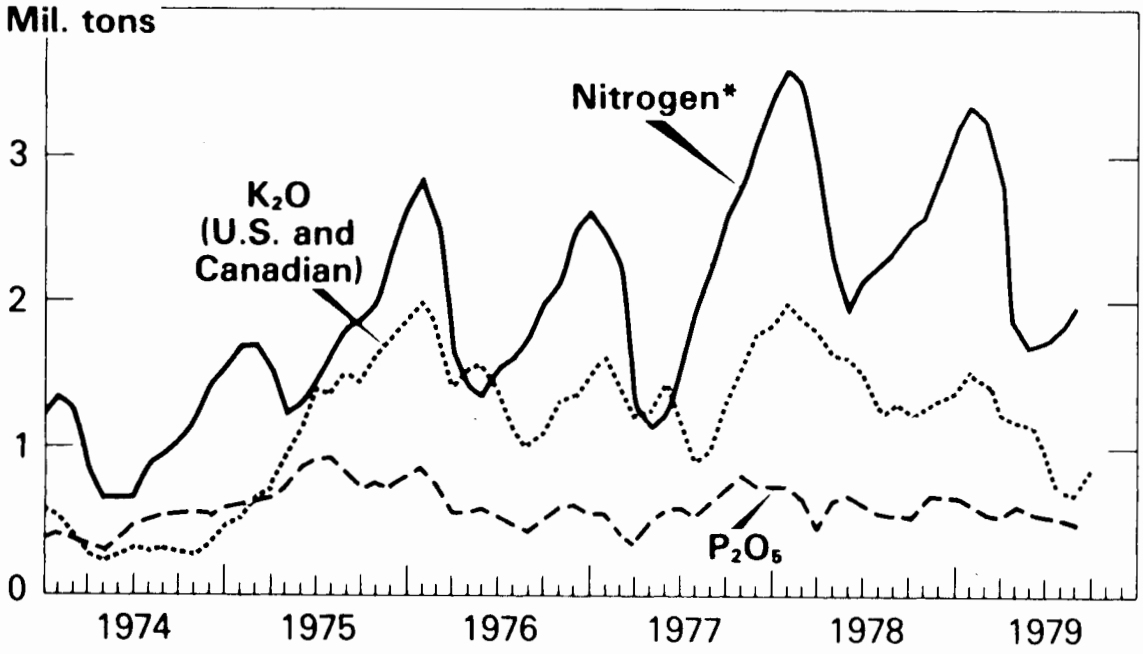
Material	October 1, 1978[1]	October 1, 1979[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizer inventories:[2]			
Anhydrous ammonia[3]	2,063	1,742	-16
Ammonium nitrate, solid	274	169	-38
Nitrogen solutions	530	349	-34
Phosphatic fertilizer inventories:[4]			
Normal and enriched superphosphate	36	42	+17
Concentrated superphosphate	113	187	-22
Diammonium phosphates	154	124	-20
Other ammonium phosphates	58	37	-36
Other phosphatic fertilizer materials	17	12	-29
Total phosphatic fertilizers	378	302	-20
Wet process phosphoric acid inventories:[4]	180	169	-6
Muriate of potash inventories:[5]			
United States	386	228	-13
Canada	892	483	-46

[1] All figures subject to revision. [2] Nitrogen solutions reported in 1,000 tons of N. Others reported in 1,000 tons of material. [3] Includes material for nonfertilizer use. [4] Reported in 1,000 tons of P_2O_5. [5] Reported in 1,000 tons of K_2O.

Source: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products", September 1979, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/phosphate Institute.

Fertilizer Manufacturers' Inventories, 1974 to 1979

Nitrogen, P_2O_5 and K_2O



*Does not include urea.

Figure 1

USDA

Neg. ESCS 2623-79 (12)

inventories. Inventories of other phosphate fertilizer materials followed the usual seasonal pattern and were down. Inventories declined during the spring season and were below the year-earlier level by October 1, 1979.

Potash inventories (U.S. and Canadian) were above year-earlier levels early in 1978/79, but declined as production was adjusted downward and as shipments continued ahead of the prior year's pace. Stocks held by U.S. potash producers on March 1, 1979 were down 27 percent while stocks of Canadian producers were down 23 percent from 1978. On October 30, 1979, combined stocks of U.S. and Canadian producers were 43 percent below October 30, 1978 levels, indicating brisk replenishment of stocks by domestic dealers and wholesalers.

Fertilizer Production Levels

Production of nitrogenous fertilizer materials in 1978/79 reflects inventory adjustments going into 1978/79. Because stocks of anhydrous ammonia and nitrogen solutions were very large, production was reduced. More modest stock levels for ammonium nitrate and ammonium sulfate and a brisk export and domestic market for urea kept production levels above those of the previous year.

Anhydrous ammonia production in 1978/79 declined about 2 percent to 17.2 million tons (table 4). Production of ammonium nitrate and ammonium sulfate were up modestly. Of the nitrogen fertilizer materials, urea production rose the most—by 20 percent—while production of nitrogen solutions dropped the most—by 12 percent. In July-September 1979, anhydrous ammonia and urea production were ahead of the year-earlier pace. Production of ammonium nitrate, ammonium sulfate, and nitrogen solutions were down.

Phosphate fertilizer production increased in 1978/79 as producers satisfied an increasing domestic and foreign demand. Output of wet-process phosphoric acid, normal superphosphate,

Table 3—Manufacturers' inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, March 1, 1978 and 1979

Material	March 1, 1978[1]	March 1, 1979[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizer inventories:[2]			
Anhydrous ammonia[3]	3,278	2,960	-10
Ammonium nitrate, solid	413	388	-6
Nitrogen solutions	655	719	+10
Phosphatic fertilizer inventories:[4]			
Normal and enriched superphosphate	55	45	-22
Concentrated superphosphate	154	105	-32
Diammonium phosphates	260	206	-21
Other ammonium phosphates	79	62	-22
Other phosphatic fertilizer materials	23	17	-26
Total phosphatic fertilizers	571	435	-24
Wet process phosphoric acid inventories:[4]	198	191	-4
Muriate of potash inventories:[5]			
United States	573	418	-27
Canada	1,424	1,091	-23

[1] All figures subject to revision. [2] Nitrogen solutions reported in 1,000 tons of N. Others reported in 1,000 tons of material. [3] Includes material for nonfertilizer use. [4] Reported in 1,000 tons of P_2O_5. [5] Reported in 1,000 tons of K_2O.

Sources: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products", February and March 1979, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/Phosphate Institute.

Table 4—Production of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, years ending June 30, 1978 and 1979

Material	1978[1]	1979[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizers:[2]			
Anhydrous ammonia[3]	17,490	17,222	-2
Ammonium nitrate, solid	3,051	3,105	+2
Urea[3]	5,020	6,014	+20
Nitrogen solutions	2,567	2,265	-12
Ammonium sulfate[4]	2,348	2,461	+5
Phosphatic fertilizers:[5]			
Normal and enriched superphosphate	290	325	+12
Concentrated superphosphate	1,778	1,840	+4
Diammonium phosphates	3,714	4,026	+8
Other ammonium phosphates	893	985	+10
Other phosphatic fertilizer materials	283	266	-6
Total phosphatic fertilizers	6,958	7,442	+7
Wet process phosphoric acid:[5 6]	8,196	9,190	+12
Muriate of potash:[7]			
United States	2,294	2,256	-2
Canada	6,842	7,040	+3

[1] All figures subject to revision. [2] Nitrogen solutions reported in 1,000 tons of N. Others reported in 1,000 tons of material. [3] Includes material for nonfertilizer use. [4] Includes synthetic, by-product coke oven, and by product, other than coke oven. [5] Reported in 1,000 tons of P_2O_5. [6] Includes merchant acid. [7] Reported in 1,000 tons of K_2O.

Sources: Ammonium sulfate (coke oven): *Mineral Industry Surveys*, "Coke and Coal Chemicals", July 1979 and earlier issues, U.S. Dept. of Interior, Bureau of Mines. Urea: "Preliminary Report on U.S. Production of Selected Synthetic Organic Chemicals", February 1979 and earlier issues, U.S. International Trade Commission and Current Industrial Reports, M28B, Inorganic Fertilizer Materials and Related Products, February-August 1979 issues. Other nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products," August 1979 and earlier issues, U.S. Dept. of Commerce, Bureau of the Census. Muriate of Potash: Potash/-phosphate Institute.

and other ammonium phosphates rose 10 percent or more from a year earlier. Diammonium phosphate production was up 8 percent, while production of concentrated superphosphate was up 4 percent. Wet-process phosphoric acid production—at 9.2 million tons—reached a record level. The same was true of diammonium phosphate and concentrated superphosphate production at 4.0 and 1.8 million tons, respectively. Total production of processed phosphate fertilizer increased about 7 percent to 7.4 million tons. In July-September 1979, production of wet-process phosphoric acid, concentrated superphosphate, and ammonium phosphates continued to outpace year-earlier levels.

Combined U.S. and Canadian production of muriate of potash was up less than 2 percent in 1978/79. U.S. production declined 2 percent to about 2.2 million tons, while Canadian production increased 3 percent to over 7 million tons. In the July-September 1979 quarter combined U.S.-Canadian production was almost 11 percent ahead of the year-earlier period.

Farm Prices for Fertilizer

Fertilizer prices strengthened throughout 1979 because of increased domestic consumption, strong offshore demand, and substantantial increases in production, transportation, and retailing costs (figures 2, 3, 4,). Most recently, it was the strong export market that exerted the greatest pressure upon domestic prices allowing fertilizer producers to pass along increased costs. Average farm prices increased about 7 percent during 1978/79.

Nitrogen Fertilizer Prices: Large inventories of nitrogenous fertilizer materials depressed prices throughout most of 1978. However, as producers held production below or close to year-earlier levels the improved demand situation led to increased prices in the 1979 spring season. After the close of the domestic planting season, a continuing strong export demand caused prices to escalate further.

Average farm prices for anhydrous ammonia and urea increased the most. Ammonium nitrate and ammonium sulfate prices had smaller increases, while nitrogen solution prices were up the least (tables 5 and 6). In addition to the 5 percent rise in prices during 1978/79, overall average farm prices for nitrogen fertilizer had risen another 6 percent June to October 1979. Nitrogen prices may rise another 10 to 12 percent by next spring, reflecting increased domestic and foreign demand and rising producer costs.

Phosphate Fertilizer Prices: Compared with nitrogen and potash fertilizer prices, phosphate fertilizer prices have increased the most (tables 5 and 7). Led by the increase in diammonium phosphate prices, phosphate prices jumped more than 15 percent from May 1979 to October 1979. The strong domestic and export demand along with tightening supplies will probably add another 11 to 13 percent to phosphate fertilizer prices by spring 1980.

Potash Fertilizer Prices: Farm prices for potash rose more than 13 percent during 1978/79, with U.S. consumption increasing 12 percent. A continuing strong domestic and foreign market

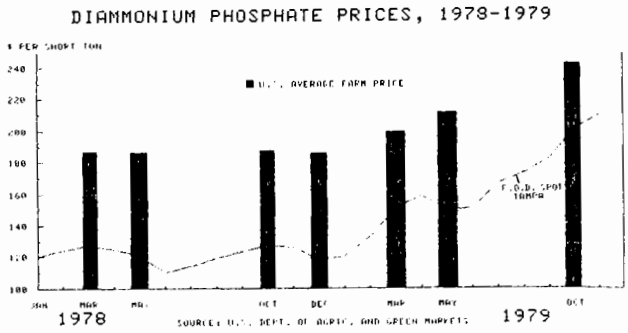


Figure 3

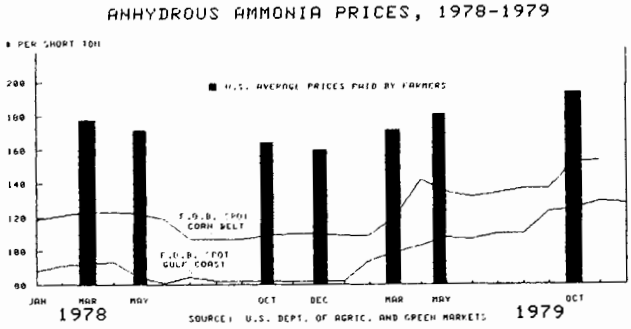


Figure 2

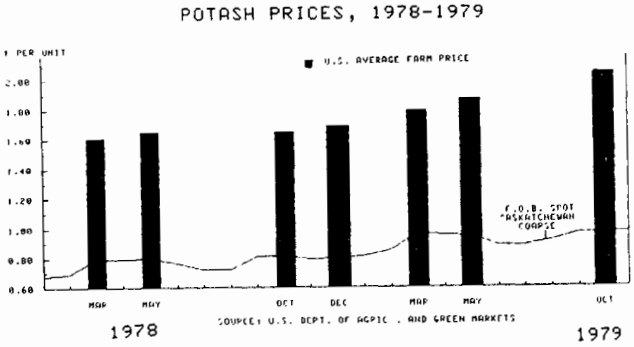


Figure 4

Table 5--Average prices paid by farmers per ton of selected fertilizers, United States, April 15 prices, 1968-76, May 15 prices 1977-79 and October 15 prices 1978-79

Year	Anhydrous ammonia	Superphosphate 46 percent P_2O_5	Superphosphate 20 percent P_2O_5	18-46-0	Potash 60 percent K_2O	Mixed fertilizer 6-24-24
	Dollars					
1968	91.40	78.40	43.20	101.00	49.10	81.80
1969	75.60	74.00	43.80	94.10	47.80	73.20
1970	75.00	75.10	45.40	94.40	50.90	75.00
1971	79.30	76.60	47.80	95.70	58.20	80.30
1972	80.00	78.00	49.90	97.40	58.80	81.00
1973	87.60	87.50	53.70	109.00	61.50	88.00
1974	183.00	150.00	91.40	181.00	81.30	139.00
1975	265.00	214.00	118.00	263.00	102.00	186.00
1976	191.00	158.00	95.20	189.00	95.90	148.00
1977	188.00	148.00	103.00	185.00	96.90	145.00
1978:						
May 15	171.00	[1] 153.00	100.00	186.00	96.40	150.00
Oct. 15	164.00	[1] 153.00	108.00	187.00	98.90	148.00
1979:						
May 15	182.00	[1] 172.00	111.00	210.00	112.00	161.00
Oct. 15	194.00	[1] 203.00	120.00	245.00	122.00	180.00

[1] Specifications changed to 44%-46% P_2O_5.

Source: "Agricultural Prices", USDA, ERS, Pr 1 (10-79) and earlier issues.

Table 6—Average prices paid by farmers per 20-pound unit of nitrogen contained in nitrogenous materials, United States, 1968-1979

Year	Nitrate of soda	Sulfate of ammonia	Ammonium nitrate	Urea	Anhydrous ammonia	Nitrogen solutions percent N		
						28	30	32
	Dollars							
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	1.80	1.83
1971	4.07	2.52	1.89	1.80	.97	1.79	1.87	1.90
1972	4.13	2.54	1.93	1.79	.98	1.85	1.84	1.96
1973	4.84	2.69	2.13	1.98	1.07	2.05	1.94	2.09
1974	8.19	5.37	4.15	4.02	2.23	4.11	3.70	3.97
1975	12.38	7.32	5.55	5.36	3.23	5.68	5.10	5.25
1976	9.63	4.79	4.03	3.65	2.32	3.89	3.77	4.09
1977	9.17	4.97	4.30	3.72	2.29	4.11	4.03	4.25
1978:								
May 15	9.18	5.20	4.14	3.70	2.08	3.96	3.90	4.14
Oct. 15	9.18	5.40	4.10	3.68	2.00	3.78	3.76	4.02
1979:								
May 15	9.00	5.50	4.20	3.82	2.20	3.84	3.70	4.08
Oct. 15	9.24	5.74	4.32	4.16	2.36	3.96	3.82	4.28

Source: Computed from "Agricultural Prices", USDA, ESCS, Pr 1 (10-79) and earlier issues.

allowed the fertilizer industry to pass along higher costs, resulting in an additional 9 percent increase in farm prices between May and October 1979. Since strong demand is expected to continue throughout 1979/80, further price increases of 7 to 8 percent are expected by next spring.

Table 7—Average prices paid by farmers per 20-pound unit of P_2O_5 contained in phosphate materials, and K_2O in muriate, of potash, United States, 1978-79

Year	Superphosphate		Muriate of potash[3]
	Normal[1]	Concentrated[2]	
	Dollars		
1968	2.16	1.70	.82
1969	2.19	1.61	.80
1970	2.27	1.63	.85
1971	2.39	1.67	.97
1972	2.50	1.70	.98
1973	2.69	1.90	1.03
1974	4.57	3.26	1.36
1975	5.90	4.65	1.70
1976	4.76	3.43	1.60
1977	5.15	3.22	1.61
1978:			
May 15	5.00	3.38	1.62
Oct. 15	5.40	3.38	1.64
1979:			
May 15	5.54	3.80	1.84
Oct. 15	6.00	4.50	2.02

[1] 20 percent P_2O_5. [2] 46 percent P_2O_5. 44%-46% after 1977. [3] 60 percent K_2O.

Source: Computed from "Agricultural Prices", USDA, ESCS, Pr 1 (10-79) and earlier issues.

Fertilizer Use Estimates

In the 12 month period ending June 30, 1979, over 51 million tons of fertilizer materials were used in the United States and Puerto Rico (table 8). This represents a 7-percent increase from the 47.5 million tons used in 1977/78. Use of all primary nutrients was up 9 percent to 22.4 million tons. Of the primary nutrients, nitrogen use was up 7 percent to 10.6 million tons, phosphate use increased 9 percent to 5.5 million tons, and potash use was up 12 percent to 6.2 million tons (table 8).

Regional Variations: Most of the regions showed an increase in use. The Northeast, Delta States and Pacific regions registered small declines (table 9). Nitrogen use declined in the Delta States and Appalachian regions, phosphate use fell in the Delta States and Pacific regions, while potash use dropped in the Pacific and Northeast (tables 10, 11, and 12).

Use of Mixtures and Direct Application Materials: The proportion of fertilizers applied as mixtures declined slightly to 46 percent of total fertilizer use in 1978/79. Direct applications increased to 54 percent of the total (table 13).

Use of Dry Bagged, Dry Bulk, and Liquid Fertilizers: The proportion of total fertilizer tonnage applied in liquid form increased to 33 percent in 1978/79, while dry bulk application increased to 52 percent (table 14). These increases came at the expense of dry bagged materials, whose proportion declined to about 15 percent of the total.

Table 8—All fertilizer: Total use and primary nutrient use, United States, 1965-1979[1]

Year ended June 30	Total use	Primary Nutrient Use				
		N	Available P_2O_5	K_2O	Total	Index
	1,000 tons					*1967=100*
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	12,444.6	89.1
1967	37,081	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	39,589	7,459.0	4,573.9	4,035.5	16,068.3	115.0
1971	41,118	8,133.6	4,803.4	4,231.4	17,168.4	122.9
1972	41,206	8,022.3	4,863.7	4,326.8	17,212.8	123.2
1973	43,288	8,295.1	5,085.2	4,648.7	18,029.0	129.0
1974	47,094	9,157.2	5,098.6	5,082.6	19,338.4	138.4
1975	42,484	8,600.8	4,506.8	4,453.2	17,560.9	125.6
1976	49,189	10,411.6	5,227.6	5,209.7	20,848.8	149.2
1977	51,624	10,647.4	5,629.7	5,833.8	22,110.9	158.2
1978	47,497	9,964.6	5,096.1	5,526.1	20,586.9	147.3
1979	51,031	10,643.0	5,543.7	6,216.1	22,402.8	160.3

[1] Includes Puerto Rico.

Source: "Commercial Fertilizers, Consumption for year ended June 30, 1979", USDA, ESCS, SpCr 7 (11-79) and earlier issues.

Table 9—Total use of primary nutrients by regions, years ended June 30, 1978 and 1979[1]

Region	1978	1979[2]	Change
	1,000 tons		*Percent*
Northeast	928	924	-1
Lake States	2,508	2,779	10
Corn Belt	6,672	7,690	+15
Northern Plains	2,285	2,467	+8
Appalachian	1,699	1,742	+3
Southeast	1,954	2,042	+5
Delta States	892	871	-2
Southern Plains	1,393	1,596	+15
Mountain	819	850	+4
Pacific	1,403	1,366	-3
United States	20,553	22,327	+9

[1] Excludes Puerto Rico. [2] Totals may not add due to rounding.

Table 10—Use of nitrogen as fertilizer, by regions, years ended June 30, 1978 and 1979[1]

Region	1978	1979[2]	Change
	1,000 tons N		*Percent*
Northeast	325	334	+3
Lake States	922	1,069	+16
Corn Belt	2,874	3,144	+9
Northern Plains	1,643	1,762	+7
Appalachian	617	608	-1
Southeast	778	781	+1
Delta States	420	400	-5
Southern Plains	929	1,036	+12
Mountain	535	560	+5
Pacific	908	914	+1
United States	9,949	10,608	+7

[1] Excludes Puerto Rico. [2] Totals may not add due to rounding.

Table 11—Use of phosphate as fertilizer, by regions, years ended June 30, 1978 and 1979[1]

Region	1978	1979[2]	Change
	1,000 tons P_2O_5		*Percent*
Northeast	287	291	+1
Lake States	613	677	+10
Corn Belt	1,639	1,882	+15
Northern Plains	500	545	+9
Appalachian	475	503	+6
Southeast	440	466	+6
Delta States	215	209	-3
Southern Plains	337	402	+19
Mountain	246	247	+1
Pacific	337	308	-9
United States	5,090	5,530	+9

[1] Excludes Puerto Rico. [2] Totals may not add due to rounding.

Table 12—Use of potash as fertilizer, by regions, years ended June 30, 1978 and 1979[1]

Region	1978	1979[2]	Change
	1,000 tons K_2O		*Percent*
Northeast	316	298	-6
Lake States	973	1,033	+6
Corn Belt	2,159	2,665	+23
Northern Plains	142	160	+13
Appalachian	608	632	+4
Southeast	736	795	+8
Delta States	258	261	+1
Southern Plains	127	157	+24
Mountain	38	44	+16
Pacific	157	144	-8
United States	5,514	6,188	+12

[1] Excludes Puerto Rico. [2] Totals may not add due to rounding.

Table 13—All fertilizer: Mixtures and direct-application materials used, averages 1951-1970, annual 1971-1979, United States[1]

Year ended June 30	All fertilizer	Mixtures		Materials[2]	
		Quantity	Percentage of total	Quantity	Percentage of total
	1,000 tons		*Percent*	*1,000 tons*	*Percent*
Average:					
1951-1955	22,183	14,904	67	7,280	33
1956-1960	22,670	14,904	66	8,366	37
1961-1965	28,455	16,929	59	11,526	41
1966-1970	37,598	20,693	55	16,904	45
1971	41,118	21,513	52	19,605	48
1972	41,206	21,511	52	19,695	48
1973	43,288	22,547	52	20,741	48
1974	47,094	24,067	51	23,027	49
1975	42,484	20,647	48	21,837	52
1976	49,189	22,958	47	26,231	53
1977	51,624	24,099	47	27,524	53
1978	47,497	22,110	47	25,387	53
1979	51,031	23,639	46	27,392	54

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

Sources: "Commercial Fertilizers, Consumption For Year Ended June 30, 1978", USDA, ESCS, SpCr7 (11-79) and earlier issues. "Commercial Fertilizers, Consumption of Commercial Fertilizers, Primary Plant Nutrients, and Micronutrients", USDA, SRS, Statistical Bulletin No. 472.

Table 14—All fertilizers: Use by class, mixtures and direct application materials 1967-1979[1] [2]

Year ended June 30	Dry bagged	Percentage	Dry bulk	Percentage	Fluid	Percentage
	1,000 tons	*Percent*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*
1967	15,489.2	43	12,159.4	35	7,676.1	22
1968	13,900.1	38	14,313.4	39	8,556.6	23
1969	13,143.8	35	15,198.5	41	8,936.7	24
1970	12,146.3	32	15,822.4	42	9,977.2	26
1971	11,500.0	29	16,931.7	43	11,131.8	28
1972	11,242.0	28	17,463.7	44	10,839.7	27
1973	10,544.8	25	20,153.6	48	11,124.0	27
1974	10,482.4	23	21,836.7	49	12,645.3	28
1975	9,044.1	22	19,372.6	48	12,189.3	30
1976	8,555.8	18	23,409.6	50	14,927.8	32
1977	8,264.1	17	25,154.0	51	15,680.4	32
1978	7,491.1	17	23,423.9	51	14,706.1	32
1979	7,235.7	15	25,552.5	52	16,163.8	33

[1] Data for 1973 and later includes Alaska, Hawaii, and Puerto Rico. [2] Includes all commercial fertilizer sold or shipped for farm and nonfarm use as fertilizer. Secondary and micronutrients applied directly to the soil are not included. Anhydrous ammonia is included in "Fluid."

Source: "Commercial Fertilizers, Consumption by Class for year ended June 30, 1979," USDA, ESCS, SpCr 7 (79), and earlier issues.

FERTILIZER USE ON CROPS - 1978/79

Fertilizer application in 1978/79 probably reflected income prospects for the various crops. Improved corn price prospects encouraged corn producers to increase fertilization rates as did stable, but favorable, soybean price expectations (table 15). Improved price prospects and favorable weather conditions at winter wheat planting time increased fertilizer use on wheat. Producer efforts to lower production costs probably caused cotton producers to cut fertilizer use.

Corn for Grain: Fertilization of corn acres took about 42 percent of the nitrogen, 39 percent of the phosphate, and 38 percent of the potash used by U.S. farmers in 1978/79.

The 18 States surveyed for fertilizer use on corn accounted for 93 percent of the total acreage of corn harvested for grain in the United States. Of the fields surveyed in 1979, 96 percent received some fertilizer, up from 95 percent in 1978 and equal to the percentage of acres receiving fertilizer in 1977 (table 16). The proportion of corn acres receiving nitrogen, phosphate, and potash were above a year earlier.

In 1979, the record application rates for the three nutrients applied to corn acreage reflected two sucessive years of record corn yields. Nitrogen was applied to corn for grain at the rate of 135 pounds per acre, up about 7 percent from a year earlier. The application rates of 69 pounds for phosphate and 84 pounds for potash were up 1 and 5 percent, respectively.

Cotton: The 13 cotton-producing States surveyed accounted for 99 percent of total U.S. acreage harvested in 1979 (table 17). Of the fields surveyed, 71 percent received some fertilizer, up about 3 percent from a year earlier. The proportion of cotton acreage receiving nitrogen and phosphate increased from a year earlier, but remained below 1977 levels. The proportion of acres fertilized with potash declined again in 1979 to about 27 percent.

The amount of nitrogen applied to cotton in 1979 averaged about 71 pounds, down for the second consecutive year. Application rates for phosphate and potash were down 7 and 18 percent, respectively, from a year earlier.

Table 15—Estimates of fertilizers used on harvested acres of corn for grain, cotton, soybeans for beans, and all wheat, United States, 1975-79

Crop and year	Acres receiving				Rates per acre receiving			Total U.S. harvested acreage[1]
	Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	
	Percent				*Pounds*			*1,000 acres*
Corn								
1975	94	94	86	82	105	58	67.	67,505
1976	97	97	90	84	127	67	78	71,300
1977	96	96	88	82	128	68	82	70,872
1978	95	95	87	81	126	68	80	69,970
1979	96	96	89	82	135	69	84	69,496
Cotton								
1975	65	65	43	33	78	50	55	8,796
1976	76	75	53	37	81	52	56	10,914
1977	79	78	51	31	78	53	52	13,275
1978	69	69	45	31	76	54	54	12,370
1979	71	71	48	27	71	50	44	13,037
Soybeans								
1975	28	18	25	26	15	40	53	53,579
1976	31	20	28	30	14	42	60	49,358
1977	35	24	33	34	16	45	60	57,612
1978	37	25	35	36	17	45	62	63,343
1979	40	26	38	39	16	46	67	70,249
All wheat								
1975	63	63	43	21	46	35	35	69,391
1976	71	71	50	21	51	37	37	70,771
1977	65	64	44	19	53	39	41	66,461
1978	61	61	38	16	52	35	34	56,839
1979	66	65	44	18	54	38	43	62,227

[1] "Crop Production," CrPr 2-2 (11-79), Crop Reporting Board, ESCS, USDA, November 9, 1979 and "Crop Production, 1978 Annual Summary," CrPr 2-1 (79), Crop Reporting Board, ESCS, USDA, January 16, 1979.

Table 16—Fertilizer use on corn acreage harvested for grain, selected States, 1979

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*				*Pounds*			*Percent*		
Pennsylvania	1,190	105	99.0	99.0	98.1	96.2	110.7	68.6	58.4	79.8	0.0	20.2
Michigan	2,200	94	100.0	100.0	100.0	98.9	106.6	68.9	84.5	63.8	0.0	36.2
Minnesota	5,900	147	95.2	93.9	93.2	93.2	106.5	59.6	72.9	82.1	1.4	16.4
Wisconsin	2,850	120	99.2	99.2	98.3	99.2	93.0	57.4	90.6	71.4	0.8	27.7
3 States	10,950	361	97.2	96.5	95.9	95.9	102.9	61.0	80.1	75.5	1.0	23.5
Illinois	10,500	233	99.6	99.1	93.6	91.0	146.4	88.1	108.5	63.8	3.5	32.7
Indiana	5,850	177	98.3	97.2	98.3	93.2	149.4	85.3	108.7	66.7	2.3	31.0
Iowa	12,600	202	97.5	97.5	89.1	87.6	138.1	69.7	75.2	82.7	4.1	13.2
Missouri	2,250	137	95.6	95.6	89.1	89.1	116.2	58.6	70.6	72.5	5.4	22.1
Ohio	3,630	60	100.0	100.0	98.3	100.0	145.4	81.6	101.2	76.7	0.0	23.3
5 States	34,830	809	98.4	98.1	93.0	91.0	141.9	78.7	93.7	73.0	3.1	23.9
Kansas	1,450	148	95.9	95.9	67.9	32.4	173.5	45.6	29.2	81.3	5.4	13.3
Nebraska	6,700	176	95.1	94.7	71.9	40.3	157.2	40.7	25.6	67.2	3.9	28.9
South Dakota	2,500	93	59.1	59.1	48.4	31.2	62.0	33.0	17.8	72.7	12.7	14.6
3 States	10,650	417	86.7	86.5	65.9	37.1	144.4	40.0	24.5	70.2	5.6	24.2
Kentucky	1,270	107	96.3	96.3	93.5	93.5	114.0	74.5	83.3	66.0	2.9	31.1
North Carolina	1,700	114	100.0	100.0	100.0	100.0	154.4	63.8	97.2	21.1	.9	78.1
Virginia	600	40	100.0	100.0	97.5	92.5	143.2	66.0	94.7	52.5	2.5	45.0
3 States	3,570	261	98.7	98.7	97.3	96.4	138.5	67.8	92.0	42.0	1.9	56.1
Georgia	1,550	101	100.0	100.0	100.0	100.0	150.6	54.3	86.9	17.8	2.0	80.2
Texas	1,300	159	95.6	95.6	83.6	43.4	151.2	47.2	22.5	46.1	12.5	41.4
Colorado	820	115	95.7	95.7	79.2	36.8	149.9	71.4	28.8	31.7	9.0	59.3
18 States	64,860	2,328	96.3	95.9	89.1	81.9	135.4	68.6	83.7	69.0	3.2	27.8

[1] "Crop Production" CrPr 2-2 (11-79) Crop Reporting Board, ESCS, USDA, November 9, 1979. [2] Percentages apply to acres receiving fertilizer.

Table 17—Fertilizer use on cotton acreage harvested, selected States 1979

State	Acres for harvest[1]	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized[2]		
			Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*				*Pounds*			*Percent*		
Missouri	140	66	100.0	95.5	95.5	100.0	51.8	49.6	51.5	92.4	4.6	3.0
Tennessee	230	98	99.0	99.0	99.0	99.0	76.3	74.4	79.2	81.4	1.0	17.6
Alabama	325	106	100.0	100.0	84.0	84.0	69.9	62.9	68.4	84.9	1.9	13.2
Georgia	140	70	100.0	85.7	95.7	98.6	68.9	47.2	79.1	24.3	1.4	74.3
South Carolina	108	75	100.0	100.0	86.7	100.4	84.4	51.0	101.9	25.3	0.0	74.7
3 States	573	251	100.0	96.5	87.3	90.6	72.5	56.5	78.2	58.9	1.4	39.7
Arkansas	600	203	98.5	97.5	77.8	82.8	61.7	36.6	50.8	64.5	12.0	23.5
Louisiana	465	107	100.0	100.0	64.5	64.5	68.1	49.0	52.9	73.8	9.4	16.8
Mississippi	1.030	378	100.0	100.0	32.2	33.4	87.3	61.1	62.8	63.3	14.5	22.2
3 States	2,095	648	99.0	99.3	52.5	54.5	75.8	47.4	55.0	66.0	12.6	21.4
Oklahoma	580	101	55.4	55.4	50.5	33.7	31.5	42.7	22.5	100.0	0.0	0.0
Texas	6,930	630	52.8	52.6	45.1	17.1	44.9	44.5	15.9	83.1	8.0	8.9
2 States	7,510	731	53.0	52.8	45.5	18.4	43.8	44.3	16.8	84.4	7.4	8.2
Arizona	658	110	92.7	92.7	46.4	2.7	142.3	61.3	54.9	7.8	54.9	37.3
New Mexico	146	59	69.5	69.5	50.8	13.6	60.7	54.0	15.4	58.5	29.3	12.3
2 States	804	169	88.5	88.5	47.2	4.7	130.7	59.9	34.2	15.1	51.3	33.6
California	1,635	269	93.9	93.9	30.5	4.5	105.6	65.3	43.7	28.6	42.9	28.5
13 States	12,987	2,232	71.3	70.9	48.2	27.1	70.7	49.7	44.4	64.1	17.3	18.6

[1] "Crop Production," CrPr 2-2 (11-79) Crop Reporting Board, ESCS, USDA, November 9, 1979. [2] Percentages apply to acres receiving fertilizer.

In addition to the income and cost aspects of cotton production, fertilizer use on cotton is down because of regional shifts in cotton acres. A higher proportion of 1979 cotton acres were grown in Texas, an area where fertilization rates are below other major cotton growing regions.

Soybeans for beans: The 17 States surveyed for fertilizer use on soybeans in 1979 accounted for 93 percent of the total harvested acreage (table 18). The percent of acres receiving fertilizer increased, as did the percent receiving nitrogen, phosphate, and potash. This is the fourth year in a row that the proportion of soybean acreage fertilized has increased.

Nitrogen application was down 1 pound to 16 pounds per acre, while phosphate use was up 1 pound per acre. Potash use increased 5 pounds per acre.

All wheat: The 17 States surveyed for fertilizer use on wheat in 1979 accounted for 93 percent of total U.S. harvested acreage (table 19). Of the fields surveyed, 66 percent received some fertilizer, up from 61 percent in 1978. The proportion of acres receiving each of the three primary nutrients increased from a year earlier with the proportion fertilized with phosphate increasing the most. Application rates on wheat acreage harvested in 1979 were up for all three nutrients, with phosphate and potash rates up substantially.

Table 18—Fertilizer use on soybean acreage harvested for beans, selected States 1979

State			Acres receiving				Rate per acre receiving			Acres fertilized[2]		
	Acres for harvest[1]	Fields in survey	Any fertilizer	N	P_2O_5	K_2O	N	P_2O_5	K_2O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	*Number*	*Percent*				*Pounds*			*Percent*		
Minnesota . . .	5,260	91	22.0	13.2	20.9	20.9	15.8	36.1	56.3	95.0	0.0	5.0
Illinois	9,700	164	24.4	11.0	19.5	23.2	14.9	56.7	91.6	97.5	0.0	2.5
Indiana	4,400	111	66.7	50.5	61.3	64.0	11.2	38.0	69.1	94.6	4.0	1.4
Iowa	8,150	146	12.3	6.8	12.3	12.3	11.3	35.9	51.7	100.0	0.0	0.0
Missouri	5,930	139	30.9	14.4	25.2	30.2	18.8	48.6	71.5	100.0	0.0	0.0
Ohio	4,020	119	58.8	46.2	56.3	57.1	12.0	45.8	53.1	95.7	4.3	0.0
5 States	32,200	679	32.6	20.4	29.0	31.5	13.0	45.1	69.2	97.0	2.1	0.9
Kansas	1,540	56	21.4	16.1	19.6	7.1	15.4	29.8	26.3	91.7	8.3	0.0
Nebraska	1,600	64	20.3	14.1	17.2	10.9	20.9	35.5	17.9	100.0	0.0	0.0
2 States	3,140	120	20.9	15.0	18.4	9.1	18.1	32.5	21.1	95.8	4.2	0.0
Kentucky	1,600	68	67.6	57.4	67.6	66.2	18.4	59.8	63.8	97.8	2.2	0.0
North Carolina .	1,850	74	73.0	60.8	71.6	73.0	16.6	45.0	75.5	96.3	3.7	0.0
Tennessee . . .	2,600	82	68.3	43.9	65.9	67.1	13.8	46.0	63.4	98.2	1.8	0.0
3 States	6,050	224	69.6	52.6	68.1	68.6	16.1	49.3	67.4	97.5	2.5	0.0
Georgia	2,050	73	86.3	71.2	86.3	86.3	21.5	47.5	76.8	98.4	1.6	0.0
Alabama	2,250	74	85.1	66.2	81.1	83.8	21.3	52.0	61.4	100.0	0.0	0.0
South Carolina .	1,660	73	87.7	45.2	84.9	86.3	19.0	41.4	89.4	93.8	3.1	3.1
3 States	5,960	220	86.2	62.1	83.9	85.4	20.9	47.4	74.6	97.7	1.4	0.9
Arkansas	5,150	142	36.6	15.5	34.5	35.9	16.7	38.3	52.4	98.1	1.9	0.0
Louisiana	3,200	92	32.6	18.5	32.6	32.6	18.3	51.5	57.8	100.0	0.0	0.0
Mississippi . . .	4,125	125	41.6	14.4	38.4	41.6	16.7	49.5	68.5	98.1	1.9	0.0
3 States	12,475	359	37.2	15.9	35.3	36.9	17.2	45.4	59.6	98.5	1.5	0.0
17 States . .	65,085	1,693	40.4	25.5	37.7	39.0	16.1	45.7	67.2	97.4	1.9	0.7

[1] "Crop Production," CrPr 2-2 (11-79) Crop Reporting Board, ESCS, USDA, November 9, 1979. [2] Percentages apply to acres receiving fertilizer.

Table 19—Fertilizer use on all wheat acreage harvested, selected States 1979

State	Acres for harvest[1]	Fields in survey	Acres receiving: Any fertilizer	Acres receiving: N	Acres receiving: P_2O_5	Acres receiving: K_2O	Rate per acre receiving: N	Rate per acre receiving: P_2O_5	Rate per acre receiving: K_2O	Acres fertilized[2]: At or before seeding	Acres fertilized[2]: After seeding	Acres fertilized[2]: At or before and after seeding
	1,000 acres	*Number*	*Percent*				*Pounds*			*Percent*		
Michigan	770	46	93.5	93.5	91.3	91.3	48.0	62.2	62.8	46.5	14.0	39.5
Minnesota	2,521	71	95.8	95.8	91.5	64.8	72.5	35.4	26.3	97.0	0.0	3.0
2 States	3,291	117	95.2	95.2	91.5	71.0	66.9	41.6	37.3	85.5	3.2	11.3
Illinois	1,300	76	97.4	93.4	88.2	68.5	54.9	67.9	74.6	44.6	12.2	43.2
Indiana	945	67	97.0	97.0	89.6	89.6	63.0	62.0	64.0	20.0	9.2	70.8
Missouri	1,600	74	89.2	83.8	77.0	78.4	58.0	46.8	56.1	59.1	16.7	24.2
Ohio	1,320	61	96.7	96.7	93.4	93.4	56.4	64.0	62.8	18.6	15.3	66.1
4 States	5,165	278	94.6	91.9	86.3	81.8	57.7	59.9	63.5	37.5	13.7	48.8
Kansas	10,600	262	70.2	70.2	38.2	8.8	49.8	34.8	24.6	77.2	4.9	17.9
Nebraska	2,600	111	56.8	56.8	15.3	1.8	49.2	36.2	18.0	88.9	7.9	3.2
North Dakota	9,555	240	67.5	65.4	55.0	9.6	41.0	28.0	17.6	97.5	1.2	12.3
South Dakota	2,720	120	19.2	19.2	17.5	4.2	19.2	23.3	9.5	100.0	0.0	0.0
4 States	25,475	733	62.4	61.6	39.9	7.9	45.3	30.8	20.4	87.3	3.5	9.2
Oklahoma	5,700	183	79.8	79.2	48.1	13.1	60.0	35.4	15.2	79.5	4.8	15.7
Texas	4,600	199	32.2	32.2	14.9	6.4	92.5	38.8	22.2	55.2	8.2	36.6
2 States	10,300	382	58.5	58.2	33.3	10.1	68.0	36.1	17.2	73.5	5.6	20.9
Colorado	2,600	91	9.9	9.9	2.2	0.0	42.5	53.0	0.0	77.8	22.2	0.0
Idaho	1,490	130	84.5	83.7	22.2	3.8	75.9	48.6	31.9	69.1	16.3	14.6
Montana	5,160	171	58.5	56.1	55.0	4.1	28.2	29.8	20.5	70.0	9.0	21.0
3 States	9,250	392	49.2	47.7	35.0	2.9	42.6	32.1	23.0	70.2	11.8	18.0
Oregon	1,220	81	87.7	87.7	14.8	2.5	74.1	45.0	31.0	69.0	15.5	15.5
Washington	3,050	145	95.9	95.9	10.3	2.1	65.0	35.4	36.7	81.3	3.6	15.1
2 States	4,270	226	93.4	93.4	11.7	2.2	67.6	39.1	34.8	77.9	6.9	15.2
17 States	57,751	2,128	66.1	65.3	43.5	17.6	53.9	38.4	42.5	75.5	6.5	18.0

[1] "Crop Production," CrPr 2-2 (10-79) Crop Reporting Board, ESCS, USDA, October 12, 1979. [2] Percentages apply to acres receiving fertilizer.

U.S. IMPORT-EXPORT REVIEW AND OUTLOOK

Value, Volume, and Balance of Trade

Quantities and declared values of imports and exports of principal fertilizer products reached record levels in 1978/79 (tables 20, 21, 22, and 23). More than 12.6 million metric tons of fertilizer valued at $890 million were imported by the United States during the last fertilizer year. These figures represent increases of 4 percent in value and 1 percent in volume over the previous year's imports. Exports experienced much greater growth in 1978/79 with volume reaching nearly 25.6 million metric tons valued at $1.8 billion. Declared value of exports rose 34 percent and tonnage increased 10 percent. The trade balance for principal fertilizer products showed a surplus of about $.9 billion in 1978/79.

On a nutrient basis, the United States continued to be a large net importer of potassium products, a large net exporter of phosphates, and nitrogen exports slightly exceeded imports. Preliminary estimates indicate that exports of phosphates, including phosphate rock, exceeded imports by about 7.5 million metric tons of nutrient, while imports of potassium nutrients were greater than exports by nearly 3.8 million tons. Imports and exports of nitrogen nutrients were nearly in balance in 1978/79, with exports exceeding imports by about 100,000 metric tons. This reversed the situation of the preceding two years when the United States was a net importer of nitrogen.

Nitrogen Imports

Overall, nitrogen nutrient imports increased about 12 percent in 1978/79, led by large increases in imports of anhydrous ammonia. While ammonia imports increased 64 percent in 1978/79, imports of

Table 20—U.S. imports of Selected fertilizer materials, years ended June 30, 1976-79 (1,000 metric tons material)

Material	1976	1977	1978	1979[1]
Anhydrous ammonia	696	878	956	1,574
Urea	479	1,330	1,280	989
Ammonium nitrate	268	315	387	249
Ammonium Nitrate-limestone	20	55	15	—
Ammonium sulfate	381	412	295	233
Sodium nitrate	81	126	133	118
Calcium nitrate	65	62	91	95
Nitrogen solutions	170	403	401	170
Other nitrogen fertilizer	117	103	119	76
Ammonium phosphates	308	351	311	272
Crude phosphates	32	51	630	781
Phosphoric acid	—	—	26	82
Normal + concentrated superphosphate	—	—	25	25
Other phosphatic fertilizer	91	96	48	11
Potassium chloride	5,866	7,449	7,452	7,645
Potassium sulfate	57	84	27	36
Potassium nitrate[2]	63	49	84	90
Other potassic fertilizer	3	—	6	1
Mixed and non-specific fertilizer	150	217	141	158
Total	8,847	11,981	12,427	12,605

[1] Preliminary. Beginning in 1978, additional categories of phosphatic materials are reported separately. [2] Includes potassium sodium nitrate.

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

Table 21—U.S. fertilizer imports: Declared values of selected materials, years ended June 30, 1976-79 (Million dollars)

	1976	1977	1978	1979[1]
Anhydrous Ammonia	80.8	93.0	97.5	149.4
Urea	46.7	155.5	164.0	129.2
Ammonium Nitrate	25.7	32.3	38.1	22.9
Ammonium Sulfate	21.2	20.4	18.3	17.5
Sodium Nitrate	8.9	9.9	11.3	10.9
Calcium Nitrate	4.4	4.0	5.8	6.1
Nitrogen Solutions	15.1	32.8	41.8	18.3
Other nitrogen fertilizer	12.7	9.6	14.3	10.4
Ammonium Phosphates	49.3	44.2	36.6	35.1
Crude Phosphates	1.6	2.6	18.0	21.1
Phosphoric Acid	—	—	3.9	10.2
Normal & concentrated superphosphate	—	—	2.5	2.8
Other phosphatic fertilizer	17.0	12.4	7.0	1.6
Potassium chloride	287.2	358.0	360.5	419.0
Potassium sulfate	6.1	7.3	2.6	3.5
Potassium nitrate[2]	11.3	6.1	10.8	10.1
Other potassic fertilizer	.1	.1	.4	.1
Mixed and non-specific fertilizer	17.5	20.7	18.9	21.8
Total	605.6	808.9	852.3	890.0

[1] Preliminary. Beginning in 1978, additional categories of phosphatic materials are reported separately. [2] Includes potassium sodium nitrate.

Source: U.S. Imports, Commodity and country report FT-135, U.S. Bureau of the Census, published monthly.

Table 22—U.S. exports of selected fertilizer materials, years ended June 30, 1976-79 (1,000 metric tons material)

Material	1976	1977	1978	1979[1]
Anhydrous ammonia	231	264	475	502
Urea	527	334	832	1,406
Ammonium nitrate	56	10	22	75
Ammonium sulfate	682	445	355	639
Sodium nitrate	1	1	17	[2]16
Other nitrogen fertilizer	20	38	22	[3]316
Phosphate rock	10,657	11,574	13,479	13,501
Normal superphosphate	20	6	23	26
Concentrated superphosphate	1,111	1,127	1,290	1,431
Diammonium phosphate	2,190	2,433	3,206	4,111
Other ammonium phosphate	278	424	476	426
Phosphoric acid[4]	522	746	1,262	1,189
Other phosphatic fertilizer	54	40	33	25
Potassium chloride	1,078	1,176	1,116	1,057
Other potassic fertilizer	302	317	424	474
Mixed fertilizer	198	203	176	400
Total	17,928	19,138	23,208	25,594

[1] Preliminary. In January 1978 Schedule B commodities were renumbered and regrouped, hence 1978 data are not always comparable to previous years. [2] Includes material containing less than 16.3 percent nitrogen. [3] Includes nitrogen solutions and aqua ammonia. [4] Beginning in 1979 phosphoric acid is reported by material tons (previously P_2O_5). All years have been converted to material equivalent.

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

Table 23—U.S. Fertilizer Exports: Declared values of selected materials, years ended June 30, 1976-79 (Million dollars)

Material	1976	1977	1978	1979[1]
Anhydrous ammonia	21.6	29.5	42.1	52.1
Urea	66.8	29.1	101.1	176.1
Ammonium nitrate	5.3	1.5	3.1	7.3
Ammonium sulfate	30.9	18.6	21.6	33.6
Sodium nitrate	.1	.1	.4	[2]3.5
Other nitrogen fertilizer	3.1	4.6	2.6	[3]24.4
Phosphate rock	420.8	319.9	353.7	373.2
Normal superphosphate	.8	.2	2.0	3.0
Concentrated superphosphate	139.5	98.4	124.5	147.6
Diammonium phosphate	377.8	290.2	421.6	602.0
Other ammonium phosphate	34.8	43.9	52.7	57.8
Phosphoric acid	68.7	89.8	84.8	151.9
Other phosphatic fertilizer	5.0	5.3	4.3	2.9
Potassium chloride	70.6	63.1	66.1	65.9
Other potassic fertilizer	23.5	24.5	26.6	37.1
Mixed fertilizer	30.1	27.7	29.5	59.6
Total	1,299.4	1,046.5	1,338.7	1,798.0

[1] Preliminary. In January 1978 Schedule B commodities were renumbered and sometimes regrouped, hence 1978 data are not always comparable to previous years. [2] Includes material containing less than 16.3 percent nitrogen. [3] Includes nitrogen solutions and aqua ammonia.

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

most other products containing nitrogen actually decreased.

Anhydrous ammonia, urea, ammonium nitrate, nitrogen solutions, and ammonium sulfate accounted for 94 percent of imported nitrogen nutrients in 1978/79. Canada continued to be the leading foreign source of each of the five products, accounting for one-half of total imports of those nitrogen materials. A new nitrogen supplier to the U.S. market, the Soviet Union, was the second largest source of imported nitrogen in 1978/79 due to greatly increased imports of Russian ammonia. Mexico, Trinidad and Tobago, and the Netherlands each accounted for roughly equivalent portions of nitrogen product imports.

Nitrogen Exports

Nitrogen exports registered a 41-percent rise in 1978/79. Urea and diammonium phosphate led in both nitrogen export volume and growth. They accounted for 64 percent of all nitrogen exported in 1978/79 and 67 percent of the growth in exports. Significant export gains were also recorded for ammonium sulfate, nitrogen solutions, and, to a lesser extent, for fertilizer grade anhydrous ammonia.

Fertilizer grade diammonium phosphate (DAP) exports increased 28 percent in 1978/79 and constituted the largest overseas shipment of nitrogen nutrients. U.S.-made DAP was shipped to 49 countries last year, making this product the most widely distributed fertilizer exported. DAP was the single most valuable U.S. fertilizer exported in 1978/79, amounting to more than $600 million. Italy, Belgium-Luxembourg, India, Brazil, and Turkey together bought 52 percent of U.S. DAP exports.

Urea exports increased 69 percent in 1978/79 registering the strongest growth in nitrogen nutrient exports. India, Brazil, and China received over two-thirds of U.S. urea shipments, although 34 other countries also imported U.S. urea.

Current Situation and Outlook for Nitrogen Trade

During July-October 1979 exports of nitrogen nutrients exceeded imports by over 165,000 metric tons (N). Imports of both anhydrous ammonia and urea in the fall of 1979 were up 19 percent and 6 percent, respectively, from the same period in 1978. On the other hand, nitrogen exports were bolstered by more than doubled ammonia shipments, a 26 percent increase in nitrogen solution exports, and a 6-percent growth in DAP exports. Urea exports about equalled last year's levels.

The outlook for nitrogen trade over the entire 1979/80 fertilizer year points to larger import and export tonnages than last year and another small nitrogen export balance.

Import growth will come predominantly from greater anhydrous ammonia volume. The Soviet Union will provide the largest quantities of ammonia this year as the Russian long-term contract with Occidental Chemical Company begins to reach maturity. Soviet ammonia imports will be substantially higher than last year and will exceed imports from other individual countries. During 1979, a group of U.S. ammonia producers petitioned the International Trade Commission (ITC) for import relief from growing Soviet ammonia shipments to the United States. Although the ITC recommended a three year import quota, on December 11 President Carter decided against imposing any form of import controls. Finding that import quotas are "not currently in the public interest," Mr. Carter felt it was critical that "farmers have access to sufficient fertilizer supplies at reasonable prices." The President did, however, direct that the government closely monitor future Soviet shipments. Congress has the final authority to let the President's decision stand or to overrule it, but must act within 90 days.

Ammonia imports from Canada will probably not exceed the 1978/79 level of about one-half million metric tons. Trinidad and Tobago will most likely supply larger quantities of U.S. ammonia imports than last year, exceeding 300,000 metric tons. Imports of ammonia from Mexico will probably diminish in 1979/80 owing to production shortfalls earlier in 1979 and plans to bring new urea plants into production.

Nitrogen exports in 1979/80 should exceed 1978/79 levels primarily due to the strength of DAP export demand and the expanded market for anhydrous ammonia. When transportation costs are surging upward, high analysis fertilizers are even more attractive to the world's farmers. Thus diammonium phosphate—with its high phosphate content and "bonus" nitrogen (18 percent N, 46 percent P_2O_5)—is enjoying very strong worldwide demand, and the United States is the principal supplier. So far this year, DAP purchases by India have been exceptionally large; however, if drought conditions worsen there, fertilizer use may decrease and DAP shipments to India would slow down. High DAP prices could also dampen demand.

Anhydrous ammonia exports during July-October 1979 exceeded 300,000 metric tons, compared with 133,000 a year earlier. Strong demand from Europe, where higher production costs prevail, accounts for most of the ammonia export growth. Over half of the U.S. ammonia exported during July-October 1979 went to Europe. European ammonia prices will most likely remain above U.S. prices for the remainder of the fertilizer year; thus,

U.S. producers will be induced to continue higher ammonia exports to Western Europe.

Phosphate Fertilizers And Phosphate Rock

The United States was again a major exporter of phosphate fertilizers and phosphate rock in 1978/79. Phosphate rock exports remained about the same, while phosphate nutrients exported as upgraded products climbed 17 percent over the previous year. Phosphate rock's share of total phosphate nutrient exports declined from 60 percent in 1977/78 to 56 percent in 1978/79, while DAP's share rose from 20 to 24 percent. This trend toward exporting a greater proportion of high analysis upgraded products rather than low nutrient raw material is likely to accelerate due to rising shipping costs.

Phosphate rock was exported to 43 countries, with nearly half going to Canada, Japan, and Korea. The hefty increase in rock exports to Canada (13 percent) is partly the result of continuing strength of domestic demand for phosphate fertilizers. Canadian phosphate shipments grew 3 percent in 1978/79.

Diammonium phosphate exports accounted for the largest share of upgraded phosphate fertilizer exports, totalling nearly 1.9 million metric tons (P_2O_5) in 1978/79. The growth in DAP exports is discussed above with nitrogen exports.

In 1978/79 export volume of phosphoric acid measured in product tons may have decreased slightly.[2] However, it appears that, nutrient-wise, just as much phosphate was exported as acid in 1978/79 as in the previous year. This is due to increased exports of superphosphoric acid (SPA), a higher nutrient product. Brazil was, again, the largest customer for U.S. phosphoric acid with some growth occuring due to temporarily relaxed phosphate import quotas there. A new phosphoric acid customer, the Soviet Union, became the second largest recipient of U.S. acid, due to large shipments of SPA under the long term barter arrangement with Occidental. Eventually, 1 million short tons of SPA will be shipped to the Soviet Union by Occidental in exchange for Russian ammonia, urea, and potash. India also significantly increased imports of U.S. phosphoric acid in 1978/79, partly owing to sulfur shortages which made other supplies of phosphoric acid unavailable.

Phosphate imports in 1978/79 grew some over the previous year but remained heavily overshadowed by phosphate exports. Phosphate rock imports, principally from Morocco, grew to around 781,000 metric tons—a 24-percent increase. The nutrient value of upgraded phosphate imports remained essentially unchanged from the previous year.

Phosphate Trade Current Situation And Outlook

Overall phosphate exports were significantly higher during July-October 1979 than during the same period a year earlier. Phosphoric acid exports (as P_2O_5) were 5 percent higher for the four months, largely due to heavy SPA shipments to the Soviet Union. Phosphate rock exports increased 17 percent from July-October 1978 mainly because of large gains in exports to Korea, Japan, Canada, Brazil, and Western Europe. Increased exports to India, Italy, and Brazil led the 6-percent growth in DAP exports during this period.

Continued growth in phosphate exports through June 1980 is likely, given the strong world demand and probable supply problems elsewhere caused by the tight sulfur situation.

Higher phosphoric acid exports are virtually assured throughout the remainder of the current fertilizer year due to the completion of SPA production and handling facilities built to facilitate trade with Russia. If prices of diammonium phosphate continue their sharp rise, there may be some shift in preference toward concentrated superphosphate, provided its prices do not escalate more rapidly than DAP prices.

Phosphate imports are not expected to change much in volume or composition in 1979/80. During the first four months of the fertilizer year phosphate rock imports were nearly equal to those during the same period last year.

Potash Trade Review and Outlook

Imports of potash nutrients increased about 3 percent in 1978/79. Potassium chloride accounted for 99 percent of all potassium nutrient imports. Canada continued to provide the bulk of U.S. potassium chloride imports at 95 percent. In 1978/79 imports of Canadian potassium chloride (mostly coarse grade and granular product) amounted to enough potassium nutrients to supply 70 percent of total U.S. potash consumption. Israel was the only other significant foreign supplier shipping about 225,000 metric tons of potash from the Dead Sea, mostly for use on the U.S. East Coast.

U.S. exports of potash nutrients in 1978/79 were about equal to those of a year earlier. The United States exported about 1 million tons of potash in 1978/79, about 69 percent of which went to Latin America and the Caribbean, where the United

[2]Tonnages reported are preliminary. Due to a change in reporting procedures, exact phosphoric acid exports are not currently available.

States has a transportation advantage over Canada. Brazil was the largest customer.

Potassium chloride imports were 12 percent higher during July-October 1979 than in the same period of 1978. Although some increased potash imports can be anticipated for 1979/80, the current rate of imports is likely to slow down. Little change in potash export levels is anticipated.

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT FERTILIZER PROGRAM

Commitments by the U.S. Agency for International Development (AID) to finance fertilizer purchases of developing nations amounted to over 336,000 metric tons of materials, worth over $80 million (cost and freight basis), in fiscal year (FY) 1979 (table 24). This represents a small decline in tonnage (5 percent) and a moderate increase in value (7 percent) over 1978. These figures are lower than had been anticipated for the year largely due to smaller than expected commitments to Pakistan and Bangladesh and delays in concluding agreements with India. Diammonium phosphate and urea account for nearly 85 percent of all AID-financed materials. The predominance of these two products reflects the increasing preference among developing nations for high nutrient fertilizers.

Fertilizer materials of U.S. origin represent 79 percent of total AID commitments in 1979, up from 69 percent in 1978. AID-financed fertilizer commitments of U.S. origin materials represented only about 3 percent of total U.S. exports of similar fertilizer products in FY 1979.

Asian recipients account for 72 percent of AID-financed fertilizer volume. Pakistan is the largest beneficiary, followed by Sri Lanka and Bangladesh. Zambia is another major recipient of AID fertilizers. Those countries receiving smaller quantities are Haiti, Uruguay, Niger, Benin, and Ghana.

AID financing has been a very important source of international fertilizer assistance in recent years. Based on data presented to the FAO Fertilizer Commission at its 1979 meeting, the United States provided about 27 percent of the world's volume of fertilizer aid during the period 1974/75 through 1977/78. Over the four year period, the United States provided nearly 1.5 million metric tons of fertilizer valued at over $330 million.

During FY 1980, AID expects to make commitments approximating the value of the 1979 fertilizer commitments. Largest tonnages are expected to go to India, Bangladesh, and Sri Lanka, with smaller amounts likely for African and Latin American countries. Furthermore, AID is expected to fund a far-reaching program for improving the fertilizer distribution system in Bangladesh.

Fertilizer promotion continues to be a component of some AID agricultural development projects, and the agency is participating in the financing of fertilizer production facilities in Asia. Fertilizer research and development activities are supported by AID's financial contributions towards the operation of the International Fertilizer Development Center.

Table 24—U.S. Agency for International Development Commitments to Finance Fertilizer Purchases by Developing Countries for years ended June 30, 1977 and September 30, 1978-79

Fertilizer	1977		1978		1979	
	Quantity	Amount[1]	Quantity	Amount[1]	Quantity	Amount[1]
	1,000 metric tons	*1,000 dollars*	*1,000 metric tons*	*1,000 dollars*	*1,000 metric tons*	*1,000 dollars*
Ammonium sulfate	—	—	neg.	4.3	.1	12.3
Diammonium phosphate	174.9	22,182.2	60.0	14,321.3	142.7	30,931.0
Urea	32.1	4,165.0	156.5	30,659.9	140.1	35,130.5
Concentrated superphosphate	.5	55.0	70.4	13,174.5	3.2	564.4
Potassium chloride	.1	17.6	—	—	.1	30.4
Mixed fertilizer	2.6	448.3	64.7	16,976.2	50.1	13,730.2
Total	210.2	26,868.1	351.6	75,136.2	336.4	80,398.8

[1] Cost and freight basis.

Source: U.S. Agency for International Development.

1978/79 Consumption

Preliminary estimates of 1978/79 world fertilizer consumption indicate that record quantities of nitrogen, phosphate and potash were applied to the worlds' crops. Global consumption of plant nutrients increased around 8 percent to just under 107 million metric tons (table 25).

Table 25—World Consumption of Fertilizer 1977/78 and 1978/79

(Million metric tons of nutrient)

Nutrient	Actual 1977/78	Estimate 1978/79
N	47.75	51.76
P_2O_5	28.29	30.00
K_2O	23.30	25.18
Total	99.34	106.94

Source: Actual, FAO.
Estimate, FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

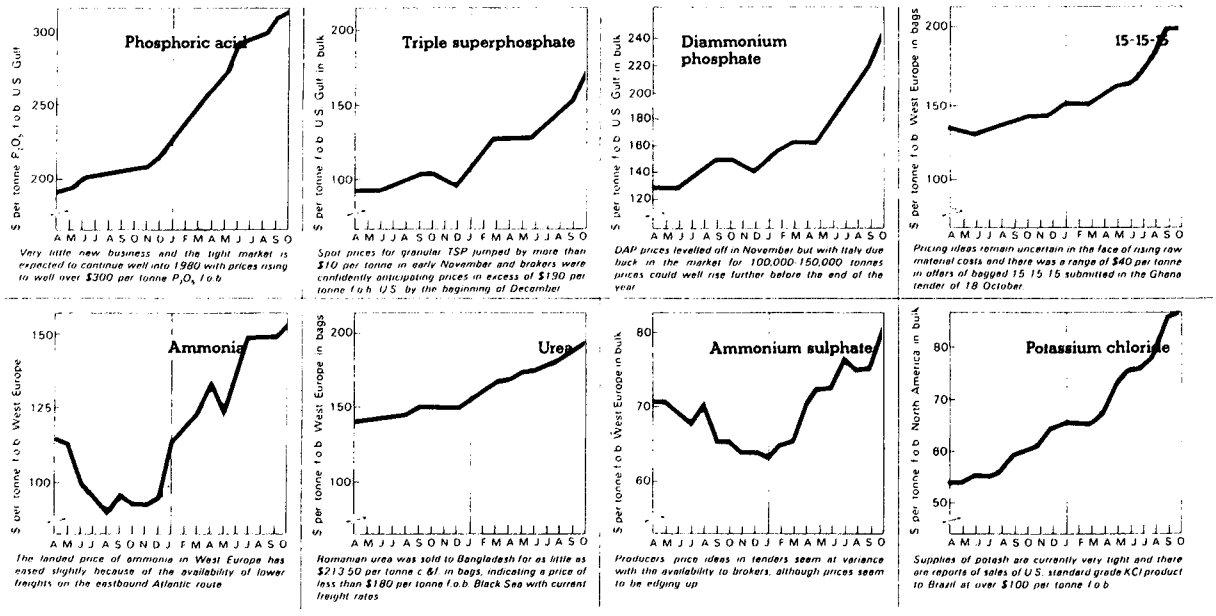
1978/79 Prices

International prices for most fertilizer products rose steadily throughout the 1978/79 fertilizer year (figure 5). Following a long decline from the unsustainably high levels of 1974 and 1975, nominal fertilizer prices for most products hit bottom during 1976 and 1977 and then stabilized or turned cautiously upward. The low point for ammonia was delayed until late 1978. By January 1979 it was apparent that real fertilizer prices were progressing on a new trend of steady climbing. Price escalation since January 1, 1979 has been dramatic.

Table 26 demonstrates what has happened to North American international spot prices of principal fertilizers. While spot prices are more volatile and considerably higher than contract prices, they are indicative of world price trends and do influence contract negotiations. From early January to early December ammonia and urea prices rose by 59 and 29 percent, respectively. Phosphoric acid climbed 31 percent while diammonium phosphate and concentrated super-phosphate soared 70 and 91 percent, respectively. Sulfur export prices from Canada exploded by 111 percent and strongly affect the cost of producing phosphates. Canadian potash prices also climbed 73 percent.

The reasons for these price surges are complex and inter-related. Steadily strong worldwide demand has allowed for the pass-through of increasing production costs, particularly for energy, and temporary production and distribution problems have disrupted supplies.

Recent International Price Trends for Principal Fertilizers, 1978-79



Source: British Sulfur Corporation, Fertilizer International, No. 126, December 1979, p.2.

Figure 5

Table 26—International Spot Prices for Principal Fertilizers and Raw Materials 1978-79

(Dollars per metric ton f.o.b.)

Product/Origin	July 31, 1978	January 1, 1979	July 30, 1979	December 2, 1979
Anhydrous ammonia				
W. Europe	90-95	111-120	145	155-160
U.S. Gulf	85-88	90	130	142-145
Urea (bulk)				
W. Europe	130-140	125-127	155	170-175
U.S. Gulf	128-130	127-130	150-155	164-168
Muriate of potash (Standard grade)				
W. Europe	50-54	62-63	80-90	80-90
Canada	54-58	65	78-80	110-115
Phosphoric acid (100% P_2O_5)				
Tampa	203	230	300	300
Morocco	200	230	340	340
Diammonium phosphate (DAP)				
Tampa	138-139	142-144	194-195	241-245
Morocco	150	150	---	---
Concentrated superphosphate (TSP)				
Tampa	94-95.50	98-99	142	186-190
Morocco	100	100	155-160	170-175
Sulfur (Solid)				
W. Europe	52-58	68	90-95	115
Canada	40-42	50-52	90-92	105-110

Source: Green Markets.

While dramatically increased energy costs following OPEC petroleum price increases served to catalyze both the 1974-75 fertilizer price boom and the current price escalation, in neither case do energy price increases fully explain fertilizer price jumps. In 1974/75 world fertilizer production capacity was slow to respond to expanding fertilizer demand resulting from concern about a world food crisis. In addition price controls in the United States were lifted in 1973 and allowed domestic fertilizer prices to abruptly rise. Producers in the United States who had exported fertilizer during periods of low domestic prices were then attracted back to the domestic market. As a consequence international supplies tightened and world prices also began to rise.

An important moderating factor affecting the current fertilizer outlook is the more comfortable production capacity situation compared with 1973 and 1974. Expansions in the industry have resulted in surplus supply capability worldwide for all three nutrients.

Nitrogen

Among fertilizers, nitrogen prices are most affected by rising energy costs due to the large amount of hydrocarbon feedstock and process fuel required in the ammonia manufacturing process. Most of the world's ammonia capacity is based on natural gas but significant numbers of plants are based upon naphtha and fuel oil, both petroleum derivatives. A few plants currently use coal as a feedstock, although coal will become more important in the future.

Naphtha and fuel oil prices respond quickly and directly to increasing petroleum prices. Naphtha prices have risen proportionately more than any other petroleum product this year. European spot prices doubled from mid-January to early December 1979. Even contract prices for naphtha in Europe rose to an estimated $300 per metric ton during the fourth quarter. With naphtha selling at these prices, feedstock and fuel alone for naphtha based plants would cost over $250 per metric ton of ammonia. Energy analysts now believe that naphtha prices may remain near their current high levels since naphtha is currently the preferred petrochemical feedstock in Europe and it competes for the same fractions of the crude oil barrel used for gasoline, diesel fuel and fuel oil.

While only 16 percent of the world's ammonia capacity is based upon naphtha and fuel oil, some regions and countries are disproportionately affected by rising naphtha and fuel oil costs. Europe and Asia are the most dependent upon these feedstocks.

In June 1979, the FAO/UNIDO/World Bank Fertilizer Working Group forecast that during the 1979/80 fertilizer year world supply capability for fertilizer ammonia would exceed projected world demand by 2.1 million metric tons of nitrogen (N). World naphtha based ammonia capacity totaled over 10 million metric tons of nitrogen in 1979. If excessively high naphtha prices force the idling or closure of a large proportion of naphtha based ammonia plants, world ammonia production may not keep up with the projected demand.

While some naphtha based ammonia plants have been idled in Europe, most are continuing operations, many with the help of government subsidies as in Spain. Most plants that are so-equipped are expected to convert to less costly feedstock such as liquified petroleum gas (LPG). This has already been accomplished in Norway, for example. LPG is still not competitive with natural gas, and is viewed as a temporary alternative. Spain, for instance, hopes to eventually import natural gas via undersea pipeline from Algeria.

It is important to note that there are also various non-energy factors contributing to tighter nitrogen supplies in 1979 and thus to higher prices. Among these factors are frozen port facilities leading to curtailed Russian ammonia exports last winter, mechanical failures at four Mexican ammonia plants last spring, and an explosion at a major Dutch plant in the summer of 1979. In all three cases producers were forced to invoke *force majeure* and reduce exports. In many cases buyers were pushed into the spot market to secure alternative supplies, thus driving spot prices even higher.

Phosphate

The phosphate fertilizer industry is not as strongly affected by rising energy costs as the nitrogen industry because it is based upon the mining of a non-fuel mineral, phosphate rock. However, phosphate mining does require significant amounts of energy for strip mining, rock drying, processing of the rock (beneficiation) and transportation.

Furthermore, the phospate industry is the world's largest consumer of sulfuric acid which is used in converting phosphate rock to phosphoric acid and upgraded phosphate products. Sulfur production and use is highly energy intensive.

Spot prices for solid sulfur have increased by 69 percent and 111 percent since January 1 in Western Europe and Canada, respectively. These increases are the result of tight world sulfur supplies during the first half of 1979. Among the causes of the sulfur shortage were:

—Cessation of production in Iran following political upheaval.

—Curtailed exports from Poland resulting from frozen, then flooded port facilities.

—Curtailed Canadian exports due to snow closed railroad routes to Vancouver and a longshoreman's strike in Vancouver.

—Lost Polish production due to curtailed natural gas imports from the USSR.

More recently, damage to a railroad bridge leading to Vancouver's export terminals has seriously impaired Canadian sulfur exports.

Phosphoric acid is the intermediate product from which upgraded phosphate fertilizers are made. The cost of sulfur required to manufacture a metric ton of phosphoric acid has increased from about $38 to nearly $100 in the past 18 months (based upon f.o.b. Canadian solid sulfur spot prices in July 30, 1978 and December 2, 1979).

The phosphate situation has been exacerbated by a scarcity of available specialized vessels for carrying phosphoric acid. Together these short term factors have increased the competition for the remaining available phosphate supplies.

Potash

The potash industry and situation are considerably less complicated than those of nitrogen and phosphates. One product, muriate of potash, dominates the world market. Very few countries are major potash producers/exporters and relatively few firms are involved. Potash mining and processing is less energy intensive than either nitrogen or phosphate. However, rising production costs, including energy costs have contributed to recent potash price increases.

Standard grade muriate of potash spot prices increased 36 percent and 73 percent in Western Europe and Canada, respectively, since January. Part of this increase is due to short-term factors including frozen ports in East Germany and the Soviet Union last winter along with port construction in Russia and the longshoreman's strike in Vancouver. Persistent rail car shortages have exerted price pressure upon North American consumed potash. Canadian exports will also be curtailed because of damage to the railroad bridge in Vancouver. Reduced exports of Soviet potash, especially to Asia, have also tightened world supplies in 1979.

World demand for potash was very strong in 1978/79 when consumption increased by about 8 percent, and another 5-percent hike is forecast for 1979/80.

A recent forecast by the Tennessee Valley Authority and the International Fertilizer Development Center indicates that growing demand could outstrip available supply by 1985 unless new capacity is developed. The possible closure of a mine with production problems in the

United Kingdom might tighten supplies even sooner.

Due to the long lead time involved in developing new potash mines and processing facilities and rising production costs, growing world demand will continue to result in rising potash prices. Potash prices will most likely rise steadily but more moderately than nitrogen or phosphate prices. In the longer term, new plants and expansions in Saskatchewan and New Brunswick, Israel, Jordan and the USSR should assure that adequate potash supplies remain available.

WORLD SUPPLY-DEMAND FORECASTS TO 1983/84[3]

World fertilizer supply capability should be adequate to meet expected world demand through 1983/84. Existing and planned fertilizer plants operating at rates comparable to recent experience (and allowing for normal non-fertilizer uses, and processing, transportation and distribution losses) should be able to supply enough ammonia, phosphoric acid and potash to satisfy forecast world fertilizer consumption growth for the next five years.

Potential surpluses in world nitrogen production capability are expected to grow larger than they are at present. Surplus world supply capabilities are foreseen for phosphate and potash throughout the period. However the sizes of potential surpluses for these two nutrients are expected to decline from present levels.

It should be noted, however, that current expectations for continued surplus supply capability for nitrogen are based upon assumptions that feedstocks for ammonia production will be readily available at resonable prices which justify continued production. As discussed previously in this report, significant segments of world ammonia production capacity are based upon naphtha, fuel oil or other petroleum derivatives. Prices for most of these products have risen dramatically in 1979, and there is a possibility that excessive feedstock costs may force some European and Asian ammonia plants to curtail production or be idled. If such closures occur widely, effective nitrogen capacity may be inadequate to comfortably satisfy growing world demand for nitrogen.

World Fertilizer Demand

World population growth and government policies aimed at expanding food production lead to increased fertilizer use. Population increases are occuring most rapidly in developing countries, and policies aimed at augmenting food production are widely existent among such nations. Centrally planned economies are currently intent upon upgrading the dietary level of their people, especially the intake of animal protein. Increased grain production for livestock feeding, particularly in Eastern Europe, calls for greater fertilizer consumption there.

World demand for fertilizer during the period from 1977/78 through 1983/84 is forecast to grow at annual compound rates of 5.9 percent for nitrogen, 5.4 percent for phosphate and 5.4 percent for potash (table 27). In the latter year nitrogen demand is expected to reach 67 million metric tons while phosphate and potash demand should amount to about 39 million and 32 million, respectively.

Table 27—Forecast world consumption growth for fertilizer 1977/78-1983/84

(compound annual growth rates)

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
	Percent			
N	3.8	9.2	6.0	5.9
P_2O_5	2.6	8.2	7.2	5.4
K_2O	3.7	8.2	6.6	5.4

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June, 1979.

The world's most rapid rates of growth in consumption for all nutrients are foreseen in developing market economies, with the greatest increases expected for nitrogen. Strong growth rates are also forecast for centrally planned economies particularly for phosphates. Plans for greatly increasing phosphate use in the Soviet Union and China are reflected in the 7.0 percent phosphate growth rate in Eastern Europe and the 8.1 percent growth in Communist Asia. Developed market economies, with low population growth and food production relatively stabilized at high levels can be expected to experience the slowest growth in fertilizer consumption.

The differences in fertilizer consumption growth rates among regions are expected to result in some significant changes in world fertilizer use patterns by 1983/84 (table 28). As regional groups, developing and centrally planned countries are

[3]The following discussion and tables 27, 28, 29, 30, and appendix tables 1, 2, and 3 are based upon forecasts made by the FAO/UNIDO/World Bank Fertilizer Working Group at its June 1979 meeting.

Table 28—Forecast Changes in Regional Shares of World Fertilizer, Consumption 1977/78-1983/84

(percent)

Region	Nitrogen		Phospate		Potash	
	1977/78	1983/84	1977/78	1983/84	1977/78	1983/84
North America	20.3	18.9	18.4	15.7	22.7	21.3
Western Europe	18.3	15.4	19.8	16.7	22.2	19.7
Oceania	.5	.5	4.2	3.8	1.0	.9
Other Developed Market Economies	2.2	1.9	4.1	3.3	3.6	2.8
Total[1] Developed Market Economies	41.3	36.7	46.5	39.5	49.5	44.7
Africa	1.0	1.1	1.4	1.7	1.0	1.3
Latin America	5.4	5.8	7.9	8.9	6.0	6.8
Near East	3.2	3.7	3.3	3.5	.2	0.3
Far East	10.7	13.8	5.9	7.6	4.1	4.8
Total[1] Developing Market Economies	20.3	24.4	18.5	21.7	11.2	13.2
Communist Asia	13.9	12.7	6.3	7.3	2.4	2.7
Eastern Europe and USSR	24.5	26.2	28.7	31.5	36.9	39.4
Total[1] Centrally Centrally Planned Economies	38.4	38.9	35.0	38.8	39.3	42.1

[1] Totals may not equal sum of separate regions due to rounding.

Source: FAO/UNIDO/World Bank Ferilizer Working Group, June 1979.

forecast to increase their shares of world consumption of all nutrients. Nations with developed market economies will experience decreases in their shares of world fertilizer use with the greatest share reductions for all nutrients expected in Western Europe. Eastern Europe (including the USSR) is predicted to enjoy the largest gains in phosphate and potash consumption shares while the Far East should register the greatest share increase for world nitrogen use.

Supply Capability

Growth in supply capability is expected to meet the world's expanding fertilizer needs through 1983/84. However, rates of supply expansion for phosphate and potash (table 29) are slower than rates of growth in consumption. Thus, although excess supply capability will likely continue for all three nutrients for the next 5 years, the magnitude of that excess capability will decline for potash and phosphate.

Table 29—Forecast growth in world supply capability for fertilizer, 1978/79-1983-84

(compound annual growth rates)

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
	Percent			
N	2.9	13.1	8.0	6.3
P_2O_5	1.0	12.1	6.1	4.3
K_2O	3.5	([1])	4.7	4.3

[1] Potash supply capability in developing market economies was negligible in 1978/79.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

World supply capability for nitrogen is forecast to expand at a compound annual rate of 6.3 percent through 1983/84 reaching nearly 74 million metric tons that year. Phosphate and potash supply capabilities are both expected to grow at the rate of 4.3 percent annually reaching about 42 and 36 million metric tons, respectively in 1983/84. Regional shares of the world's fertilizer supply capability will undergo some significant shifts due to regional variation in growth rates (table 30).

Nitrogen supply capability growth among developed countries will be slower than that in developing and centrally planned countries. In fact, supply capability will actually decrease in Japan through 1983/84. The developed countries' share of world nitrogen supply capability is expected to decline by about 7 percentage points by 1983/84. Western Europe, alone, will experience a share decrease of nearly 4 percentage points. Eastern Europe will gain shares amounting to about 4 percentage points and the Near East will increase its share by 2 percentage points. Most of the Eastern European supply growth will take place in the USSR, while Near East growth is mostly slated for oil and gas rich states along the Persian Gulf. Capacity expansions in India will be important toward increasing Far East supply capability shares.

All developed regions will lose shares of the world's phosphate supply capability by 1983/84

Table 30—Forecast Changes in Regional Shares of World Fertilizer Supply Capability, 1978/79-1983/84

(Percent)

Region	Nitrogen		Phosphate		Potash	
	1978/79	1983/84	1978/79	1983/84	1978/79	1983/84
North America	20.5	18.5	27.1	23.3	30.7	31.6
Western Europe	17.5	13.8	20.6	17.0	21.5	18.0
Oceania	.4	.3	3.6	3.4	0.0	0.0
Other Developed Market Economies	3.7	2.2	5.0	4.4	2.4	2.9
Total[1] Developed Market Economies	42.1	34.8	56.4	48.1	54.6	52.5
Africa	.2	.6	3.3	5.6	0.0	0.0
Latin America	4.4	5.5	3.9	4.6	.1	.2
Near East	2.9	4.9	1.9	4.2	0.0	1.2
Far East	8.3	9.9	3.7	4.0	0.0	0.0
Total[1] Developing Market Economies	15.8	20.9	12.7	18.4	.1	1.4
Communist Asia	11.1	9.6	5.7	6.2	1.1	1.4
Eastern Europe and USSR	31.1	34.8	25.2	27.4	44.2	44.8
Total[1] Centrally Planned Economies	42.1	44.3	30.9	33.5	45.3	46.1

[1] Totals may not equal sum of separate regions due to rounding.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

with the largest drops expected in North America and Western Europe, about 4 percentage points each. All regions among developing and centrally planned countries will increase their shares. By 1983/84, more than half of the world's phosphate fertilizer supplies could potentially originate outside of the developed, Western nations, a significant new pattern.

Regional shares of potash supply capability will shift relatively little in the next five years. Over three fourths of the world's supply capability will remain concentrated in North America and Eastern Europe (predominantly in Canada and the Soviet Union). Western Europe will be the only region to lose potash shares by 1983/84, nearly 4 percentage points. A new producing region, the Near East, will be capable of supplying just over 1 percent of the world's potash supply when the Dead Sea project in Jordan comes on-stream.

Inter-Regional Fertilizer Trade

Nitrogen

From 1977/78 through 1983/84 significant changes are foreseen in the volume, nutrient ratios and geographical flow of inter-regional fertilizer trade. In 1977/78 about 10.3 million metric tons of fertilizer nutrients were transferred through inter-regional trade (about 10 percent of world consumption). By 1983/84, inter-regional trade is predicted to reach about 12.6 million metric tons (about 9 percent of world consumption). In 1977/78 nitrogen accounted for nearly one half of inter-regional trade, phosphate about one fifth, and potash one-third. By 1983/84, potash will account for the largest share of inter-regional trade at 37 percent with nitrogen and phosphate accounting for 32 and 31 percent, respectively.

Nitrogen traded among regions in 1977/78 totalled 4.9 million metric tons (N). By 1983/84 this volume is expected to fall to 4.0 million largely due to new capacity in the Near East and South America which will enable those regions to cease importing nitrogen from other regions. The Near East will shift from importing one-third million metric tons in 1977/78 to potentially producing a 1.1 million metric ton nitrogen surplus in 1983/84. In 1977/78 Latin America needed to import 1.2 million metric tons of nitrogen from outside the region. By 1983/84, Latin America could produce a small nitrogen surplus of about 150,000 metric tons, mostly as a result of ammonia capacity expansions in Mexico, Brazil and Trinidad and Tobago.

Nitrogen capacity in Western Europe is expected to remain virtually stagnant for the next few years. As a result of consumption growth, by 1983/84 Western Europe is expected to be a small net importing region, thus reversing its traditional net exporting posture. In contrast, Eastern European ammonia capacity is expected to increase by 60 percent between 1977/78 and 1983/84. Eastern Europe's exportable nitrogen surplus of 3 million metric tons in 1977/78 is forecast to expand to a potential 8.1 million metric tons by 1983/84. Most of the capacity expansion and growth in export availability will come from the Soviet Union.

Phosphate

In 1977/78 only 1.9 million metric tons (P_2O_5) of phosphate fertilizers (including phosphoric acid) were sold in inter-regional trade. By 1983/84 this trade is expected to more than double to nearly 4 million metric tons. This burgeoning phosphate trade will be the result of the doubling of the import needs of Latin America, the Far East and Communist Asia from 1977/78 to 1983/84. Brazil, India and China account for major shares of the growth in phosphate requirements. Furthermore, Eastern Europe will shift from being a small net exporter in 1977/78 to becoming a significant net importer of phosphate fertilizer by 1983/84. The Soviet Union has already curtailed its phosphate exports and is currently importing that nutrient from the United States with additional imports from Morocco planned for the future.

North America will continue to be the principal supplier of phosphate fertilizer exports but the most rapid growth will take place in Africa. By 1983/84, African upgraded phosphate fertilizer exports (predominatly from Morocco and Algeria) could reach about 1.7 million metric tons, almost half the North American level of 3.6 million. In 1977/78 the Near East needed to import 380,000 metric tons of phosphate nutrients from outside the region. As a consequence of phosphate capacity expansion in Jordan and Egypt, by 1983/84 the Near East should be able to achieve surplus production for export outside the region of approximately the same volume.

Potash

Inter-regional potash trade is forecast to grow from 3.4 million metric tons (K_20) in 1977/78 to 4.7 million in 1983/84. North America and Eastern Europe (mainly Canada and the USSR) will be the principal sources of potash exports in 1983/84 as they were in 1977/78. In 1983/84 Oceania, Africa and the Far East will be wholly dependent upon extra-regional imports to meet their potash requirements. Latin America will still require all but 3 percent of its potash from outside the region, Brazil having the only significant production facilities. A new potash production facility on the Jordanian shore of the Dead Sea and expansion of the Israeli facility on the opposite shore of the same Sea will lead to changes in two regions. Both the Near East (including Jordan) and Other Developing Market Economies (including Israel) will shift from being net importers of potash in 1977/78 to being net exporters by 1983/84.

Appendix table 1—World nitrogen fertilizer supply capabilities, demand and balances[1]
(million metric tons of nutrients)

Region	Actual[2]	Preliminary Estimate	Forecast				
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
North America							
Supply capability	11.28	10.85	13.93	13.93	13.81	13.74	13.65
Consumption	9.69	10.77	11.17	11.56	11.94	12.40	12.70
Surplus (-deficit)	1.59	0.08	2.76	2.37	1.87	1.34	.95
Western Europe							
Supply capability	10.09	9.24	9.66	9.71	9.86	9.99	10.19
Consumption	8.75	8.86	9.14	9.44	9.71	9.99	10.38
Surplus (-deficit)	1.34	0.38	0.52	0.27	0.15	0.00	-0.19
Oceania							
Supply capability	0.22	0.20	0.20	0.20	0.21	0.23	0.23
Consumption	0.23	0.24	0.26	0.27	0.29	0.30	0.31
Surplus (-Deficit)	-0.01	-0.04	-0.06	-0.07	-0.08	-0.07	-0.08
Other developed market economies							
Supply capability	1.91	1.97	1.85	1.81	1.76	1.71	1.66
Consumption	1.07	1.11	1.15	1.18	1.22	1.26	1.30
Surplus (-deficit)	0.84	0.86	0.70	0.63	0.54	0.45	0.36
Total developed market economies							
Supply capability	23.50	22.26	25.64	25.65	25.64	25.67	25.73
Consumption	19.74	20.98	21.72	22.45	23.16	23.95	24.69
Surplus (-deficit)	3.76	1.28	3.92	3.20	2.48	1.72	1.04
Africa							
Supply capability	0.15	0.08	0.08	0.13	0.26	0.35	0.43
Consumption	0.47	0.50	0.55	0.60	0.65	0.69	0.74
Surplus (-deficit)	-0.32	-0.42	-0.47	-0.47	-0.39	-0.34	-0.31
Latin America							
Supply capability	1.36	2.35	2.58	2.81	3.20	3.73	4.05
Consumption	2.58	2.69	2.92	3.15	3.39	3.65	3.90
Surplus (-deficit)	-1.22	-0.34	-0.34	-0.34	-0.19	0.08	0.15
Near East							
Supply capability	1.21	1.54	2.05	2.67	3.14	3.44	3.62
Consumption	1.54	1.59	1.78	1.96	2.13	2.29	2.48
Surplus (-deficit)	-0.33	-0.05	0.27	0.71	1.01	1.15	1.14
Far East							
Supply capability	3.62	4.37	4.94	5.65	6.28	6.86	7.34
Consumption	5.10	5.83	6.46	7.04	7.81	8.50	9.27
Surplus (-deficit	-1.48	-1.46	-1.52	-1.39	-1.53	-1.64	-1.93
Total developing market economies							
Supply capability	6.34	8.34	9.65	11.26	12.88	14.38	15.44
Consumption	9.69	10.61	11.71	12.75	13.98	15.13	16.39
Surplus (-deficit)	-3.35	-2.27	-2.06	-1.49	-1.10	-0.75	-0.95
Communist Asia							
Supply capability	5.07	5.85	6.42	6.80	7.03	7.07	7.07
Consumption	6.63	7.07	7.41	7.80	8.06	8.33	8.54
Surplus (-deficit)	-1.56	-1.22	-0.99	-1.00	-1.03	-1.26	-1.47
Eastern Europe and USSR							
Supply capability	14.71	16.44	18.34	20.57	22.79	24.79	25.73
Consumption	11.69	13.10	14.10	15.10	16.00	16.80	17.60
Surplus (-deficit)	3.02	3.34	4.24	5.47	6.79	7.99	8.13
Total centrally planned economies							
Supply capability	19.78	22.29	24.76	27.37	29.82	31.86	32.80
Consumption	18.32	20.17	21.51	22.90	24.06	25.13	26.14
Surplus (-deficit)	1.46	2.12	3.25	4.47	5.76	6.73	6.66
World Total							
Supply capability	49.62	52.89	60.05	64.28	68.34	71.91	73.97
Available supply[3]	47.88	51.76	57.05	61.07	64.92	68.31	70.27
Consumption	47.75	51.76	54.94	58.10	61.20	64.21	67.22
Surplus (-deficit)[4]	0.13	0.00	2.11	2.97	3.72	4.10	3.05

[1] *Forecast supply capability* refers to maximum total ammonia supply capability should demand be there, except that some production cuts announced by producers, particularly in Japan (Other Developed) have been taken account of. Forecast supply capabilities are based on existing and announced new ammonia capacity. For new capacities in developing countries, capacity utilization is assumed to be 65% of final average capacity utilization for the country during the first year of operation and 85% the second year, thereafter the country average utilization rate is assumed. For developed countries these same rates are 80% and 90% respectively. Capacity utilization in ammonia units is based on past experience on a country-by-country basis. Furthermore, deductions have been made for nitrogen used for non-fetilizer purposes (forecast country by country) and for nitrogen conversion losses in-down-stream fertilizer processing units. [2] *Actual* refers to actual production and consumption as reported to FAO. [3] *Available Supply* is world supply capability less a 5 percent allowance to account for normal stock changes, transportation and distribution losses and the time lag between production and consumption. [4] World *Surplus (deficit)* does not equal the sum of regional balances due to adjustments described in Footnote 3.

Source: Actual and Preliminary Estimate: FAO Forecast: FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

Appendix table 2—World phosphate fertilizer supply capabilities, demand and balances[1]
(million metric tons of nutrients)

Region	Actual[2]	Preliminary Estimate	Forecast				
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
North America							
Supply capability	8.13	9.13	9.38	9.58	9.64	9.66	9.68
Consumption	5.20	5.58	5.69	5.79	5.89	5.99	6.08
Surplus(-deficit)	2.93	3.55	3.69	3.79	3.75	3.67	3.60
Western Europe							
Supply capability	5.79	6.95	7.01	7.06	7.10	7.11	7.09
Consumption	5.60	5.71	5.88	6.03	6.19	6.35	6.48
Surplus (-deficit	0.19	1.24	1.13	1.03	0.91	0.76	0.61
Oceania							
Supply capability	1.16	1.22	1.27	1.32	1.34	1.37	1.40
Consumption	1.19	1.26	1.32	1.37	1.40	1.43	1.46
Surplus (-deficit)	-0.03	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06
Other developed market economies							
Supply capability	1.15	1.70	1.69	1.72	1.76	1.84	1.84
Consumption	1.16	1.18	1.20	1.23	1.25	1.27	1.29
Surplus (-deficit)	-0.01	0.52	0.49	0.49	0.51	0.57	0.55
Total developed market economies							
Supply capability	16.23	19.00	19.35	19.68	19.84	19.98	20.01
Consumption	13.15	13.73	14.09	14.42	14.73	15.04	15.31
Surplus (-deficit)	3.08	5.27	5.26	5.26	5.11	4.94	4.70
Africa							
Supply capability	0.57	1.11	1.26	1.42	1.63	2.05	2.32
Consumption	0.41	0.42	0.49	0.53	0.58	0.62	0.66
Surplus (-deficit)	0.16	0.69	0.77	0.89	1.05	1.43	1.66
Latin America							
Supply capability	1.51	1.30	1.33	1.49	1.74	1.88	1.90
Consumption	2.23	2.31	2.53	2.76	3.00	3.23	3.46
Surplus (-deficit)	-0.72	-1.01	-1.20	-1.27	-1.26	-1.35	-1.56
Near East							
Supply capability	0.54	0.63	0.80	1.05	1.39	1.68	1.75
Consumption	0.92	0.89	0.99	1.09	1.19	1.29	1.37
Surplus (-deficit)	-0.38	-0.26	-0.19	-0.04	0.20	0.39	0.38
Far East							
Supply capability	1.04	1.25	1.35	1.47	1.59	1.67	1.67
Consumption	1.68	1.92	2.14	2.33	2.52	2.73	2.94
Surplus (-deficit)	-0.64	-0.67	-0.79	-0.86	-0.93	-1.06	-1.27
Total developing market economies							
Supply capability	3.66	4.29	4.74	5.43	6.35	7.28	7.64
Consumption	5.24	5.54	6.15	6.71	7.29	7.87	8.43
Surplus (-deficit)	-1.58	-1.25	-1.41	-1.28	-0.94	-0.59	-0.79
Communist Asia							
Supply capability	1.64	1.92	2.00	2.14	2.31	2.44	2.56
Consumption	1.77	2.05	2.15	2.32	2.51	2.67	2.82
Surplus (-deficit)	-0.13	-0.13	-0.15	-0.18	-0.20	-0.23	-0.26
Eastern Europe and USSR							
Supply capability	8.43	8.48	8.89	9.41	10.03	10.75	11.40
Consumption	8.13	8.68	9.39	10.11	10.83	11.55	12.20
Surplus (-deficit)	0.30	-0.20	-0.50	-0.70	-0.80	-0.80	-0.80
Total centrally planned economies							
Supply capability	10.07	10.40	10.89	11.55	12.34	13.19	13.96
Consumption	9.90	10.73	11.54	12.43	13.34	14.22	15.02
Surplus (-deficit)	0.17	-0.33	-0.65	-0.88	-1.00	-1.03	-1.06
World total							
Supply capability	29.96	33.69	34.98	36.66	38.53	40.45	41.61
Available supply[3]	28.44	32.68	33.93	35.56	37.37	39.24	40.36
Consumption	28.29	30.00	31.78	33.56	35.36	37.13	38.76
Surplus (deficit)[4]	0.15	2.68	2.15	2.00	2.01	2.11	1.60

[1] Forecast *Supply capability* is made up of wet process phosphoric acid production (100%) and other P_2O_5 production consisting of single superphosphate (100%), basic slag (100%) and the phosphate rock contribution into the manufacturing of concentrated superphosphates (30%) and nitrophosphates (60-100%, depending on region). For new plants capacity utilization is assumed at 40, 80 and 90% in developed countries and at 35, 70 and 80% in developing countries for the first year, third year and thereafter, respectively. Non-fertilizer uses have been forecast on a country-by-country basis and deducted to give the acid available for fertilizers. Losses in the production process are estimated at 6% for all regions. [2] *Actual* refers to actual production and consumption as reported to FAO. [3] *Available Supply* is 97% of world supply capability reflecting past experience, to account for normal stock changes, transportation and distribution losses and the time lag between production and consumption. In the past 10 years, this ratio has varied between 94% and 98%. [4] World *Surplus (deficit)* does not equal the sum of regional balances due to adjustments described in footnote 3.

Source: Actual and Preliminary Estimate: FAO. Forecast:, FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

Appendix table 3—World potash fertilizer supply capabilities, demand and balances[1]

(million metric tons of nutrients)

Region	Actual[2]	Preliminary Estimate	Forecast				
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
North America							
Supply capability	8.17	9.06	9.28	9.53	9.80	10.53	11.50
Consumption	5.28	5.69	5.90	6.10	6.28	6.50	6.80
Surplus (-deficit)	2.89	3.37	3.38	3.43	3.52	4.03	4.70
Western Europe							
Supply capability	4.92	6.34	6.54	6.62	6.58	6.54	6.57
Consumption	5.17	5.37	5.64	5.82	6.01	6.16	6.31
Surplus (-deficit)	-0.25	0.97	0.90	0.80	0.57	0.38	0.26
Oceania							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.24	0.25	0.26	0.27	0.28	0.29	0.30
Surplus (-deficit)	-0.24	-0.25	-0.26	-0.27	-0.28	-0.29	-0.30
Other developed market economies							
Supply capability	0.68	0.71	0.71	0.71	0.71	0.87	1.05
Consumption	0.85	0.86	0.87	0.87	0.88	0.89	0.91
Surplus (-deficit)	-0.17	-0.15	-0.16	-0.16	-0.17	-0.02	0.14
Total developed market economies							
Supply capability	13.77	16.11	16.53	16.86	17.09	17.94	19.12
Consumption	11.54	12.17	12.67	13.06	13.45	13.84	14.32
Surplus (-deficit)	2.23	3.94	3.86	3.80	3.64	4.10	4.80
Africa							
Supply capability	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.24	0.27	0.30	0.33	0.36	0.39	0.42
Surplus (-deficit)	-0.16	-0.27	-0.30	-0.33	-0.36	-0.39	-0.42
Latin America							
Supply capability	0.01	0.02	0.02	0.02	0.02	0.02	0.07
Consumption	1.39	1.52	1.65	1.78	1.91	2.04	2.17
Surplus (-deficit)	-1.38	-1.50	-1.63	-1.76	-1.89	-2.02	-2.10
Near East							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.14	0.43
Consumption	0.04	0.05	0.06	0.07	0.07	0.08	0.09
Surplus (-deficit)	-0.04	-0.05	-0.06	-0.07	-0.07	0.06	0.34
Far East							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.95	1.05	1.14	1.23	1.34	1.43	1.53
Surplus (-deficit)	-0.95	-1.05	-1.14	-1.23	-1.34	-1.43	-1.53
Total developing market economies							
Supply capability	0.09	0.02	0.02	0.02	0.02	0.16	0.50
Consumption	2.62	1.95	3.15	3.41	3.68	3.94	4.21
Surplus (-deficit)	-2.53	-1.93	-3.13	-3.39	-3.66	-3.78	-3.71
Communist Asia							
Supply capability	0.32	0.32	0.34	0.36	0.41	0.45	0.50
Consumption	0.56	0.60	0.65	0.70	0.75	0.80	0.85
Surplus (-deficit)	-0.25	-0.28	-0.31	-0.34	-0.35	-0.35	-0.35
Eastern Europe and USSR							
Supply capability	11.58	13.03	13.85	14.76	15.30	15.80	16.30
Consumption	8.59	9.52	9.95	10.52	11.10	11.88	12.61
Surplus (-deficit)	3.00	3.51	3.90	4.24	4.20	3.92	3.69
Total centrally planned economies							
Supply capability	11.90	13.35	14.19	15.12	15.71	16.25	16.80
Consumption	9.15	10.12	10.60	11.22	11.85	12.68	13.46
Surplus (-deficit)	2.75	3.24	3.59	3.90	3.86	3.57	3.34
World total							
Supply capability	25.76	29.48	30.74	32.00	32.82	34.35	36.42
Available supply[3]	23.70	27.03	28.18	29.33	30.08	31.49	33.39
Consumption	23.30	25.18	26.42	27.69	28.98	30.46	31.99
Surplus (-deficit)[4]	0.40	1.85	1.76	1.64	1.10	1.03	1.40

[1] Forecast *Supply capability* refers to maximum total potash supply capability should demand be there. For existing plants capacity utilization is based on past experience. For new mines capacity utilization is assumed at 30, 75, and 90% for known developed ore bodies and 20, 40, 75 and 90% for unknown ore bodies for the first, second, third and fourth year and thereafter respectively. [2] *Actual* refers to actual production and consumption as reported to FAO. [3] *Available supply* is world supply capability less 3.5% technical potash, less 5% to account for normal stock increases transportation and distribution losses and the time lag between production and consumption. [4] World *Surplus (deficit)* does not equal the sum of regional balances due to adjustments described in Footnote 3.

Source: Actual and Preliminary Estimate: FAO
Forecasts: FAO/UNIDO/World Bank Fertilizer Working Group, June 1979.

Appendix table 4—Use of nitrogen as fertilizer, by States, 1974-79[1]

State and region	1974	1975	1976	1977	1978	1979
	1,000 tons of N					
Maine	16.8	14.9	14.3	14.3	13.3	13.6
New Hampshire	2.6	2.3	2.7	2.7	3.1	3.4
Vermont	7.9	7.0	7.6	7.4	6.2	7.3
Massachusetts	9.0	7.9	8.8	9.0	11.5	10.3
Rhode Island	2.7	1.6	1.9	2.3	1.5	1.7
Connecticut	8.6	7.7	8.3	8.9	7.8	7.6
New York	91.8	88.6	77.9	86.8	84.4	98.3
New Jersey	25.2	24.6	25.3	24.6	23.2	25.0
Pennsylvania	85.0	78.6	95.7	96.8	98.2	80.9
Delaware	15.5	14.7	16.9	19.9	16.5	17.7
Maryland	46.6	54.7	57.0	70.2	58.5	66.5
Dist. of Columbia	.8	1.0	1.1	1.1	.9	1.9
Northeast	312.5	303.6	317.5	344.0	324.7	334.2
Michigan	155.7	136.7	184.0	217.4	216.2	239.8
Wisconsin	140.0	133.4	171.8	203.9	214.0	216.4
Minnesota	412.8	450.3	561.3	521.0	491.7	612.4
Lake States	708.5	720.4	917.1	942.3	921.9	1,068.6
Ohio	289.5	281.7	355.7	363.5	347.2	392.3
Indiana	361.7	326.3	417.6	495.7	504.2	481.6
Illinois	729.7	817.8	934.5	977.6	792.5	906.1
Iowa	750.6	746.9	1,042.9	852.4	921.1	1,003.6
Missouri	352.5	304.8	405.1	406.3	308.6	360.1
Corn Belt	2,484.0	2,477.6	3,155.8	3,095.5	2,873.6	3,143.7
North Dakota	132.7	140.7	201.2	229.1	253.1	290.2
South Dakota	104.5	82.1	112.3	95.8	104.6	116.1
Nebraska	588.9	492.0	653.0	748.9	733.8	752.3
Kansas	564.5	568.0	645.0	636.8	551.5	603.9
Northern Plains	1,390.5	1,282.7	1,611.5	1,710.6	1,643.1	1,762.3
Virginia	82.2	90.8	99.4	114.4	98.7	98.4
West Virginia	8.7	6.4	8.7	10.7	9.0	7.7
North Carolina	218.5	220.1	254.2	261.8	222.3	235.2
Kentucky	128.8	124.8	152.2	182.8	167.1	157.3
Tennessee	113.0	100.8	109.1	131.0	119.6	109.4
Appalachian	551.3	542.8	623.6	700.6	616.7	608.0
South Carolina	104.2	89.6	112.6	116.0	97.4	90.1
Georgia	284.6	265.4	322.3	349.8	286.8	280.6
Florida	212.1	187.4	220.4	248.7	231.9	258.8
Alabama	174.5	149.7	176.9	188.3	161.7	151.9
Southeast	775.3	692.1	832.2	902.7	777.8	781.4
Mississippi	228.5	187.1	202.9	190.5	168.5	150.8
Arkansas	152.1	127.7	156.1	173.0	135.0	141.2
Louisiana	151.7	110.6	125.8	124.3	116.0	108.2
Delta States	532.2	425.4	484.9	487.8	419.5	400.2
Oklahoma	211.2	190.7	229.6	256.6	243.5	303.6
Texas	802.3	624.7	747.2	748.6	685.4	732.8
Southern Plains	1,013.4	815.4	976.8	1,005.2	928.9	1,036.4
Montana	46.0	39.0	54.0	64.0	54.0	76.4
Idaho	125.2	127.5	156.2	139.0	161.0	174.0
Wyoming	20.8	23.1	21.0	23.3	23.9	26.9
Colorado	118.0	110.6	128.8	118.1	136.8	126.0
New Mexico	34.6	29.9	36.6	32.3	32.3	28.4
Arizona	114.3	109.3	104.6	110.0	93.8	93.0
Utah	25.7	22.7	33.1	23.4	27.7	29.2
Nevada	4.2	3.7	5.0	4.8	5.4	5.7
Mountain	488.8	465.7	539.3	514.9	534.9	559.6
Washington	204.9	181.2	196.1	175.1	211.0	238.2
Oregon	98.2	98.9	127.8	127.2	122.7	133.0
California	545.7	556.3	587.1	596.1	544.7	484.1
Pacific	848.8	836.4	911.0	898.4	878.4	855.3
48 States + D.C.	9,105.5	8,562.1	10,369.6	10,602.1	9,919.5	10,549.9
Alaska	.9	.6	1.0	1.8	1.0	1.1
Hawaii	26.3	25.9	25.2	25.7	28.8	57.3
United States	9,132.7	8,588.6	10,395.5	10,629.6	9,949.3	10,608.3

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-79) and earlier issues, Crop Reporting Board, ESCS, USDA, November 1979.

Appendix table 5—Use of phosphorous as fertilizer, by States, 1974-79[1]

State and region	1974	1975	1976	1977	1978	1979
	1,000 tons available P_2O_5					
Maine	18.8	16.3	17.3	17.0	15.0	14.7
New Hampshire	2.1	2.3	3.3	2.2	2.6	2.5
Vermont	7.7	5.9	6.5	8.6	5.5	6.8
Massachusetts	7.0	5.6	6.0	5.9	7.6	6.2
Rhode Island	2.6	1.4	1.2	1.6	1.3	1.6
Connecticut	5.5	5.2	6.6	5.8	5.3	5.3
New York	78.2	69.8	73.2	78.5	76.8	90.1
New Jersey	20.7	20.0	19.6	21.5	17.5	18.8
Pennsylvania	96.3	77.2	92.7	94.7	91.7	76.1
Delaware	13.7	12.2	12.0	14.3	12.8	13.6
Maryland	43.9	46.0	44.0	59.7	50.3	54.6
Dist. of Columbia	.5	.6	.4	.5	.5	.8
Northeast	297.0	262.4	284.0	310.2	286.9	291.1
Michigan	148.4	114.5	144.7	161.7	168.5	173.7
Wisconsin	139.7	130.8	144.8	165.9	170.3	171.5
Minnesota	167.9	290.0	321.9	295.6	274.7	331.8
Lake States	556.0	535.3	610.9	623.2	613.4	677.0
Ohio	271.0	246.9	275.4	287.6	268.7	308.8
Indiana	292.4	218.7	282.6	339.8	324.0	329.5
Illinois	477.1	422.7	509.0	587.1	454.9	537.0
Iowa	396.6	424.5	463.9	417.8	423.9	496.7
Missouri	189.9	152.8	203.9	211.4	167.8	209.6
Corn Belt	1,627.0	1,465.6	1,734.8	1,843.7	1,639.3	1,881.6
North Dakota	110.2	105.6	130.9	140.7	120.3	113.6
South Dakota	61.9	55.3	66.1	55.9	60.8	60.8
Nebraska	146.6	110.9	148.8	186.0	160.4	176.1
Kansas	178.8	173.8	198.9	198.8	158.4	194.5
Northern Plains	497.4	445.6	544.7	581.3	500.0	545.0
Virginia	70.4	68.9	71.7	78.5	72.5	74.2
West Virginia	9.5	7.4	8.9	10.8	7.9	8.5
North Carolina	156.9	143.6	161.5	163.9	150.0	158.6
Kentucky	112.4	104.5	130.8	150.5	133.0	140.8
Tennessee	95.9	79.6	95.5	122.4	111.7	120.6
Appalachian	445.2	4403.9	467.8	526.1	475.1	502.7
South Carolina	75.7	60.1	69.7	77.8	66.8	64.9
Georgia	153.9	131.7	157.5	180.3	153.3	160.5
Florida	104.9	87.5	102.6	112.8	111.0	127.5
Alabama	115.0	92.2	99.5	114.5	109.0	112.7
Southeast	449.6	371.5	429.3	485.4	440.1	465.6
Mississippi	87.4	68.2	72.1	90.2	77.6	73.9
Arkansas	80.9	56.6	71.8	78.4	66.1	69.1
Louisiana	71.5	58.6	60.8	68.4	71.3	66.4
Delta States	239.8	183.4	204.7	237.1	215.0	209.4
Oklahoma	105.4	88.8	103.3	113.2	85.8	112.7
Texas	297.4	224.0	263.9	277.7	250.8	289.6
Southern Plains	402.7	312.8	367.2	390.9	336.6	402.3
Montana	60.8	44.0	63.0	74.3	59.8	79.0
Idaho	68.9	70.1	68.4	61.1	64.7	56.3
Wyoming	10.8	11.2	8.3	10.4	11.7	7.4
Colorado	44.6	46.1	53.8	43.8	46.8	32.1
New Mexico	15.7	11.2	16.9	17.6	16.8	21.4
Arizona	36.0	29.8	37.6	41.5	29.6	35.3
Utah	24.8	20.5	16.6	21.0	14.8	13.1
Nevada	2.7	2.4	3.0	2.1	1.8	2.1
Mountain	264.4	235.4	267.6	271.7	246.0	246.7
Washington	71.1	64.1	69.9	65.3	60.7	67.4
Oregon	40.6	37.9	40.8	50.3	42.1	47.6
California	178.3	165.0	181.6	213.2	203.5	166.8
Pacific	290.0	266.9	292.3	328.8	306.3	281.8
48 States + D.C.	5,069.1	4,482.8	5,202.2	5,598.5	5,058.7	5,503.2
Alaska	.5	.5	.7	1.3	.9	.7
Hawaii	19.9	20.1	18.1	23.3	30.0	25.8
United States	5,089.5	4,503.4	5,221.0	5,623.1	5,089.6	5,529.7

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-79) and earlier issues, Crop Reporting Board, ESCS, USDA, November, 1979.

Appendix table 6—Use of potash as fertilizer, by States, 1974-79[1]

State and region	1974	1975	1976	1977	1978	1979
	1,000 tons of K_2O					
Maine	19.3	17.0	17.3	16.9	15.7	15.1
New Hampshire	2.7	2.4	3.2	2.9	3.3	3.6
Vermont	9.1	6.7	7.9	7.3	6.5	7.7
Massachusetts	7.3	6.0	6.8	6.6	8.6	7.5
Rhode Island	2.5	1.4	1.3	1.6	1.1	1.3
Connecticut	7.3	5.4	6.3	4.8	5.1	5.1
New York	79.0	70.9	74.8	81.4	83.9	72.4
New Jersey	21.9	19.8	21.3	23.2	21.0	22.0
Pennsylvania	83.5	72.2	89.1	88.6	90.6	74.7
Delaware	19.4	18.9	19.4	23.1	19.2	20.6
Maryland	56.5	57.3	57.9	73.5	61.1	67.4
Dist. of Columbia	.4	.5	.4	.4	.4	.7
Northeast	308.7	278.6	305.7	330.3	316.5	298.1
Michigan	179.8	146.3	187.3	219.2	233.9	249.8
Wisconsin	271.3	237.0	290.3	351.9	381.0	344.0
Minnesota	323.1	329.1	350.6	360.8	358.0	439.3
Lake States	774.2	712.4	828.2	931.9	972.9	1,033.1
Ohio	309.8	281.5	329.8	351.3	350.9	415.9
Indiana	403.7	318.2	397.5	522.0	468.4	535.7
Illinois	605.8	531.5	658.3	764.3	662.3	785.3
Iowa	460.4	442.8	496.4	478.1	458.8	641.9
Missouri	216.8	185.2	254.5	268.3	218.6	286.0
Corn Belt	1,996.6	1,759.3	2,136.5	2,384.1	2,159.0	2,664.8
North Dakota	17.6	16.5	18.0	18.7	19.3	23.6
South Dakota	16.1	13.3	14.5	15.0	15.4	17.2
Nebraska	57.4	44.2	55.1	69.7	63.8	68.8
Kansas	62.0	45.7	48.4	54.7	43.4	50.1
Northern Plains	153.1	119.7	136.0	158.2	141.9	159.7
Virginia	80.8	83.7	89.4	97.5	90.1	95.5
West Virginia	8.7	5.0	7.5	8.8	8.8	7.7
North Carolina	203.7	189.7	224.2	233.1	216.5	226.0
Kentucky	134.4	117.0	148.3	169.7	158.0	166.9
Tennessee	108.0	88.3	109.2	130.3	134.2	135.5
Appalachian	535.7	483.7	578.6	639.4	607.6	631.6
South Carolina	113.6	92.2	112.9	133.0	116.0	119.7
Georgia	242.2	209.9	246.7	273.9	235.9	248.5
Florida	232.1	210.7	242.1	249.7	256.4	288.5
Alabama	124.1	99.7	112.2	132.3	127.5	137.7
Southeast	712.0	612.4	713.9	788.8	735.8	794.4
Mississippi	81.4	62.3	72.7	95.9	92.0	94.9
Arkansas	95.0	66.0	84.6	96.2	86.1	85.4
Louisiana	67.7	60.5	64.5	75.4	79.4	80.7
Delta States	244.1	188.8	221.8	267.4	257.6	261.0
Oklahoma	41.3	28.0	29.3	34.3	32.1	40.6
Texas	133.3	92.0	80.6	98.7	95.2	116.3
Southern Plains	174.7	120.0	109.9	132.9	127.4	156.9
Montana	4.2	3.2	5.7	8.6	5.3	10.3
Idaho	7.1	11.6	14.5	12.8	15.1	14.9
Wyoming	.9	1.3	1.0	1.7	1.5	.7
Colorado	10.1	9.2	9.9	11.0	9.4	10.9
New Mexico	2.8	1.3	1.7	1.6	2.4	2.7
Arizona	1.5	1.4	.6	1.2	1.8	3.6
Utah	.9	.7	1.3	.8	2.6	.9
Nevada	.2	.2	.2	.2	.2	.2
Mountain	27.7	28.8	34.9	37.9	38.3	44.2
Washington	26.8	23.2	27.5	30.2	32.9	33.1
Oregon	17.7	14.2	18.5	25.6	26.8	24.1
California	71.2	73.6	61.2	69.1	73.6	58.2
Pacific	115.8	111.0	107.2	124.9	133.3	115.4
48 States + D.C.	5,042.7	4,414.8	5,172.7	5,795.7	5,490.1	6,159.2
Alaska	.3	.4	.5	1.2	.6	.5
Hawaii	22.8	23.3	25.0	24.0	23.3	28.2
United States	5,065.8	4,438.5	5,198.2	5,820.9	5,514.0	6,187.9

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-79) and earlier issues, Crop Reporting Board, ESCS, USDA, November 1979.

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